SYSTEMS THINKING - VISUALIZING RELATIONSHIPS

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NORTHFIELD

improving
It's what we do. ™

online
business systems

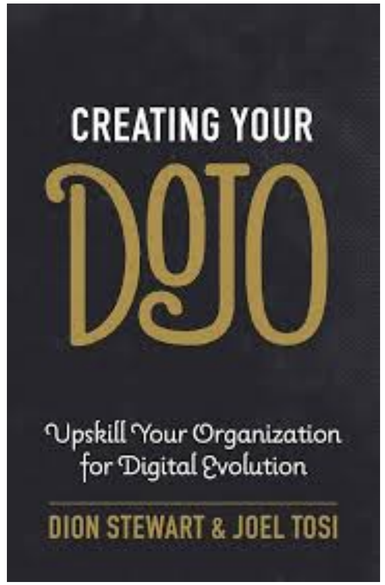
CONQUEST

IcePanel

POLLARD
banknote limited

RICHARDSON

ABOUT ME



CME Group

verizon

ATLASSIAN

CENTENE Corporation

Northwestern Mutual

IT

Coming Fall 2026

MARK43

Edward Jones

TVA

STELLANTIS

FCA
FIAT CHRYSLER AUTOMOBILES

Human Resources and Social Development Canada
Ressources humaines et Développement social Canada

NG

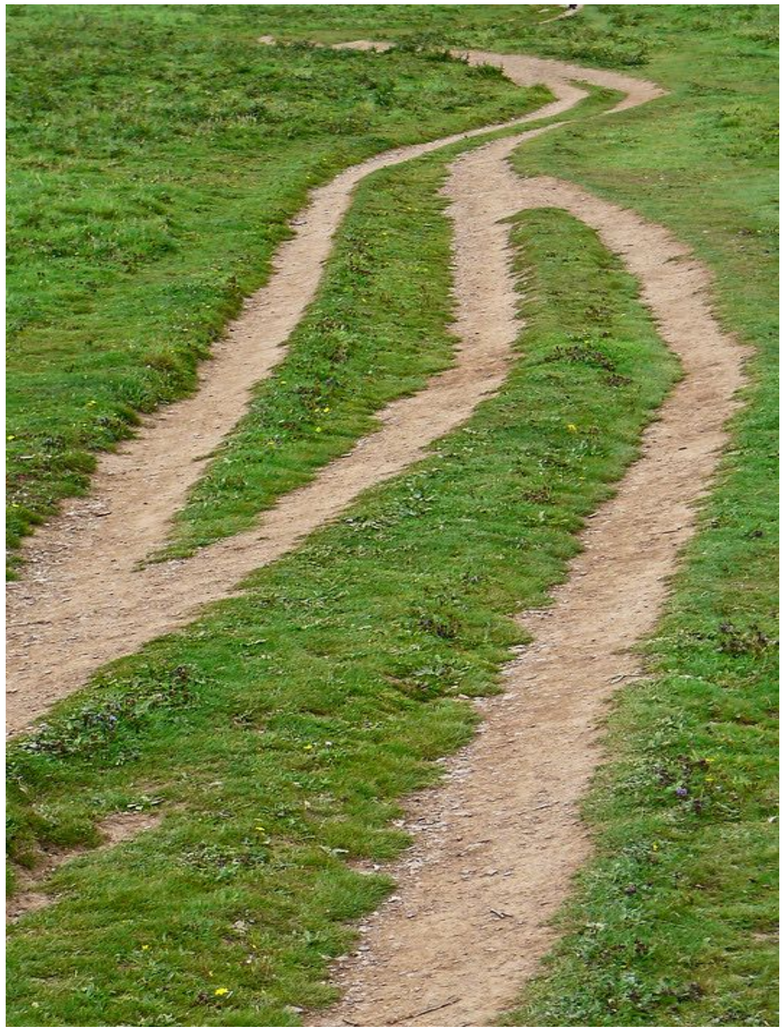
WHERE WE ARE GOING

CORE (TELL YOUR STORY):

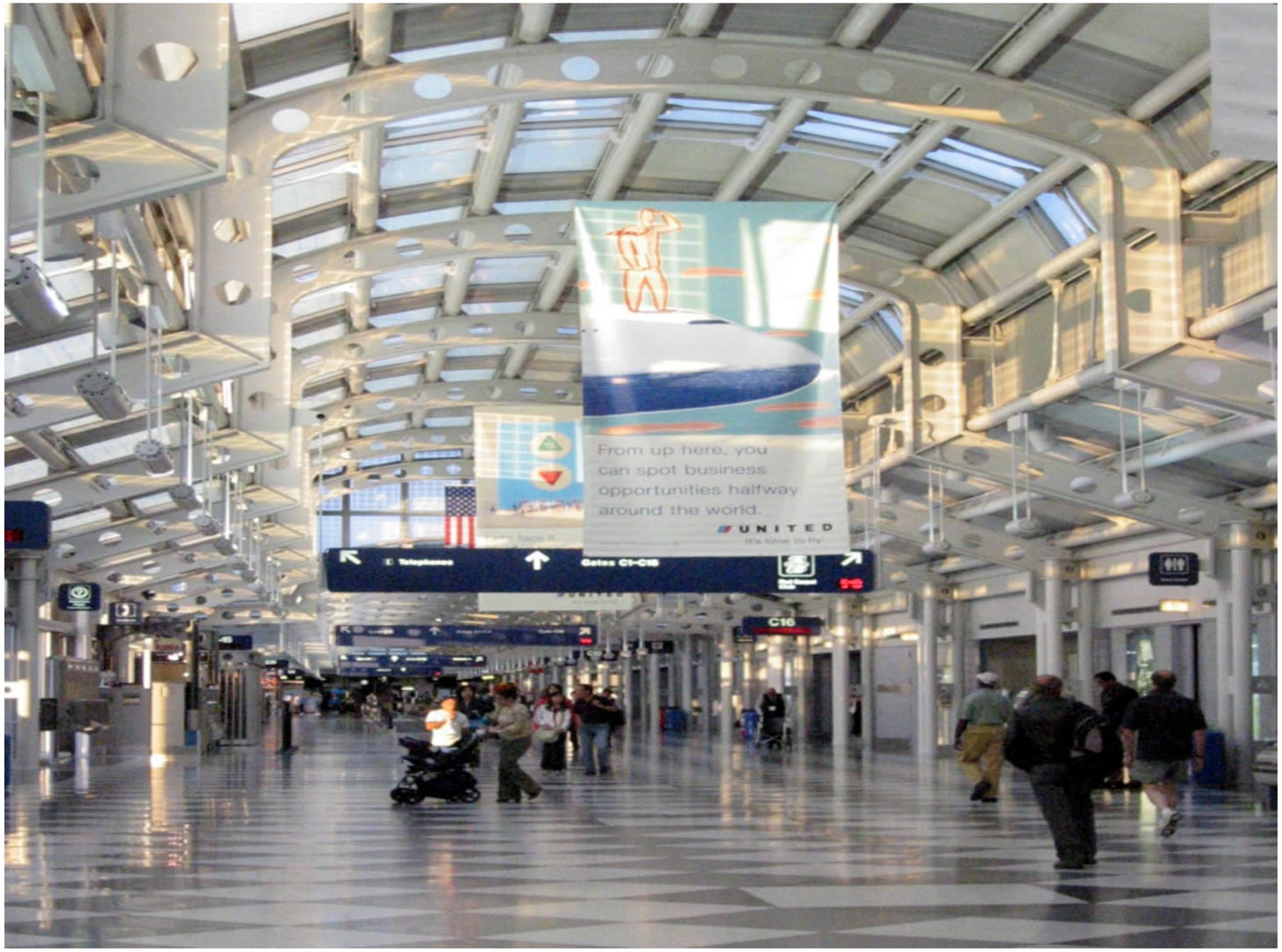
- Measuring Variability
- Modeling Reality
- Not Black and White
- Demand Types
- Applying
- Shewhart Charts
- Causal Loops
- U-Curves & Optimizations
- Value / Failure Demand
- CuriousDuck.io; Homework

OTHER TOPICS (DECISIONS):

- Options on Where to Act
- Understanding Roots
- Leverage Points
- Iceberg Model

