

Supply Chain Resilience – Myth or Answer to Strategic Challenges?

ECG Academy Alumni Meeting, Barcelona, 2022-Feb-11

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**Hochschule
Hof**

University of
Applied Sciences



Where will we go? How can we be prepared?

Inflation

Raw Material
Shortages

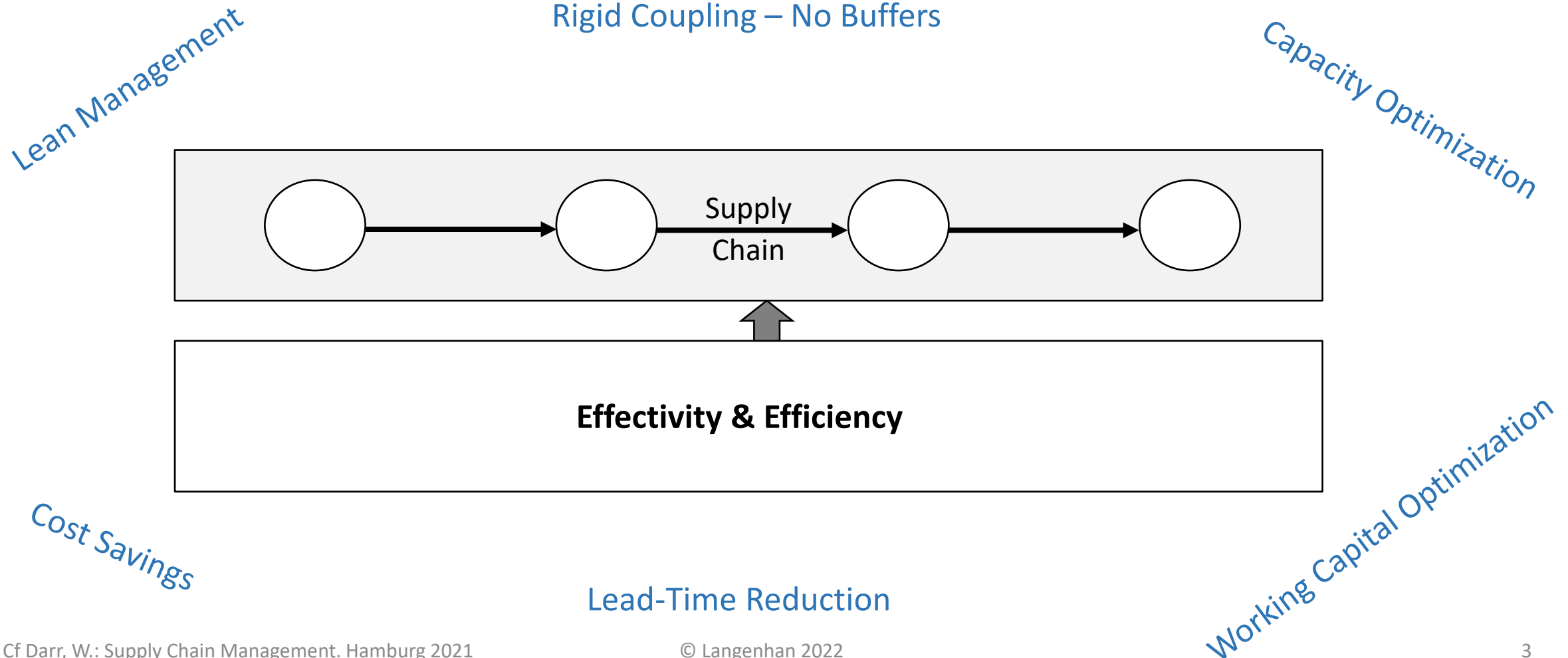


Semiconductor
Crisis

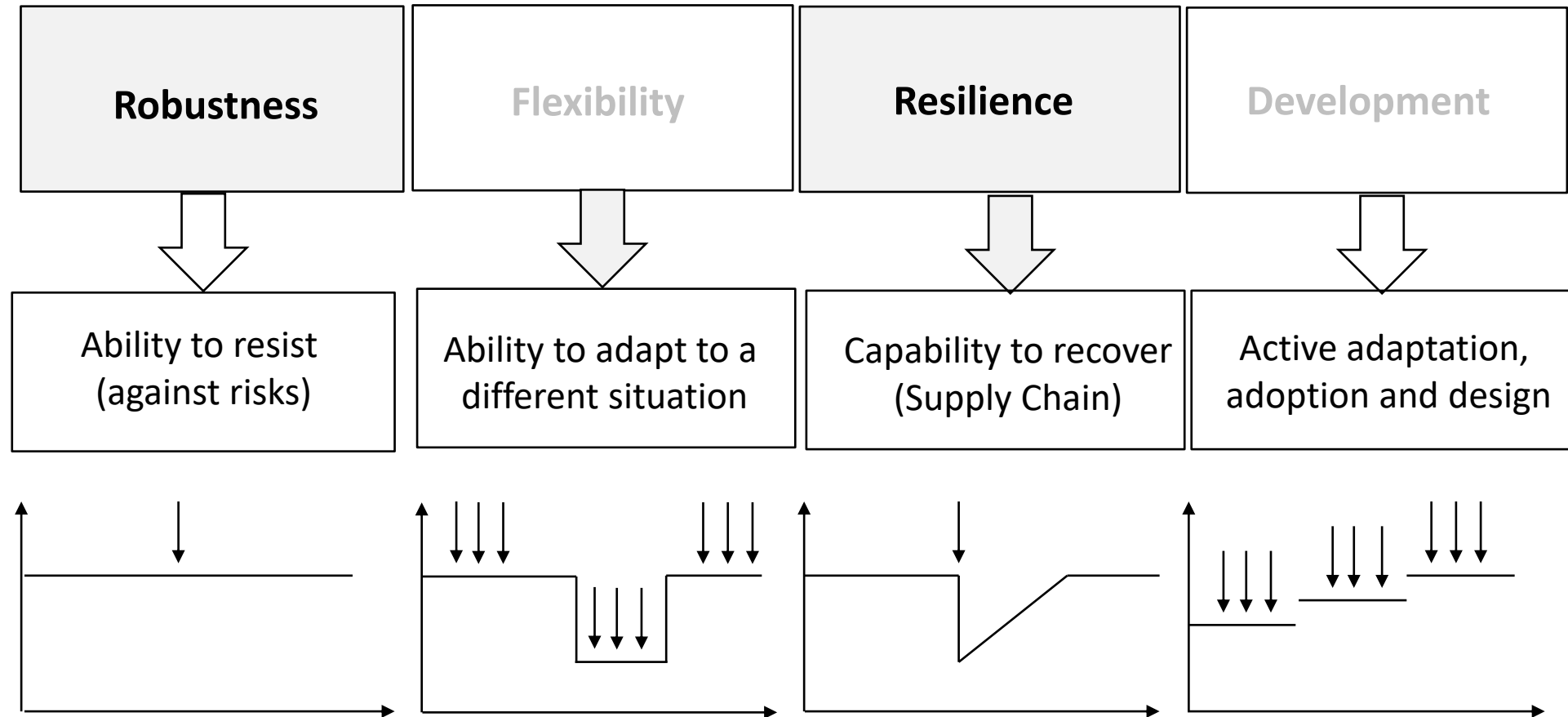
Deviations from
Plans

...

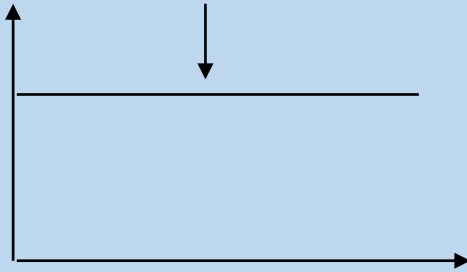
Initial situation and state of the art so far: It is a counter model to resilient supply chains



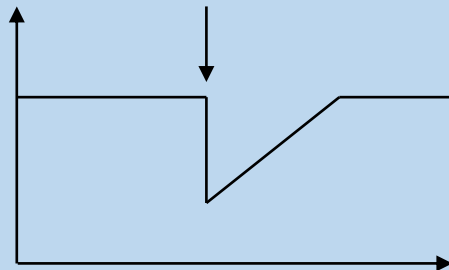
Do we need a Paradigm Shift? Four patterns of changed supply chain approaches



Risk Management scholars define



- ***Robustness*** is the ability to **maintain** operations during a crisis



- ***Resilience*** can be defined as the ability to **return** to normal operations over an acceptable period of time, post-disruption.

Baseline

Widely used definitions of resilience

Engineering/material science

Ability of a material to return to its original state after being subjected to external forces.

Psychology

Ability of a patient to recover from trauma.

Business

Ability of a company to return to an economically successful path after a crisis.

