# SYSTEMS THINKING - CONCEPTS TO SEE THE WHOLE

EST DOJO 2017

AND Co

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# ABOUT ME


Make it easier for people

- to learn
- to do great work

Wrote Books

Past lives - Architect at Red Hat;

Trading Platforms; etc

Hit me up if you want to chat

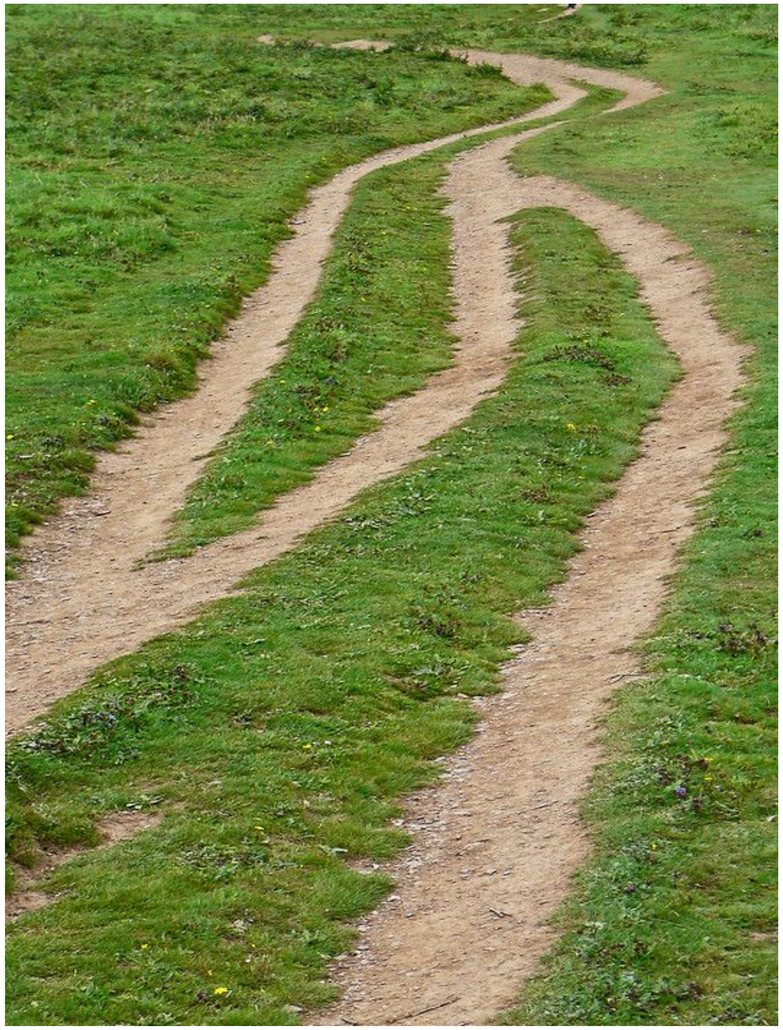
# WHERE WE ARE GOING

**CORE (TELL YOUR STORY):**

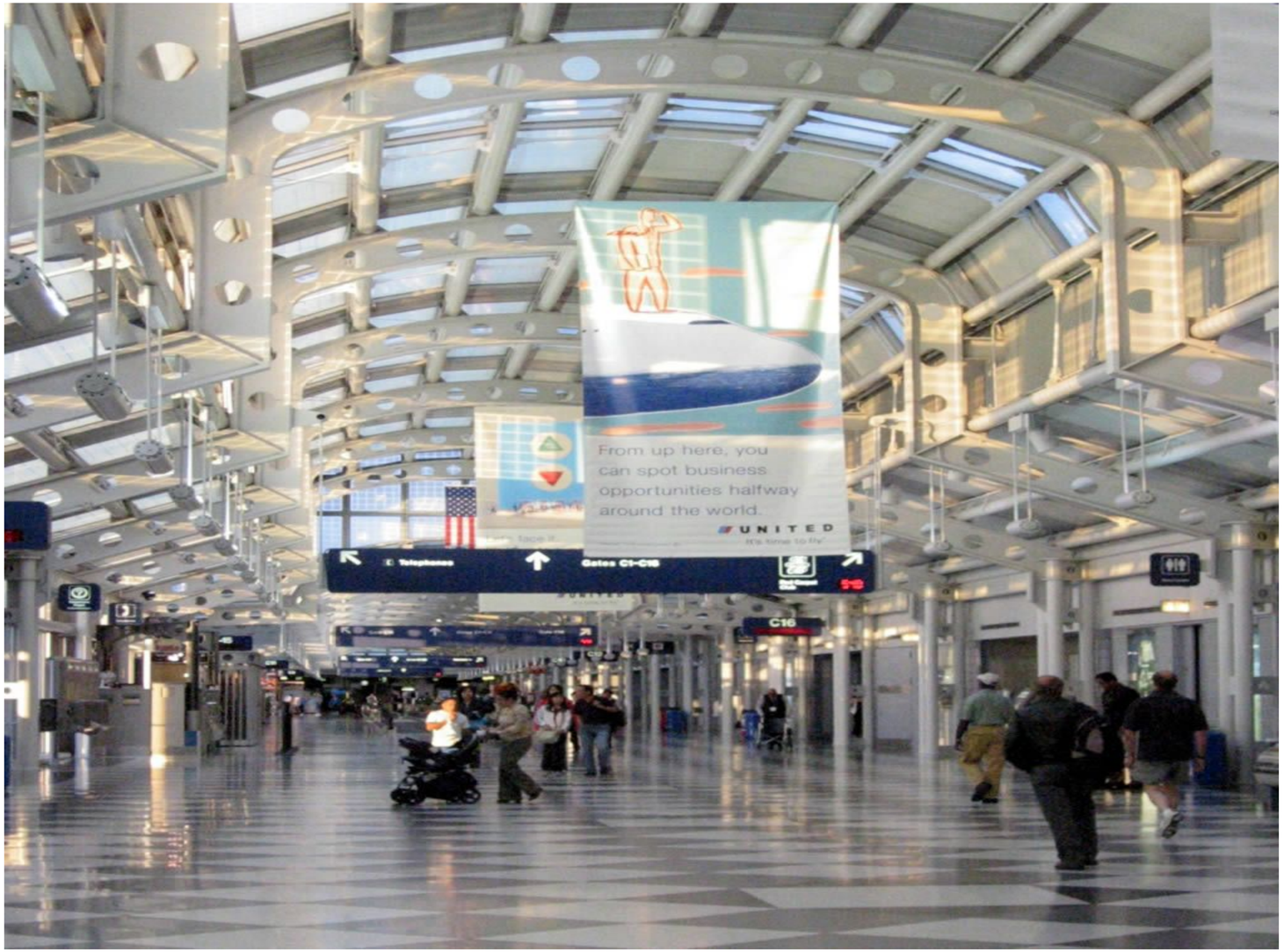
- Measuring Variability
- Modeling Reality
- Not Black and White
- Applying
- Shewhart Charts
- Causal Loops
- U-Curves  & Optimizations
- CuriousDuck.io; Homework

**OTHER TOPICS (DECISIONS):**

- Demand Types
- Options on Where to Act
- Understanding Roots
- Value / Failure Demand
- Leverage Points
- Iceberg Model



# WHEN SHOULD I LEAVE?



# WHEN WILL IT BE DONE?


Velocity is 5 points / 2 week sprint

Backlog size is 40 points

When will it be done?

