Building Resilience

Strategies for Effective Supply Chain Risk Management

LUNCH AND LEARN

Thursday, March 6 2025, 12pm ET

Thank you for attending!

Chris Gaffney

Frederick Benaben

About our Related Course Series

scl.gatech.edu/scrr

Supply Chain and Logistics Institute

What is Resilience?

Resilience. Latin "*resiliere*" meaning to bounce back.

Common usage. the ability of a system to return to a normal state after a disruption.

Historical meaning. the thermodynamic work required to cause elastic deformation in a solid material.

Modern meaning. the ability of a system to adapt and cope with change while maintaining its original function and structure (*Holling*, 1973).

What is Resilience?

Physics. A mechanical characteristic that defines a material's resistance to impact

Psychology. An individual's ability to build and live satisfactorily despite traumatic circumstances.

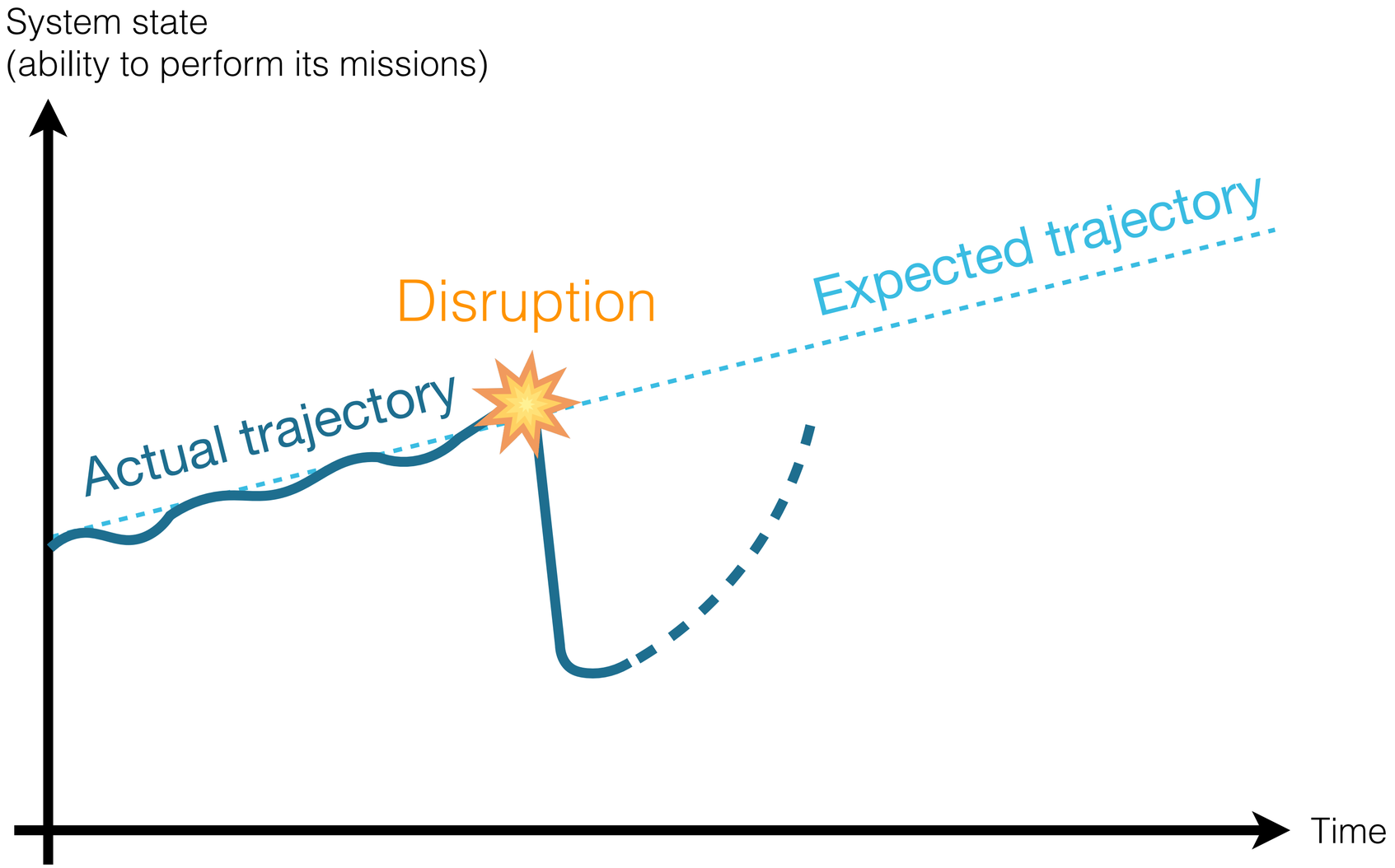
Ecology. Ability of an ecosystem, biotope or group of individuals (population, species) to recover after an external disturbance (fire, storm, clearing, etc.).

Industrial engineering. Ability of a system to continue operating even in the event of a breakdown.

Supply Chain resilience.

- *the time to return to a single, global equilibrium state* - speed of return to equilibrium (engineering resilience)
- *the measure of persistence of systems and of the ability to absorb change and disturbance and still maintain the same relationships between state variables* - amount of extrinsic forces it is able to withstand (ecological resilience)

What is Resilience?



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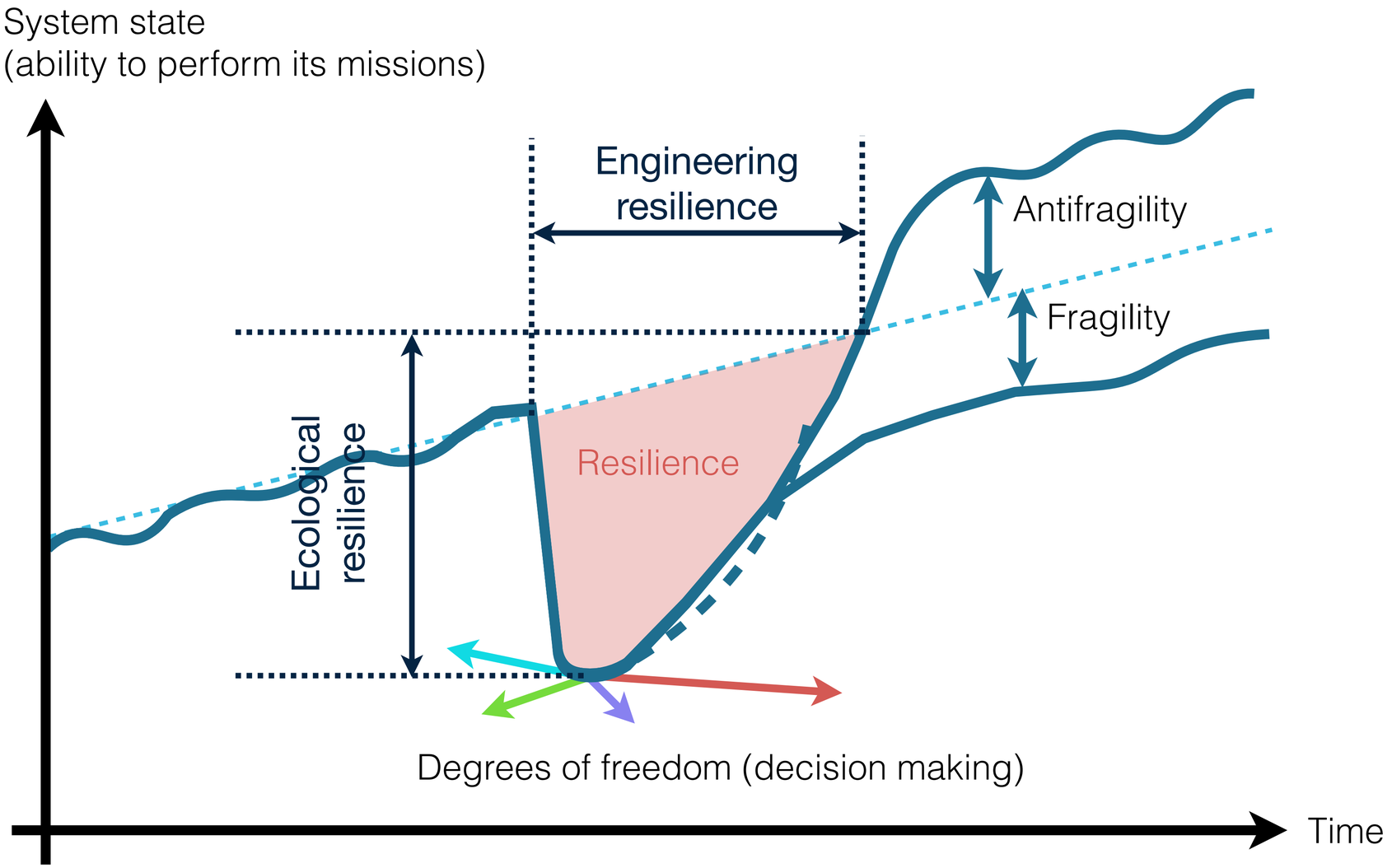


