



# 10 Years of Failure

How Racecar Teams and SREs Deal With Complex Problems

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## Who am I

- LinkedIn SRE for 3 years on API, web & mobile SRE team
- Amateur race car driver for over 10 years
- Both are very similar!





## 24 Hours of Lemons

- Race series for \$500 cars
- Team of 4-6 people, everyone works on the car
- Very similar to being a SRE :D
- Building a reliable, resilient system
- Driver stints (oncall)
- Incidents
- Working sessions





## Early work

Entire focus was on the car

- Tuning
- Fixing



Fix car





Fix car again





Fix car again, again





Problem  $\Rightarrow$  Fix. Win?





Almost



Eventual win





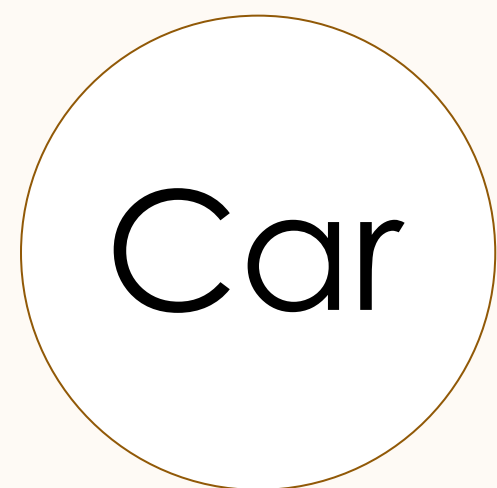