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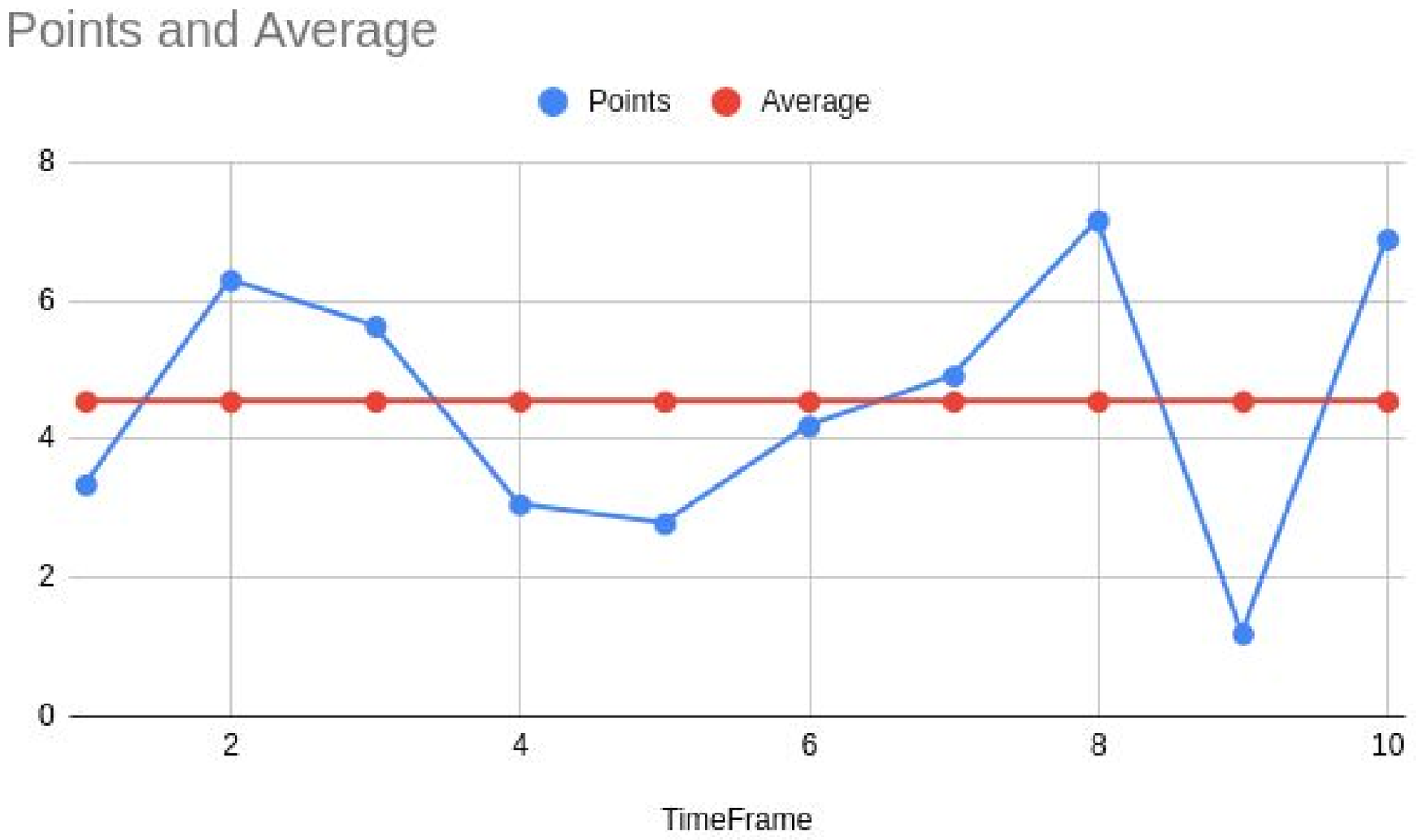
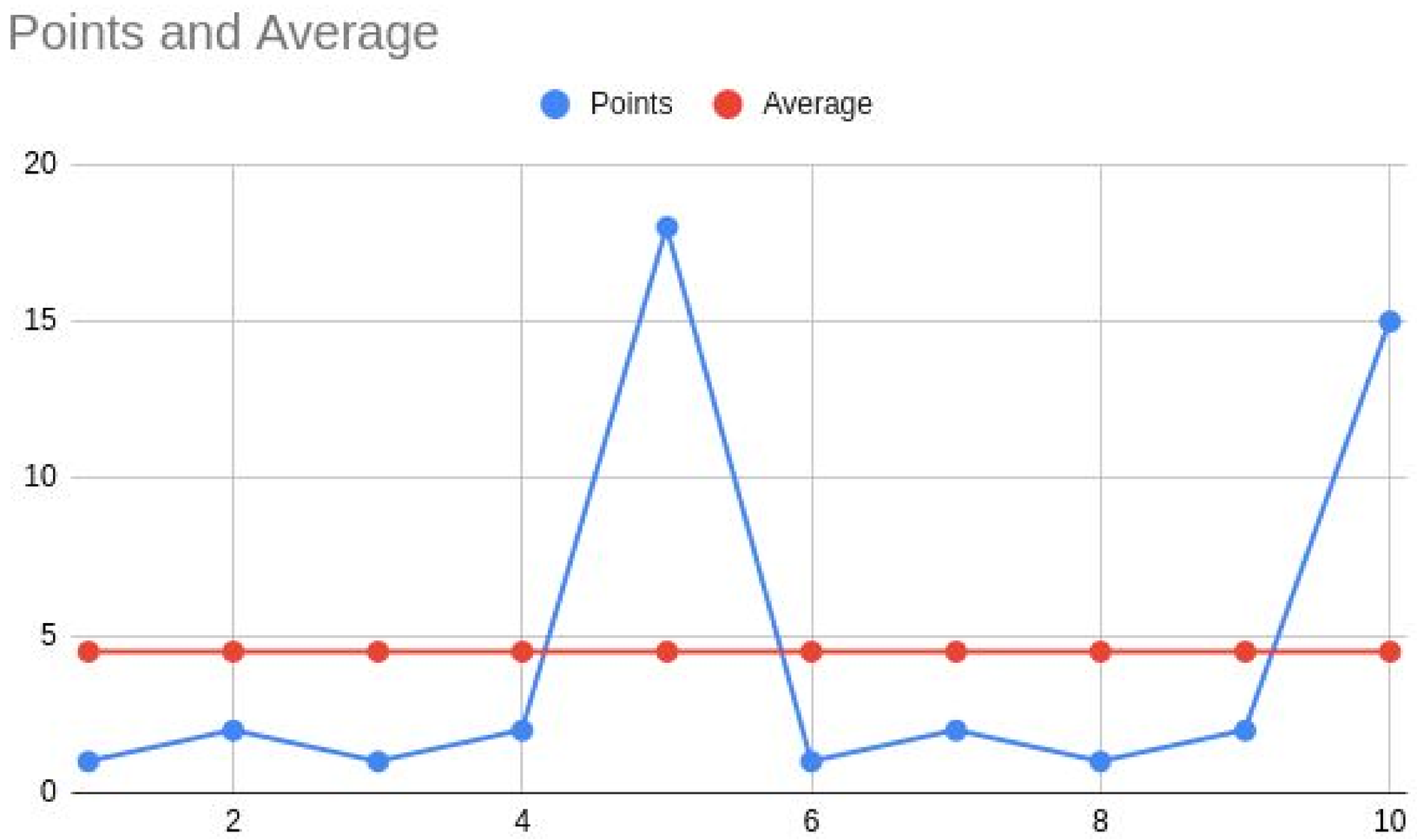