INSTABILITY

RESPONSE TO INSTABILITY

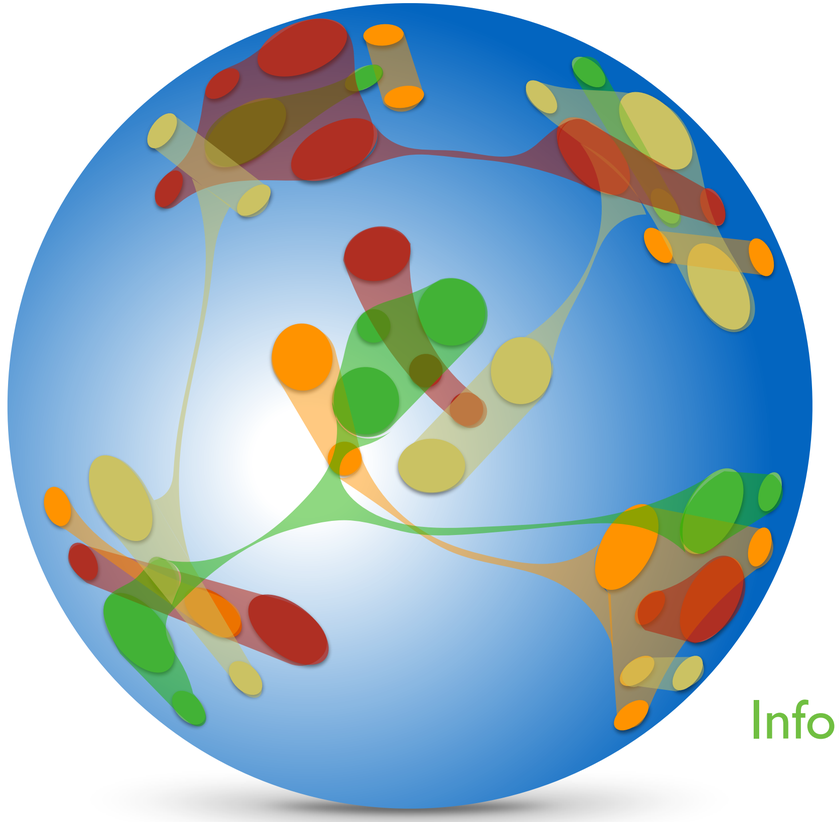
RESILIENCE

Instability

Local networks

Regional networks

Global networks



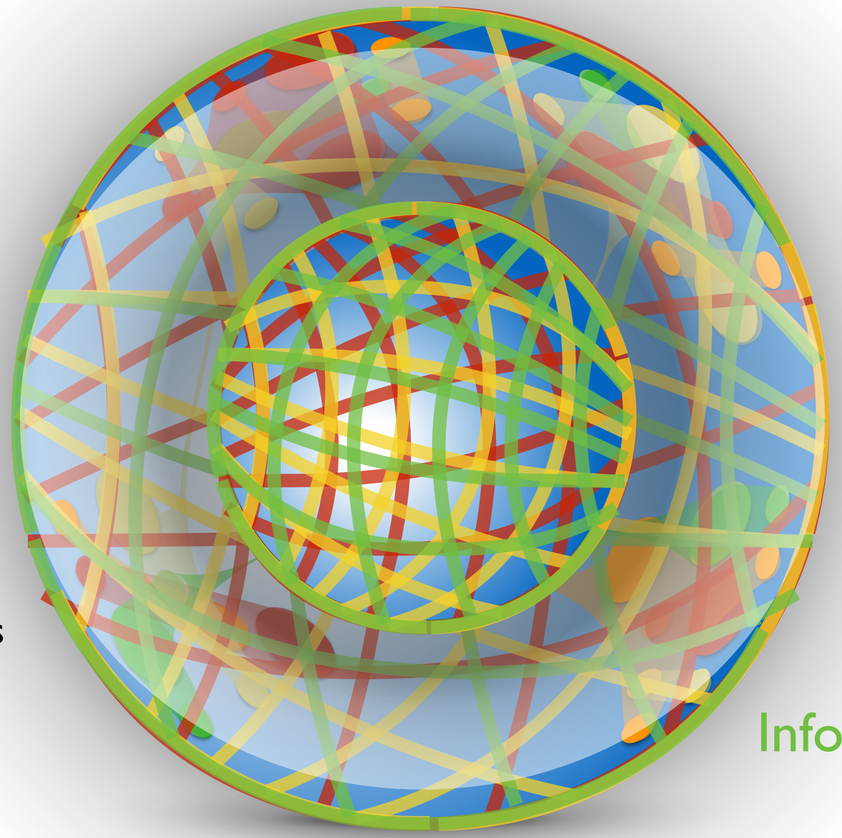
Energy

Goods

People

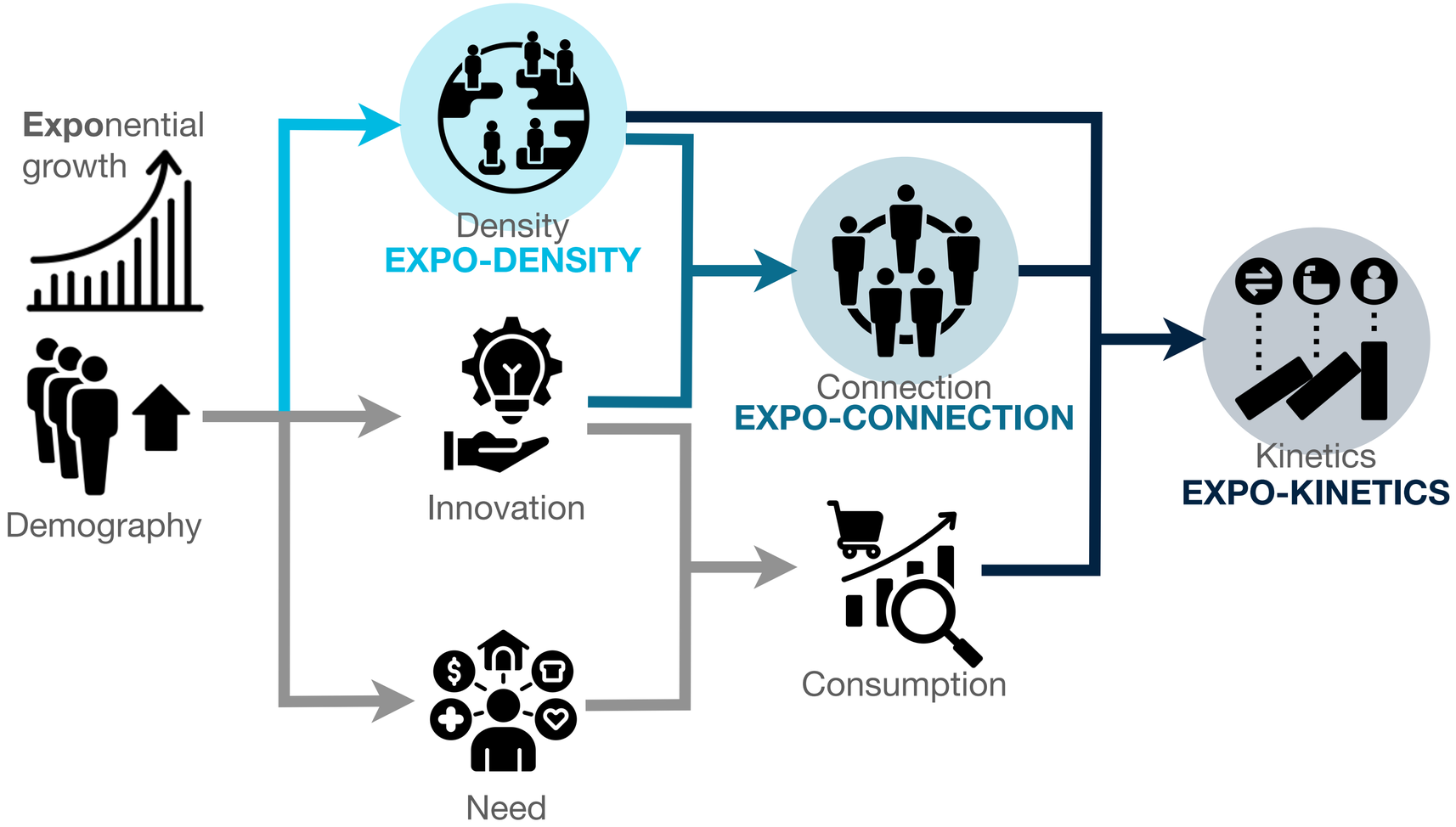
Information

Instability



INSTABILITY IS THE NORM!
NO MORE ABSORPTION SPACE

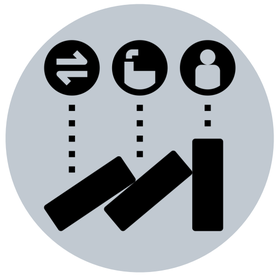
Instability



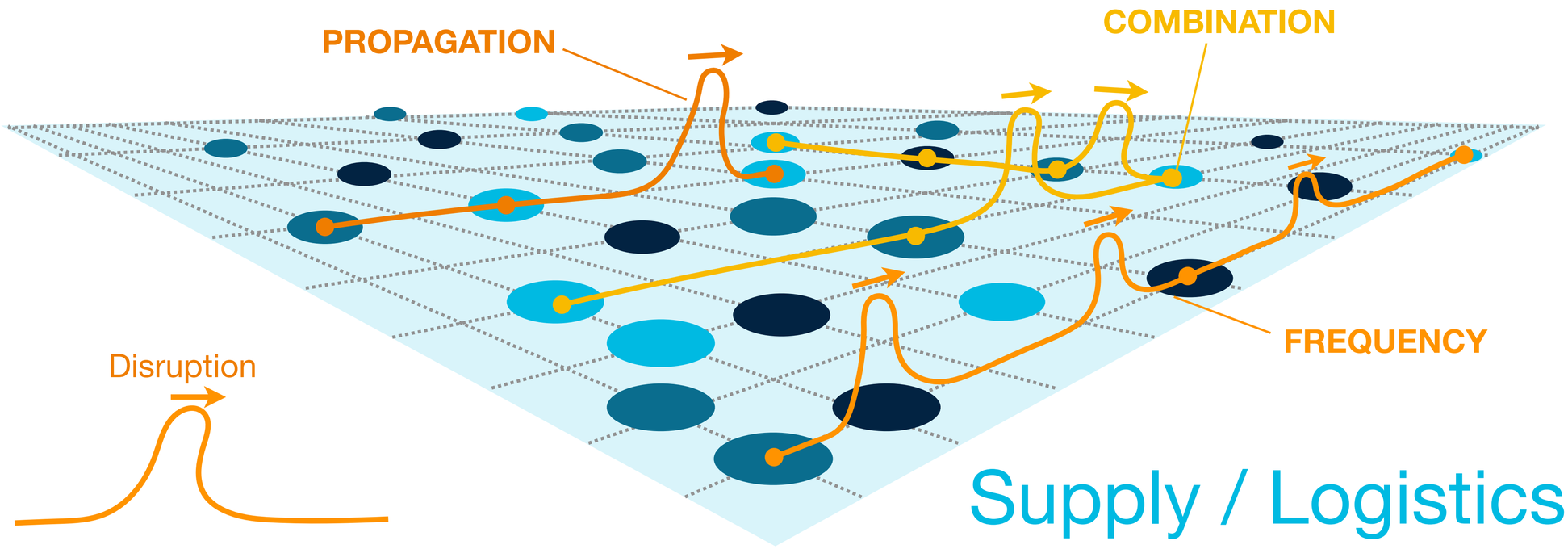
Instability

EXPO-DENSITY

EXPO-CONNECTION



EXPO-KINETICS

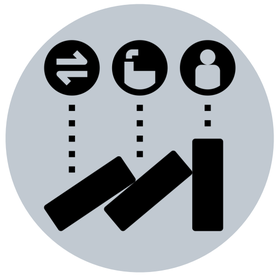


Supply / Logistics Network

Instability

EXPO-DENSITY

EXPO-CONNECTION



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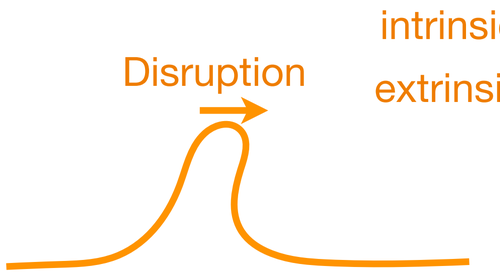
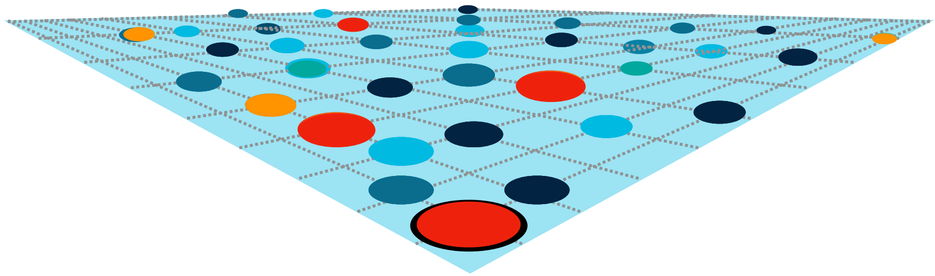


