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# Risk and Resilience in Global Supply Chains

Dr. Andreas Wieland

Associate Professor of Supply Chain Risk Management

# Will (left) vs. Should (right) Become Emerging SCM “Hot Topic”



Orange: Not part of the Top 10 on the right side; green: not part of the Top 10 on the left side

# Outline

## Risk Management

# Vulnerability of Supply Chains

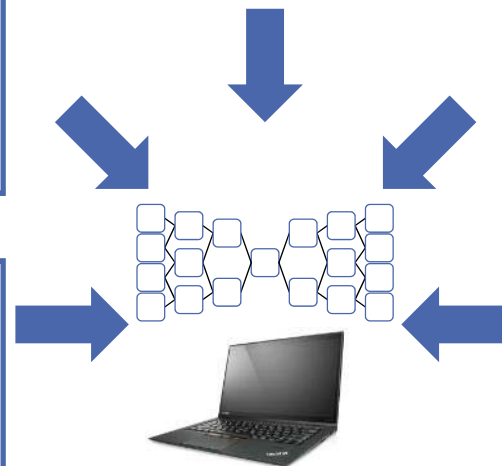
The trend towards economies of scale leads to centralized distribution/manufacturing and, thus, less flexibility

The trend towards just-in-time and lean practices leads to efficiency rather than effectiveness

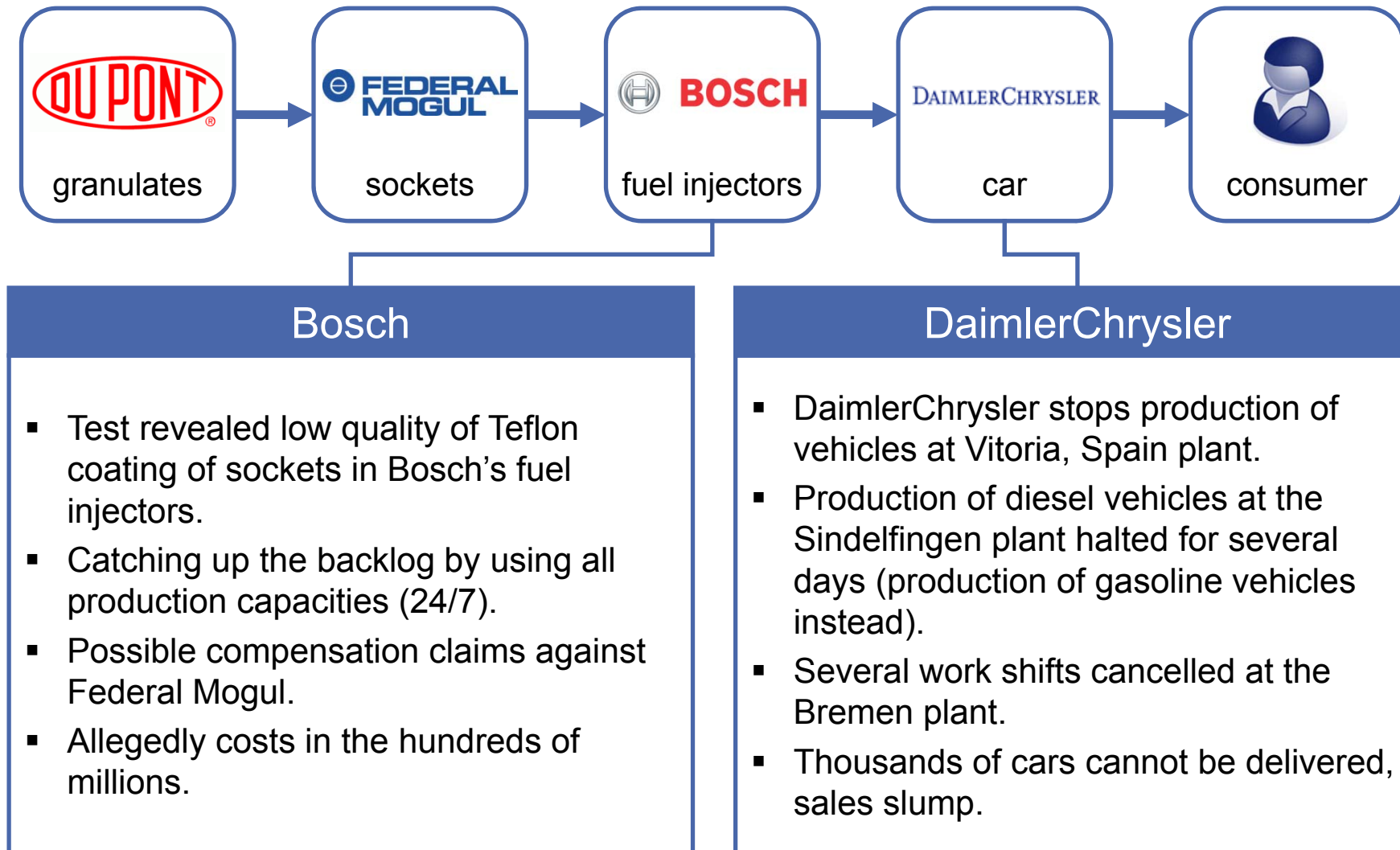
The trend towards outsourcing of non-core business activities leads to loss of control

The trend towards reducing costs leads to globalization and, thus, more complex supply chains