# SAME AVERAGE



# 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

# PROCESS BEHAVIOR CHART

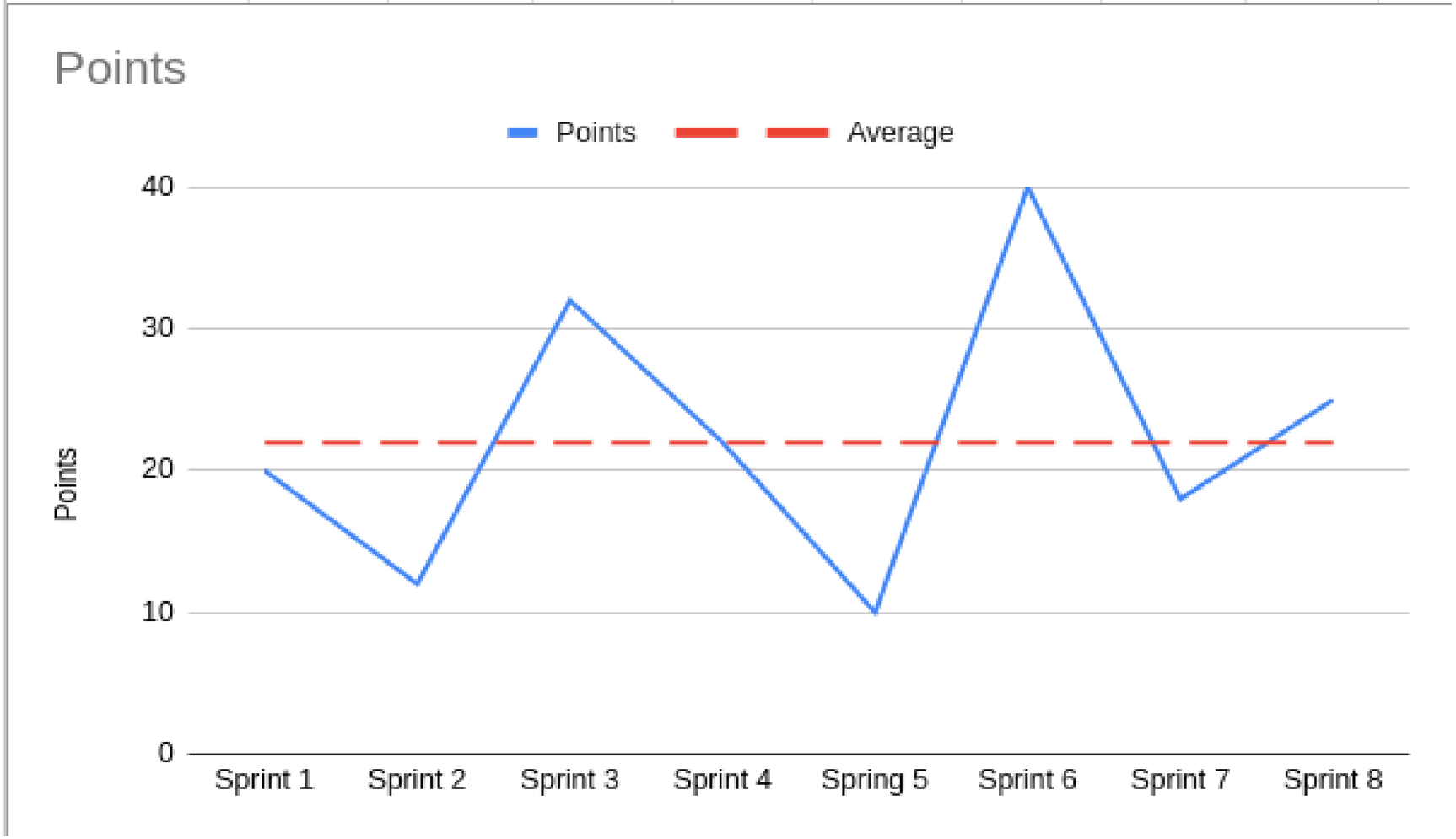
The way you deliver value is a system

If you do nothing, a stable system will continue to deliver within a given range

YOUR GOAL – do not react to natural variation

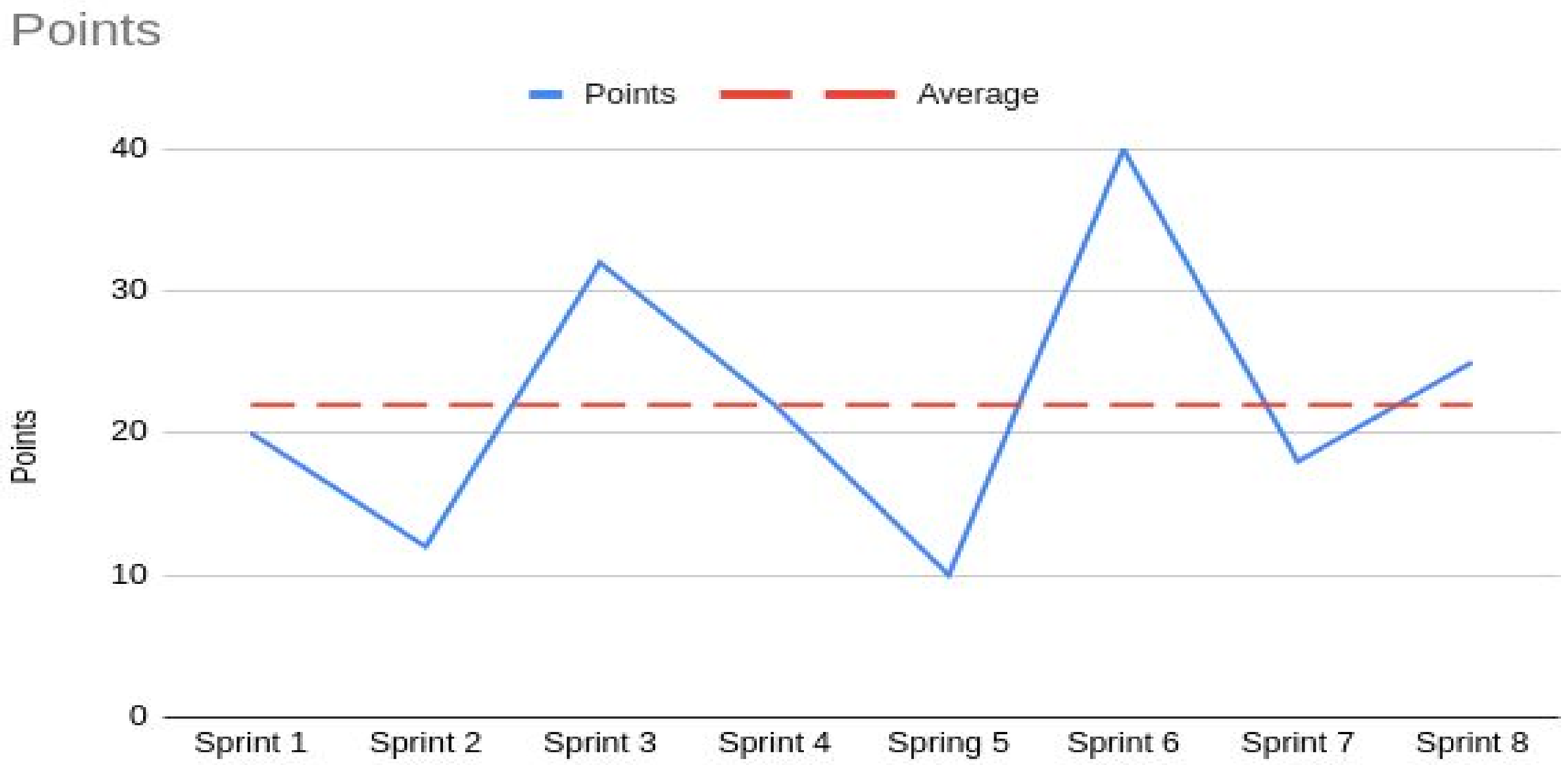
# AN EXAMPLE

| | 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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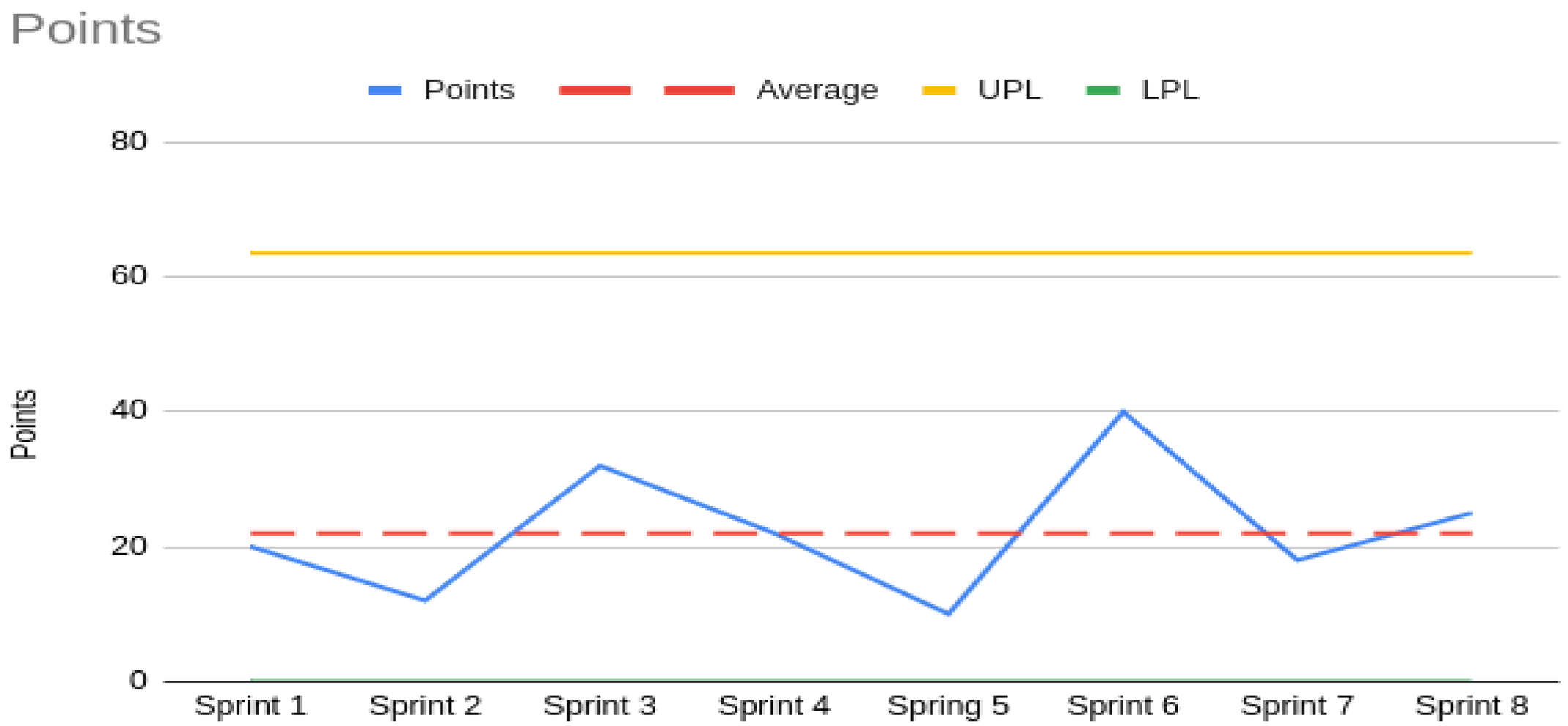