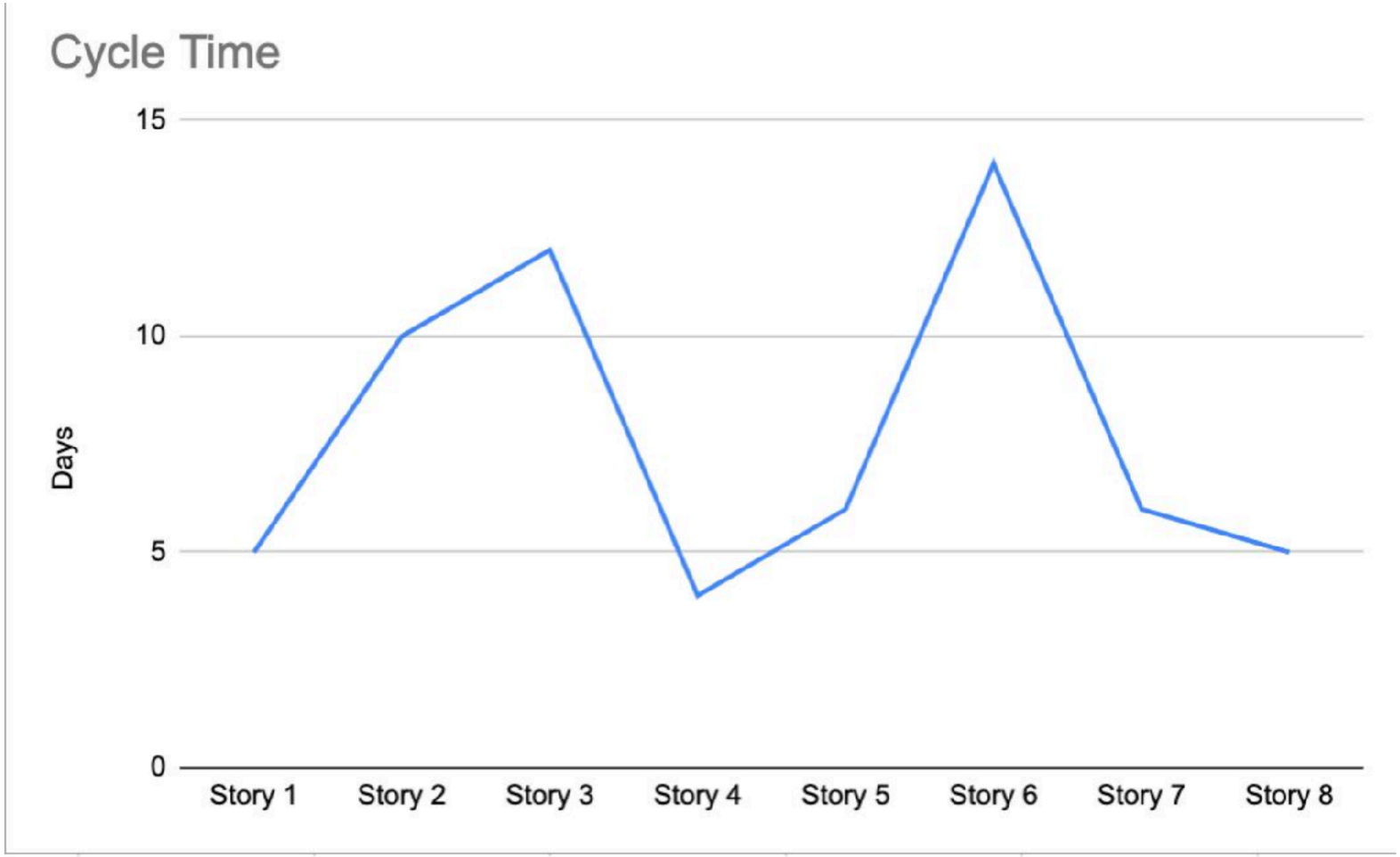


WHEN SHOULD I LEAVE?



IMAGINE THIS TEAM

WHAT DO YOU THINK?



A) Next story takes 8?

B) Next story takes 15?

C) Next story takes 20?

D) Next 3 stories take 1?

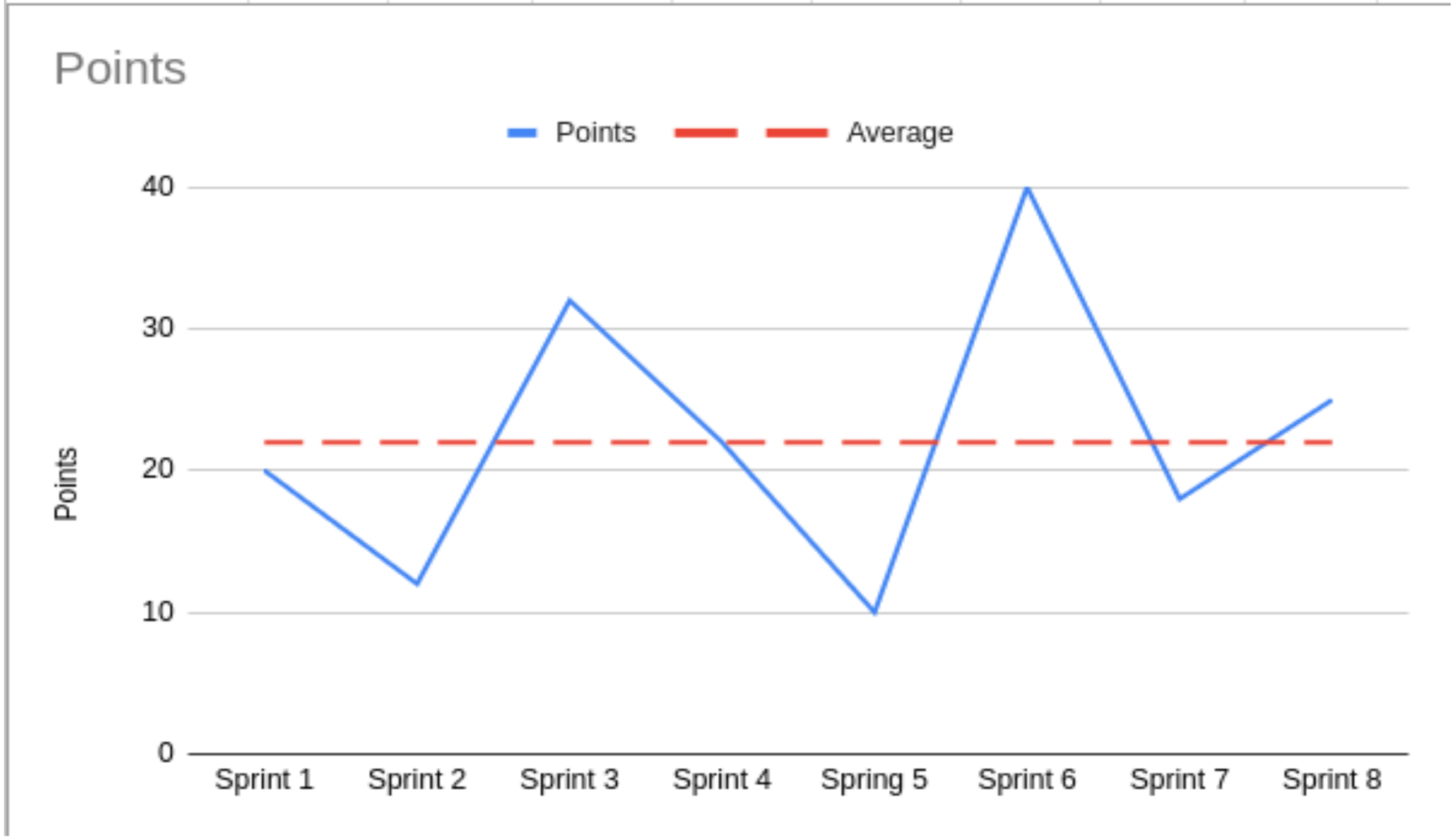
SEEING VARIABILITY
OR
WHY ‘WHEN WILL IT BE DONE’ IS FUNNY

PROCESS BEHAVIOR CHARTS

Named after Walter Shewhart (also called Shewhart charts), these are a statistical tool used to distinguish between variation in a measure due to common causes and variation due to special causes