General

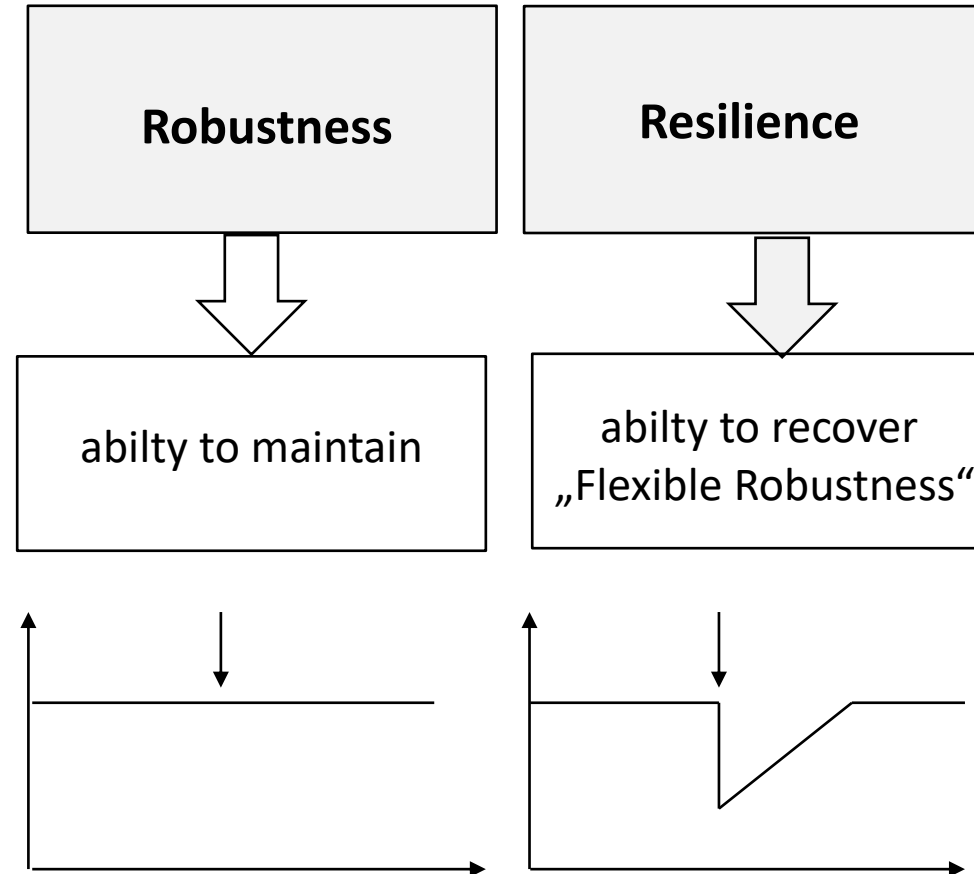
Ability of a system to deal with disruptive events.

Relationship between Robustness and Resilience

- **Robustness** =
ability to maintain
- **Resilience** =
ability to recover



- **Intelligent Combination**
of Robustness and Resilience?



Stages of Resilience

Four Stages

Phase 1:

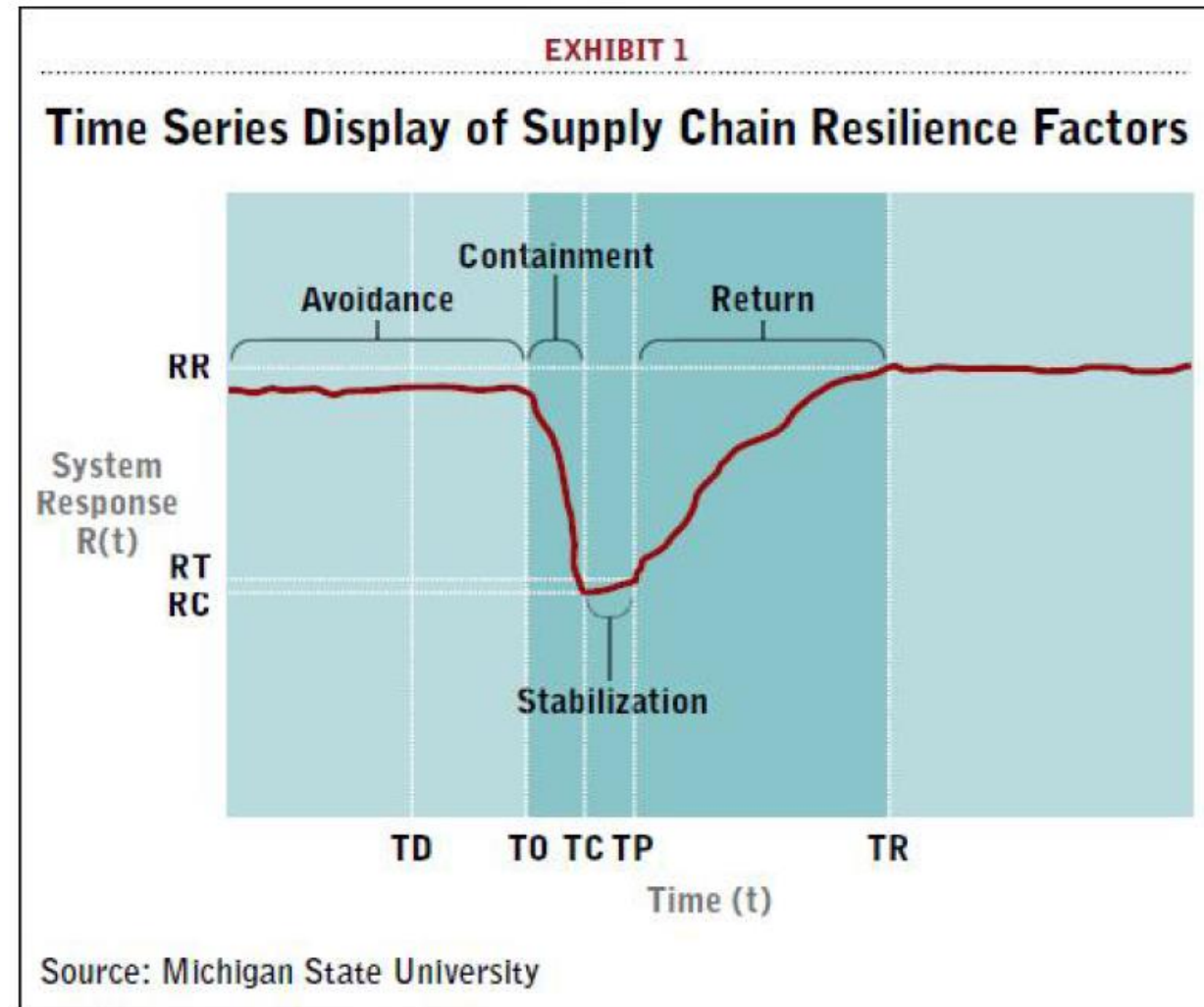
- Avoidance
- Containment

Phase 2:

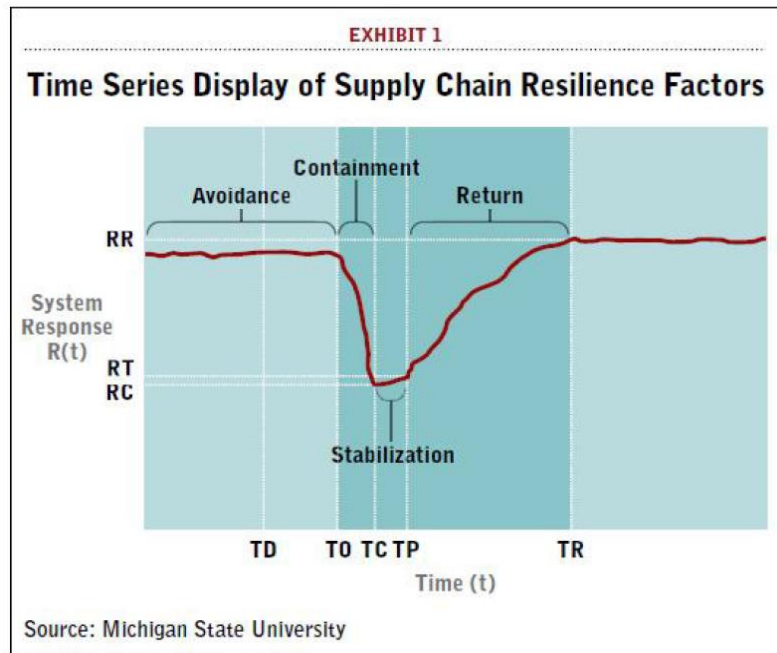
- Stabilization
- Return

T: Time

R: Relative Impact



Stages of Resilience



Cf. Melnyk, Steven et al. (2016): Understanding Supply Chain Resilience, in:
www.supplychain247.com/article/understanding_supply_chain_resilience