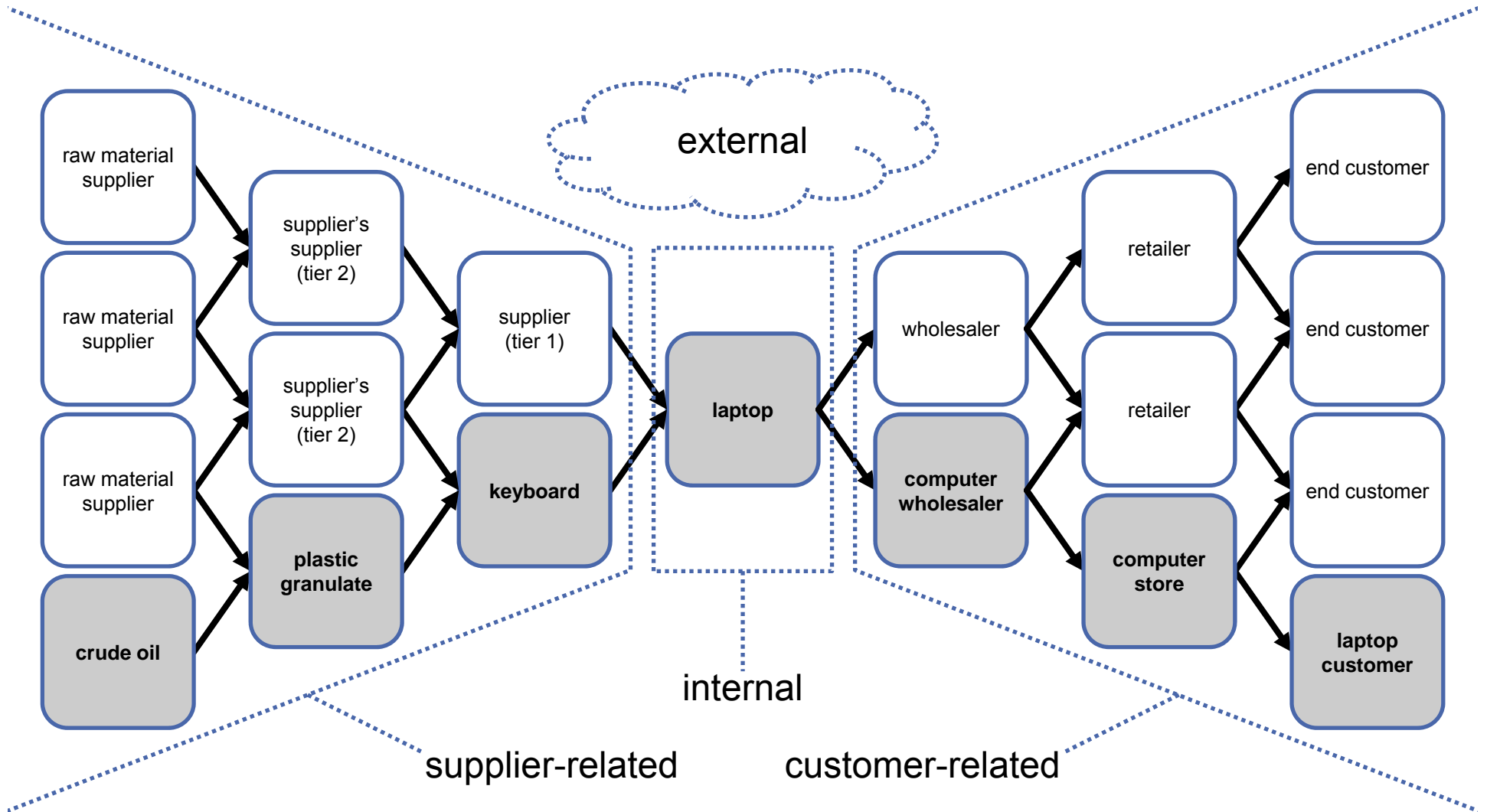
The trend towards consolidation of suppliers leads to increased potential for supply failure



# Example: Quality Problems Affect the Entire Supply Chain



# Risk Sources: Internal, External, Supplier-related, Customer-Related



# Phases of Supply Chain Risk Management

## Risk Identification

Enumerating the causes/sources of potential supply chain disruptions.

## Risk Assessment

Evaluating likelihood of occurrence and impact that event will have on the business for each cause/source of disruptions.