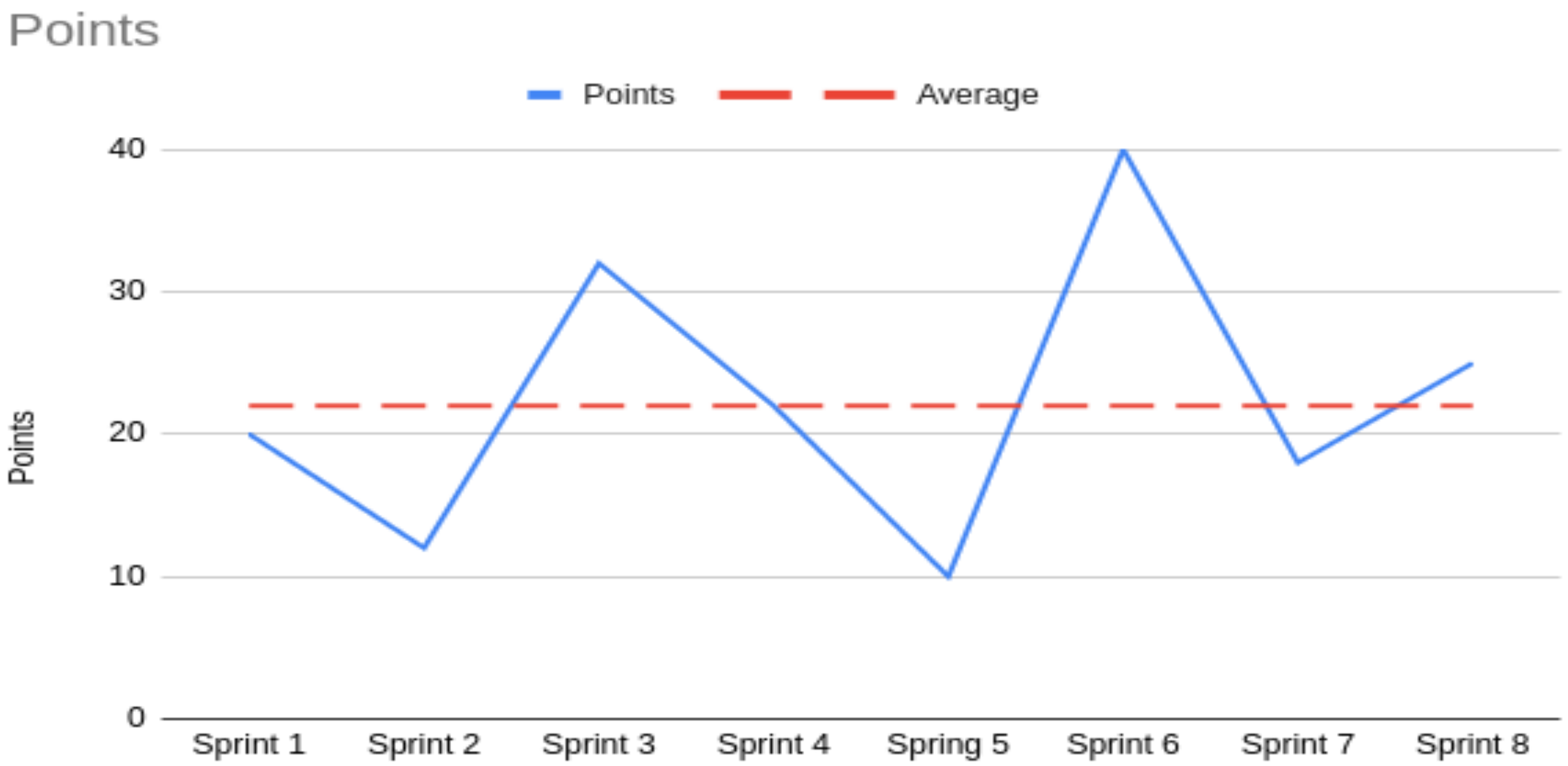
AN EXAMPLE

	Sprint 1	Sprint 2	Sprint 3	Sprint 4	Spring 5	Sprint 6	Sprint 7	Sprint 8
Points	20	12	32	22	10	40	18	25



	Sprint 1	Sprint 2	Sprint 3	Sprint 4	Spring 5	Sprint 6	Sprint 7	Sprint 8
Points	20	12	32	22	10	40	18	25

	Sprint 9	Sprint 10	Sprint 11	Sprint 12	Sprint 13	Sprint 14	Sprint 15	Sprint 16
Points	45	5	40	10	30	20	16	28



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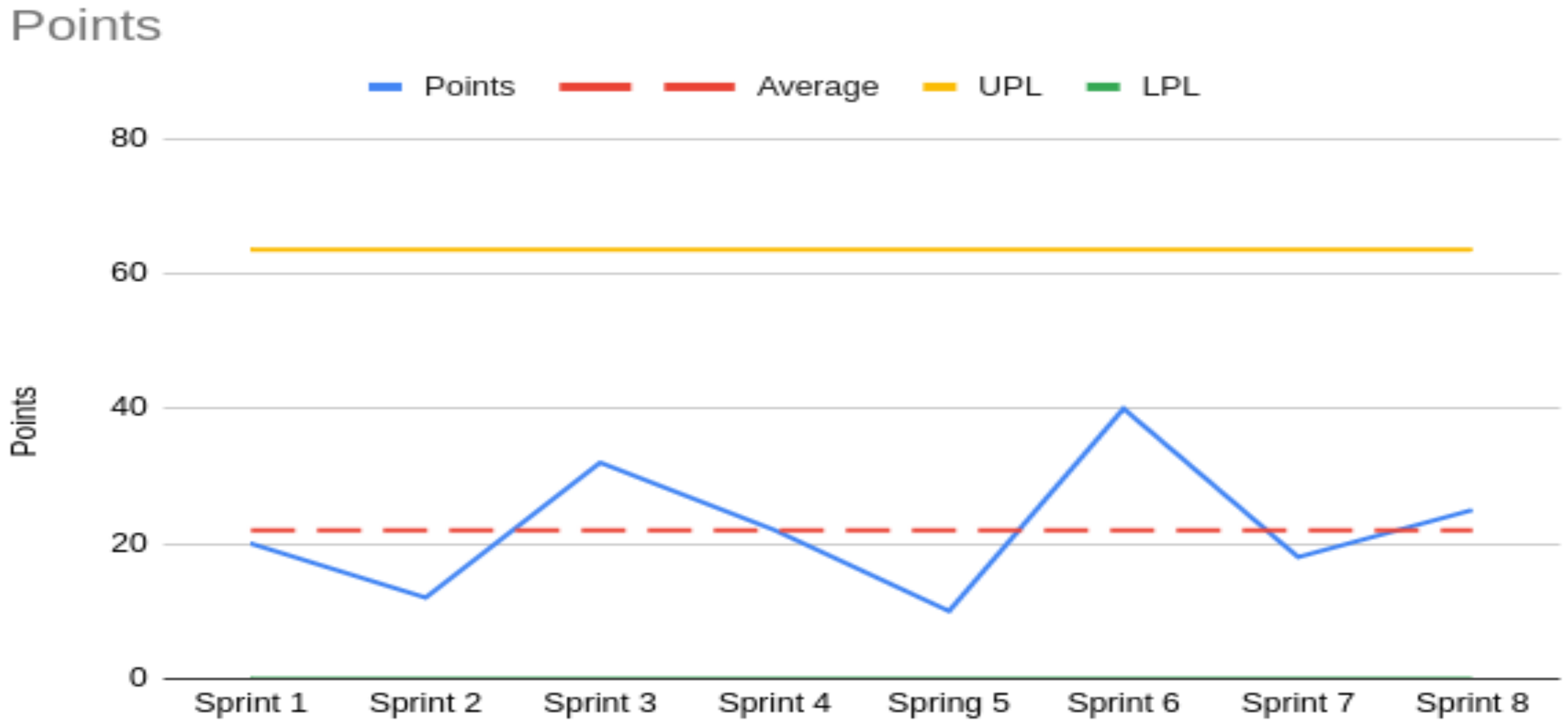
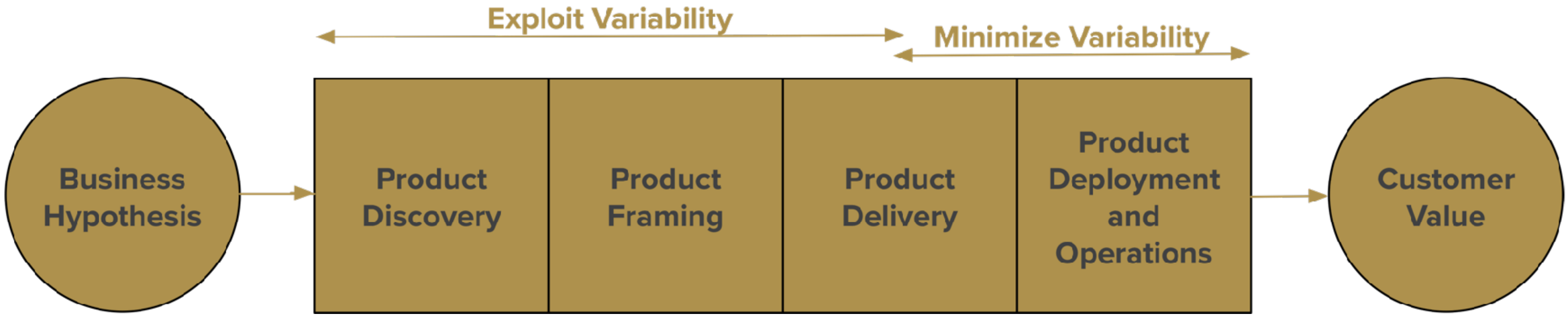


