

SCM tools for future - proofing

Capstone: Future-proofing supply chains



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Future-proofing is not all a new bag of tricks!

Supply chains are facing unprecedented uncertainty and a lot of external factors / megatrends will reshape them in the next years

Some of the issues will require “outside the box” thinking and novel solutions, BUT

- Some will just require a more extensive and thorough application of existing tools
- Some will require going back to basics
- Some will not require (or lead to) any changes

A new problem does not always require (a new) solution!

Analysing and improving a supply chain

(Sousa 2014)



**Describe –
understand the
current state**

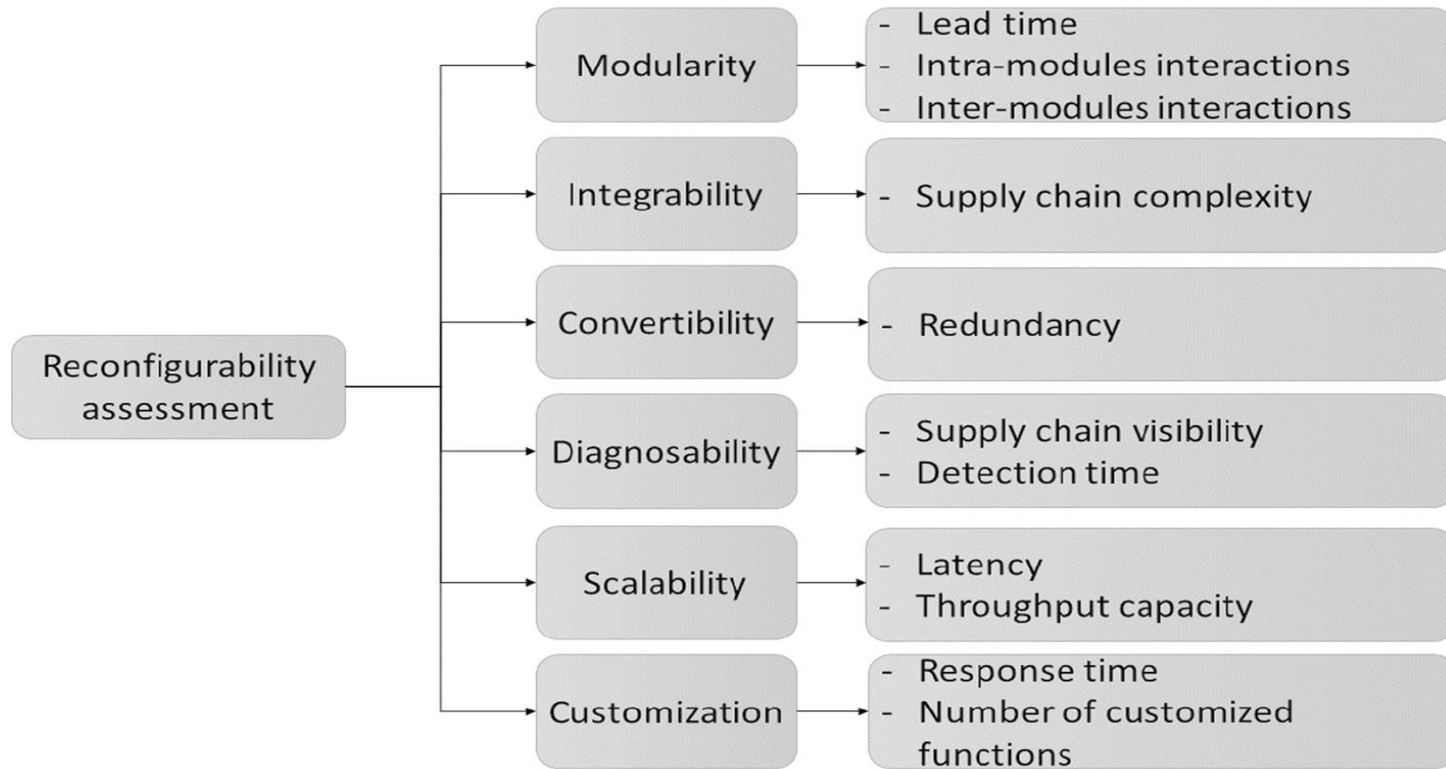


**Predict –
understand what
will happen**



**Prescribe – give
recommendations**

Changes are happening now – and changes will be needed again



A?