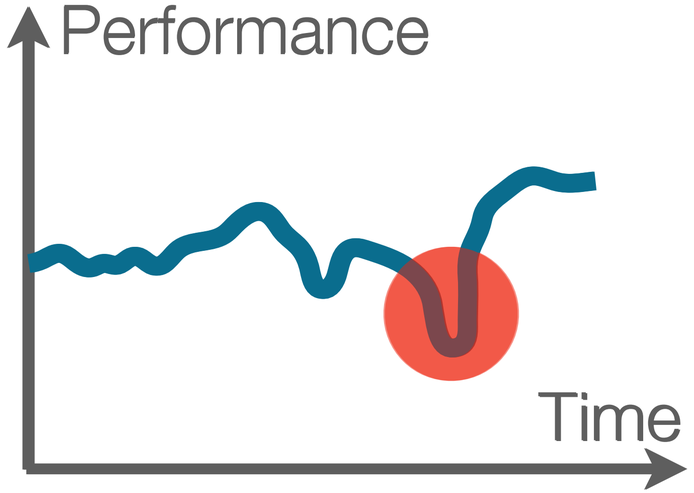
PROPAGATION

COMBINATION

FREQUENCY



EVOLUTION OF THE SYSTEM AND ITS ENVIRONMENT



EVOLUTION OF THE SYSTEM PERFORMANCE

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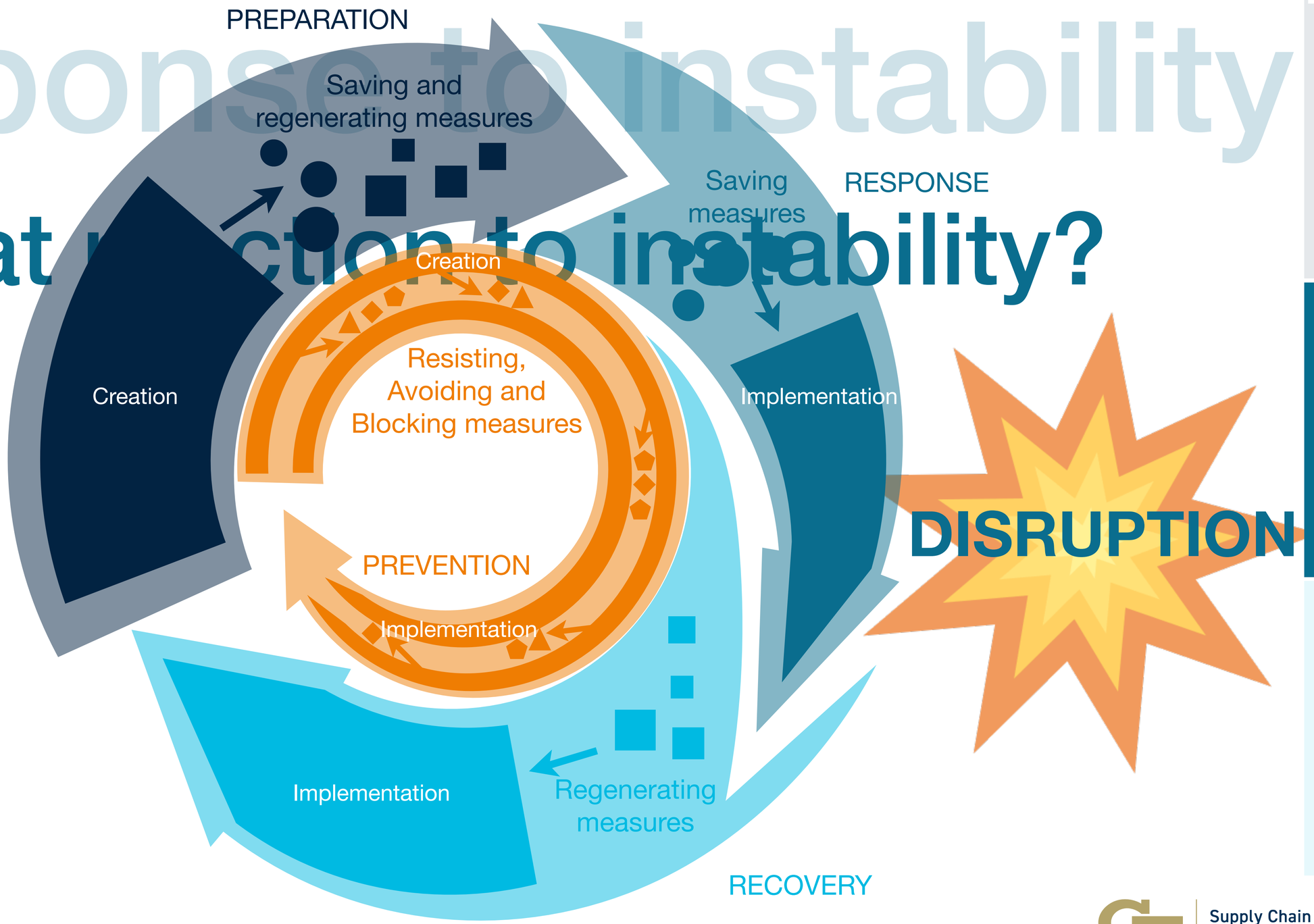
INSTABILITY

RESPONSE TO INSTABILITY

RESILIENCE

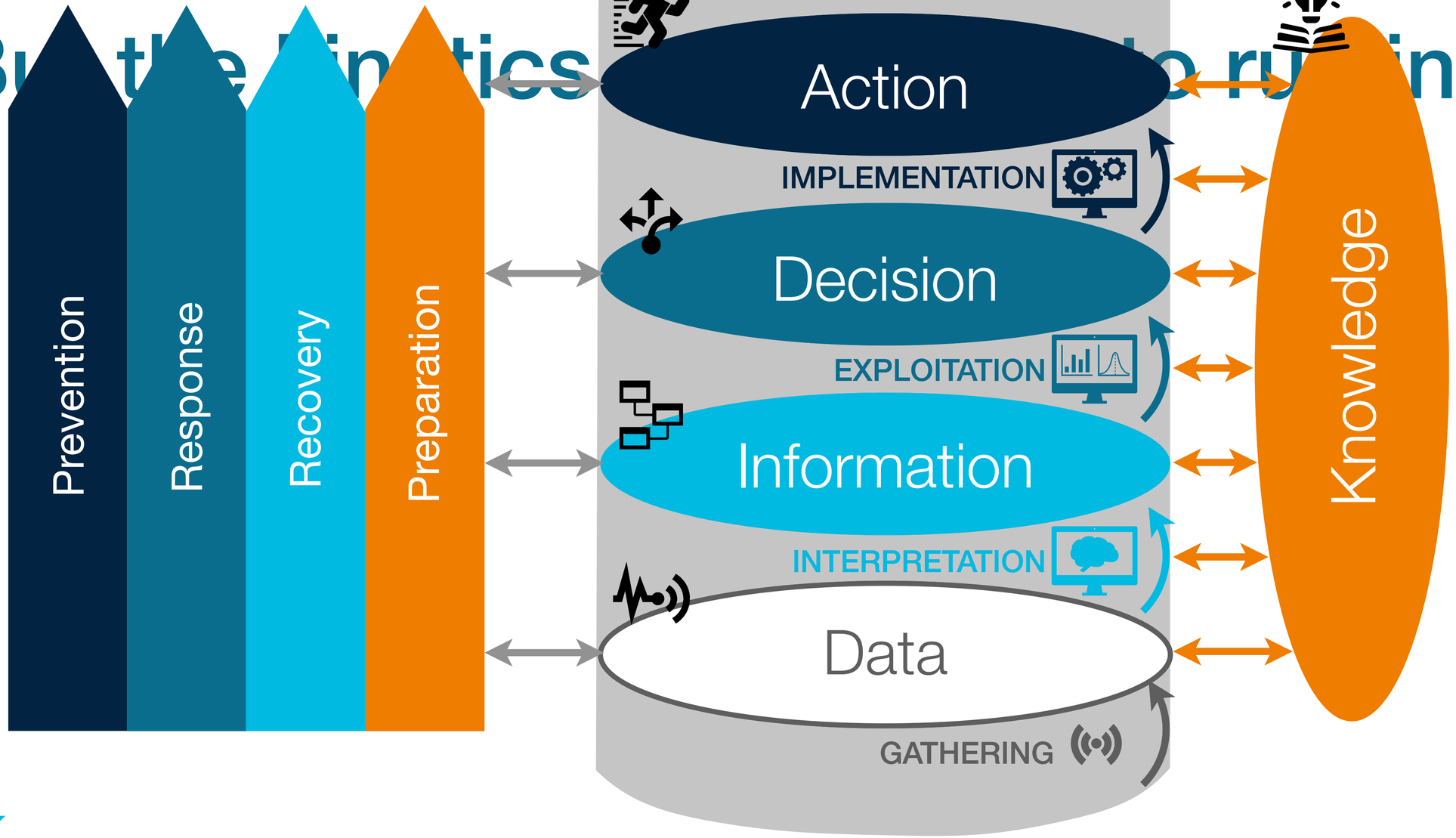
Response to instability

What reaction to instability?



Response to instability

But the kinetics [illegible] run in cycles

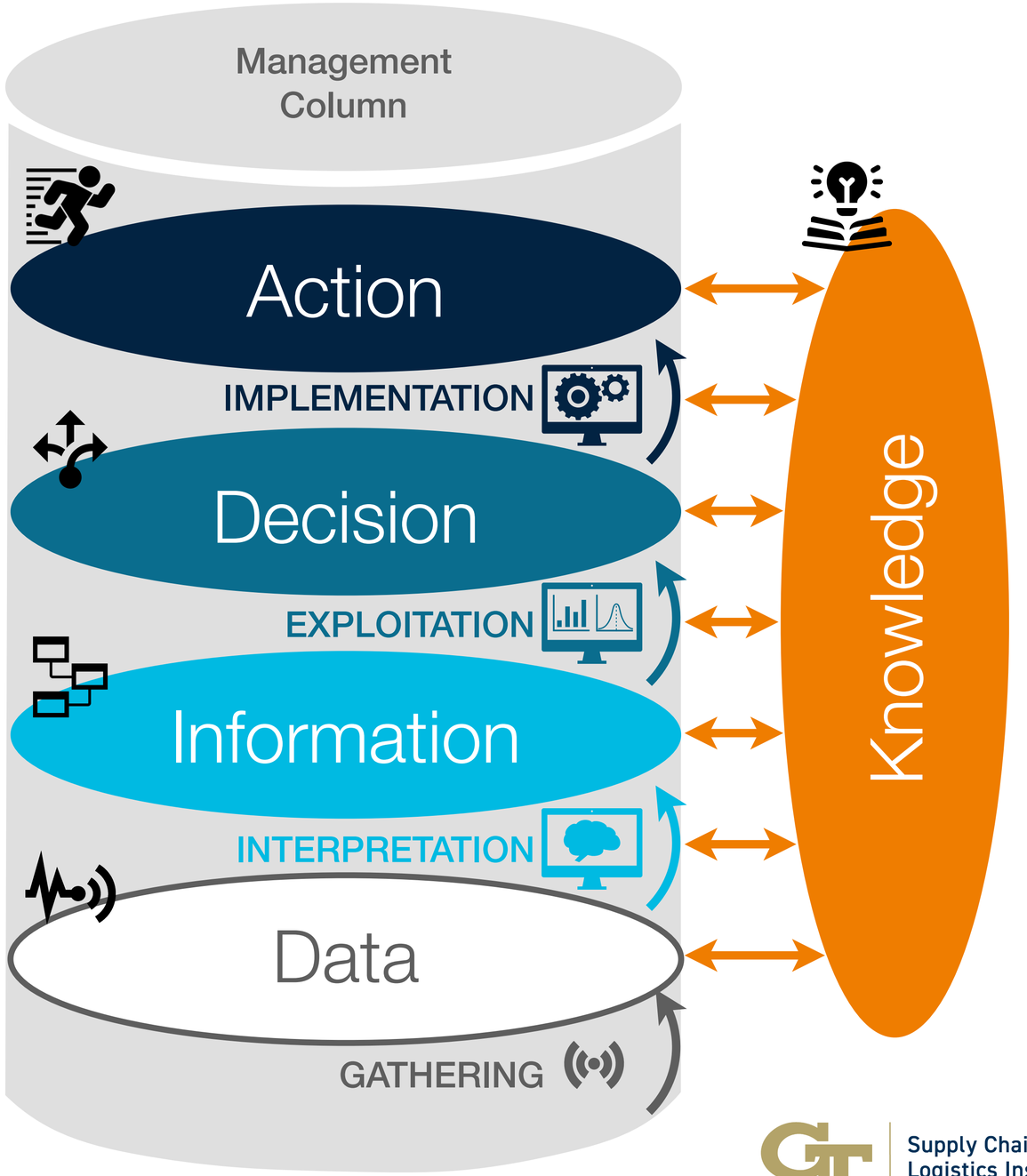


Perform the appropriate move(s)

Select the appropriate move(s)