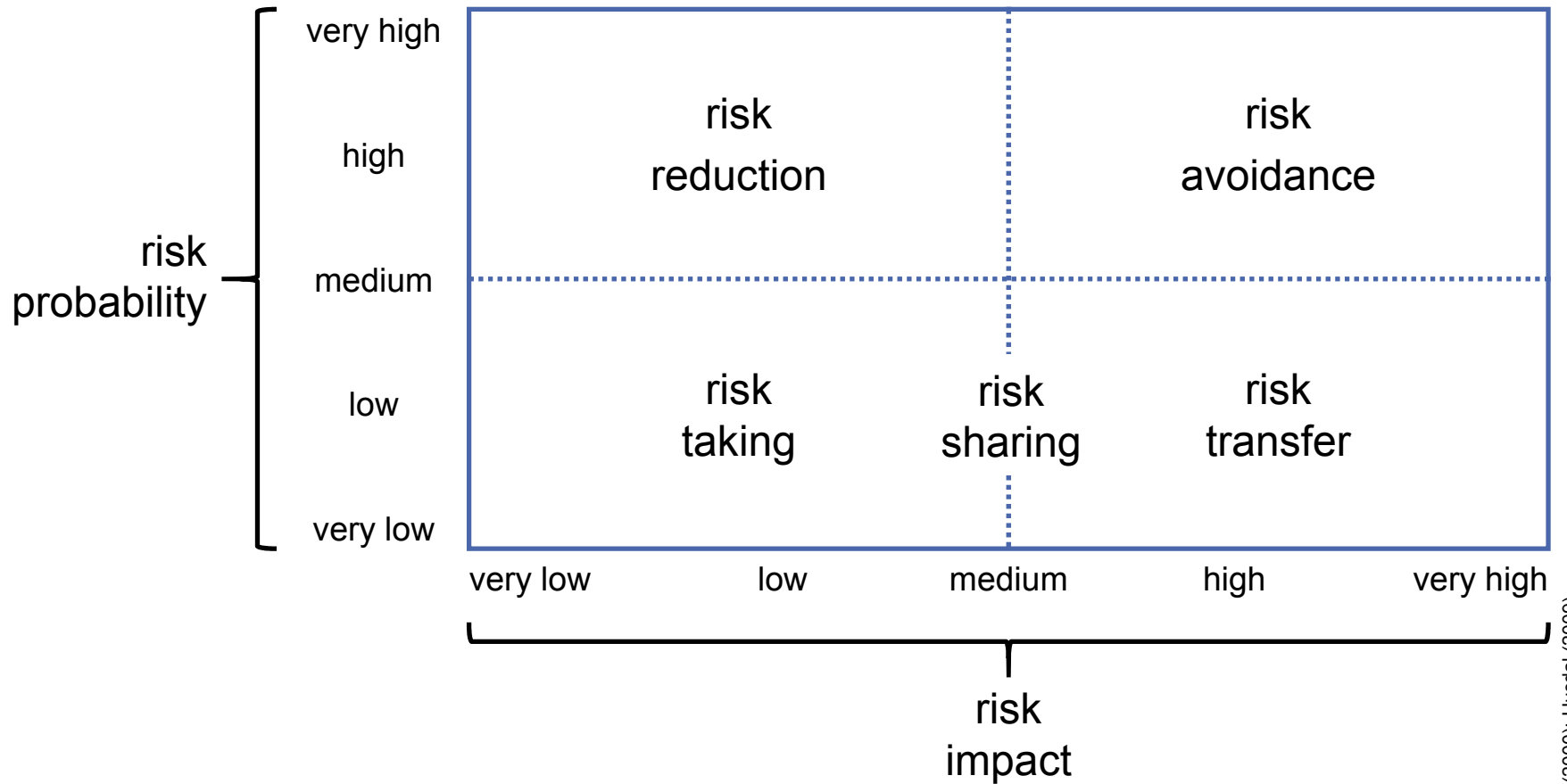
## Risk Controlling

Prioritizing causes/sources of disruptions and developing strategies for reducing the likelihood and/or mitigating the impact.

## Risk Monitoring

Monitoring developments of risks on an on-going basis, including political risks and risks related to markets and suppliers.

# Strategies to Control Risks Can Be Connected to the Risk Matrix





# Outline

What is Resilience?

# Traditional Risk Management vs. Resilience of the Supply Chain

Managing Risk Causes in the Supply Chain

1

“The greatest weakness of [traditional] risk management is its inability to adequately characterize low-probability, high-consequence (LP/HC) events.”

Pettit et al. (2010)

2

“Identifying and assessing all types of risks from all suppliers, all suppliers’ suppliers and finally all raw materials suppliers is simply impossible!”

Wieland (2016)