Reconfiguration often needed at multiple levels

**Build a supply chain that
has high reconfigurability
so it can be changed based
on changes in supply,
demand or strategic
objectives!**



**The chain or network
level**



The factory level



The workstation level

Future-proofing

For climate change



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Mitigating climate change

Sustainable supply chain management is the priority action for mitigating climate change!

Actions to prioritize include e.g.:

- Emission reductions – including scope 3
- Energy and material usage reduction
- Reduce, reuse, repair etc.

Increasing efforts in SSCM are also needed to protect biodiversity

While focus should be on mitigating climate change, simultaneously actions will be needed to mitigate for its already present impacts

Climate-proof your supply chain

**Energy efficiency &
CO2 emissions a
highly connected
issue**



Future-proofing

For inflation and
economic downturns

A”

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Inflation Trends: Annual Percentage Change (Historic and Projected)					GEP 2023
			Projections		
Country/Regional Classification	2020	2021	2022	2023	2024
World	3.23	4.70	8.75	6.52	4.13
Advanced Economies	0.68	3.11	7.22	4.38	2.38
United States	1.24	4.68	8.05	3.50	2.23
Euro Area	0.25	2.59	8.31	5.74	2.74
Major Advanced Economies (G7)	0.80	3.33	7.25	4.27	2.33
Emerging and Developing Asia	3.13	2.21	4.06	3.63	2.79
ASEAN-5	1.36	1.95	4.70	4.36	2.84
China	2.39	0.85	2.16	2.24	1.86
India	6.17	5.50	6.88	5.14	4.35
Middle East and Central Asia	10.45	12.93	13.77	13.06	8.86
Latin America and the Caribbean	6.40	9.79	14.06	11.45	8.05
Sub-Saharan Africa	10.19	11.07	14.44	11.87	8.57

Tackling inflation in a supply chain

- **Share asset use in pre-competitive or noncompetitive situations**
- **Place fewer but larger orders to help a key supplier operate more cost-efficiently.**
- **Join buying consortiums**
- **Acceptance: Aim for low impact, not no impact**
- **Awareness: Be prudent with expenditure by knowing expenditure**
- **Action: Don't negotiate price, negotiate partnerships**

Hong 2022

GEP 2022

Leading through inflation

- **Data Visibility**
 - Realtime view of requirements, stock, supply options and risks, collaborating with suppliers to balance needs with capacity and price
- **Reuse and Reduce**
 - Those circular solutions again!
- **Prequalify multiple components**
- **Supply chain finance**
 - Helping tier N stay afloat if limited alternatives

Supply chain finance - examples

Trade credit

Purchase order financing

Buyer investment

Inventory financing

FIGURE 2

Action areas for supply chain management during periods of economic crisis

Action Area

Key Actions

- | | | |
|----------|---|--|
| 1 | Understanding true demand | <ul style="list-style-type: none">• Identify reliable information• Communicate with customers• Develop demand scenarios |
| 2 | Monitoring and safeguarding supply | <ul style="list-style-type: none">• Identify supplier criticality• Monitor supplier health and lead times• Ensure the survival of critical suppliers |
| 3 | Creating flexible, breathing supply chains | <ul style="list-style-type: none">• Understand the effects of demand fluctuations• Convert fixed costs into variable costs• Define smart contracts |
| 4 | Aligning inventories to free up cash | <ul style="list-style-type: none">• Avoid surplus-inventory intake• Align inventory policies• Streamline service offerings |
| 5 | Preparing for upswing | <ul style="list-style-type: none">• Retain and develop talent• Prepare long-term projects• Provide upside capacity |

Hoberg and Alicke, 2020
“5 lessons for supply chains from the financial crisis”