Use their experience of boxing to understand their environment

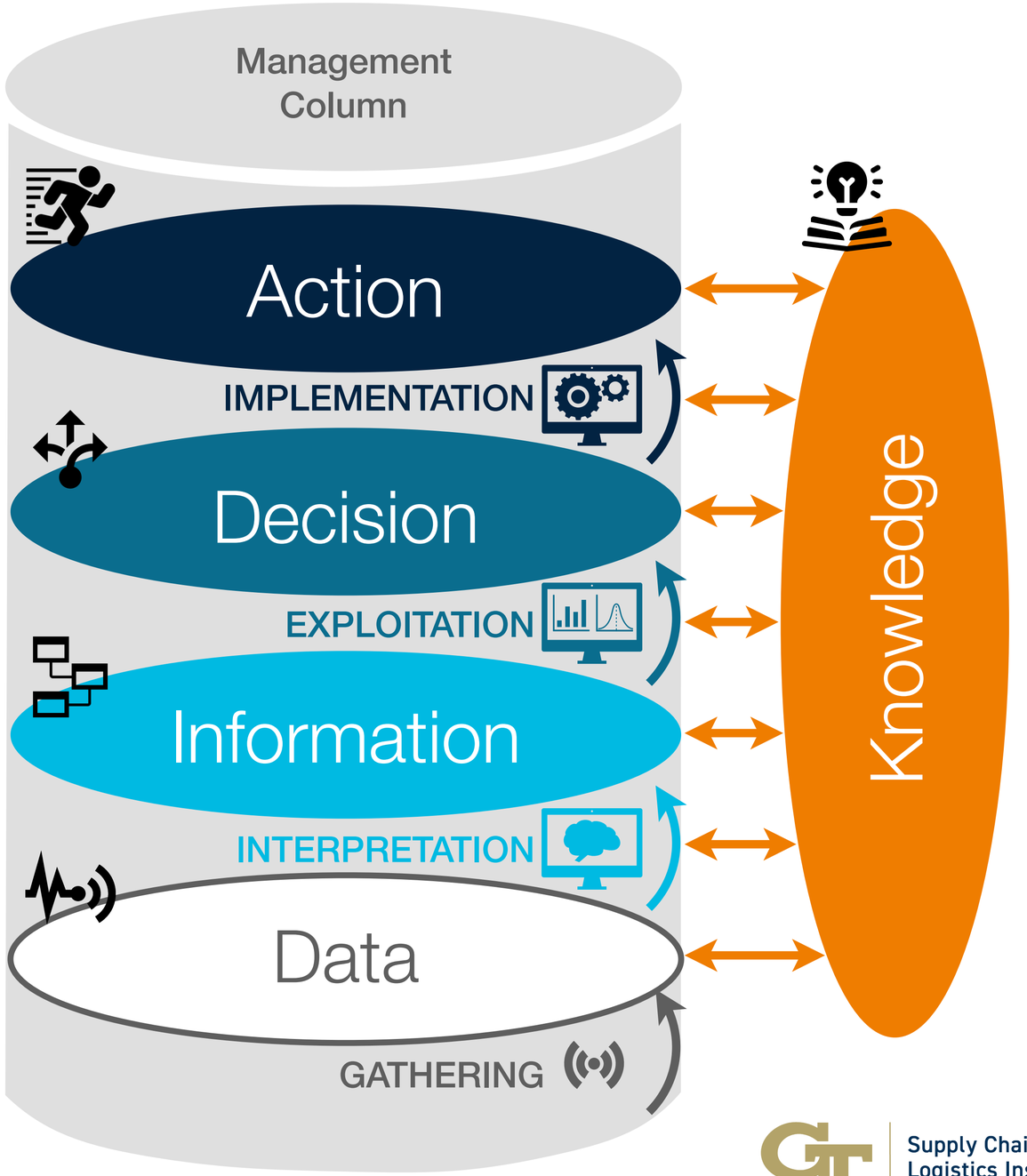
Use their senses to collect data about their environment



Deal with time scales (fight, career)

Manage relevance of move(s)

Define achievable objectives



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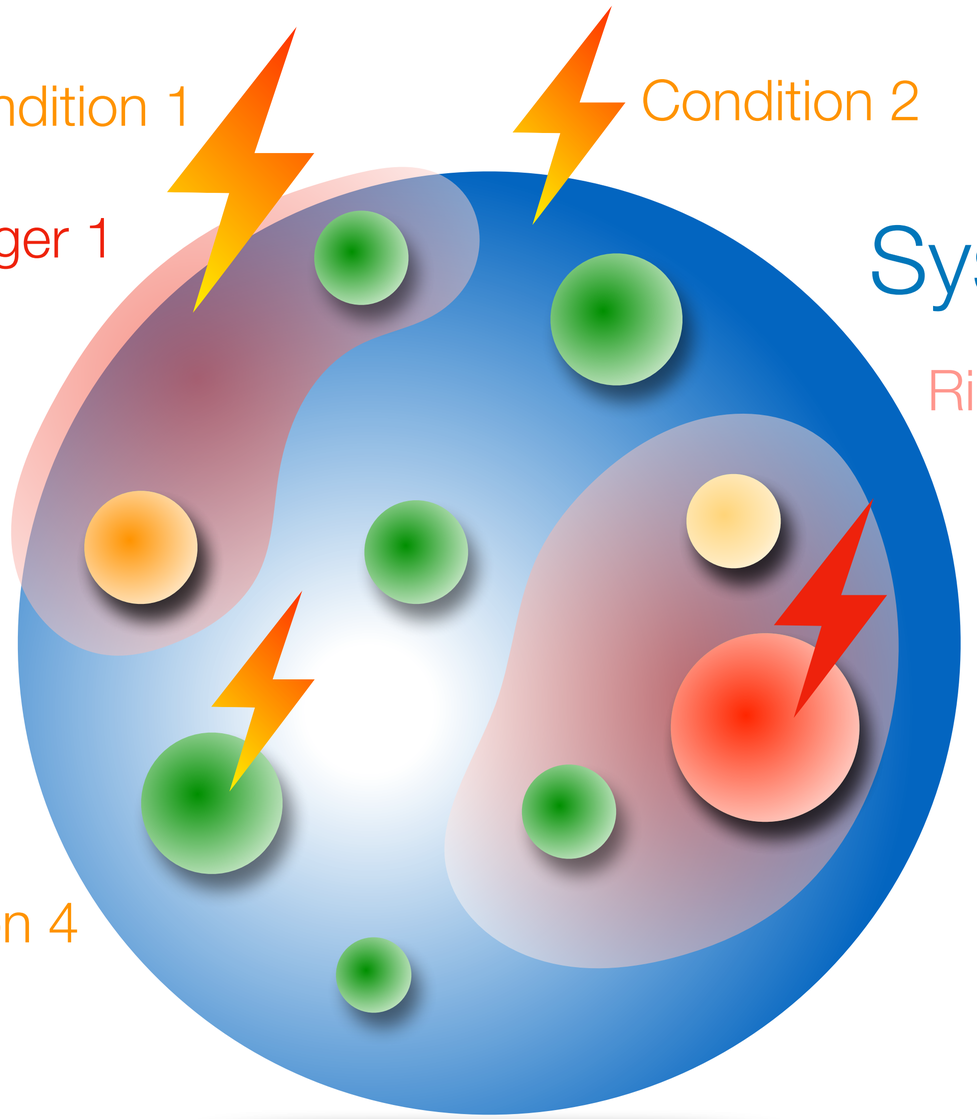
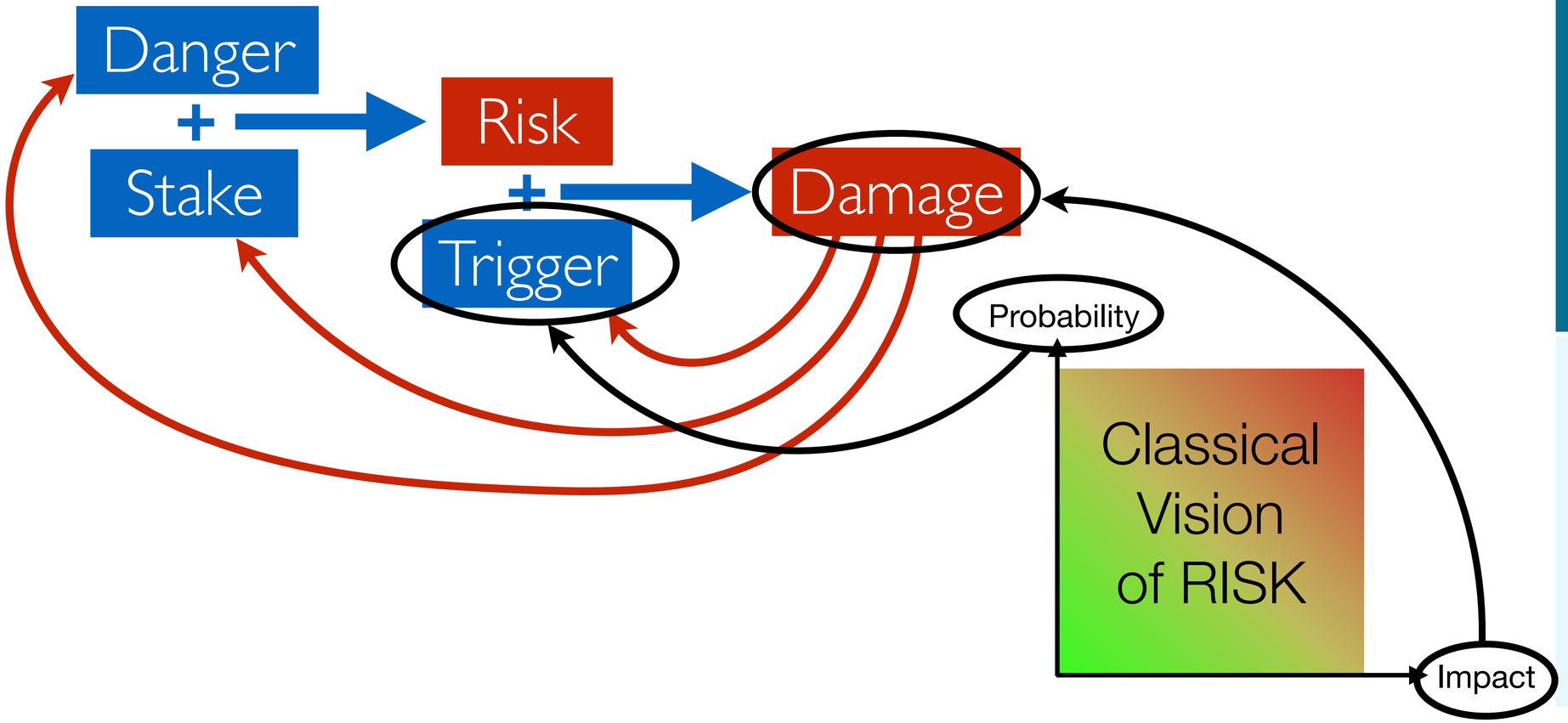
Response to instability