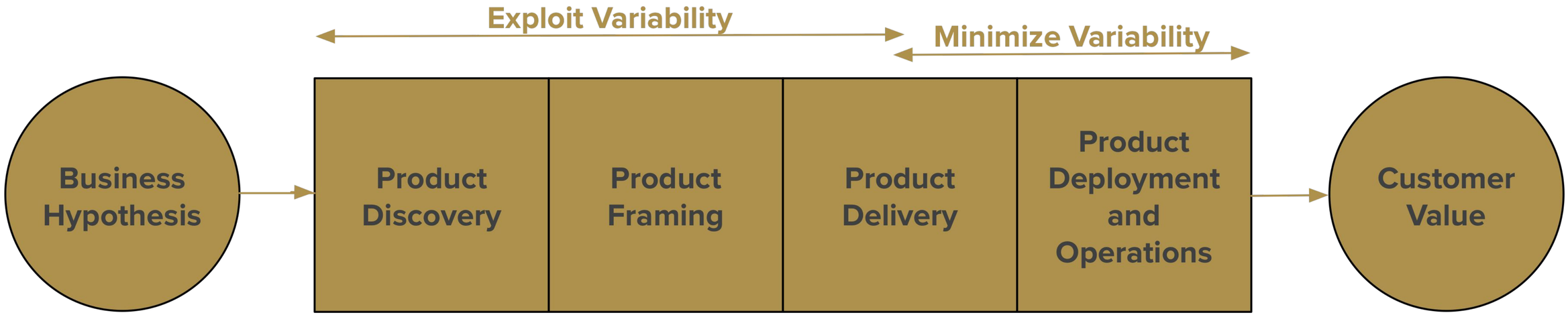


UNDERSTANDING VARIATION IS THE KEY TO SUCCESS IN QUALITY AND BUSINESS

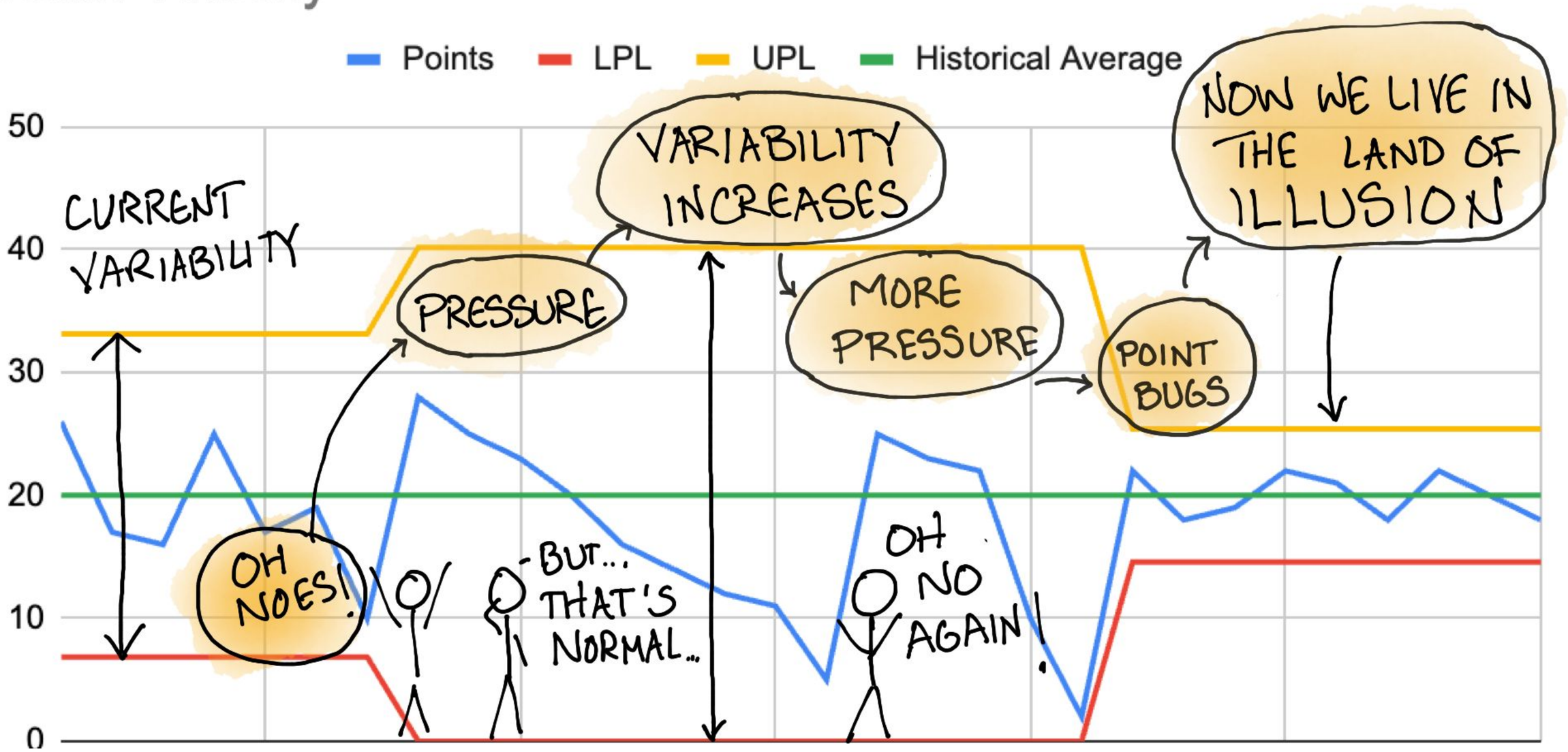
- W. Edwards Deming

# THE GOAL IS NOT ZERO VARIABILITY



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

# Team Velocity



# HOW WE UNINTENTIONALLY HIDE VARIABILITY


"User Story Mapping" by visualpun.ch is licensed under CC BY-SA 2.0. To view a copy of this license, visit https://creativecommons.org/licenses/by-sa/2.0/?ref=openverse.