Tendering

Supplier market intelligence
RFI/RFP process
Reverse auctions
Expressive bidding

**Back to basics?
Cost-savings
with the Kraljic
matrix,
Leverage-
category
approach**

Globalization

Global sourcing
Make or buy
LCC sourcing
Bestshoring

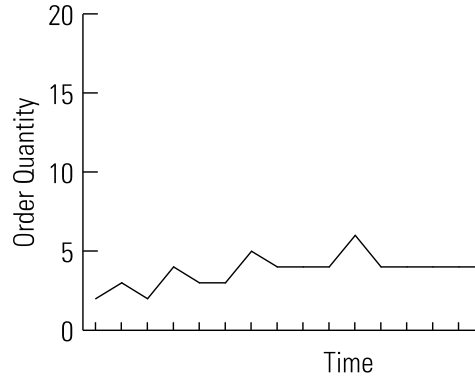
Supplier pricing review

Price benchmark
Total cost of ownership
Unbundled prices
Leverage market imbalances

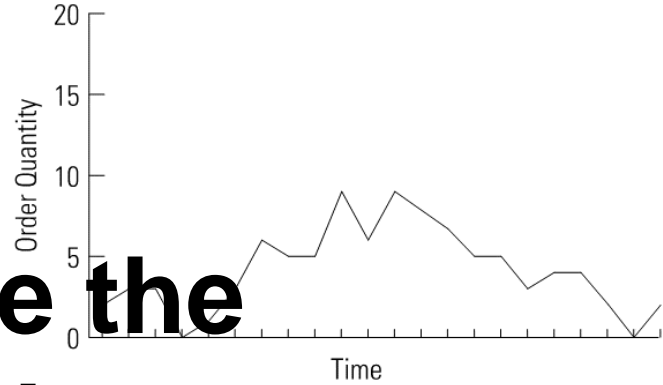
Target pricing

Cost regression analysis
Factor cost analysis
Cost based price modelling
Linear performance pricing