Response to instability

CAUSAL CHAIN

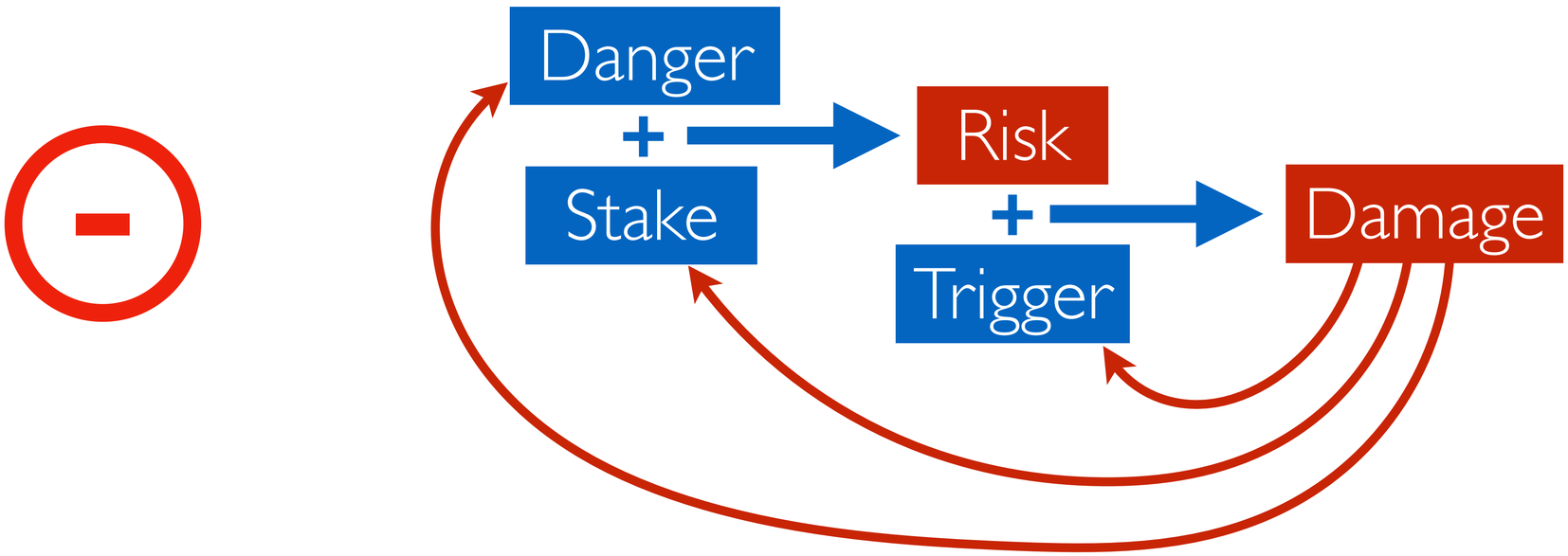
PROPAGATION CHAIN



Response to instability

CAUSAL CHAIN

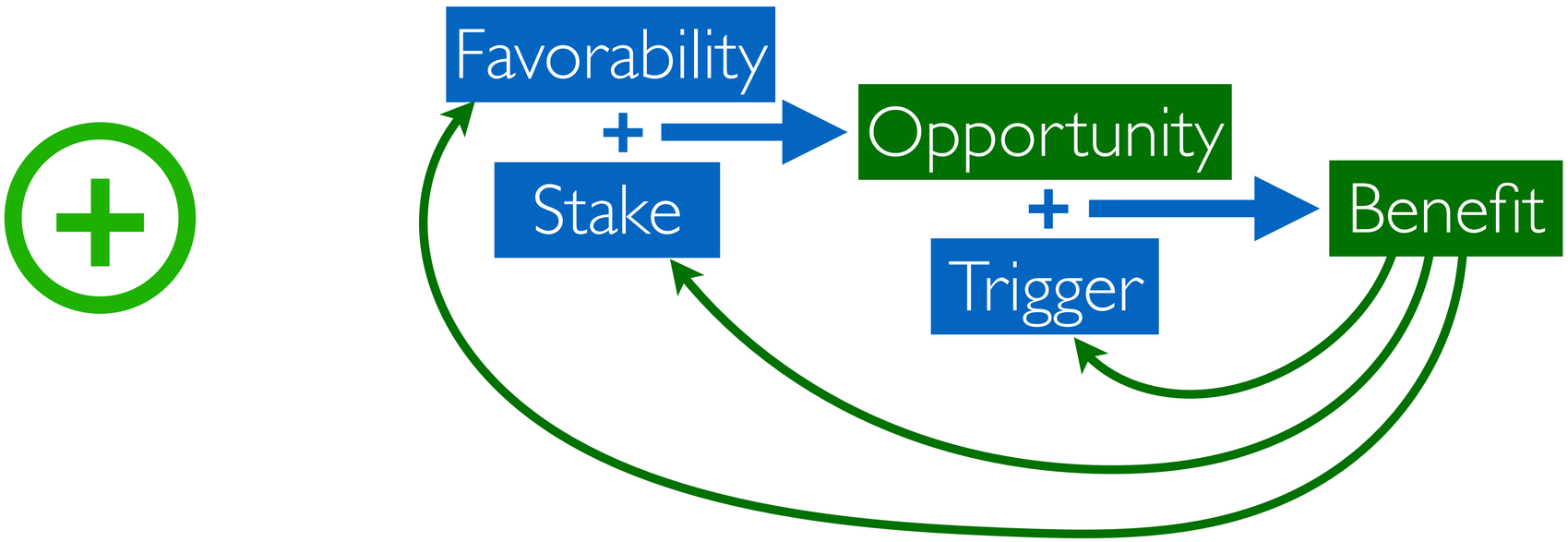
PROPAGATION CHAIN



Response to instability

CAUSAL CHAIN

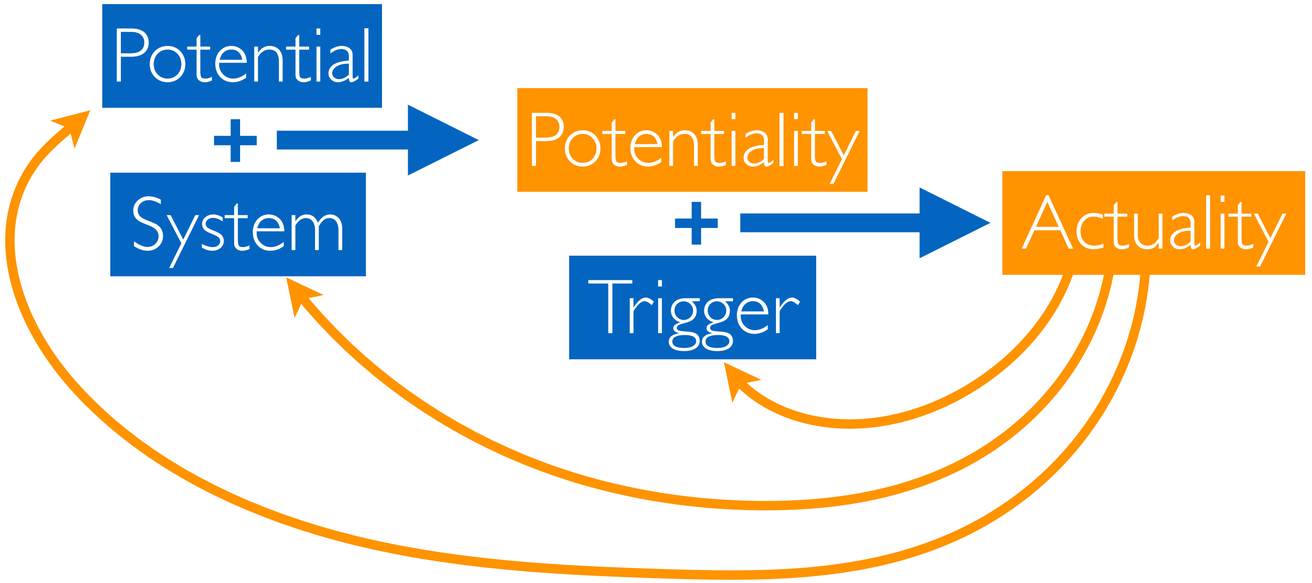
PROPAGATION CHAIN



Response to instability

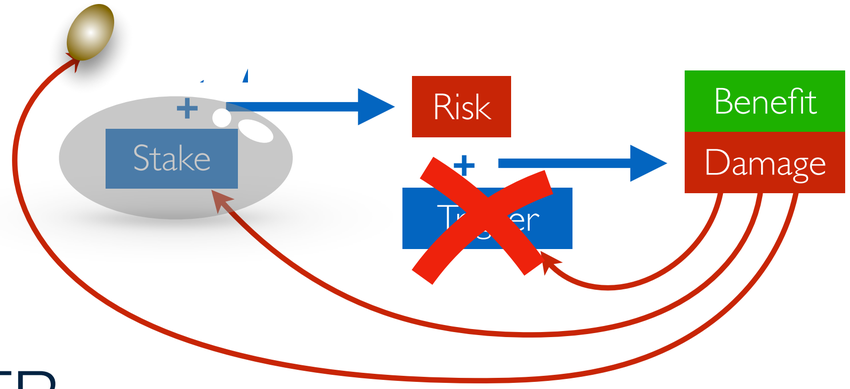
CAUSAL CHAIN

PROPAGATION CHAIN



Response to instability

PREVENTION



RESPONSE

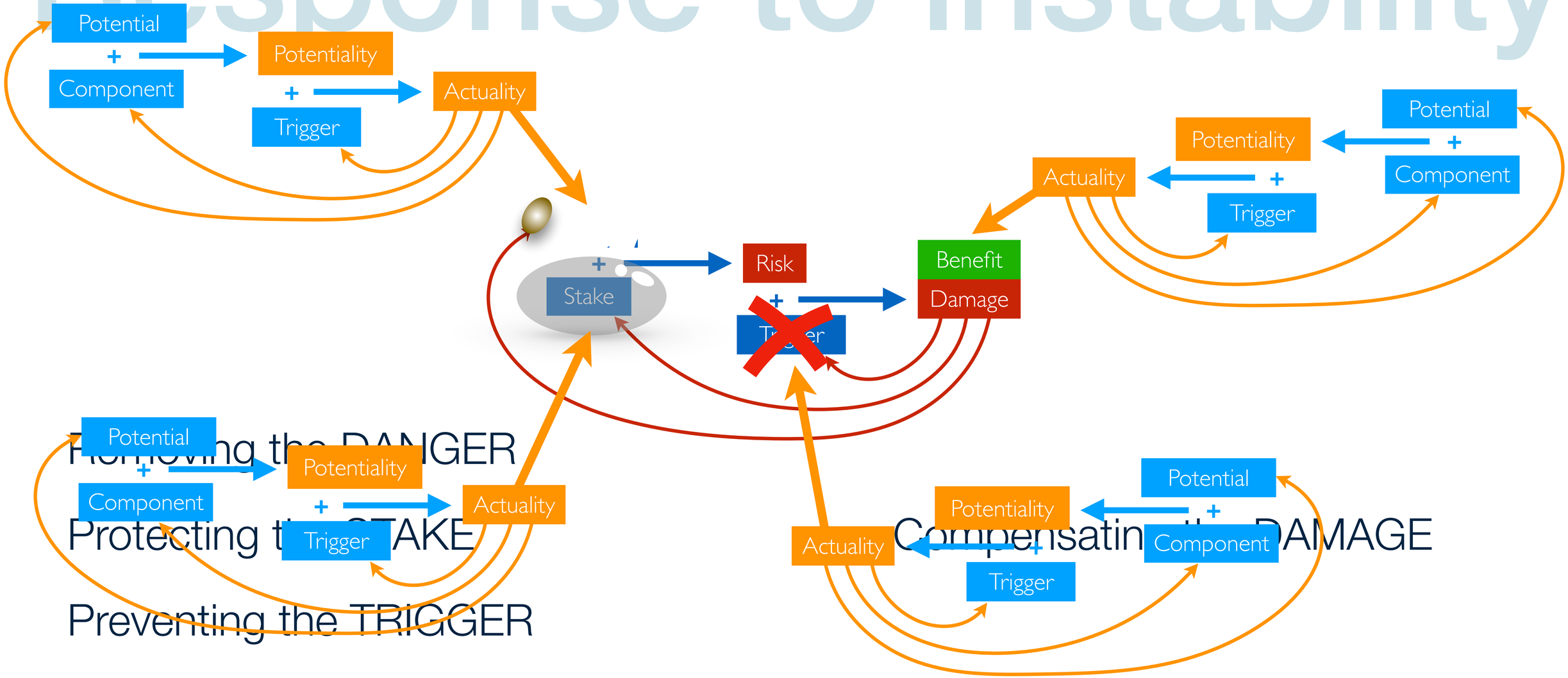
Removing the DANGER

Protecting the STAKE

Preventing the TRIGGER

Compensating the DAMAGE