‘The Process’

Stories

Branches

Tests

Scheduling

Not Measuring Impacts / Wrong Measures

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?

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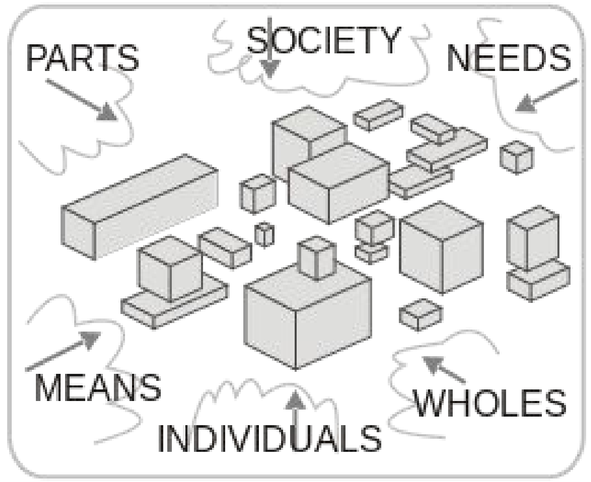


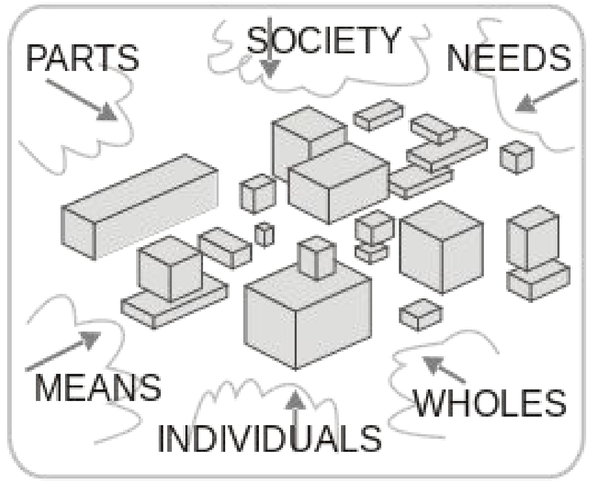

By Marcel Douwe Dekker - Self-made, based on an own standard and Pierre Malotaux's model: 'Model externe organisatie van de maatschappelijke voortbrenging op basis van de hoofdfuncties van de onderneming in 3 dimensies'; in 'Constructieleer van de organisatie van menselijke samenwerking' op blz. 33, in Industriele organisatie B Collegedictaat bb5, TU Delft, 1985. pp. 120-147., CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=2963694

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

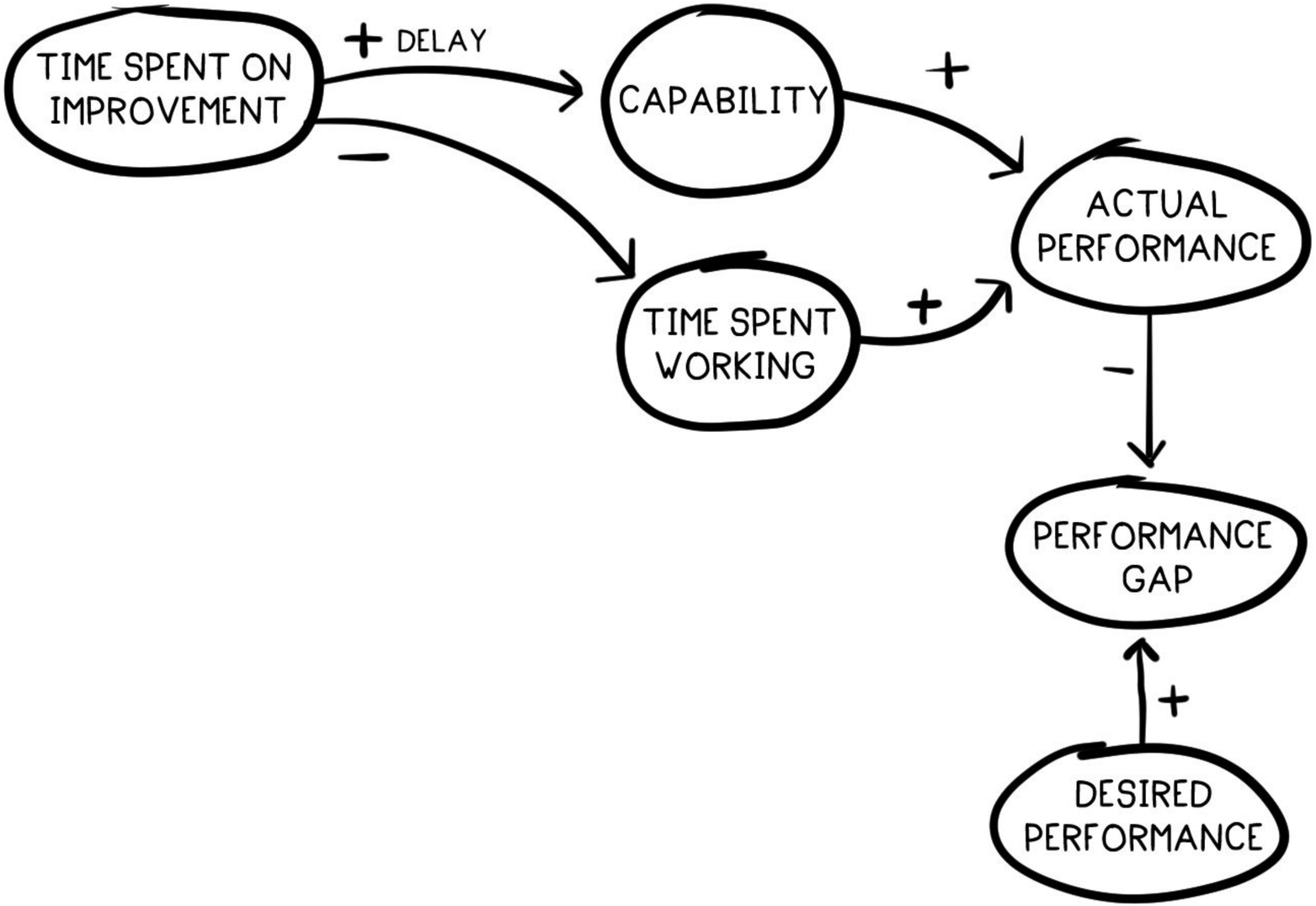



Let’s us make sense of how we develop products and the interrelationships

The items that influence product development are not always direct, linear, or obvious

By Marcel Douwe Dekker - Self-made, based on an own standard and Pierre Malotaux’s model: ‘Model externe organisatie van de maatschappelijke voortbrenging op basis van de hoofdfuncties van de onderneming in 3 dimensies’; in ‘Constructieleer van de organisatie van menselijke samenwerking’ op blz. 33, in Industriele organisatie B Collegedictaat bb5, TU Delft, 1985. pp. 120-147., CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=2963694