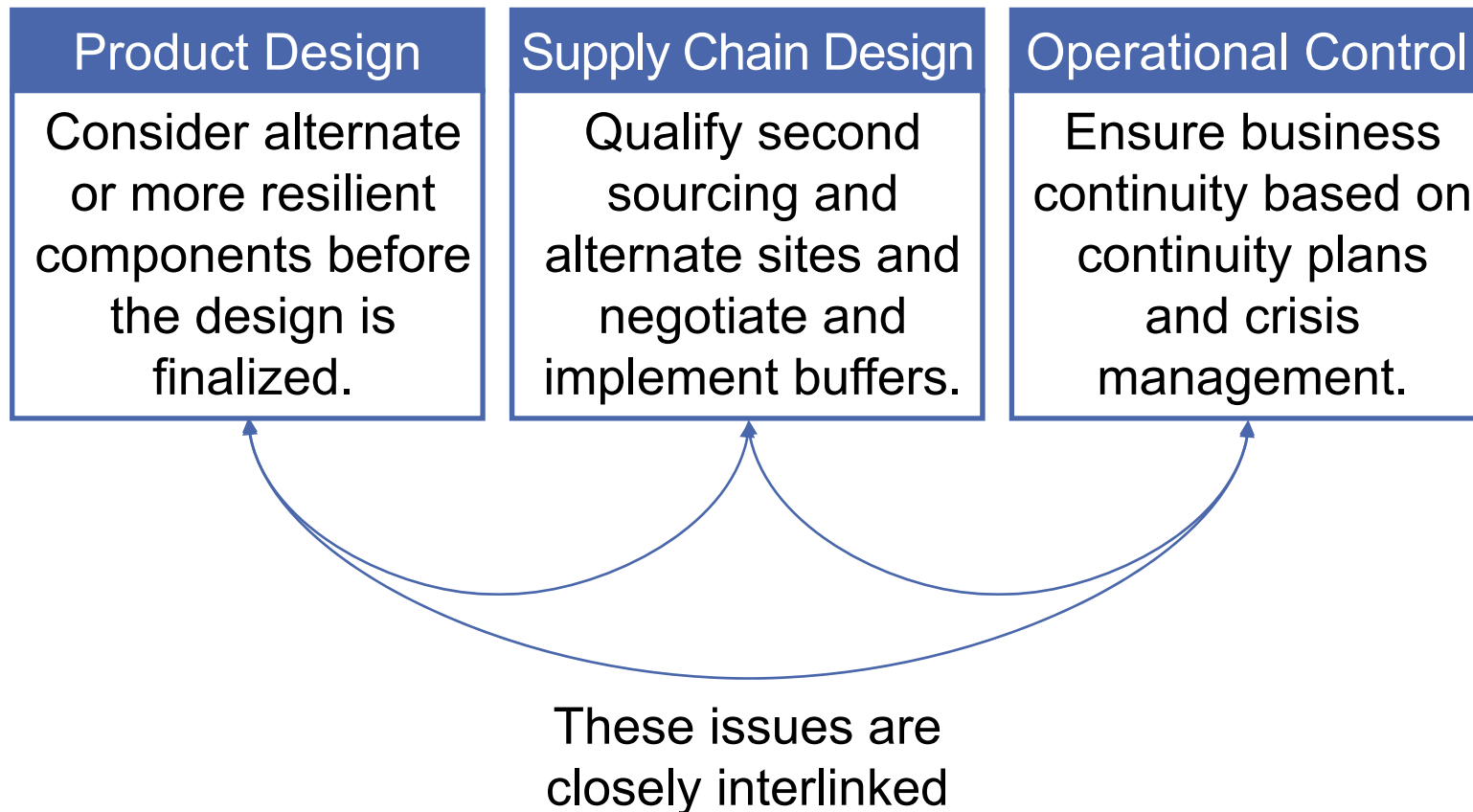
3

“Instead of looking at the causes of risk it would be better to focus on the systemic characteristics of the [supply chain] in order for it to be robust.”

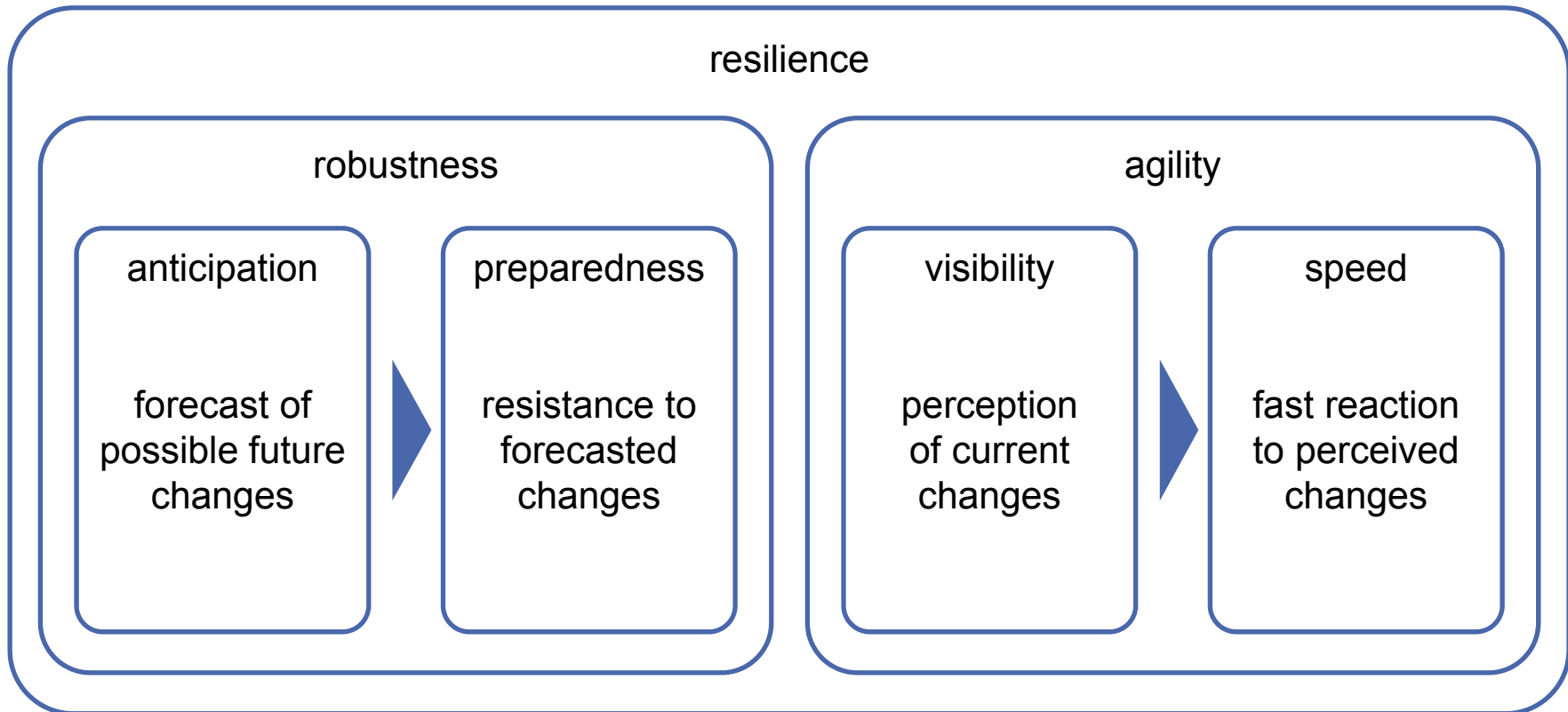
Wieland (2016)

Creating a Resilient Supply Chain System

# Decision/Design Issues that Influence Vulnerability



# Mechanisms to Create Resilience



# Two General Strategies: Robustness and Agility

## Robustness

*“ability of a supply chain to resist change without adapting its initial stable configuration (proactive).”*

Wieland & Wallenburg (2012)