Response to instability

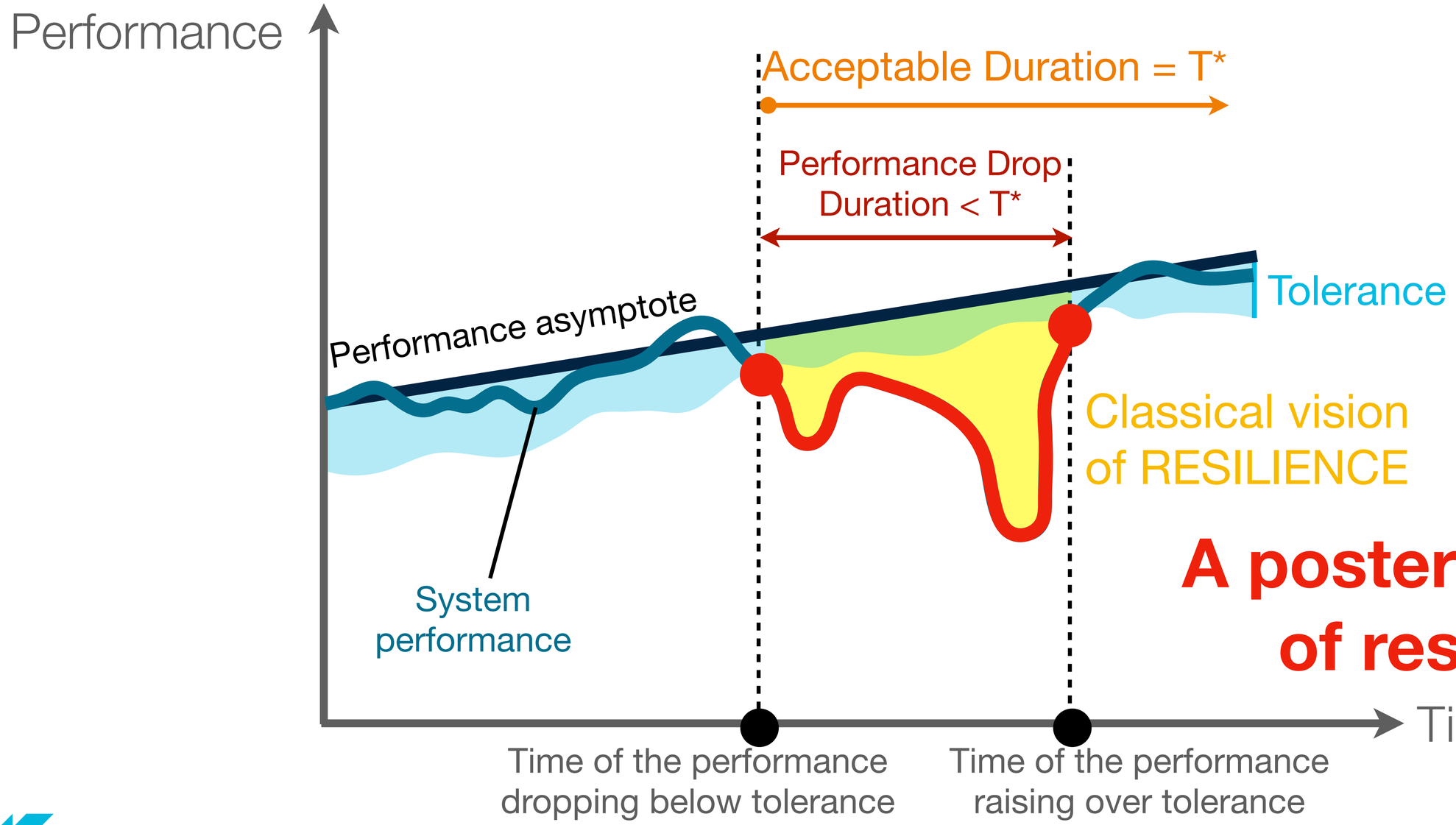


INSTABILITY

RESPONSE TO INSTABILITY

RESILIENCE

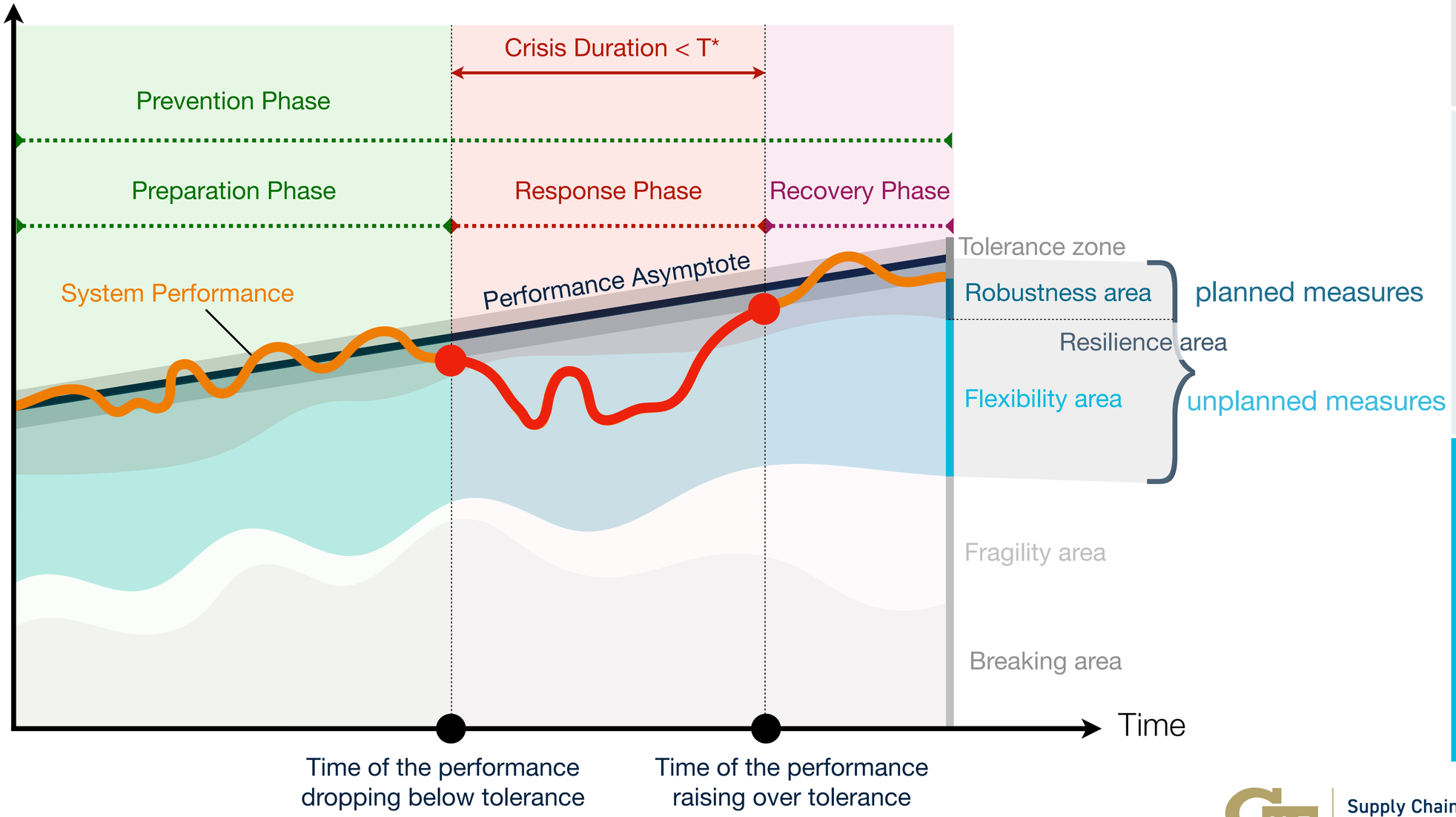
Resilience



A posteriori vision of resilience

Resilience

Live vision of resilience



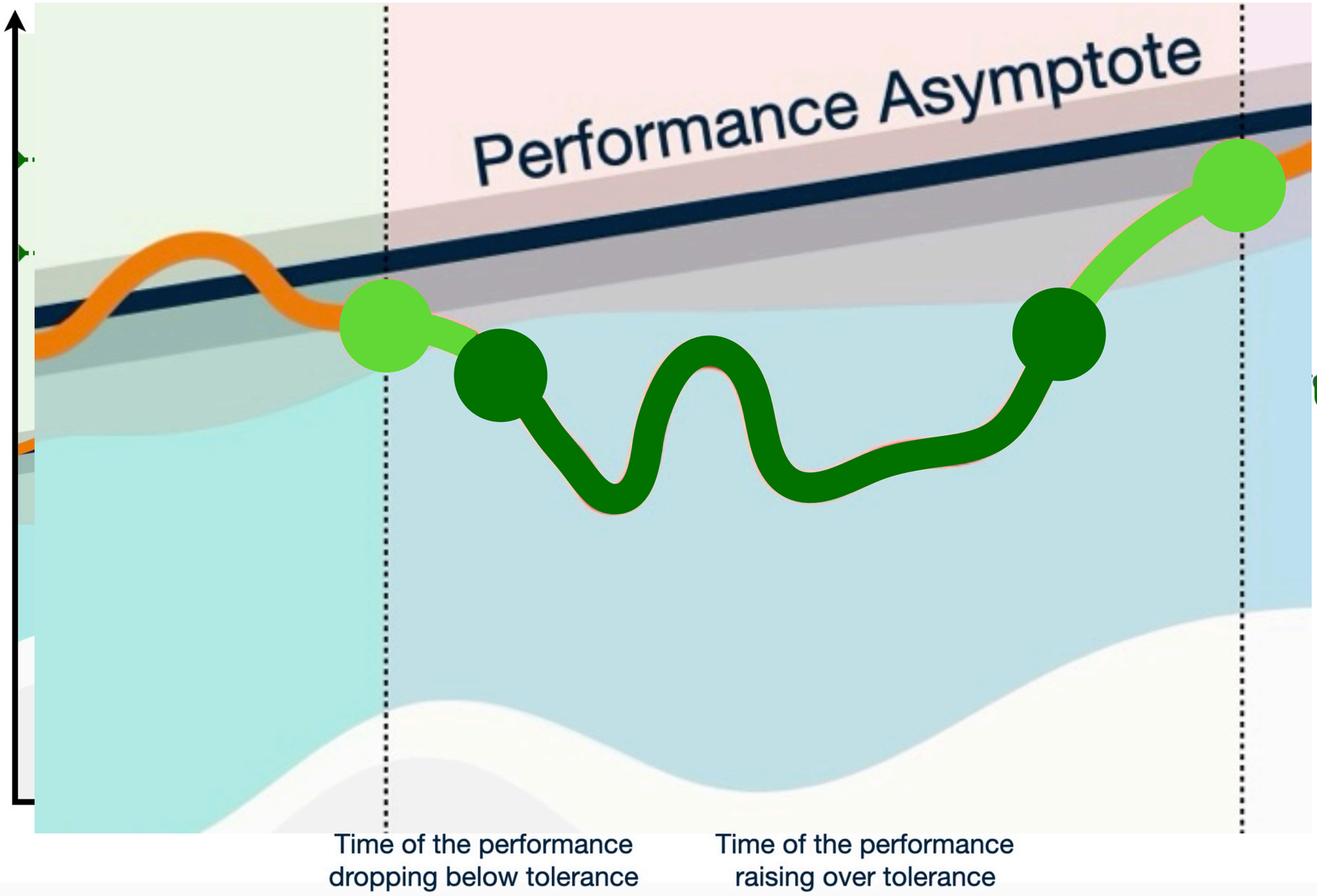
Resilience

To be discussed:

RESILIENCE OBSERVED FROM PERFORMANCE

vs.

RESILIENCE OBSERVED FROM CAPABILITY



PLANNED MEASURES

UNPLANNED MEASURES

Resilience

Robustness:

Flexibility:

Resilience:

Resilience

Resilience = Robustness + Flexibility

Resilience

How to improve RESILIENCE?