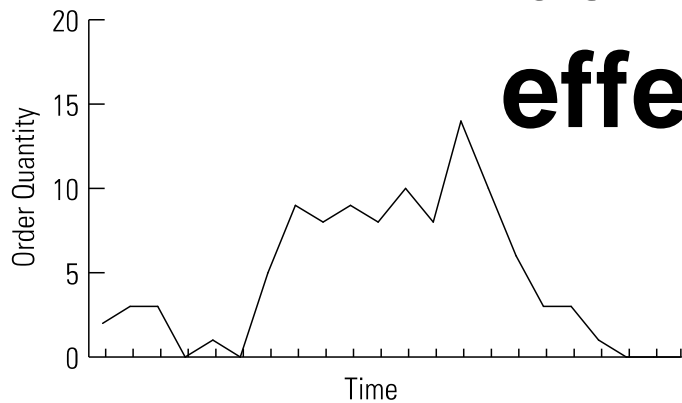
Consumer Sales



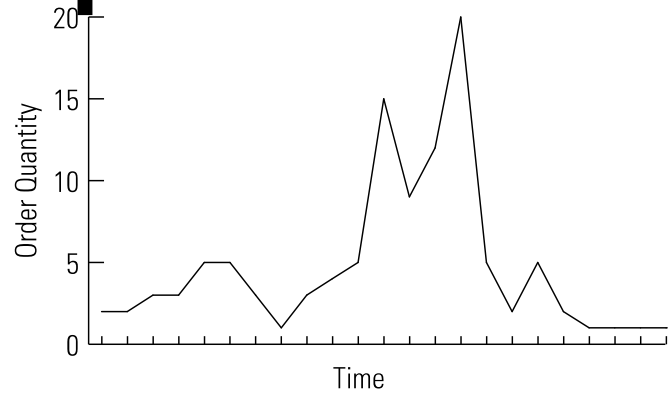
Retailer's Orders to Manufacturer



Wholesaler's Orders to Manufacturer



Manufacturer's Orders to Supplier

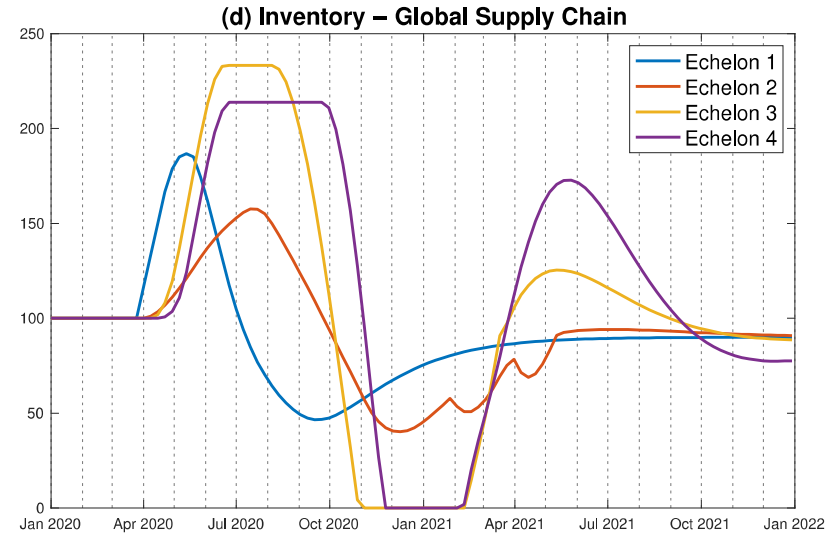
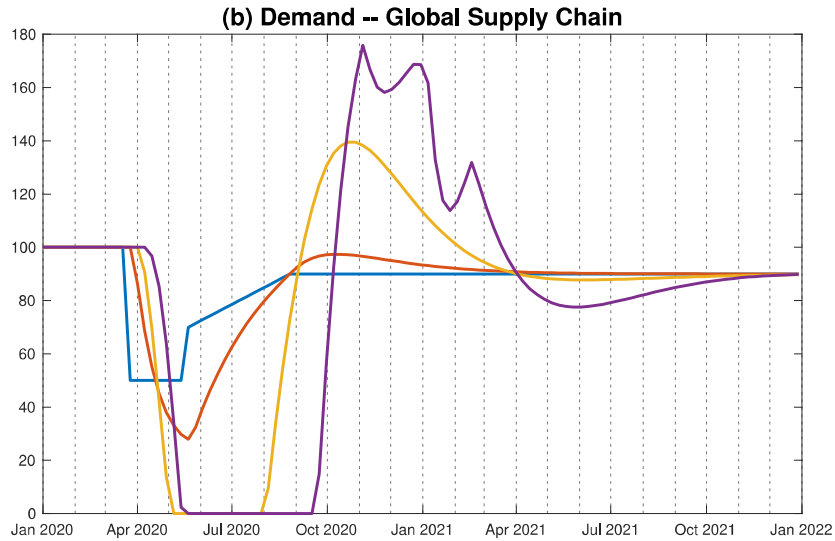


**Beware the
bullwhip
effect**

Bullwhip effect in 2008 as a result of the financial crisis: case chemical industry

Lehman Wave shakes the Chemical industry
ROBERT PEELS*, MAXIMILIANO UDENIO,
JAN C. FRANSOO, SJAAK GRIFFIOEN

Level in supply chain		Percentage of sales decline
Upstream	Resin production	30%
	Paint production	20%
	Parts production	15%
	OEM	8%
Downstream	Retailer	Fairly stable



Forecasted model of covid impacts on demand and inventory across a global supply chain