Measurement by times and buffers

e.g. Simchi-Levi (2015): TTR and TTS.

Analysing the need for action and deriving of the capacity to act.

Two indicators to assess resilience and action.

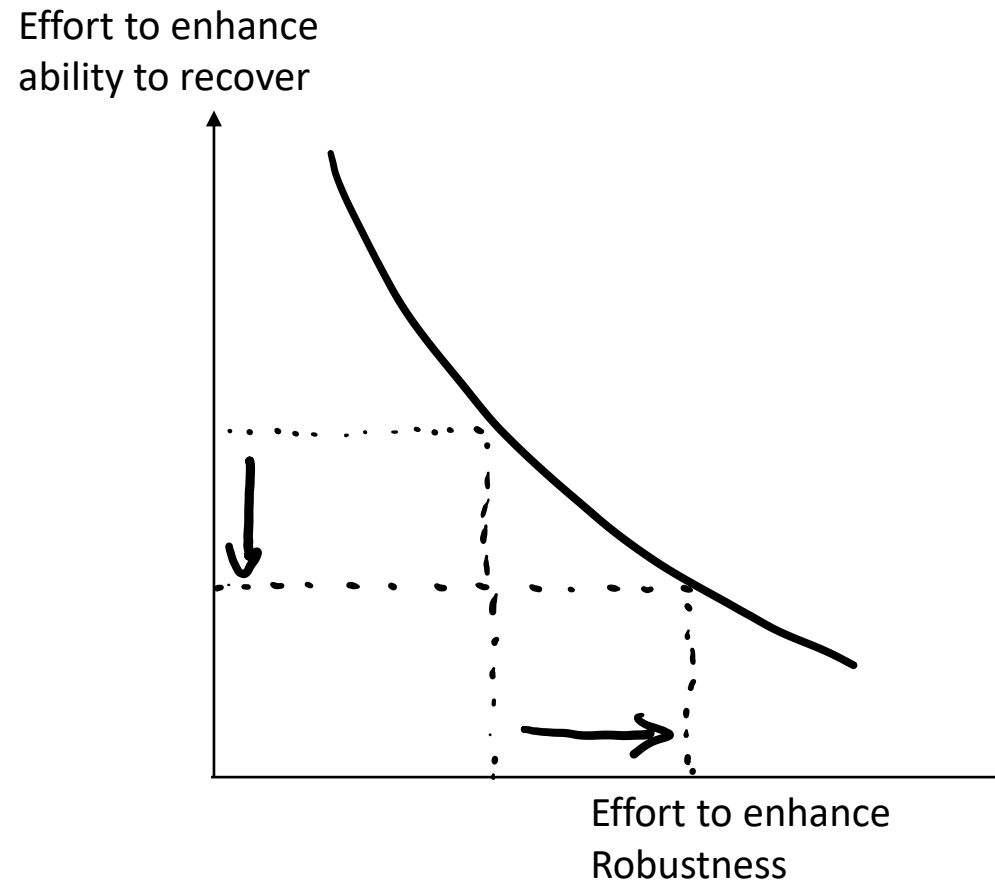
Resilience: time-to-recovery (TTR): duration until delivery capability is restored.