- Multiple sources of supply
- Inventory buffers
- Flexible transportation

## Agility

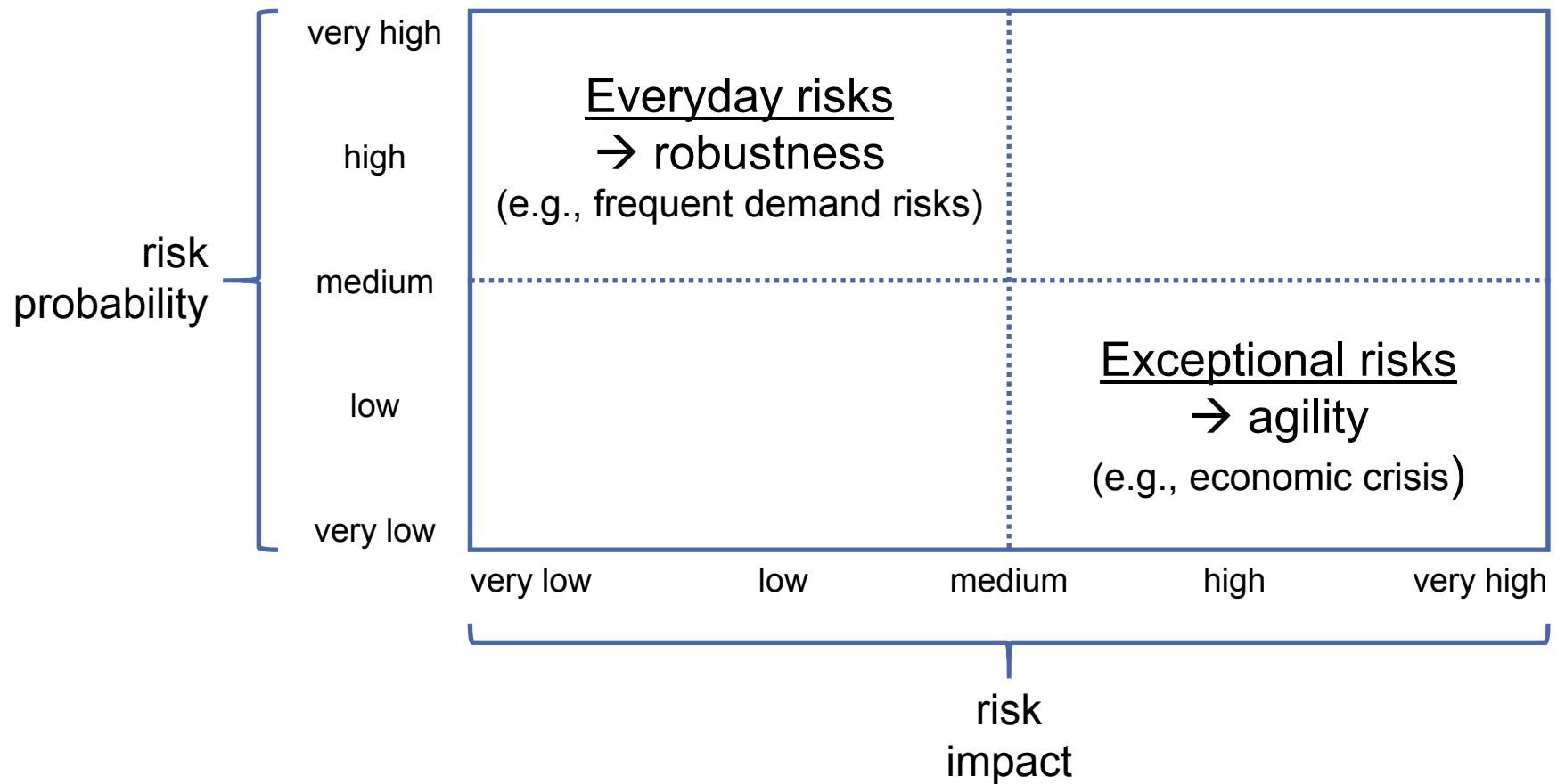
*“ability of a supply chain to rapidly respond to change by adapting its initial stable configuration (reactive).”*

Wieland & Wallenburg (2012)

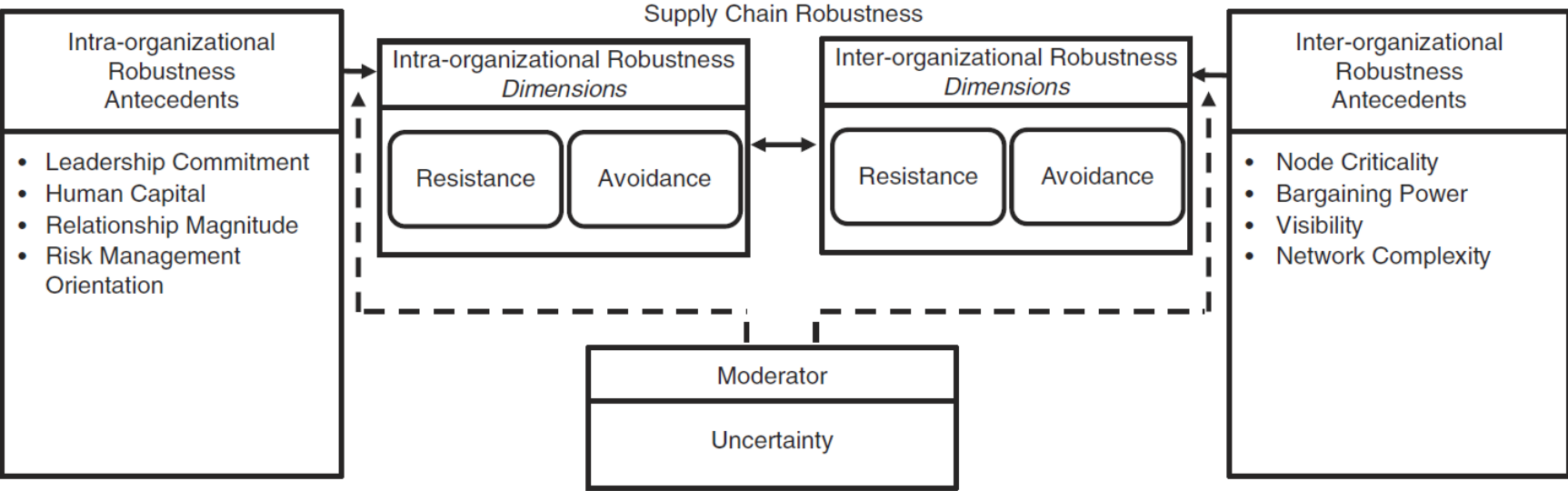
- Contingency plan
- Lead-time reduction
- Trained personnel

→ “Lean management” might be cost efficient in the short term. However, in the case of high disruption risks, investing in a robust and/or agile supply chain can be more appropriate in the long term.