UNDERSTANDING VARIATION IS THE KEY TO SUCCESS IN QUALITY AND BUSINESS

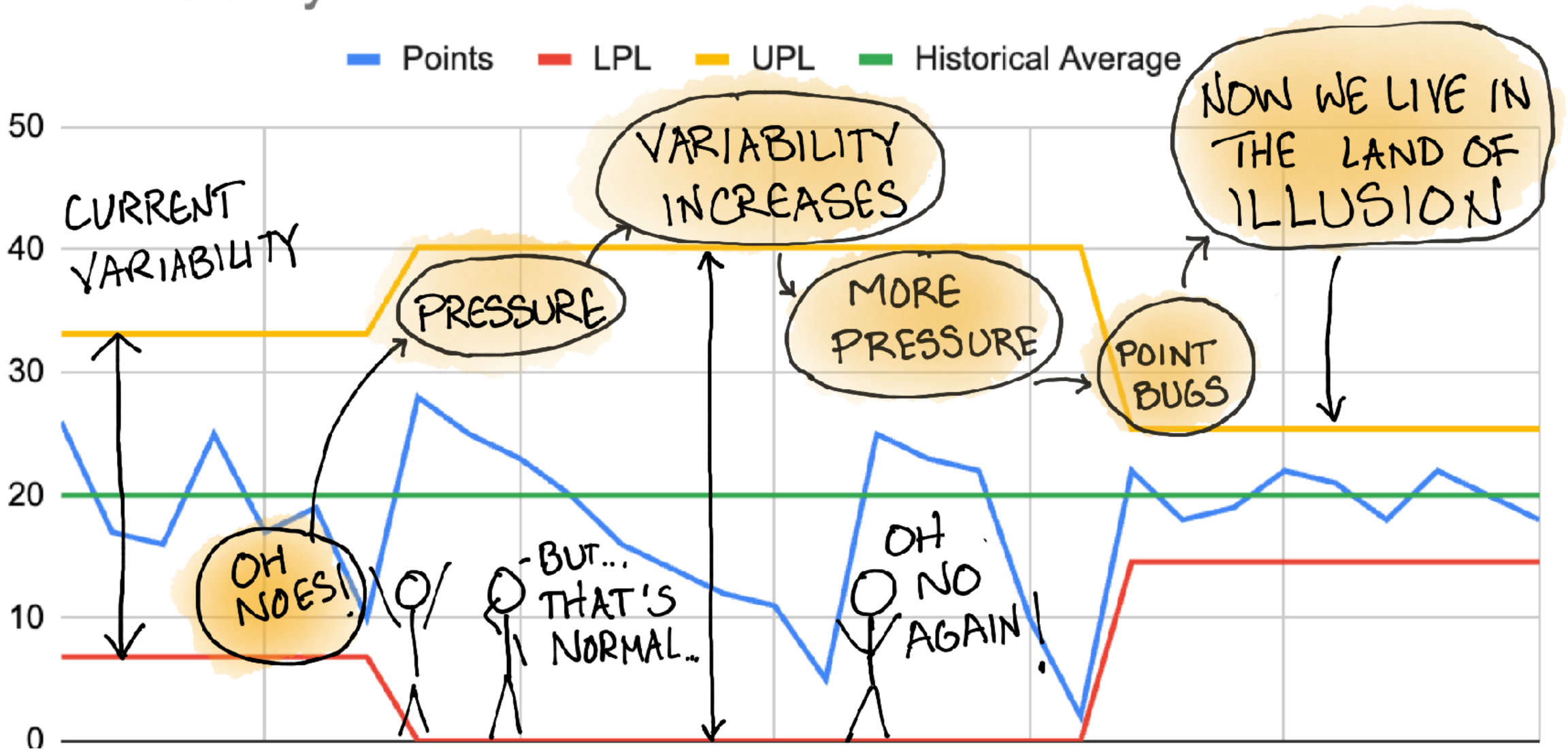
- W. Edwards Deming

THE GOAL IS NOT ZERO VARIABILITY



WHEN WE ONLY SEE THE METRIC AND NOT THE VARIABILITY - WHAT HAPPENS?

Team Velocity



IN A STABLE SYSTEM, THE RESULTS REMAIN WITHIN A CERTAIN PREDICTABLE RANGE.

TO EXPECT OUTCOMES OUTSIDE OF THIS RANGE IS TO IGNORE THE NATURE OF THE SYSTEM.

WHAT EFFECTS VARIABILITY?

WHAT IS SYSTEMS THINKING?

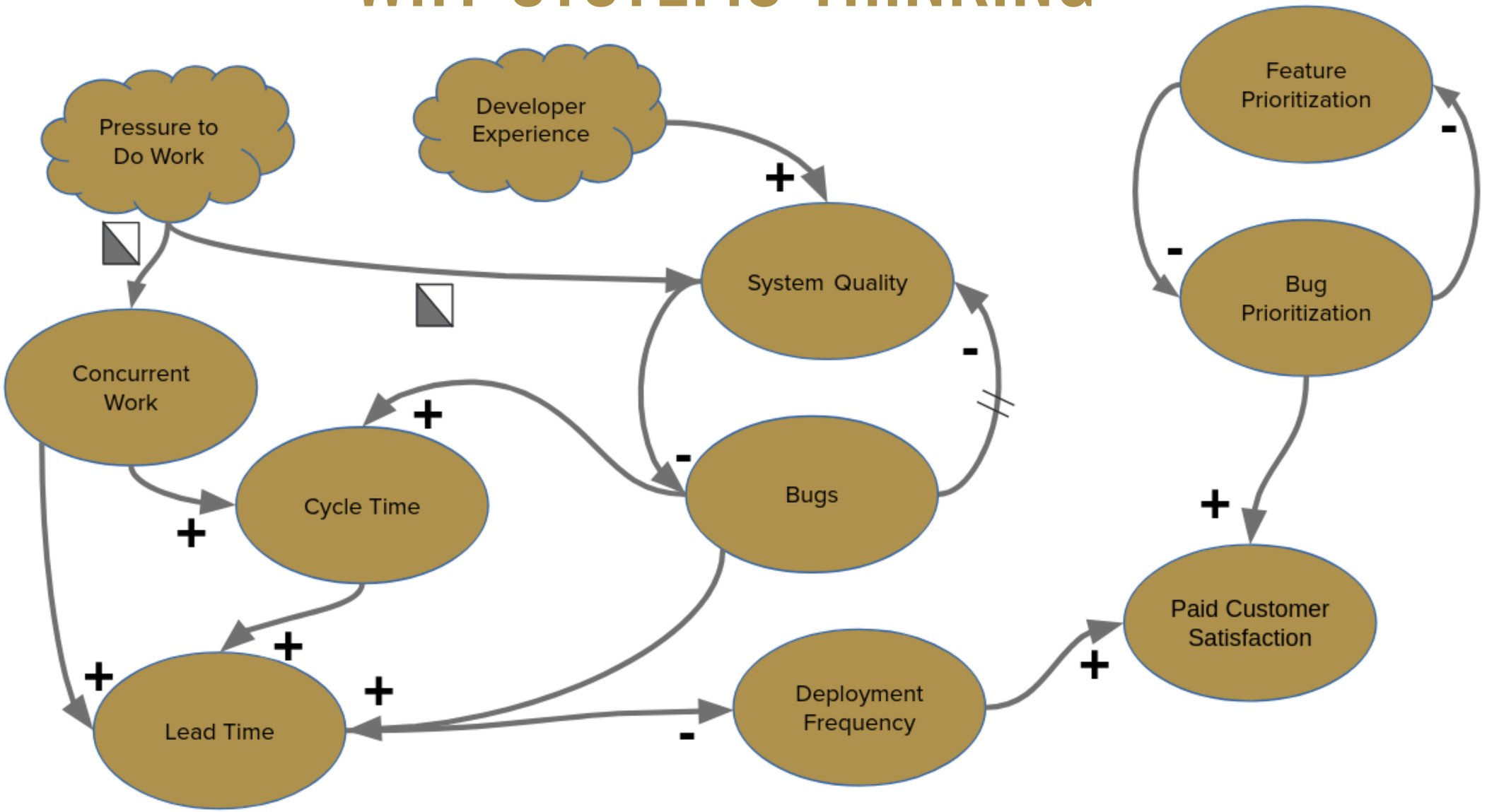
WHAT IS SYSTEMS THINKING

A **system** is a group of interrelated parts working together as a whole.

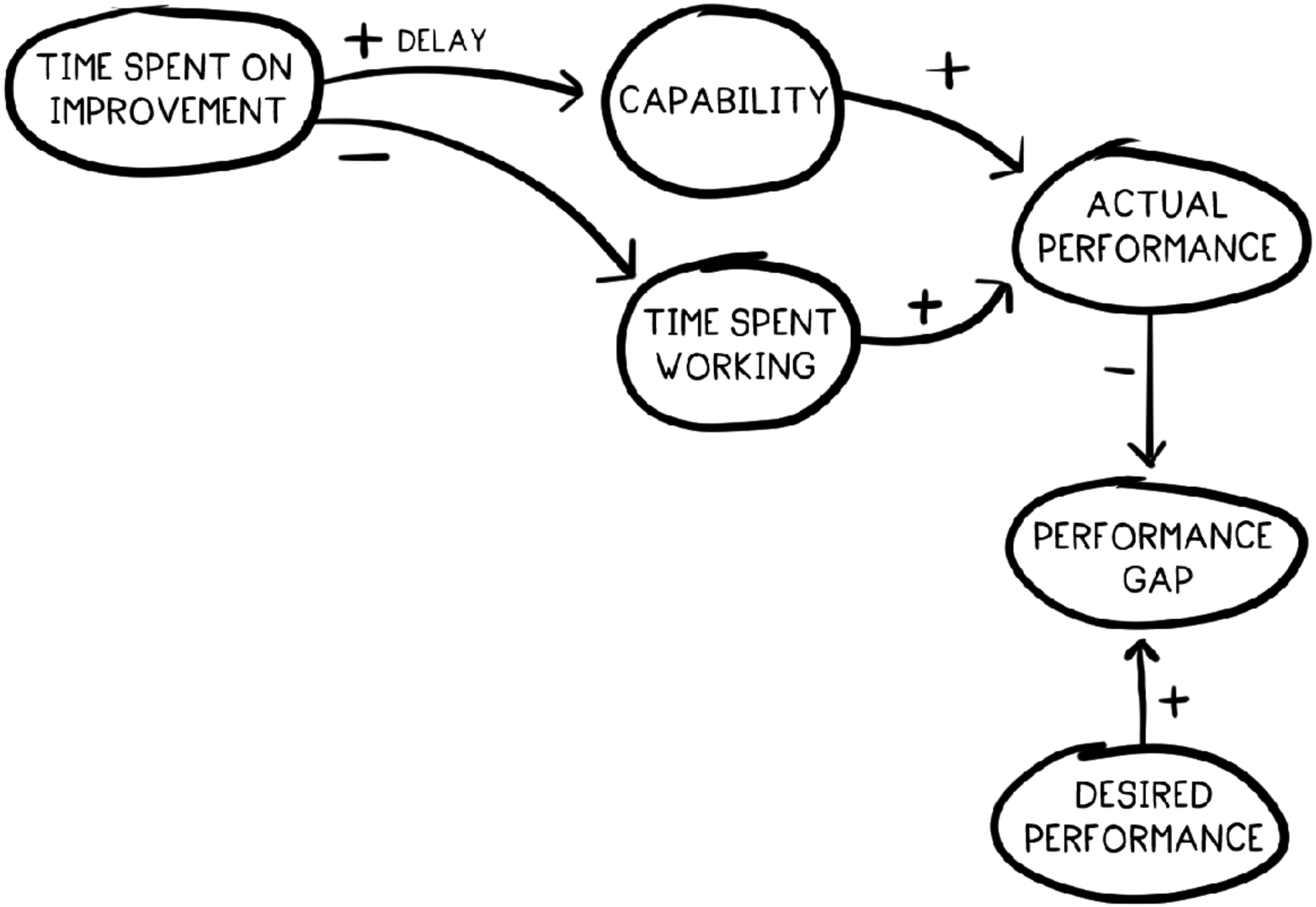
Systems Thinking is a way of **sense making** of the **complexity** of the world by looking at in terms of **wholes and relationships** rather than splitting it into its parts.