Future-proofing

Reorganizing global
supply chains

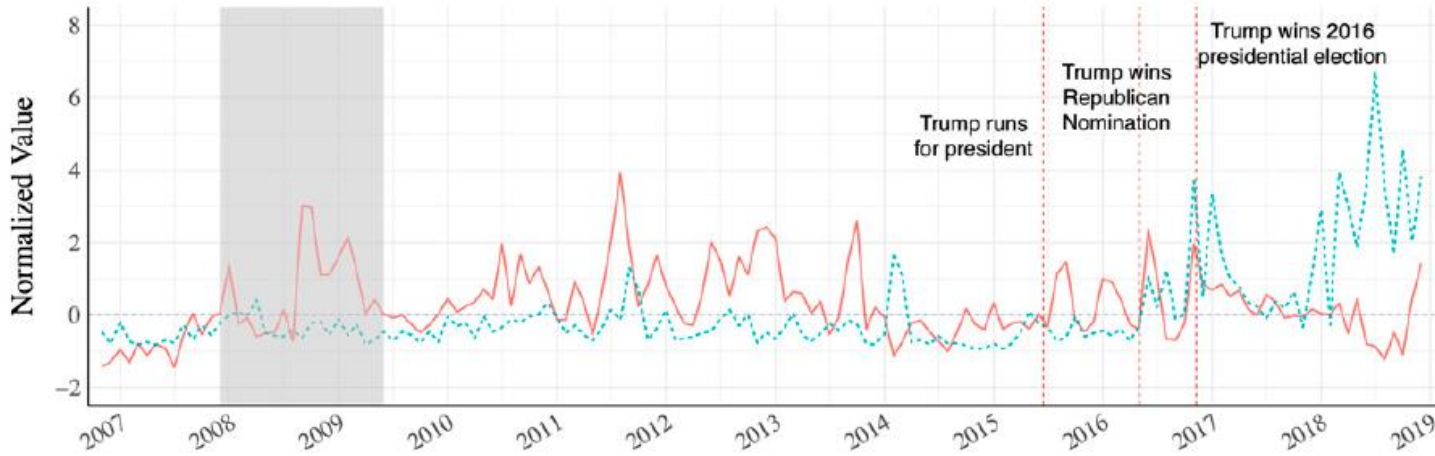


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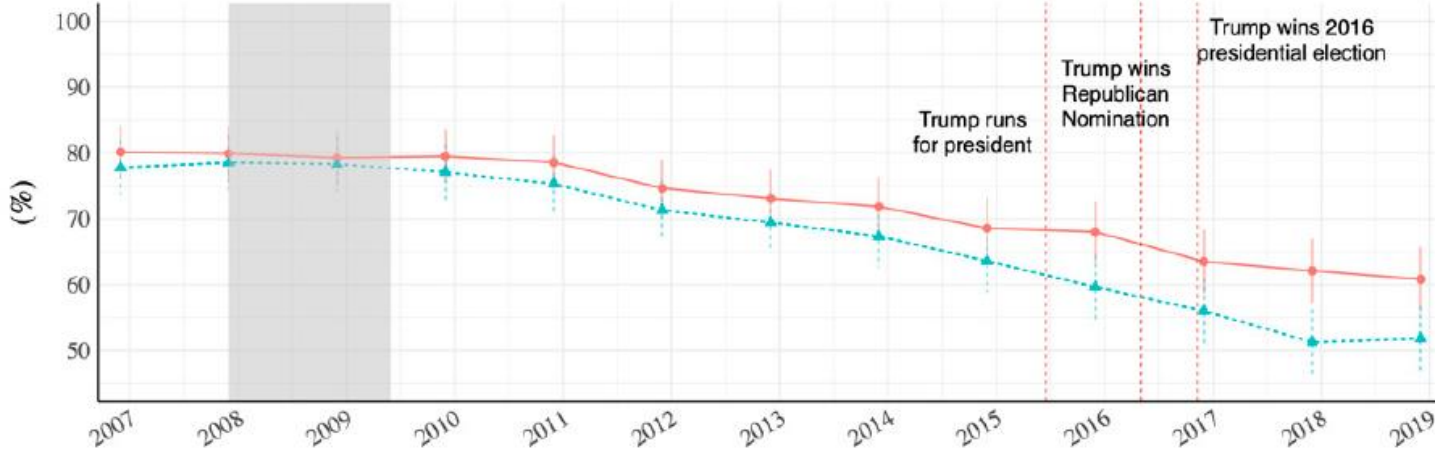
U.S. Trade and non-Trade Economic Policy Uncertainty

— American Non-Trade Policy Uncertainty - - American Trade Policy Uncertainty



Domestic Fraction of Suppliers

● Mostly Domestic Customers ▲ Mostly Foreign Customers



“Trade and Foreign Economic Policy Uncertainty in Supply Chain Networks: Who Comes Home?”
Charoenwong et al. 2022

Factors to be considered in global supply chains

International transport
Transport modes costs and performance
Benefits of components bulk shipping
Longer lead times
International transport
Customs operations
Inventory reduction options
Various requirements of different geographical markets
Brand, product formulation, peripherals
Taste, language environment
Contents or pack forms
Technological specifications and culture
Differences in production factors' costs across countries
Differences in materials and parts' costs across countries
Differences in knowledge level of workers
Trade agreements and regulations
Duties on import