Robustness: Time-to-Survive (TTS): e.g. duration of delivery capability through inventories in the SC.

Cf. David Simchi-Levi, William Schmidt, Yehua Wei, Peter Yun Zhang, Keith Combs, Yao Ge, Oleg Gusikhin, Michael Sanders, Don Zhang (2015) Identifying Risks and Mitigating Disruptions in the Automotive Supply Chain. Interfaces 45(5):375-390

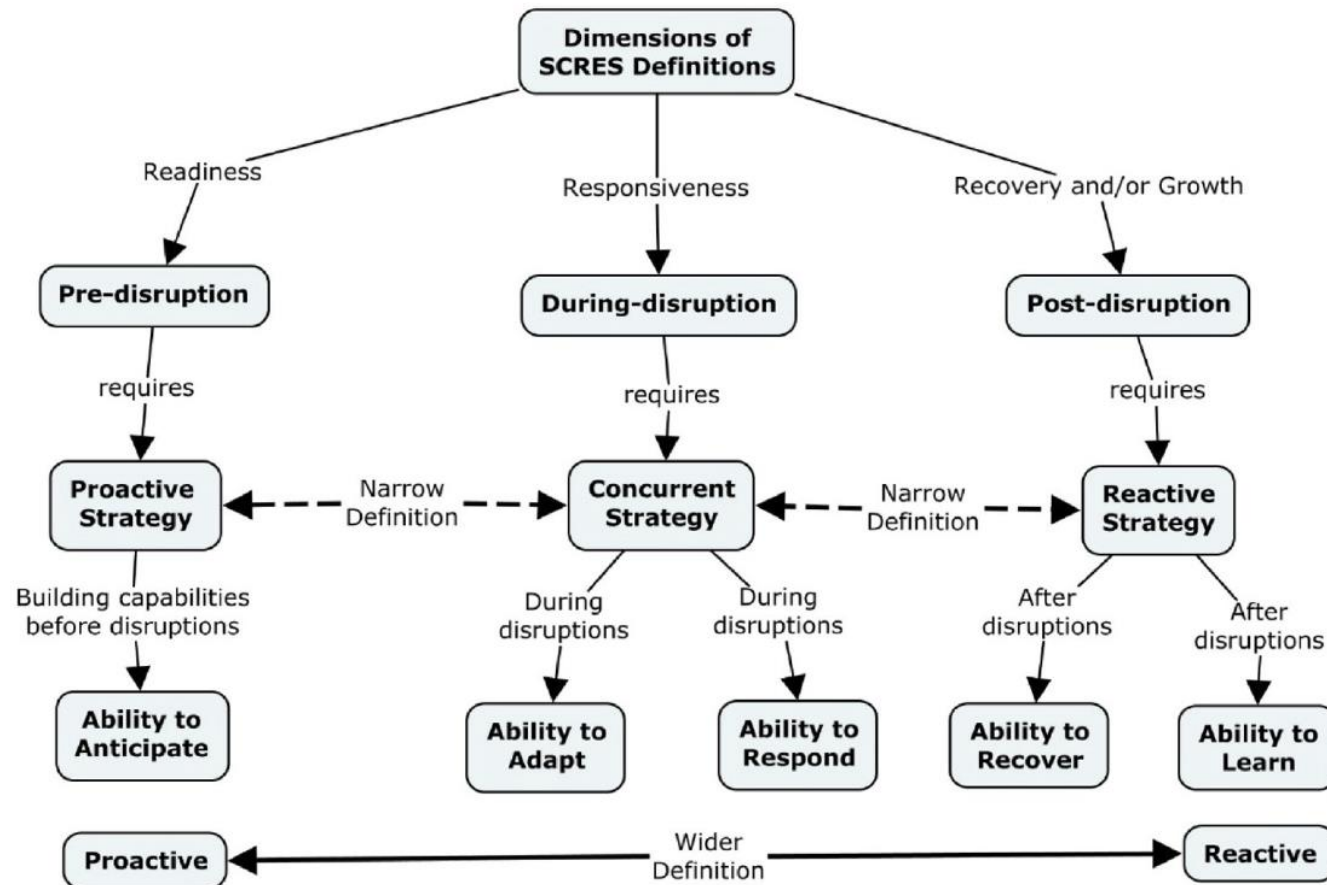
Indifference Curve of Robustness and Recovery