# MODELING SYSTEMS



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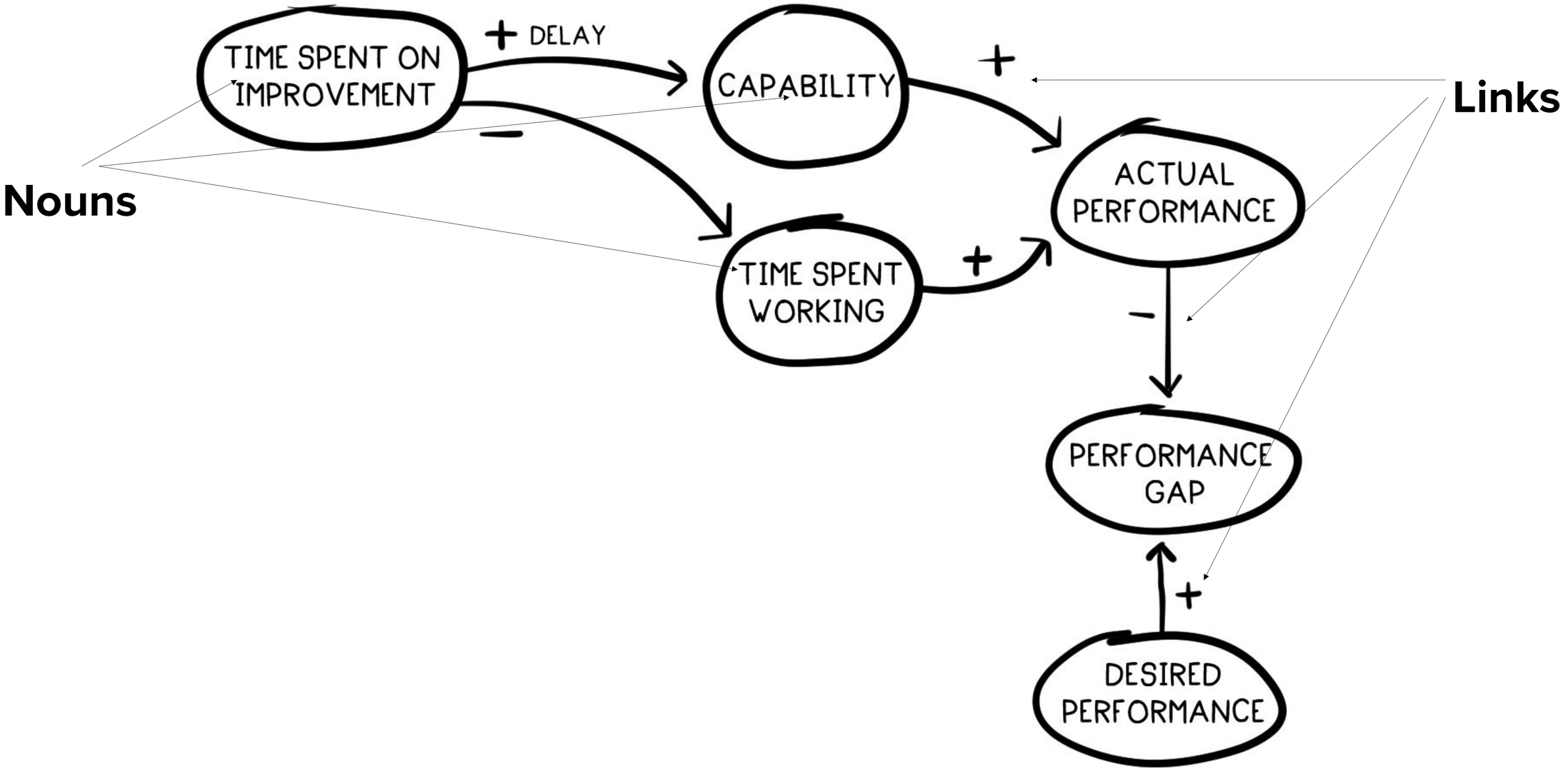


# MODELING SYSTEMS

**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.

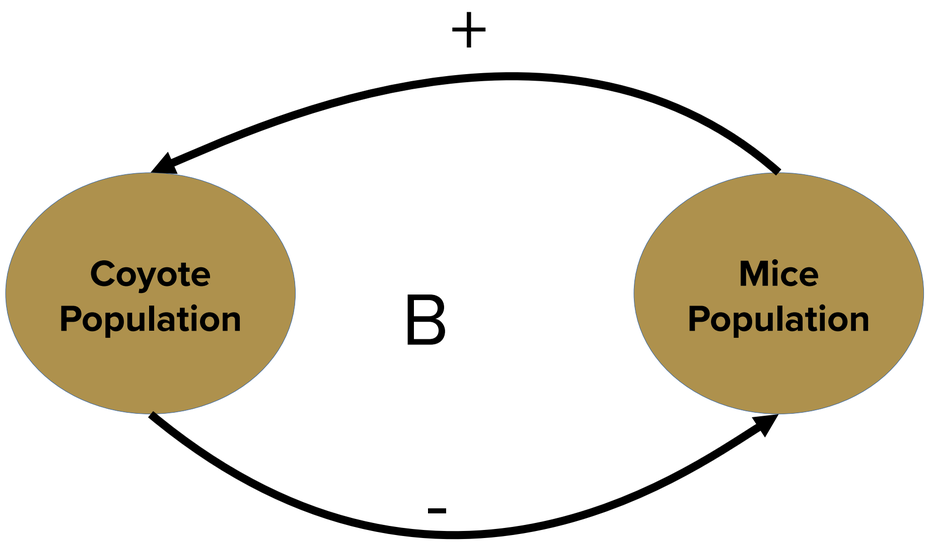
# TYPES OF LOOPS

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

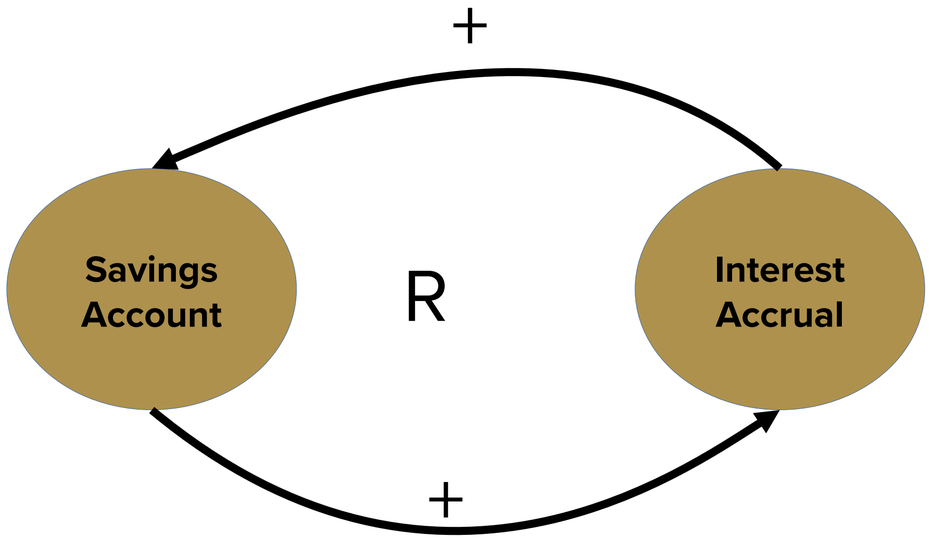
**Reinforcing Loop –** These loops are spirals, causing continual growth or shrinking of the output from a system.  This could be a good thing or a bad thing – a virtuous or a vicious cycle.  These are unstable systems.  Marked with an ‘R.’