Our model changed

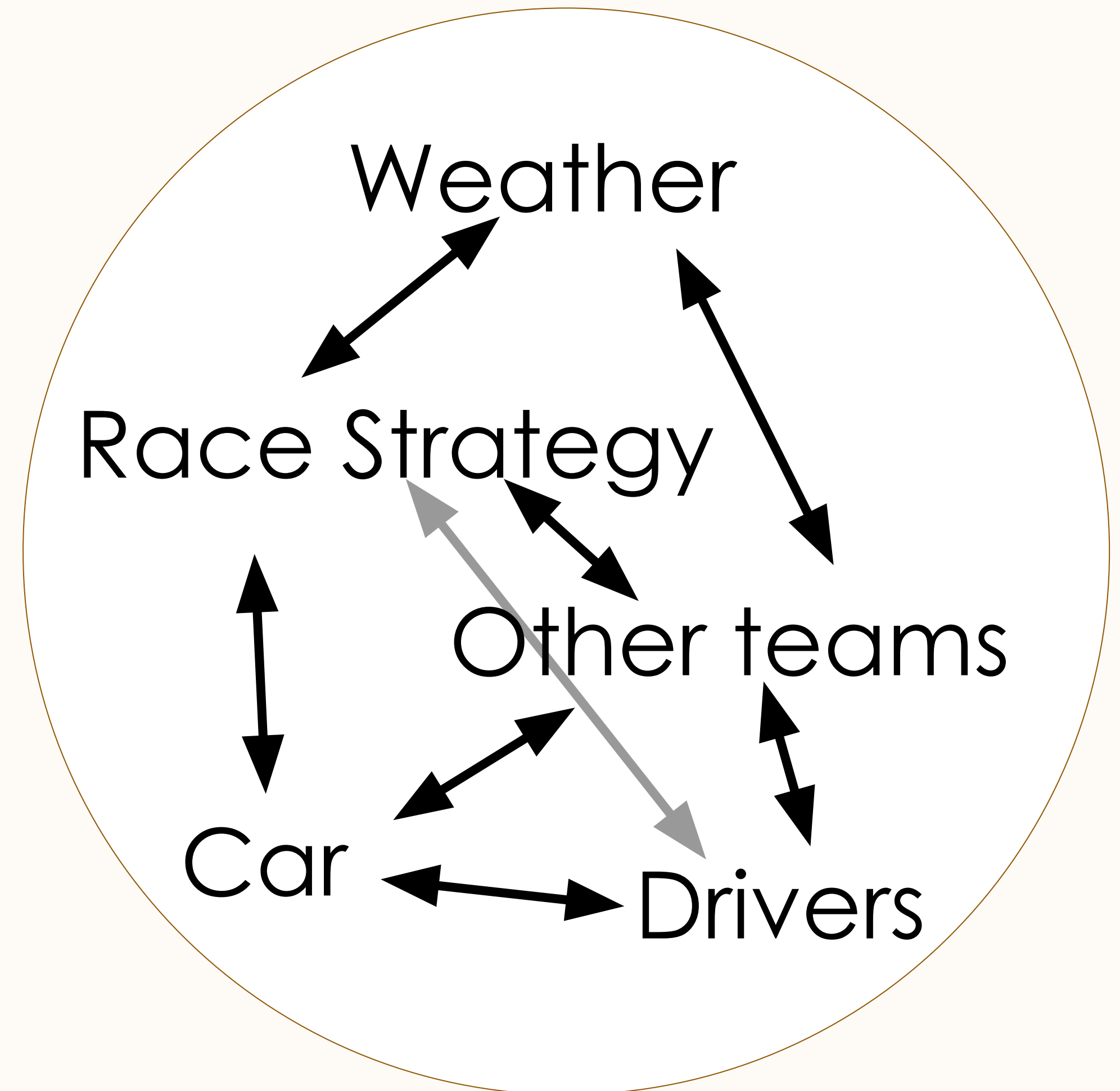


# Model change

Old



New





# Complex Systems vs Complicated Systems



# Complex Systems

- Stochastic - effects of changes are not proportional, a small change may have massive impact.
- Run in degraded mode.
- There is no root cause for incidents - complex systems have many safeguards, so failure requires many contributors.
- Many dynamic events occurring all the time and interacting.
- Localized changes have unintended changes in other areas.
- Same starting conditions can produce different outcomes.



Sound Familiar?



We are dealing with complex systems



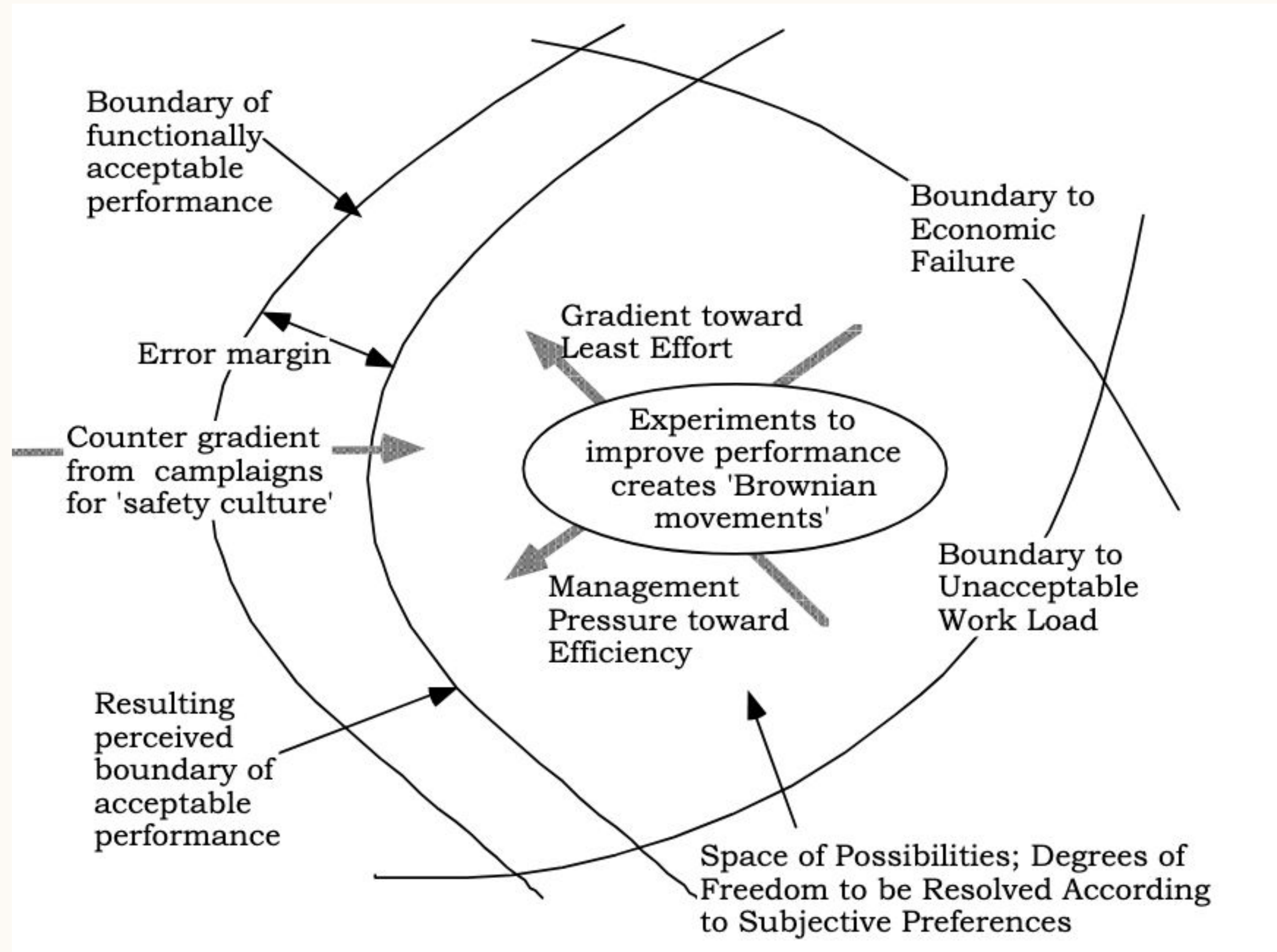
Complex systems require a different approach