Duty drawbacks
Government laws, regulations,
and local content requirements
Differential tax rates and transfer pricing schemes
Exchange rate fluctuations
Environmental concerns

**Which do you think take
priority?**

**Does it depend on the firm /
industry?**

Trends in global value chains

Low wages less important in global production decisions

- Only 13 percent of globally traded goods are now exported from low-wage to high-wage countries
- Access to talent, market proximity, resource scarcity, risk mgmt., innovation etc.

Trade flows are becoming more regionalized – nearshoring (and reshoring) increasing

Data flows a different story?

- global flows of data have grown 320 times larger since 2005

Global network structure linked to level of vulnerability

Whether local, regional or global, these are the things to pay attention to!

Geographical concentration of spend

Substitutability of suppliers

Interconnectivity

Number of sub tiers & visibility

Supplier size and financial dependence on your firm

How to make regionalization work?

TO INCREASE EFFECTIVENESS

- Identify potential suppliers with relevant capabilities
- Develop local capabilities with existing supply base and jointly identify how they can create a regional base
- When sub-scale, partner with others to build attractive platform for potential suppliers

CONSIDER PRODUCT DESIGN

- Design for substitution, to enable replacement of key components in case of disruption and/or allow for late-stage customization in the design to reduce cost of supply chain flexibility.
- Allow for circular economy (reuse, repair, redistribute, remake, recycle), which is facilitated by having production capabilities in close proximity of final consumption areas.

Future-proofing

Raw material
availability and price
volatility



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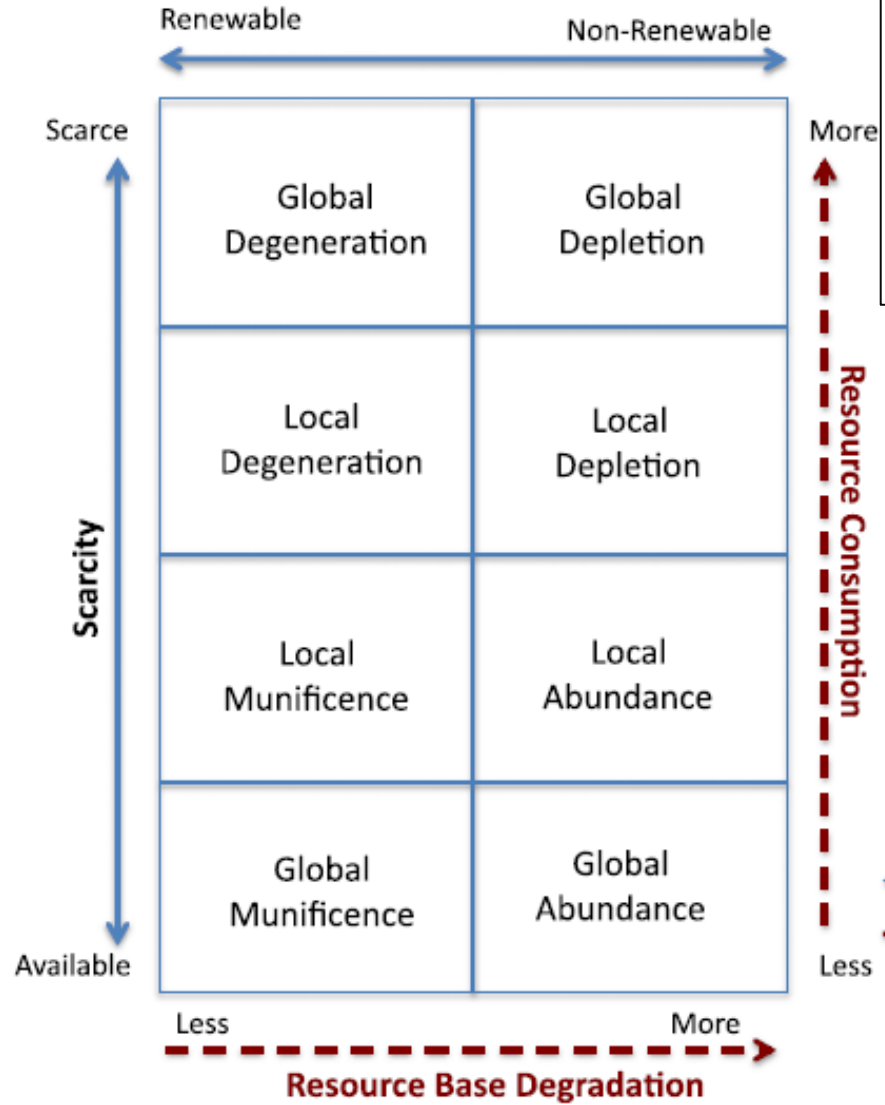