‘We used to get more done with less people’

# BALANCING AND REINFORCING LOOPS

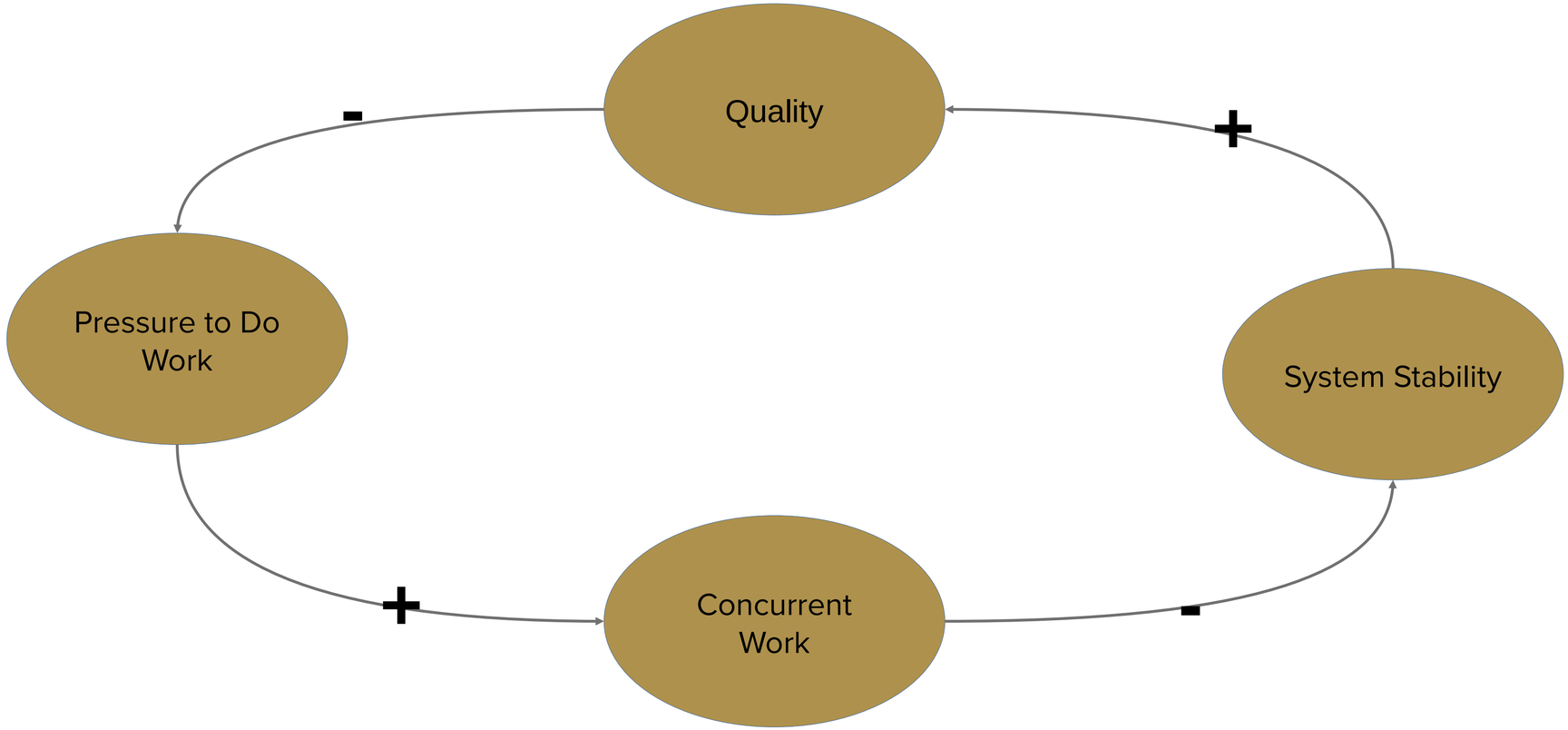



**Balancing**
Self-Correcting
Produces Stability



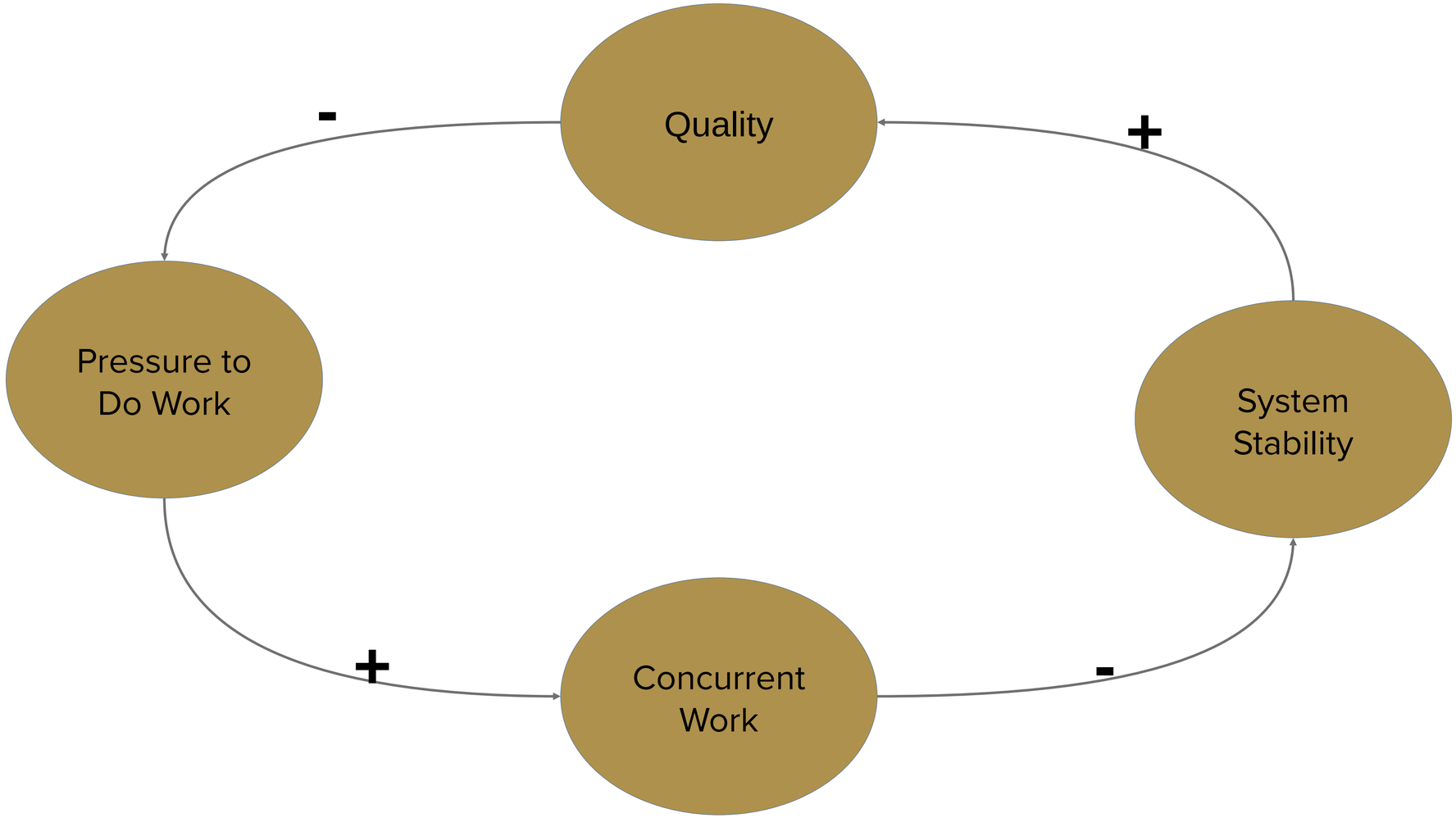

**Reinforcing**
Continued Growth
Leads to instability

# IN SOFTWARE

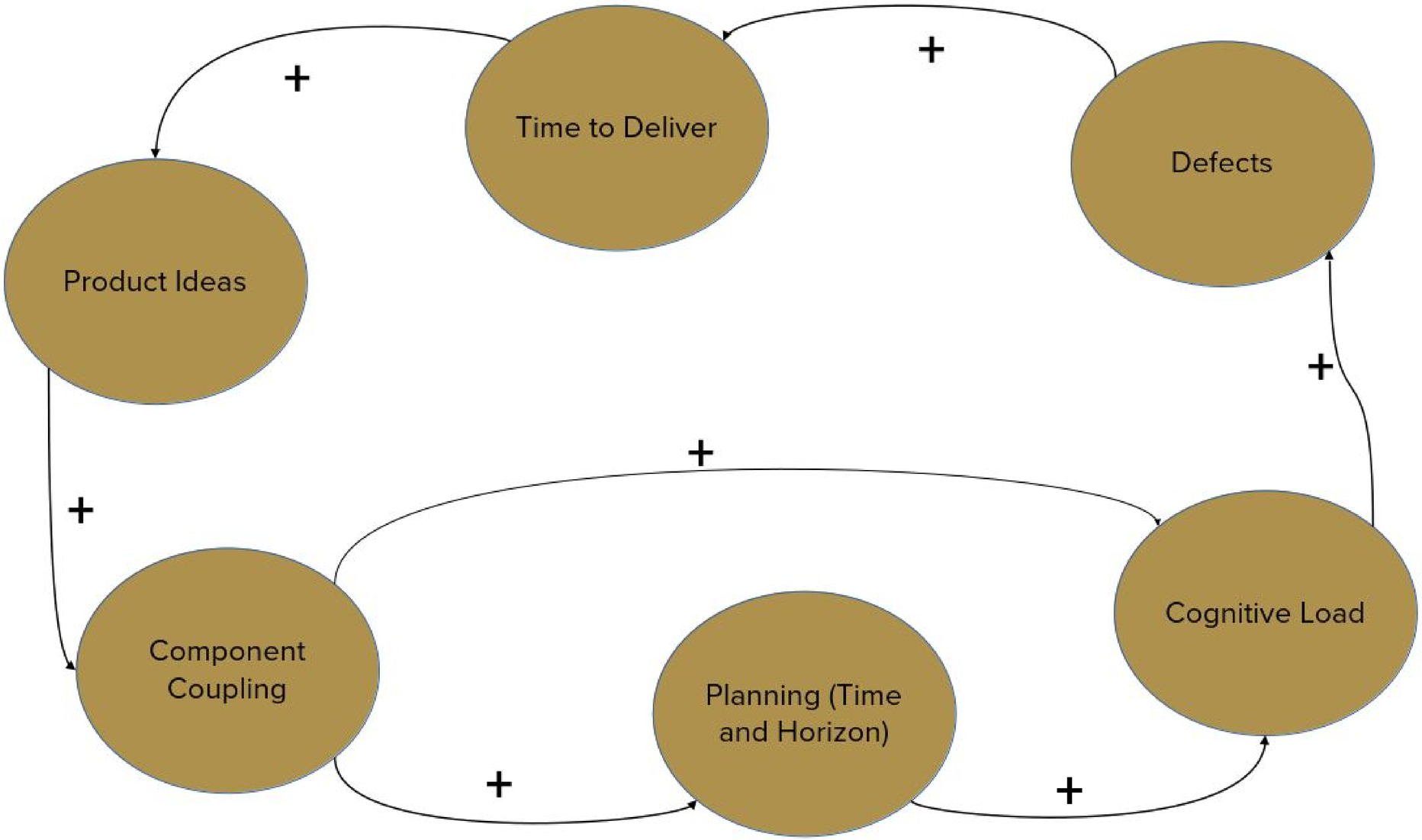