‘A discipline for seeing wholes rather than parts, for seeing patterns of change rather than static snapshots, and for understanding the subtle interconnectedness that gives (living) systems their unique character’ - Senge

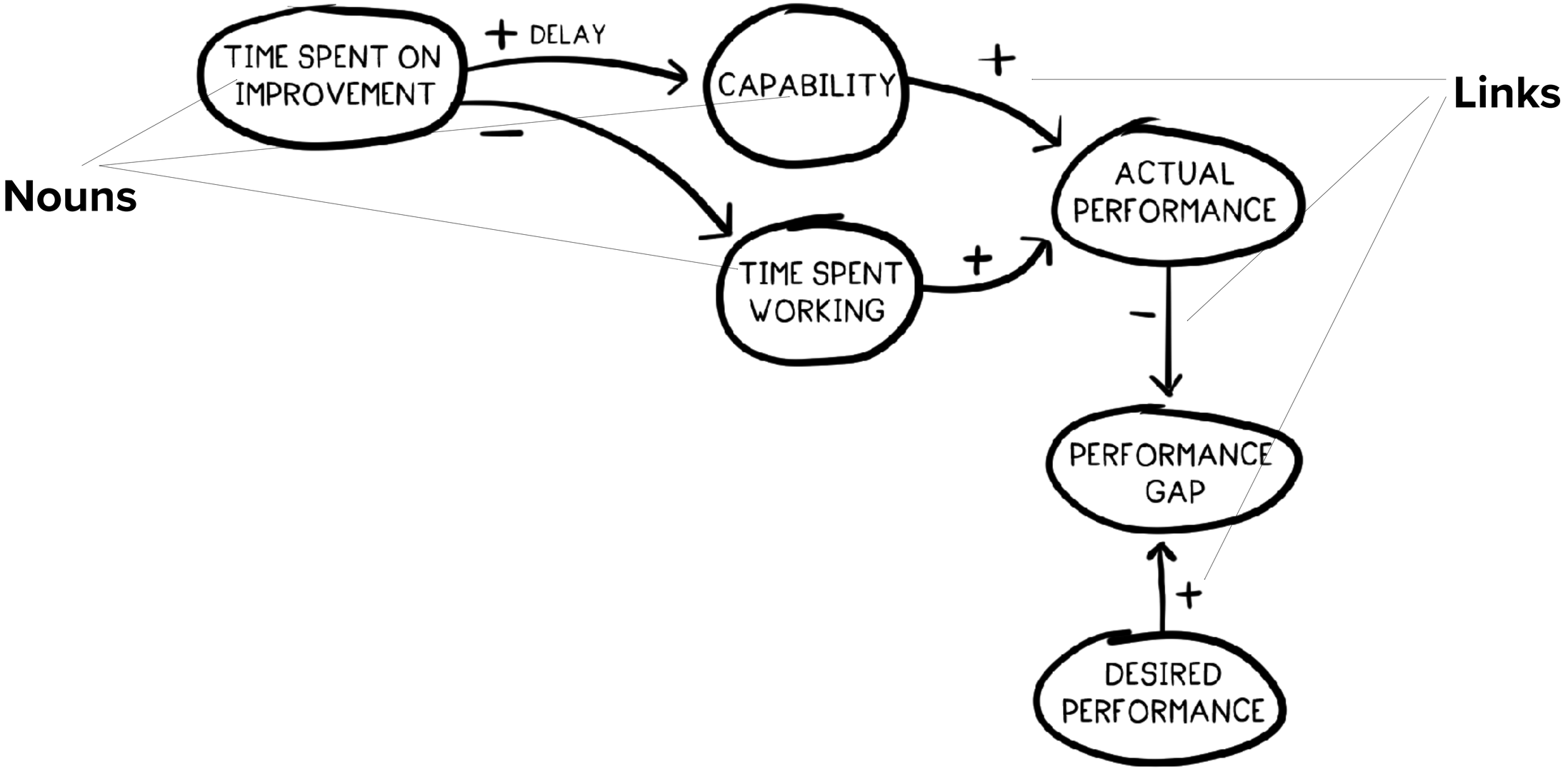
WHY SYSTEMS THINKING



MODELING SYSTEMS



MODELING SYSTEMS



MODELING SYSTEMS

Nouns /Variables – Items that are important to the system. These vary over time / can change.

Links – Verbs. Determine how these links affect each other. When 2 nouns move in the same direction based upon their verb (link), a ‘+’ is used. When 2 nouns move in opposite directions based upon their verb (link), a ‘-’ is used.

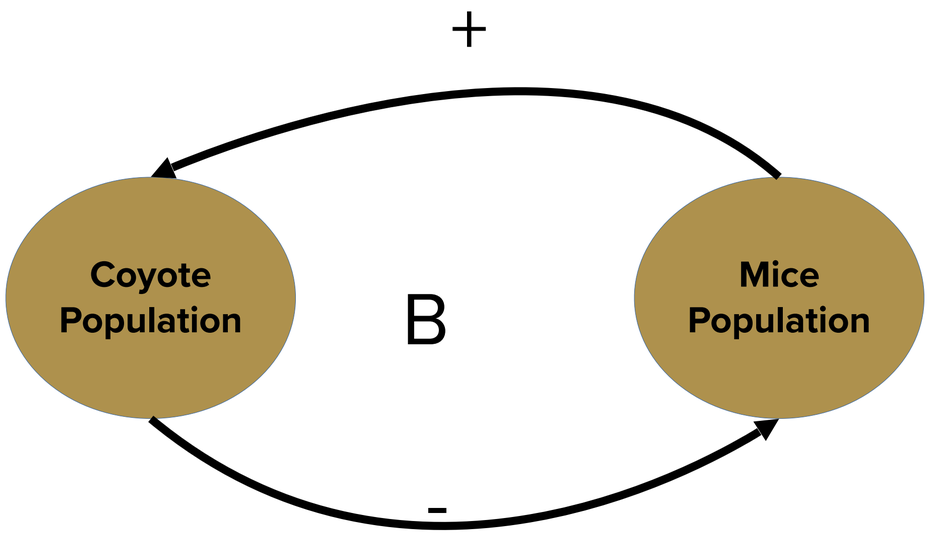
TYPES OF LOOPS

Balancing Loop – These loops represent a self-stabilizing loop. They are self-correcting at large. Marked with a ‘B.’

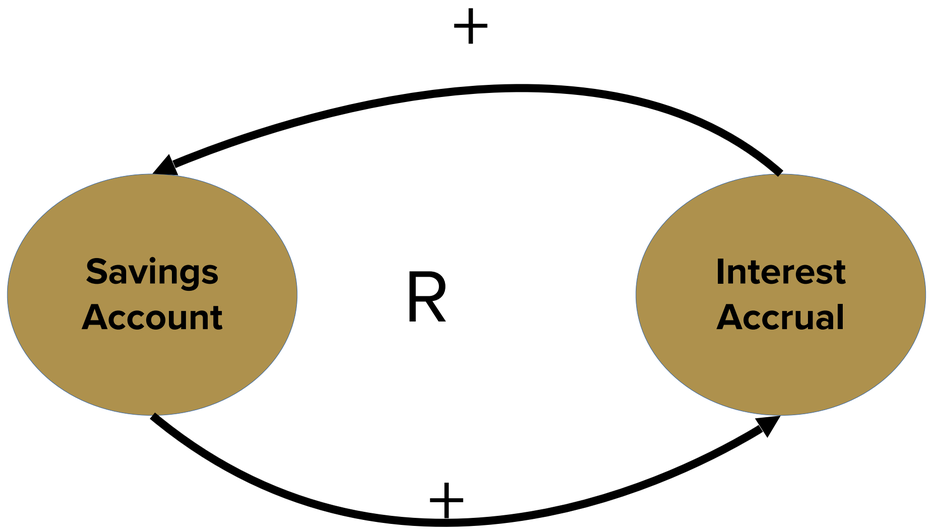
Reinforcing Loop – These loops are spirals, causing continual growth or shrinking of the output from a system. This could be a good thing or a bad thing – a virtuous or a vicious cycle. These are unstable systems. Marked with an ‘R.’