Managing price volatility risk

1. Do nothing
2. Do not accept price increases from suppliers
3. Control commodity costs through hedging
4. Pass through commodity price increases (and decreases) to customers
5. Combine hedging and pass-through prices when customers want to lock in costs
6. Offset the adverse impact of commodity prices through cost reductions
7. Charge customers "insurance" (a higher price with bigger margins) to account for their cost risk
8. Substitute for alternative materials

Critical issues report, Managing Commodity Pricing and Availability Volatility, Caps 2012

Renewability



While the EU works to detangle itself from economic dependence on Russia, exponential increase in demand for raw materials is creating supply risks due to high dependency on China, industry and experts have warned.

The demand for critical raw materials is about to skyrocket until 2050 – by around 500%, according to [projections](#) from the World Bank. This development is, for the most part, driven by the Green transition: electrical cars, for instance, require over six times as many minerals as conventional vehicles, the international energy agency said in a [report](#).

As around 19 of the 30 raw materials that the European Commission has labelled ‘critical’ are primarily produced in China, there is a high risk that these dependencies could lead to supply

RETAILERS // MARCH 21, 2022 • 7 MIN READ

The shortage of paper, glass and raw materials has upended manufacturing

Home > News

Building materials prices is builders' biggest concern for 2023

By Jack Woodfield published 27 days ago

Construction supplies are flowing more freely, but the price of materials could impact your 2023 building plans, builders have warned

Resource employment and conservation approaches

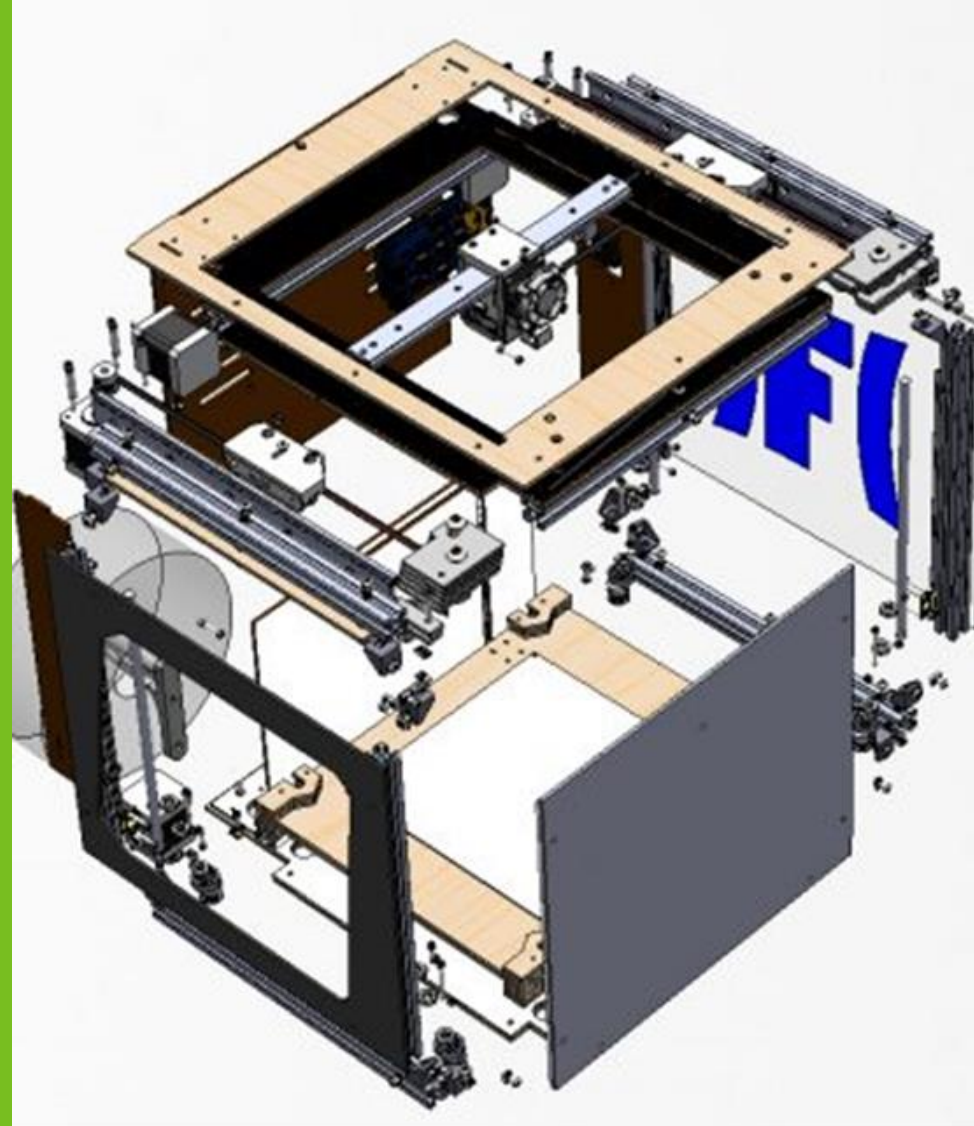
- **Resource employment approaches:**
 - Avoidance
 - Logistics techniques
 - Allocation approaches
 - Sustainment approaches
- **Conservation approaches:**
 - Resource recovery (=circular economy)
 - Resource base protection initiatives (=sustainable supply chain management)