By improving ROBUSTNESS

and/or

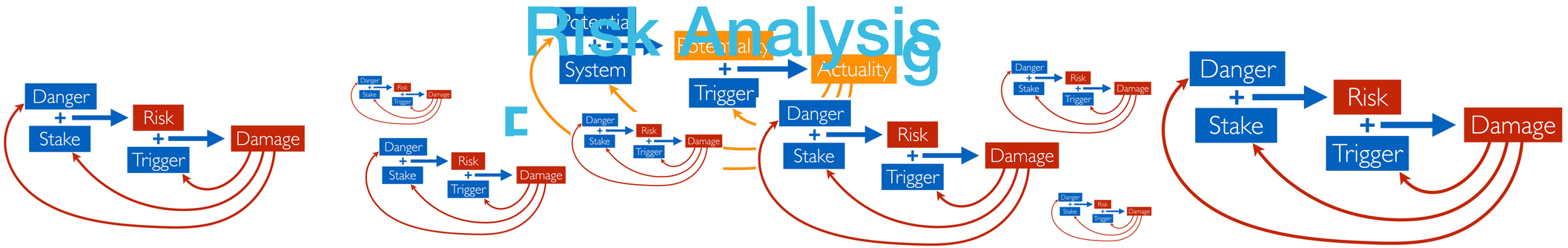
By improving FLEXIBILITY

PREVENTION
PREPARATION

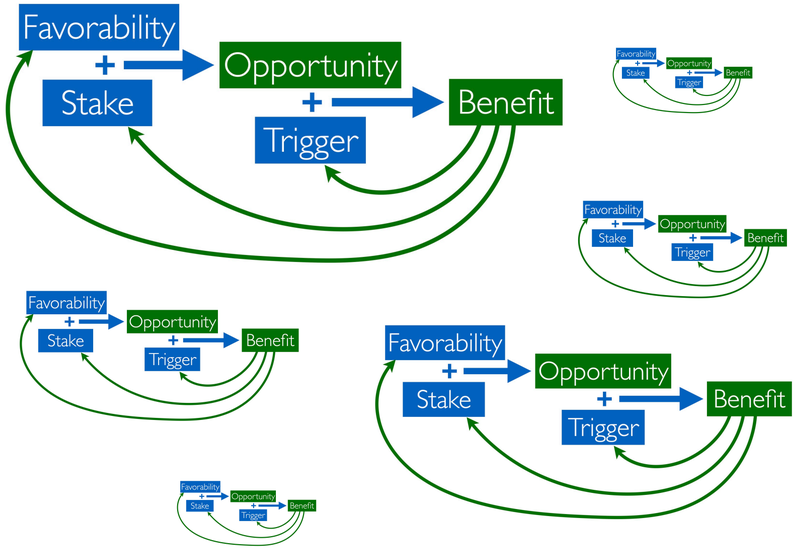
IMPROVISATION
REALLOCATION

Resilience

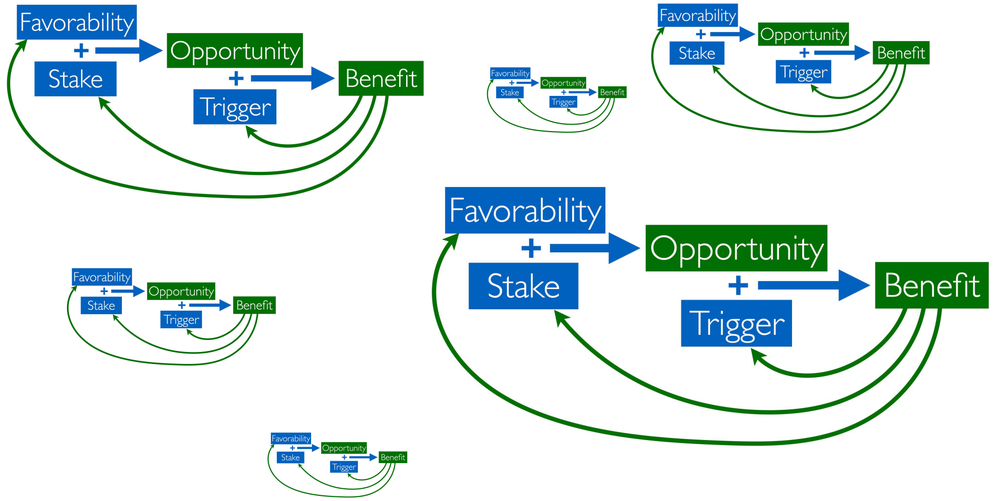
Risk Analysis



Prevention (preventive measures)



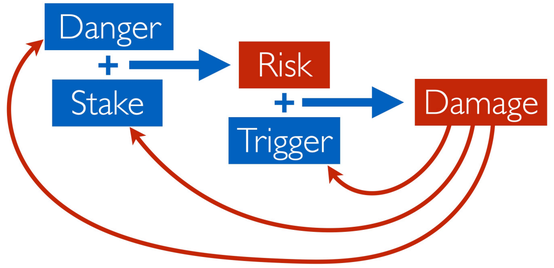
Preparation (corrective measures)



Resilience

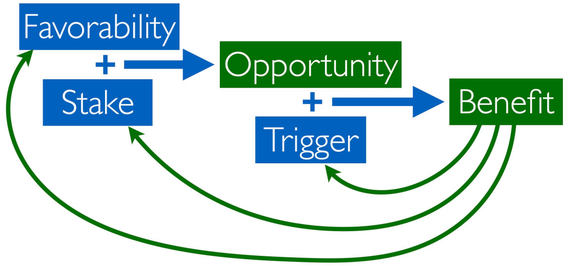
SO, NOW WE HAVE:

A set of risks

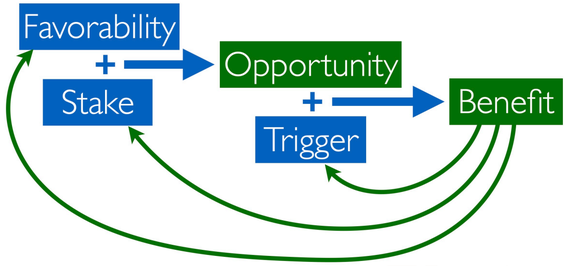


how to decide which measures to prepare or implement?

A set of preventive measures



A set of corrective measures

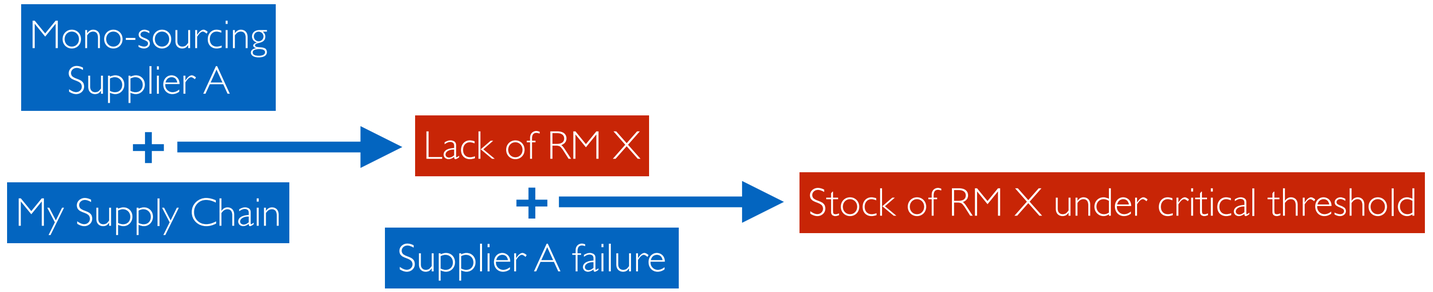


Resilience

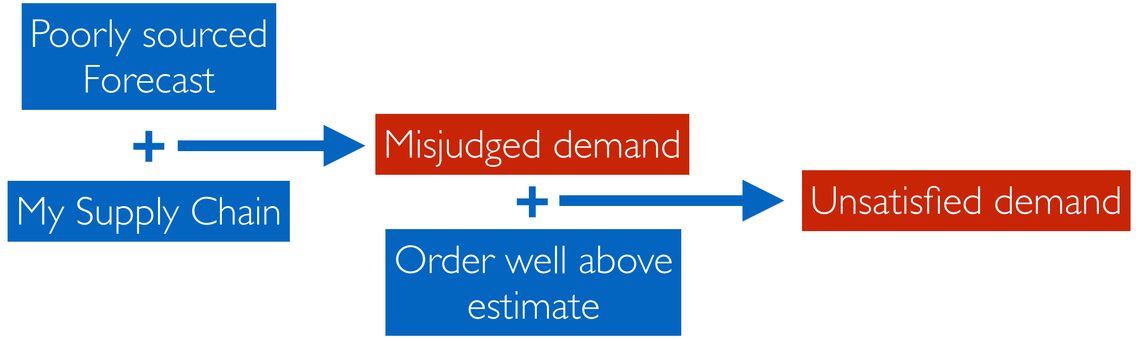
Let’s take a very simple example

Two risks have been identified

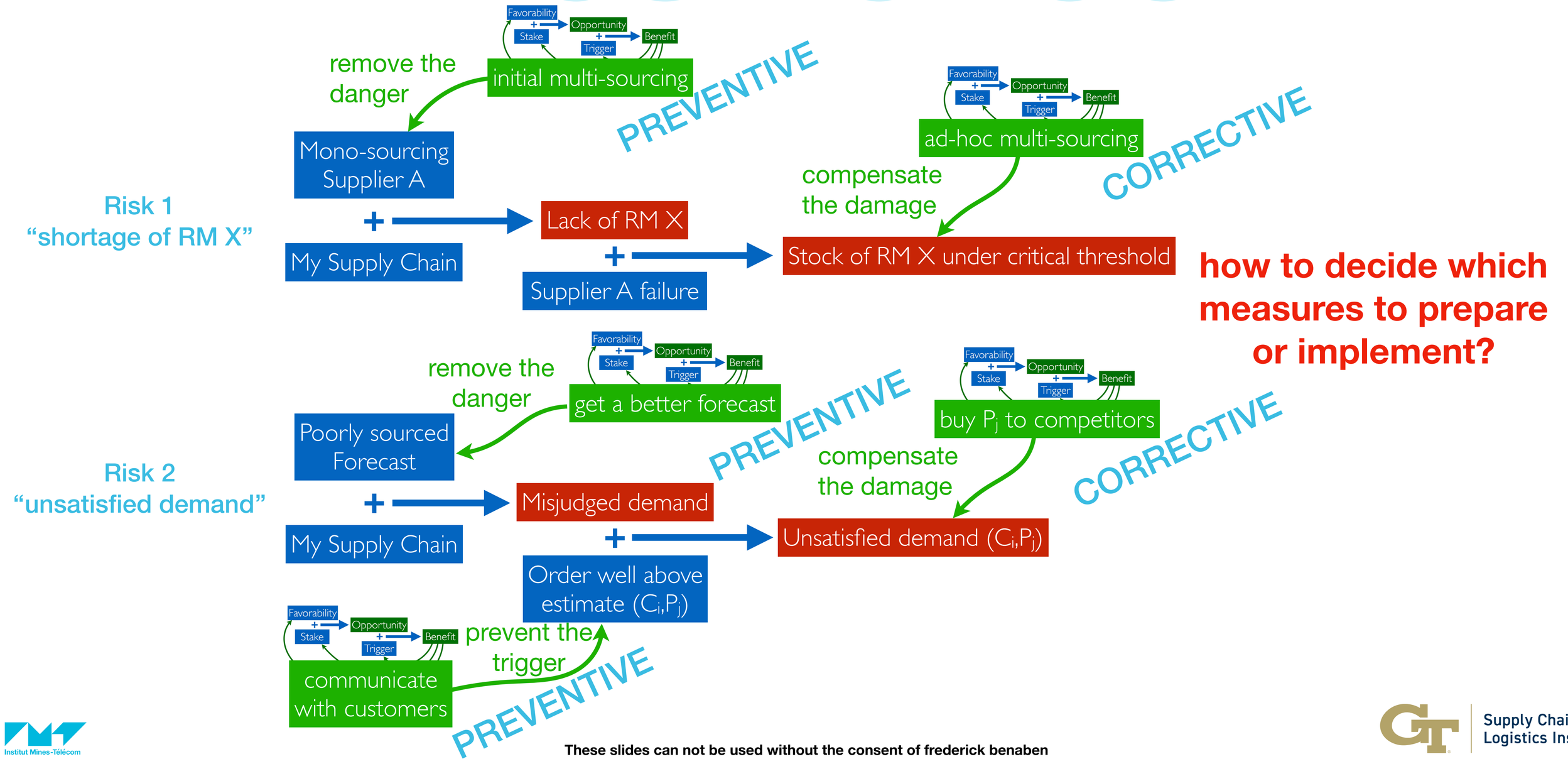
Risk 1
“shortage of RM X”



Risk 2
“unsatisfied demand”

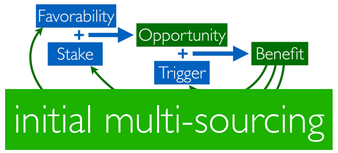


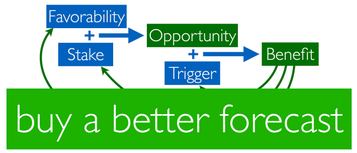
Resilience

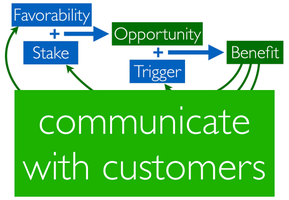


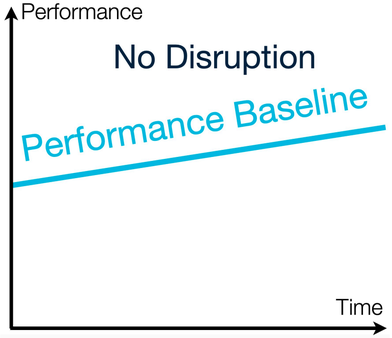
Resilience

PREVENTIVE

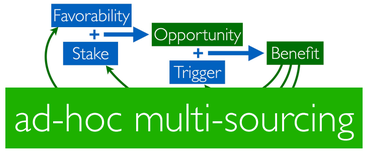


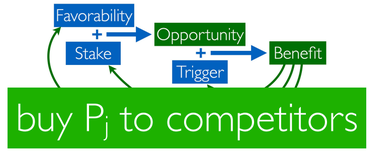






CORRECTIVE





How effective is the measure if the risk occurs?