- **Intelligent Combination** of Robustness and Resilience
- The Robustness determines the extent of the recovery
- Recovery effort determines the extent of robustness



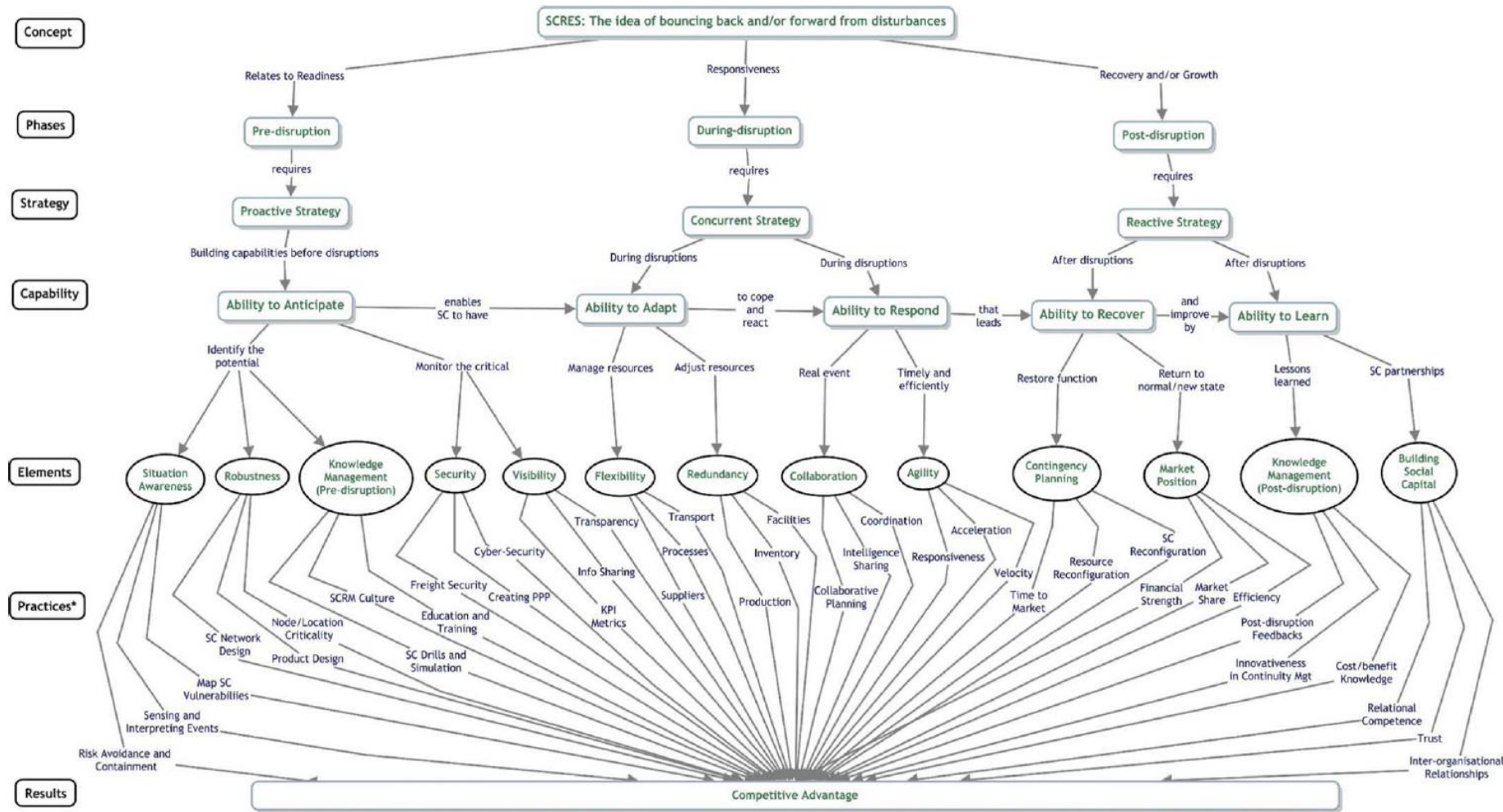
Resilient Supply Chains: Dimensions, Strategies, Abilities

Figure 6 Three constructs of SCRES definitions



Cf. Abubakar Ali Amr Mahfouz Amr Arisha , (2017)," Analysing supply chain resilience: integrating the constructs in a concept mapping framework via a systematic literature review " , Supply Chain Management: An International Journal, Vol. 22 Iss 1, pp. 16 – 39.