Future-proofing

Postponement or speculation



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Postponement decisions

Time postponement

- Delaying forward shipment of goods
- Delaying manufacturing/differentiating tasks

Form postponement

- Upstream
- Downstream

Place postponement

- Delaying forward shipment of goods with a focus on keeping inventory in central location until customer order

The P/S Matrix and Generic Supply Chain P/S Strategies

Logistics

Manufacturing

		Speculation Decentralized inventories	Postponement Centralized inventories and direct distribution
Speculation Make to inventory	The full speculation strategy	The logistics postponement strategy	
Postponement Make to order	The manufacturing postponement strategy	The full postponement strategy	

Implications related to each strategy

		Logistics	
		Speculation	Postponement
Manufacturing	Speculation	<ul style="list-style-type: none"> • Low production costs • High inventory costs • Low distribution costs • High customer service 	<ul style="list-style-type: none"> • Low production costs • Low/mid. inventory costs • High distribution costs • Low/mid. customer service
	Postponement	<ul style="list-style-type: none"> • Mid./high production costs • Mid./high inventory costs • Low distribution costs • Mid./high customer service 	<ul style="list-style-type: none"> • Mid./high production costs • Low inventory costs • High distribution costs • Low customer service

Postponement Strategies Results and Conclusions

Postponement can be considered as efficient strategy for managing product variety

- Improves service & reduces variability of service delivery
- Reduces costs

Value of postponement increases when

- ...forecast uncertainty increases
- ...product proliferation increases

Postponement is most efficient when demand between product derivatives is roughly equal

- Multi-channel environment

Old strategy – new name? Micro supply chains

Micro supply chains move production and distribution from global manufacturing hubs to closer to the end customer

Combining mass production with modular technology to enable late form postponement

Working within borders means less vulnerability to exchange rates and tariffs

Ability to manufacture in smaller batches will reduce inventory costs and waste

Micro-fulfillment – not postponement but speculation

Micro-fulfillment: placing small-scale warehouse facilities in accessible urban locations close to consumer

AI and analytics (so not really speculation!) with automation are used to deliver goods rapidly

Requires detailed thinking through of:

- Locations for the micro-warehouses
- Delivery times offered
- Product selection
- In-house vs outsource?