‘We used to get more done with less people’

BALANCING AND REINFORCING LOOPS

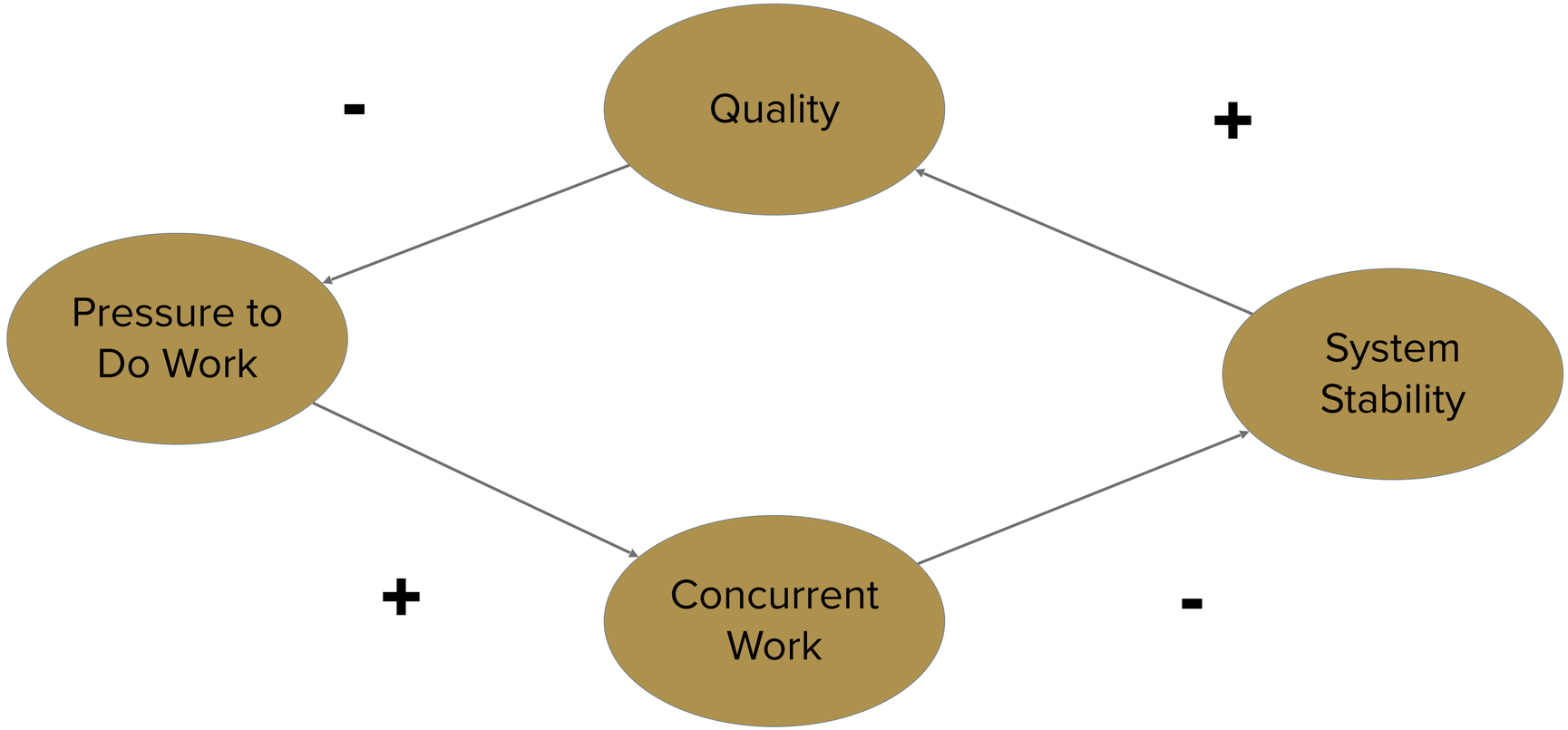


Balancing
Self-Correcting
Produces Stability



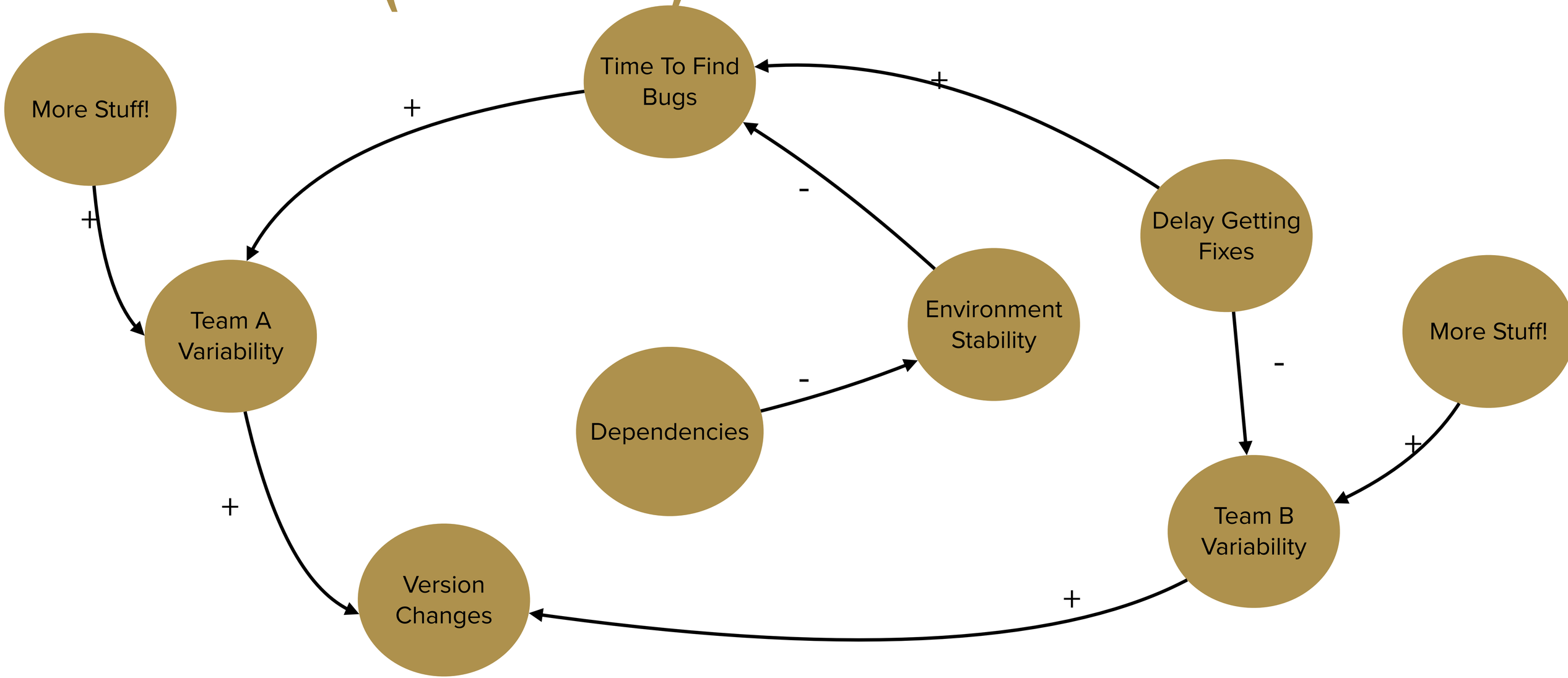
Reinforcing
Continued Growth
Leads to instability

IN SOFTWARE



What type of loop is this?

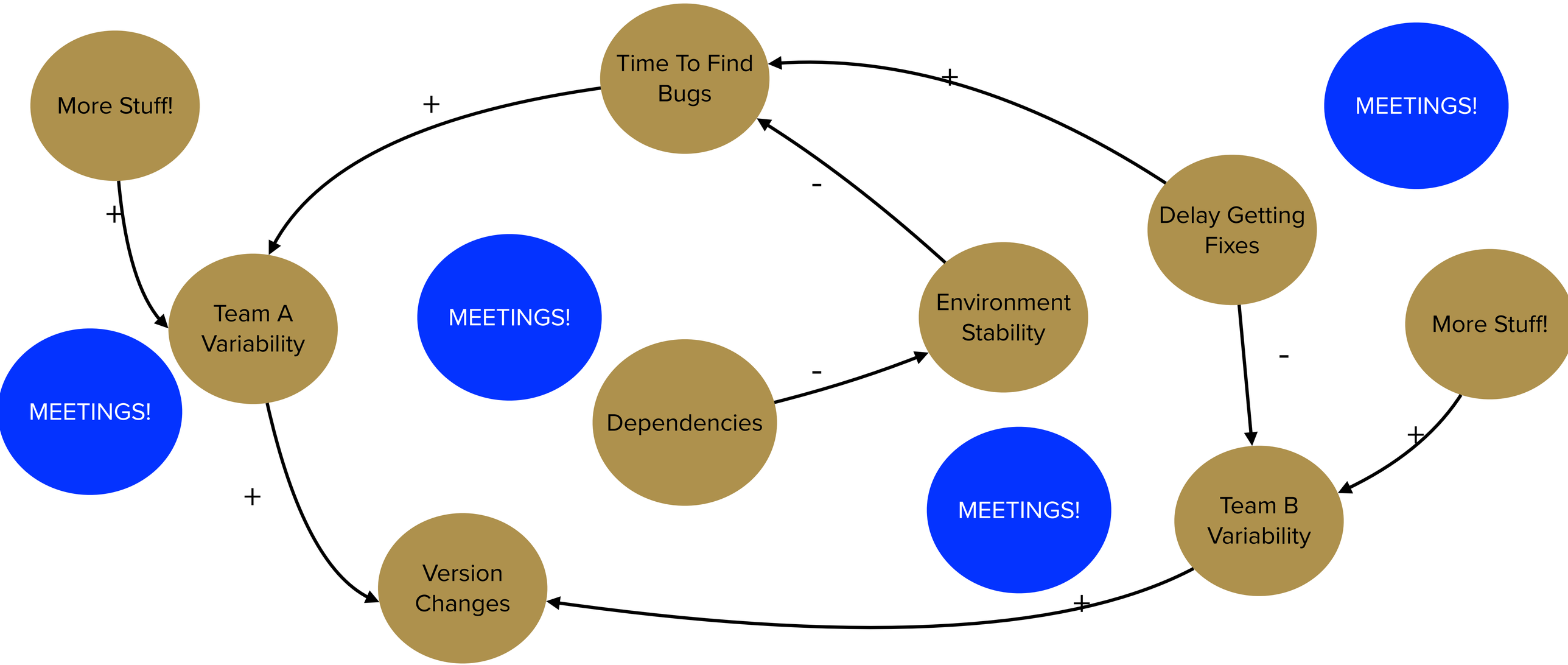
SO WHAT (ARE SOME) CAUSES OF VARIABILITY?