# Robustness, Agility, and the Risk Matrix



# Conceptual Framework of Supply Chain Robustness



Source: Durach, Wieland & Machuca (2015)

# Three Types of Resilience

## Engineering Resilience

= the ability of a system to return to an equilibrium or steady-state after a disturbance (e.g. natural disaster).

The resistance to disturbance and the speed by which the system returns to equilibrium is the measure of resilience. The faster the system bounces back, the more resilient it is.

→ fail safe engineering design; there is one equilibrium

## Ecological Resilience

= the ability to persist and the ability to adapt

Here, resilience is defined not just according to how long it takes for the system to bounce back after a shock, but also how much disturbance it can take and remain within critical thresholds.

→ there can be multiple equilibria and alternative stability domains

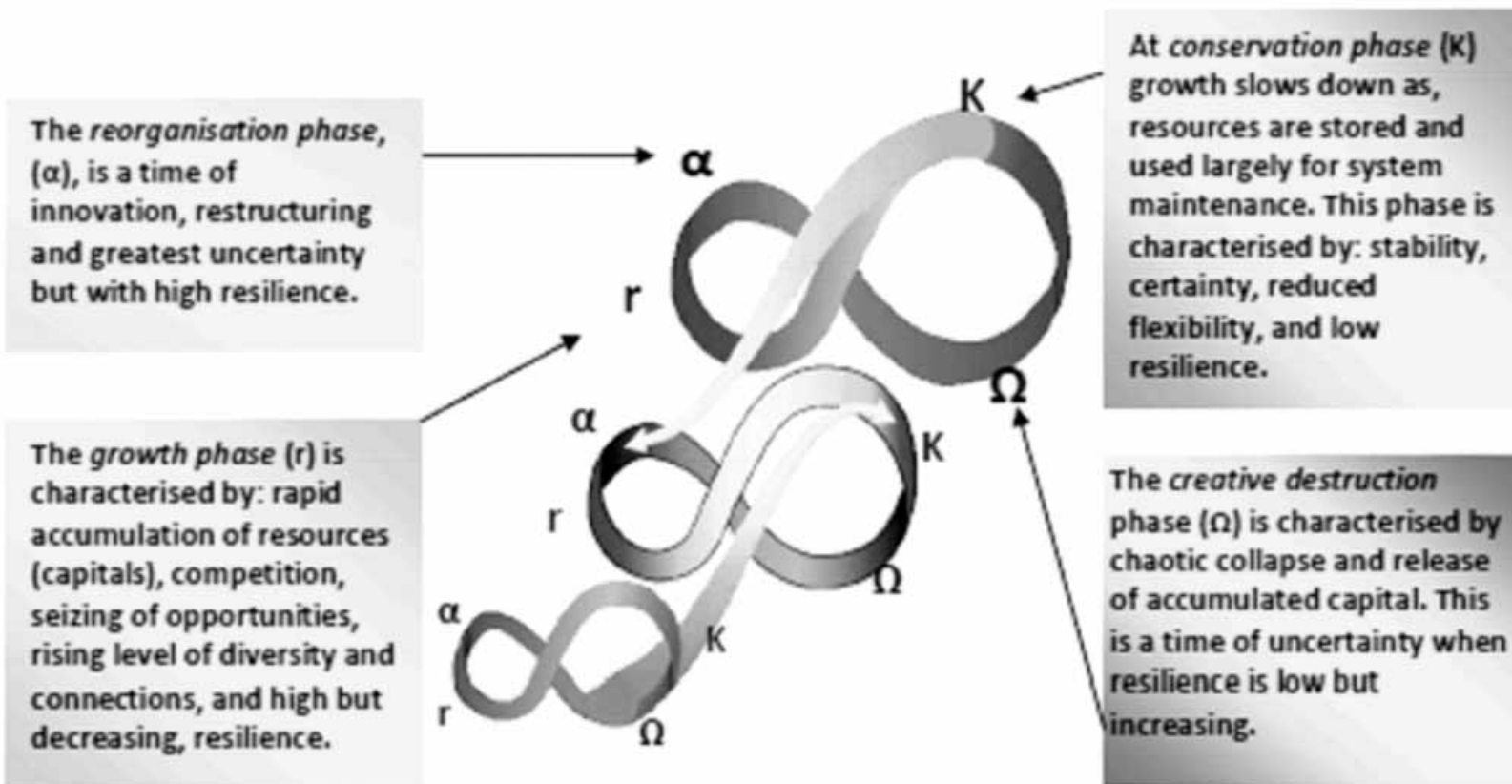
## Evolutionary (= Socio-Ecological) Resilience

Resilience is not conceived of as a return to normality, but rather as the ability of complex socio-ecological systems to change, adapt, and, crucially, transform in response to stresses and strains.