Figure 8 SCRES concept mapping framework



Note: *For a full list of practices, see (Table VI)

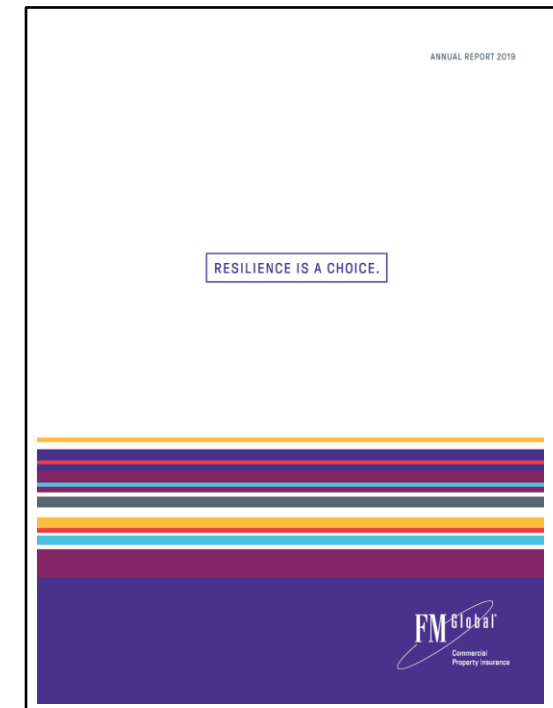
Practices for Resilient Supply Chains

Cf. Abubakar Ali Amr Mahfouz Amr Arisha , (2017)," Analysing supply chain resilience: integrating the constructs in a concept mapping framework via a systematic literature review ", Supply Chain Management: An International Journal, Vol. 22 Iss 1, pp. 16 – 39.

Supply Chain Resilience: Survey of FM-Global

Key findings and statements

- FM Global is a global industrial insurer
- Analysis of supply chain disruption by country
- Annual index conducted by Oxford Metrica
- Nine drivers aggregated to three factors
 - Economy
 - Risk quality
 - Supply chain
- Data sources: independent institutions (IMF, World Bank, Economic Forum, own databases)
- Resilience Index was awarded the "Business Insurance Innovation Award 2015".



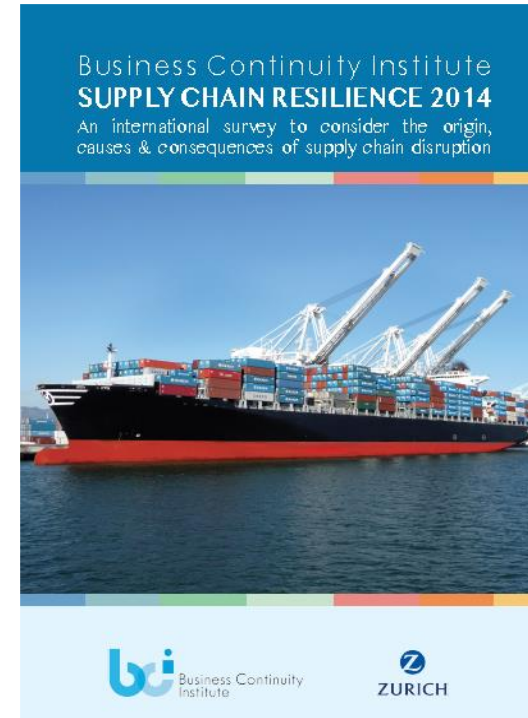
Resilience der Supply Chain – BCI Survey

Key Findings

- BCI: Business Continuity Institute
- Since 2009, **analyses on reasons and consequences** of supply chain disruptions (approx. 500 questionnaires answered from 71 countries)
- **73.5 %** do not have full transparency of their SCs
- **81 %** with at least one supply chain interruption p.a.
- **51%** of disruptions at Tier 2 or higher
- 13% of disruptions are not investigated
- Main reasons: IT failure, weather, suppliers - also exchange rates.
- Consequences: decrease in productivity/profit, increase in labor costs, at 23.6% > \$1 million
- **40 %** were not insured
- Top management issue only at **28.6%**

Source: www.theBCI.org

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How to build a resilient organisation?