WHEN WE DON'T SEE THE SYSTEM,
WE ACT WITH BEST INTENTIONS

IN THE WORST WAYS

DO THE 'SCALED' PROCESS HARDER!



BEFORE YOU MAKE A CHANGE
UNDERSTAND THE SYSTEM
TELL YOUR STORY

LOTS OF GOOD ANSWERS
COUPLE REAL BAD ONES

U-CURVES & OPTIMIZATIONS

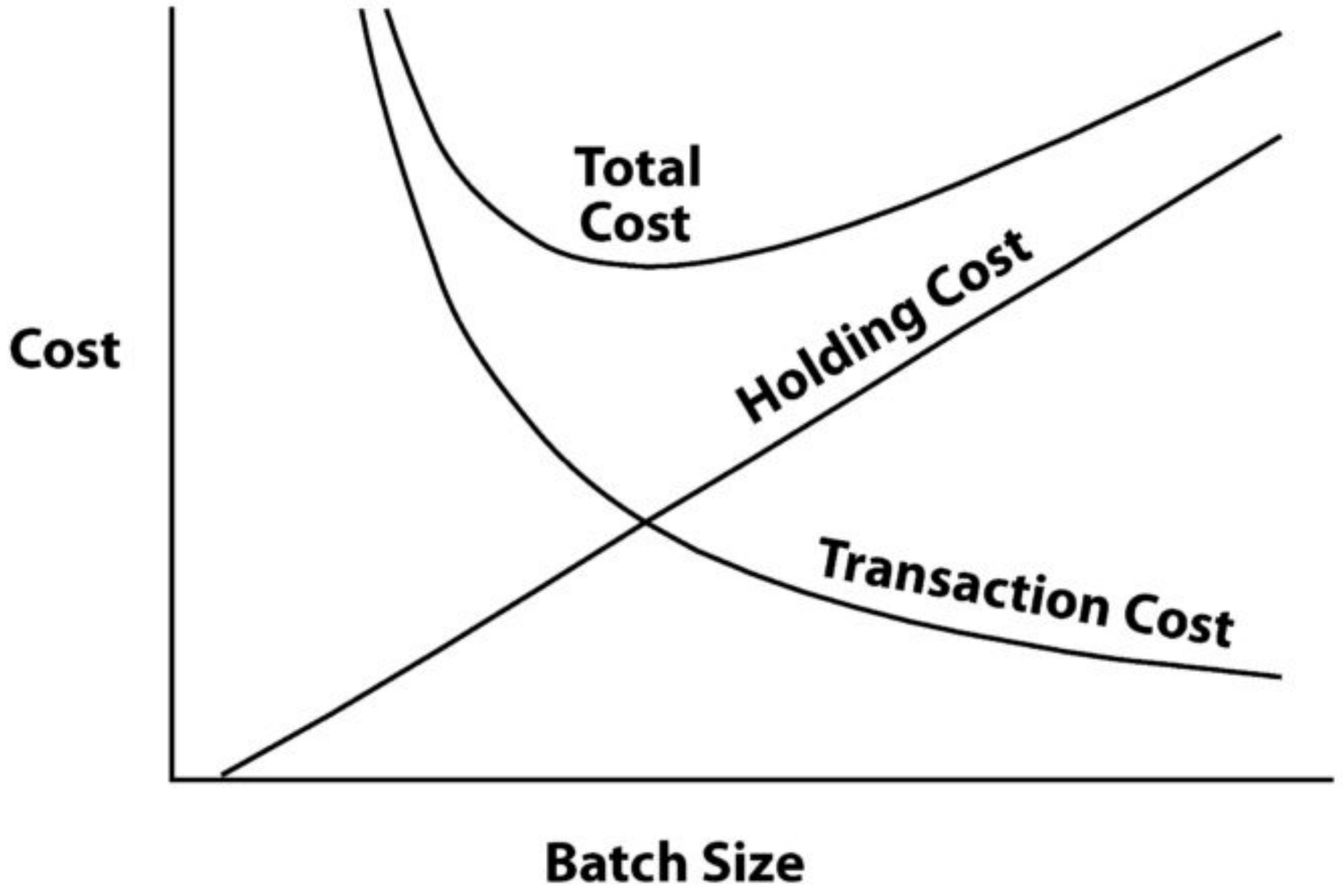
A U-curve is where there isn't necessarily an 'exact' right answer, but there are drastic penalties on both ends of the spectrum. i.e. optimizations never occur at the extreme.

The goal with U-curves is to get 'close enough' and realize that beyond close enough, there is usually significant effort for marginal improvement.

Frequently what happens is we don't 'see' the more than one influence on our decision

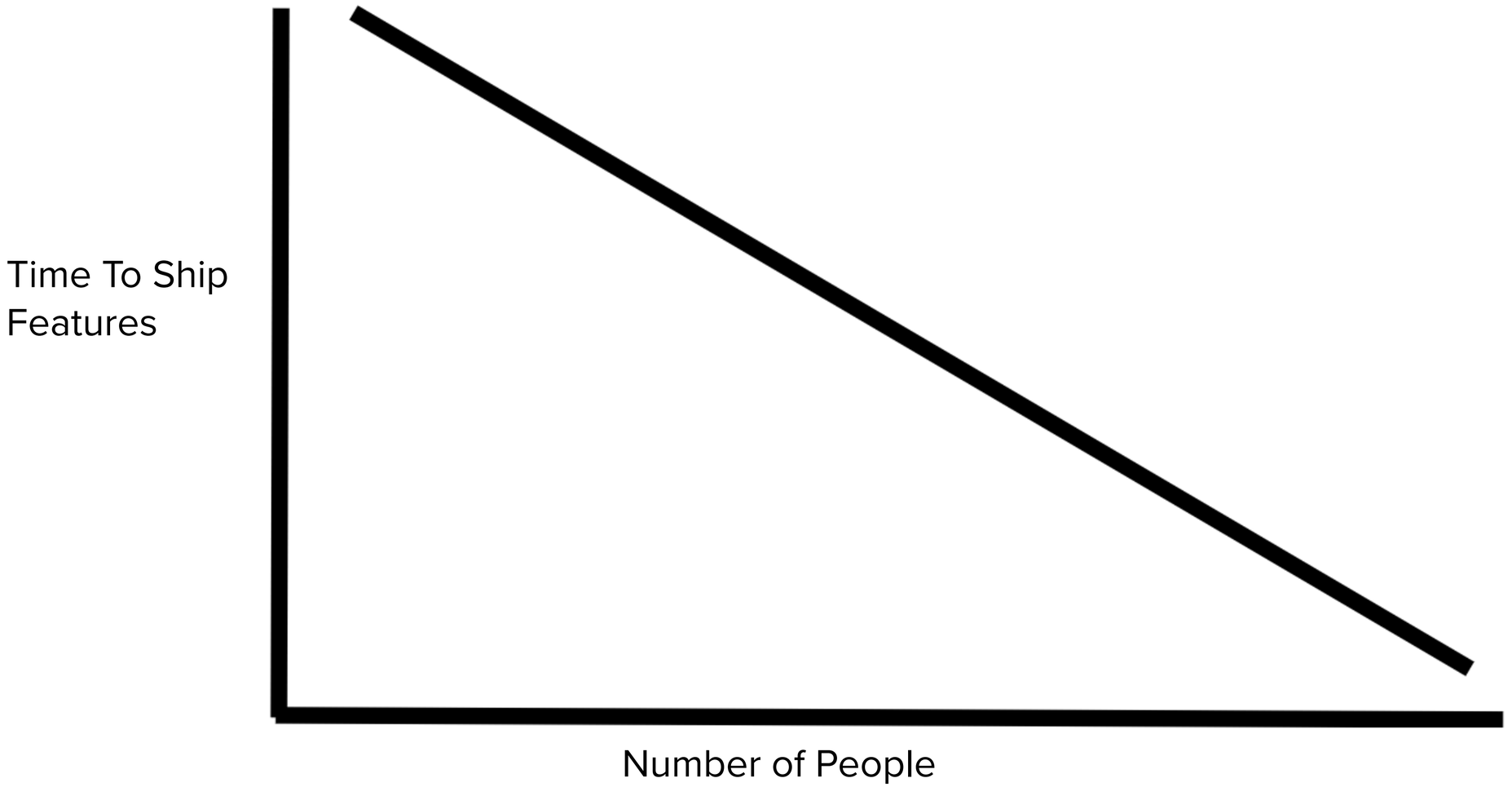
What U-curves do you see in software development?