→ Systems are conceived as complex, non-linear, and self-organizing, permeated by uncertainty and discontinuities



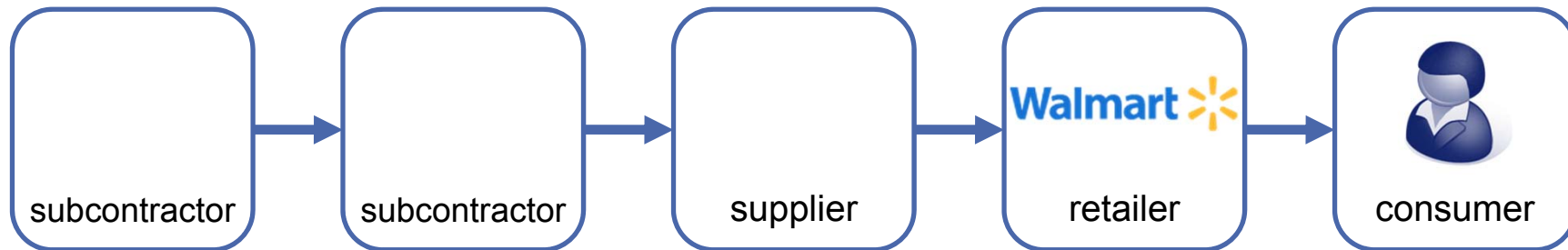
# The “Adaptive Cycle” – A Metaphor of the Evolutionary Understanding of Resilience



# Outline

What's Next?

# 2013 Rana Plaza Collapse



- On 24 April 2013, an eight-story commercial building, Rana Plaza, collapsed near Dhaka, Bangladesh.
- More than 1,100 lowly-paid garment workers, making cut-price clothes for the West, die.
- The key issue for retailers is whether consumers will be prepared to pay higher prices, which seem inevitable.

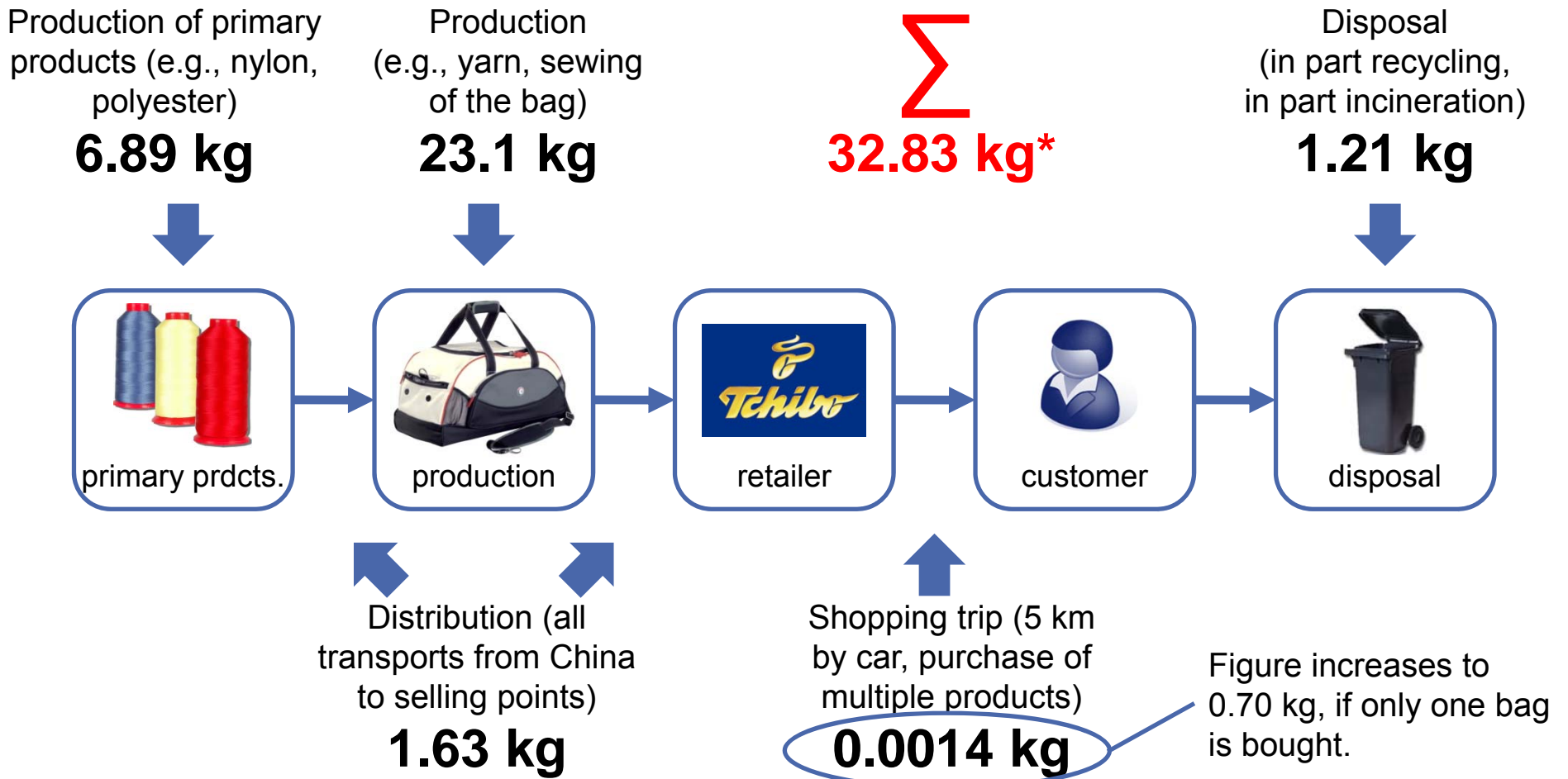
# The Cocoa Supply Chain



↔ = captive relations  
 ↔ = turn-key suppliers  
 ↔ = market relations

Source: based on The Guardian (2014), <http://www.theguardian.com/sustainable-business/fairtrade-partner-zone/2014/nov/21/there-is-a-solution-to-the-looming-chocolate-shortage-pay-farmers-a-fair-price>

# Carbon Footprint of a Sport Bag Supply Chain (1.436 kg)



\* kg CO<sub>2e</sub> per functional unit.  
Source: c.f. PCF-Projekt.