# Tips for handling complex systems



# Understand the pressures involved





# Go beyond 'root cause'

- 'Contributing factors' is a better label
- Pursue 'second stories' - look at systems and processes involved



# Search for systemic issues

- Look for gaps
- Record 'close calls' - these are indicative of systemic issues
- Encourage teammates to bring up problems



# Understand that people create safety

- Every day people make decisions that create safety in complex systems
- People are the largest source of adaptive capacity in systems
- Invest in them



This is the first step

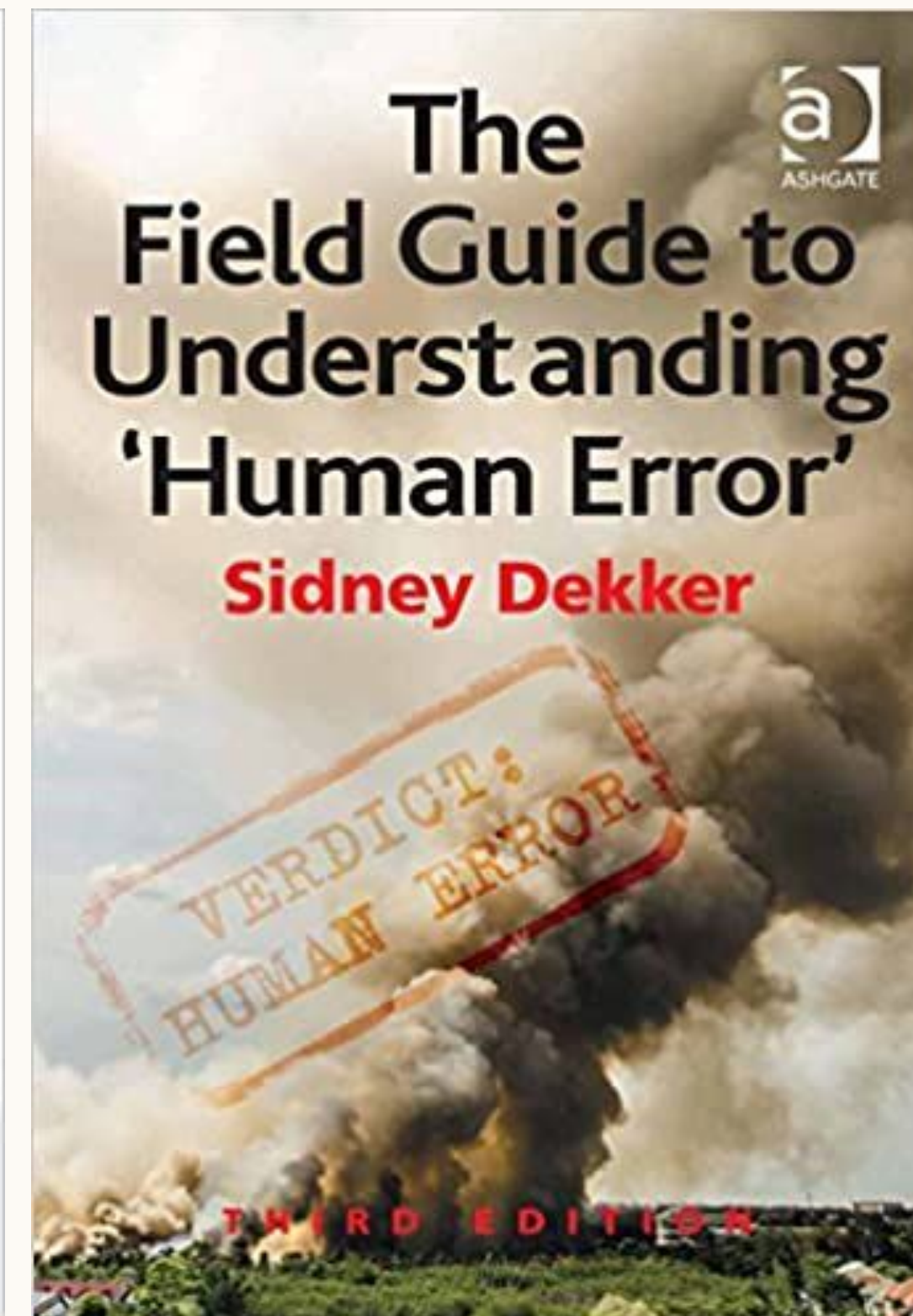
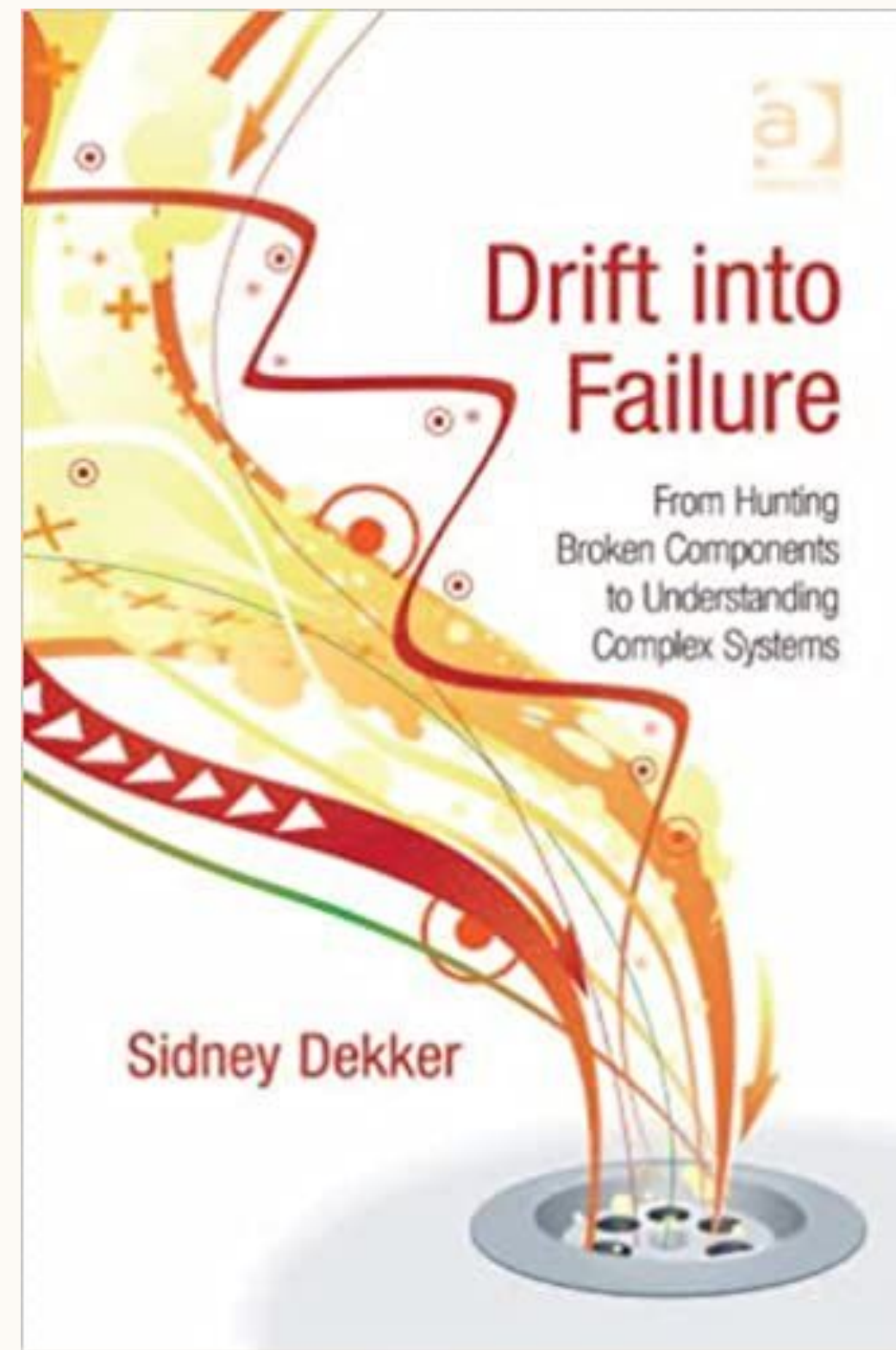
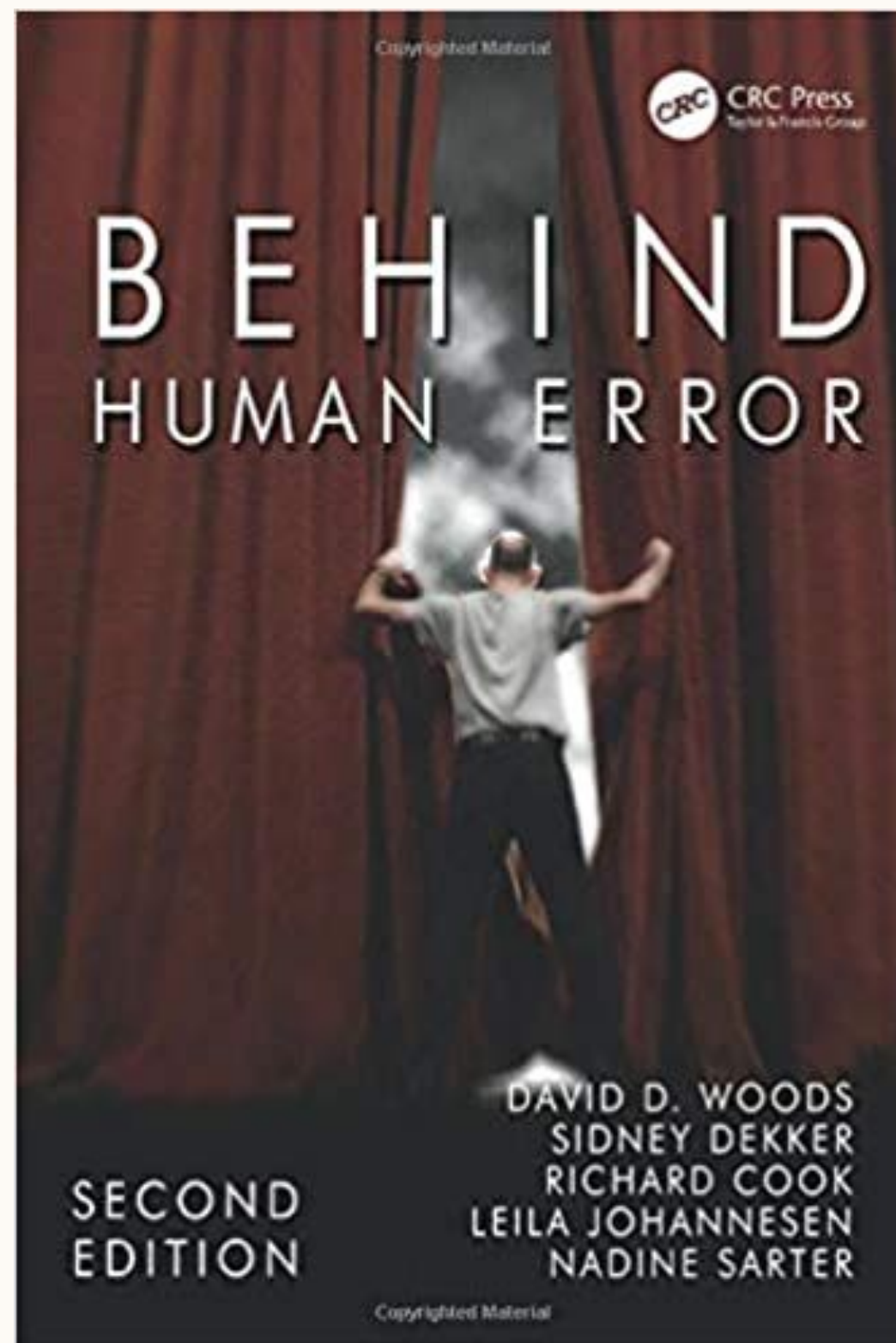


Next steps

# To Learn More

Papers:

- How Complex Systems Fail
- <https://www.learningfromincidents.io/>
- <https://github.com/lorin/resilience-engineering>





Thank You