U-CURVE OPTIMIZATIONS



From "The Principles of Product Development Flow," by Donald G. Reinertsen.
Celeritas Publishing: 2009. Copyright 2009, Donald G. Reinertsen

WE NEED TO SHIP FASTER...I KNOW, LET'S ADD PEOPLE



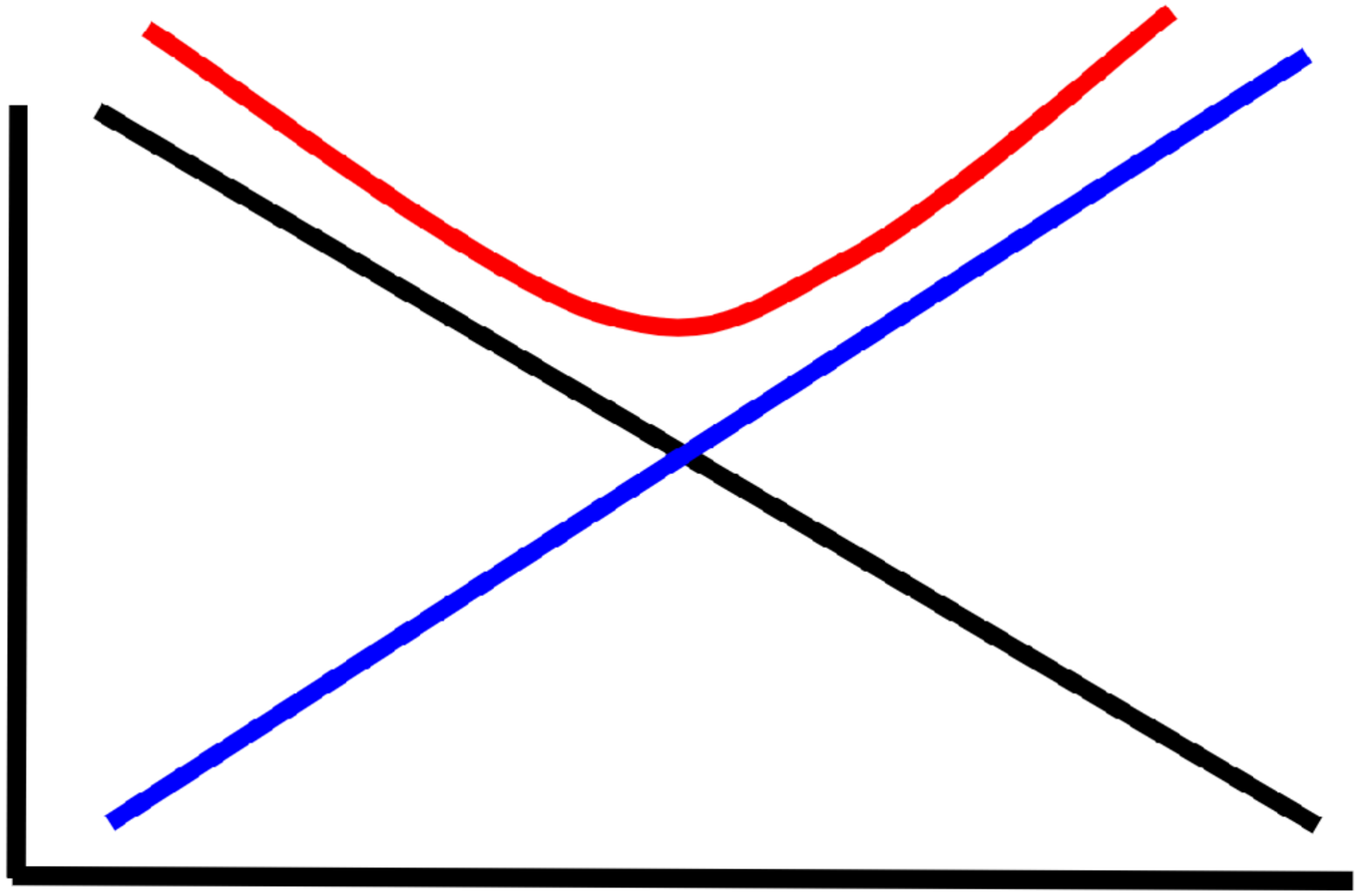
U-CURVES

Capacity (Total number of workable hours) is only one aspect that influences time to ship

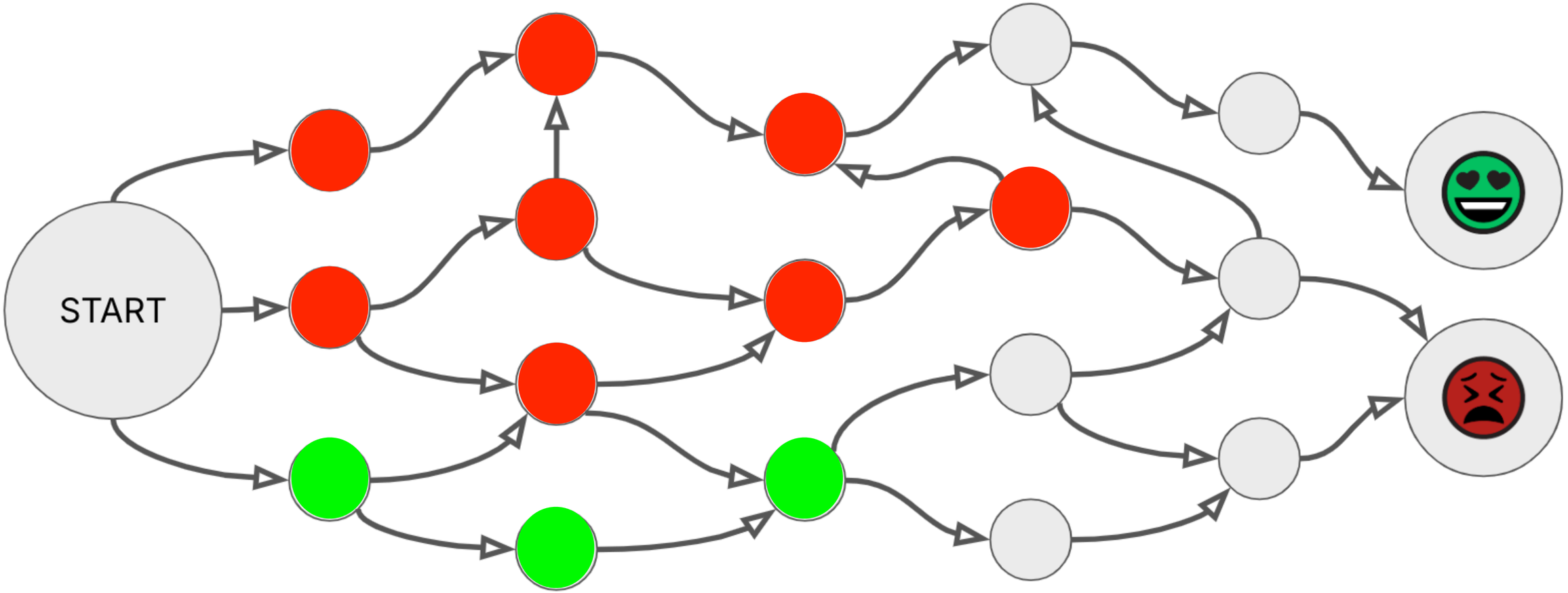
For instance, there is also time to coordinate. This is influenced by:

- Number of people
- Amount of concurrent work
- Stability of environments
- Testability
- Familiarity with codebase
- Ease of making changes independently (function of architecture)
- Variability
- And So on

A MORE COMPLETE VIEW GIVES US OPTIONS



BLIND DECISIONS CAN LOP OFF OPTIONS



Credit - Elisabeth Hendrickson

U-CURVES & OPTIMIZATIONS

ASK: What are we optimizing for?

ALIGN: What contributes to this?

DECIDE: When is it ‘good enough’?

Ex

- Team of DBAs vs Cross-Functional Team
- One process vs Teams Choose
- Software teaming vs All Async
- Fix Tech Debt vs Ship Features

And Many More

https://src.nappy.co/photo/jD3TugQ3dBJ38gR4jynev

IMPROVE! HA, WE DON'T EVEN HAVE ENOUGH TIME TO DO OUR WORK AS IT IS

VALUE DEMAND VS FAILURE DEMAND

John Seddon - Vanguard Method - https://beyondcommandandcontrol.com/failure-demand

VALUE DEMAND

Value Demand simply put, is what the customer wants. The reason you are in business

Occasionally studying these demands may show customer wants that your organization currently doesn't service.

External Demand – From the customer

Internal Demand – Make the work easier

BAU Demand – Work we do to keep the business going. Roll up reports, communication, risk, etc. With BAU, we look at how to eliminate or automate

FAILURE DEMAND

Failure Demand is demand caused by the failure to do something correctly for the customer

Additionally, you could take the lens of what isn't value demand is failure demand

What examples of Failure Demand can you think of?

IN SOFTWARE

Value Demand

+

Failure Demand

WANT TO ‘GET MORE DONE WITH LESS’?
DO LESS FAILURE DEMAND

HOMEWORK

NEXT WEEK

Observe how work works in your organizations
- How much variability is there?
- What is causing it?
- Discover U-curves in your organization.

When is it ‘good enough?’

Create a causal loop diagram

https://sim.curiousduck.io

Share your story internally

BIG HINT – You can engage your teams and peers on this exercise

curious duck
digital laboratory, llc

ACT WHERE PAIN IS CAUSED

NOT WHERE IT IS OBSERVED

CONNECT!

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SOURCES / RECOMMENDED READING

Thinking in Systems - Donella Meadows

Understanding Variation: The Key To Managing Chaos – Donald J Wheeler

The Principles of Product Development Flow – Donald G. Reinertsen

WHAT QUESTIONS DO YOU HAVE?

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