What is the cost of implementation?

What is the disturbance if the risk does not occur?

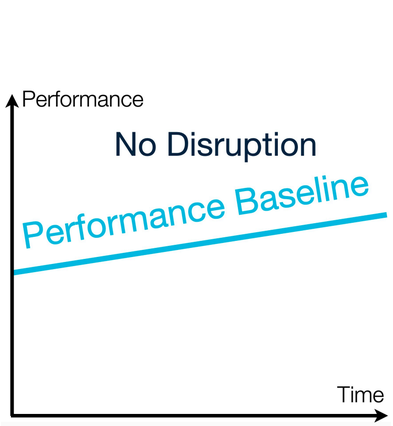
How effective is the measure if the risk occurs?

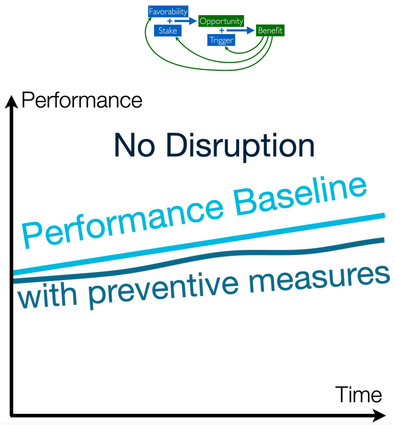
What is the cost of implementation?

Resilience

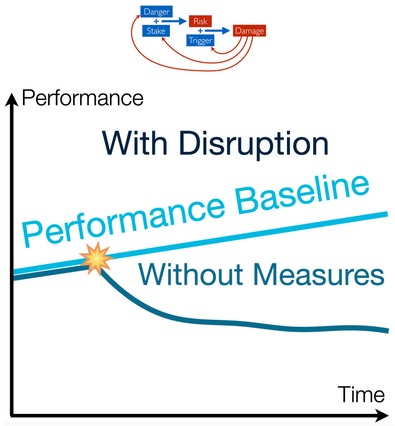
For all risks (or risk combinations)

The objective is to anticipate on the impacts…





initial multi-sourcing
get a better forecast
communicate with customers
$$



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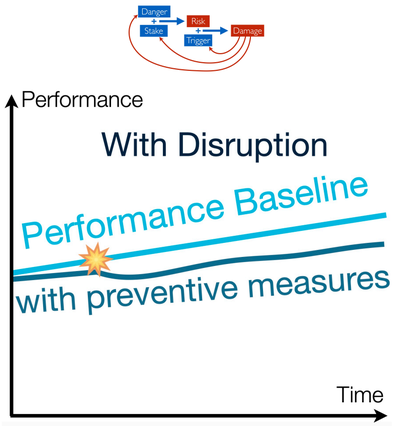

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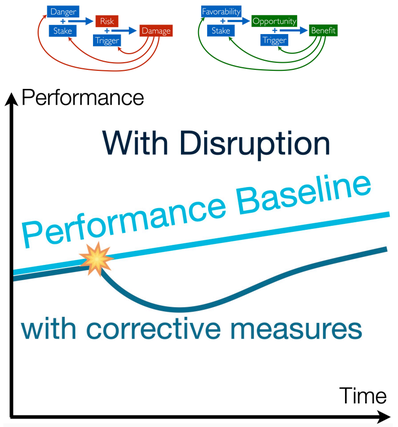
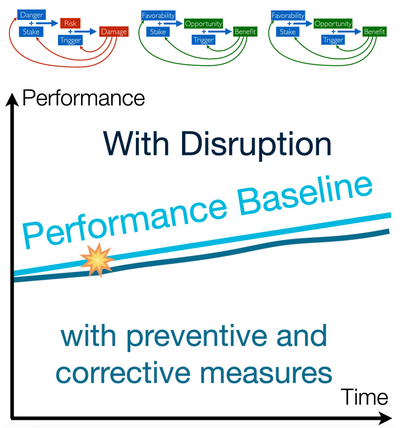


ad-hoc multi-sourcing
buy P_j to competitors
$



initial multi-sourcing
get a better forecast
communicate with customers
ad-hoc multi-sourcing
buy P_j to competitors
$$$

…in order to decide whether it is more appropriate to implement preventive measures (despite their cost and impact on the baseline) or to consider that the corrective measures ready to be deployed are sufficient.

Resilience

How to improve RESILIENCE?

By improving ROBUSTNESS

PREVENTION
PREPARATION

and/or

By improving FLEXIBILITY

IMPROVISATION
REALLOCATION

Resilience

By improving FLEXIBILITY

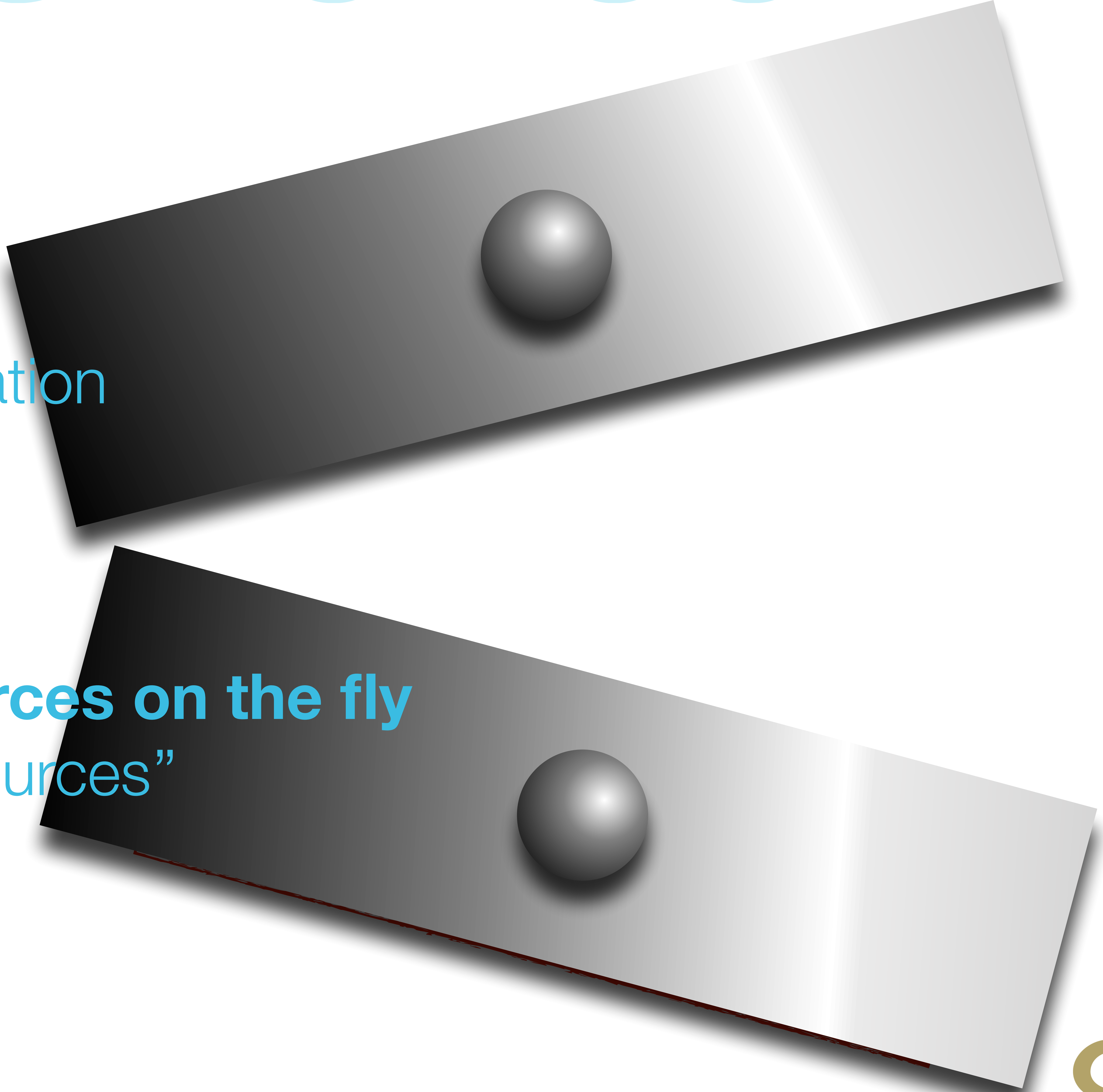
Having free capability

Not being in “resource 100% busy” configuration

Being able to reallocate resources on the fly

Having “Multi-skilled resources”

Resilience



Having free capability

in “resource 100% busy” configuration

Being able to reallocate resources on the fly

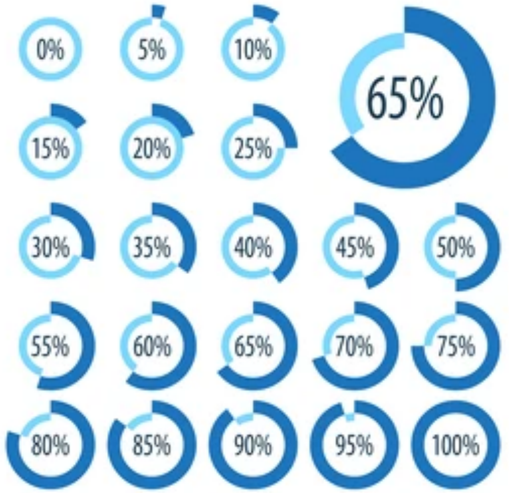
resources on the fly

Having “Multi skilled resources”

Resilience

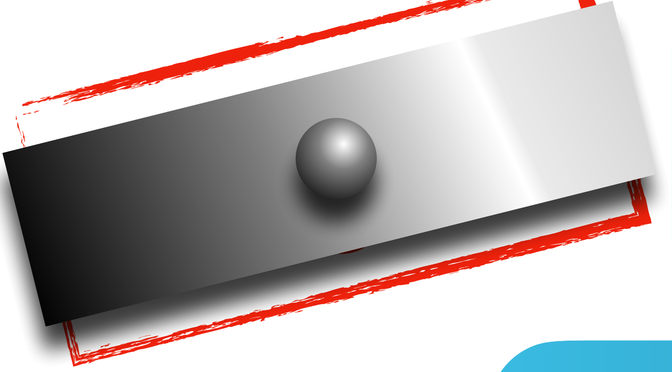
SO, NOW WE HAVE:

Control of
the load rate



It is a compromise between high efficiency and flexibility

favor multi-skilled
resources and
partners



Resilience

How to improve RESILIENCE?

By improving ROBUSTNESS

- Identify risks
- Define preventive measures
- Define corrective measures
- Define robustness plan

and/or

By improving FLEXIBILITY

- Map partners and resources
- Analyze their work load
- Analyze their skills
- Define flexibility plan

Conclusion

Conclusion

- Identify risks
- Define preventive measures
- Define corrective measures
- Define robustness plan

Chose measures to prepare and implement

- Map partners and resources
- Analyze their work load
- Analyze their skills
- Define flexibility plan

Define allocation of resources and partners

Need for continuous risks and capabilities monitoring to assess and project performance

Upcoming Supply and Demand Planning Courses

Suppy Chain Risk and Resilience
May 5-6, 2025 | Virtual (Instructor-led)

World Class Sales and Ops Planning
May 12-14, 2025 | Virtual (Instructor-led)

Suppy Chain Risk and Resilience
October 16-17, 2025 | Virtual (Instructor-led)

World Class Sales and Ops Planning
Nov, 3-5 2025 | Virtual (Instructor-led)

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Upcoming NextGen Courses

Generative AI Application for Supply Chain Professionals

March 26, 2025 - March 28, 2025 | Georgia Tech Global Learning Center/ Virtual (Instructor-led)

Modern Supply Chain Overview

April 21, 2025 – April 23, 2025 | Georgia Tech Global Learning Center

Generative AI Application for Supply Chain Professionals

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Upcoming SCL Lunch and Learn Opportunities

Succeeding in the Modern Supply Chain

w/ Dr. Matthieu Lauras

Thursday, April 3rd | 12-1pm ET | Zoom Registration Link

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