Resilience can be built in different ways:

- Through products (with buffer stocks and standardised inputs easier to be replaced)
- Through the design of the value chain (identifying places and suppliers less subject to risk)
- Through resilience monitoring (assessing the time to recover for each type of supplier)

Some strategies are common to resilience and robustness, but the difference is that **resilient firms** tend to reduce their risks but will not invest significantly to anticipate and avoid all types of disruptions. Such firms prefer to **go through the disruptions and minimise their impact**

This is why **single sourcing and a long-term relationship** with a single supplier is a strategy often observed for improving supply-chain resilience. This strategy is not optimal in terms of robustness when this supplier is affected by a risk. However, instead of switching to other suppliers and possibly incurring sunk costs, it can lead to further investment from the supplier for facilitating recovery, as well as a shorter and less-costly disruption in the end.

There is empirical evidence that **supplier diversification is associated with a slower recovery** from supply disruptions, whereas the use of long-term relationships is associated with more rapid recovery (Jain et al. 2016).

McKinsey survey about supply-chain disruptions: How can businesses manage risk and plan for a more resilient future?

- _ Supply-chain disruptions cost the average organization 45 percent of one year's profits over the course of a decade.
- _ How can businesses manage risk and plan for a more resilient future?
- _ McKinsey survey among supply-chain executives about surviving corona and going forward.

Transparency in order to be able to decide fast, and to decide to do the right thing.

Before anything else, this means investment in **digital planning**.

Almost 80 percent of the participants said they need to **improve**, and to invest in digital planning to increase supply-chain visibility to make sure they have the **ability to plan and to decide**.

What about agility?

Another way to foster robustness and resilience is to be more agile.

In this context it means to plan more often.

It's going from a monthly or even quarterly cycle to biweekly or even weekly cycles.

To do that, you need to invest in digital talent to be able to do the planning, understand all of the algorithms, and with this, come to a fast decision


What about the design of the ecosystem?




Resilience can be increased in terms of sc footprint.



This means to increase inventory for the critical parts.



To make sure that you are less dependent on critical suppliers.



Implementation of multisourcing and dual sourcing is very important.

The holy grail: Multitier Transparency?

The holy grail of supply-chain risk management is multitier transparency (according to Mck).

- A lot of companies have visibility into their first-tier suppliers (direct suppliers) because they have a contract with them
- Often the problem is not with the first tier but with the third, fourth, and fifth tiers.

Approach: To create visibility and an early-warning system.

- From the tech perspective, this is possible today.
- In addition, you also need to create trust amongst the partners within the ecosystem of the supply chain

Multitier Transparency and e2e Visibility

Digital Twin: Create end-to-end visibility

Use for simulation of disruptions and reaction szenarios

Increasing capabilities on planning

End-to-end visibility to adapt capacity/volumes quickly and not to harm the ramp-up

Thinking about flow principles, flow systems to create more resilient processes

Take into account possible bottlenecks not only internally but in the whole ecosystem

Back to normal or to New Normal?

Quo vadis Post Crisis Recovery



- Airbus Executive: „Then hopefully we will **not go back to the super-efficient, just-in-time supply chain** but more to a resilient one.
- There will be probably another natural disaster, which is what global warming tells us, and with this we could have a heat wave or flooding. We have the next disruption around the corner.“

- No current evidence that complex supply chains are more impacted by COVID-19
- Lessons from the tsunami in Japan and floods in Thailand in 2011: More offshoring
- In the midst of the COVID-19 outbreak, countries still rely on GVCs to address shortages in the supply of essential medical goods
- The first mistake is to equate self-sufficiency or domestic production with robustness.
- The second mistake is to focus on the location of production; the overriding imperative during a crisis is to maintain and scale up production
- If the objective is to build more robust supply chains (without promoting a new mercantilist agenda), a combination of international trade and local supply is what works best.

Source: <https://www.mckinsey.com/business-functions/operations/our-insights/supply-chain-resilience-is-there-a-holy-grail>; Cf. <https://voxeu.org/article/resilience-versus-robustness-global-value-chains>; Sébastien Miroudot 18 June 2020; Senior Trade Policy Analyst at the OECD Trade and Agriculture Directorate; Jain, N, K Girotra and N Netessine (2016), “Recovering from supply interruptions: The role of sourcing strategies”, INSEAD working paper No. 2016/58/10-11, 2016, August.

Oh, and by the way, there is also Climate Change waiting for us...

- Then hopefully we will not go back to the super-efficient, just-in-time supply chain but more to a resilient one. **There will be probably another natural disaster, which is what global warming tells us, and with this we could have a heat wave or flooding. We have the next disruption around the corner.***
- Whether or not we will be able to decarbonise our activities, there will be many accidents, natural disasters and supply chain disruptions on our path into the future.



... So better you think about a more resilient Business Model today...

* Sebastian Peters, senior vice president and head of logistics, planning, and digital value stream, Airbus in: <https://www.mckinsey.com/business-functions/operations/our-insights/supply-chain-resilience-is-there-a-holy-grail> © Langenhan 2022

Let's stay focused and remain confident.



Thank you for your attention!



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