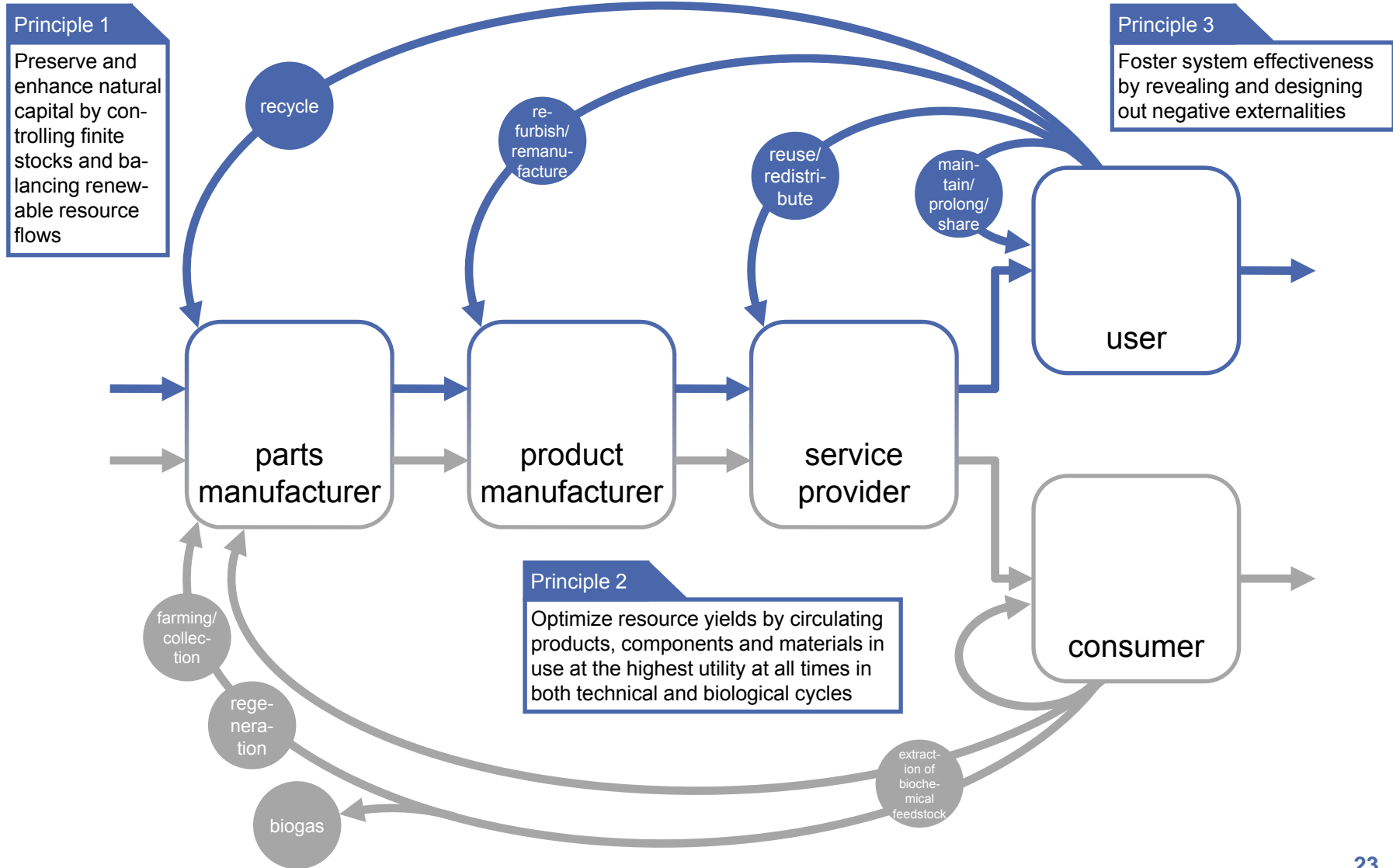
# Single-Use Cups



## Single-Use Cups

- In Germany alone, 320,000 “disposable” cups are consumed – every hour.
- This sums up to around 3,000,000,000 cups per year.
- Tens of thousands of tons of wood and plastic and billions of liters of water are needed to produce these cups.
- The energy needed to produce these cups could be used to supply a small town with energy.

# From Linear to Circular Supply Chains



# Circular Coffee Cup Supply Chains

Throw Away: Starbucks



Avoid: Coffee in a Cone



Recycle: Costa Coffee



Reuse: Italy, *al banco*



Redistribute: Cupclub



Share: Freiburg Cup





# Call for Paper Coming Soon!

## **Journal of Business Logistics / Special Topic Forum: “Participating in the Wider Debate on Resilience”**

Guest Editors: Andreas Wieland & Christian F. Durach

Studies can contribute to this STF in different ways, including (but not limited to):

- integrating recent developments in the resilience literature inside and outside of SCM,
- challenging existing meanings of resilience in the light of SCM phenomena,
- covering ethical, social and ecological harm caused by today’s consumerist business models (e.g. planetary boundaries), and/or proposing pathways towards alleviating such harm (e.g. transitions from linear to circular business models, consumer orientation to user orientation, and value creation to value retention).

Deadline: April 30, 2019 (next year, not next week 😊)

# Contact



## **Dr. Andreas Wieland**

Associate Professor of Supply Chain Risk Management  
Department of Operations Management  
Copenhagen Business School

✉ [awi.om@cbs.dk](mailto:awi.om@cbs.dk)

🔗 <http://scmresearch.org/>