What type of loop is this?

# A VICIOUS CYCLE – AND DELAYS GO UP



# AND IT GETS WORSE



# BEFORE YOU MAKE A CHANGE
# UNDERSTAND THE SYSTEM
# TELL YOUR STORY

# LOTS OF GOOD ANSWERS
# COUPLE REAL BAD ONES

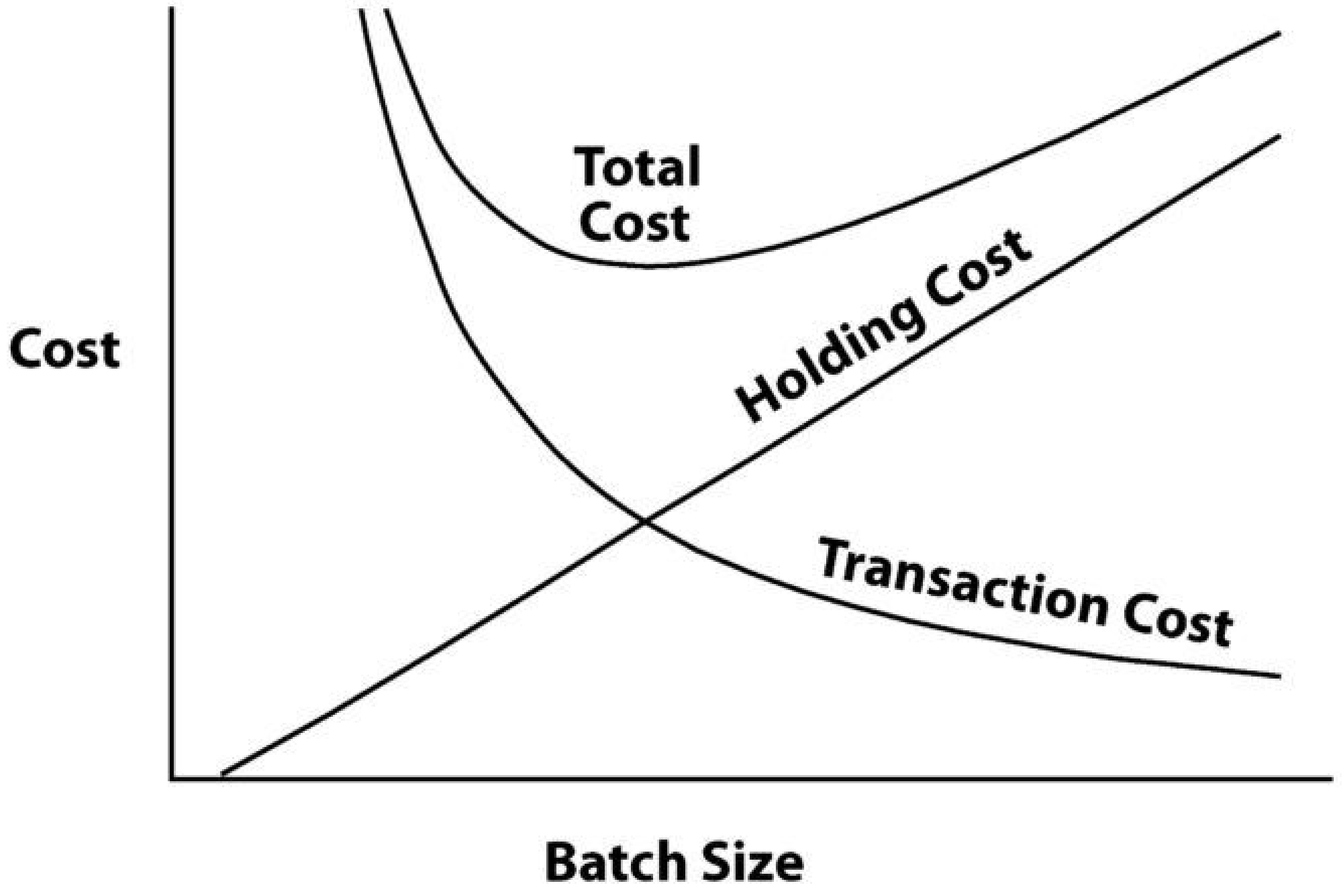
# U-CURVES & OPTIMIZATIONS

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.

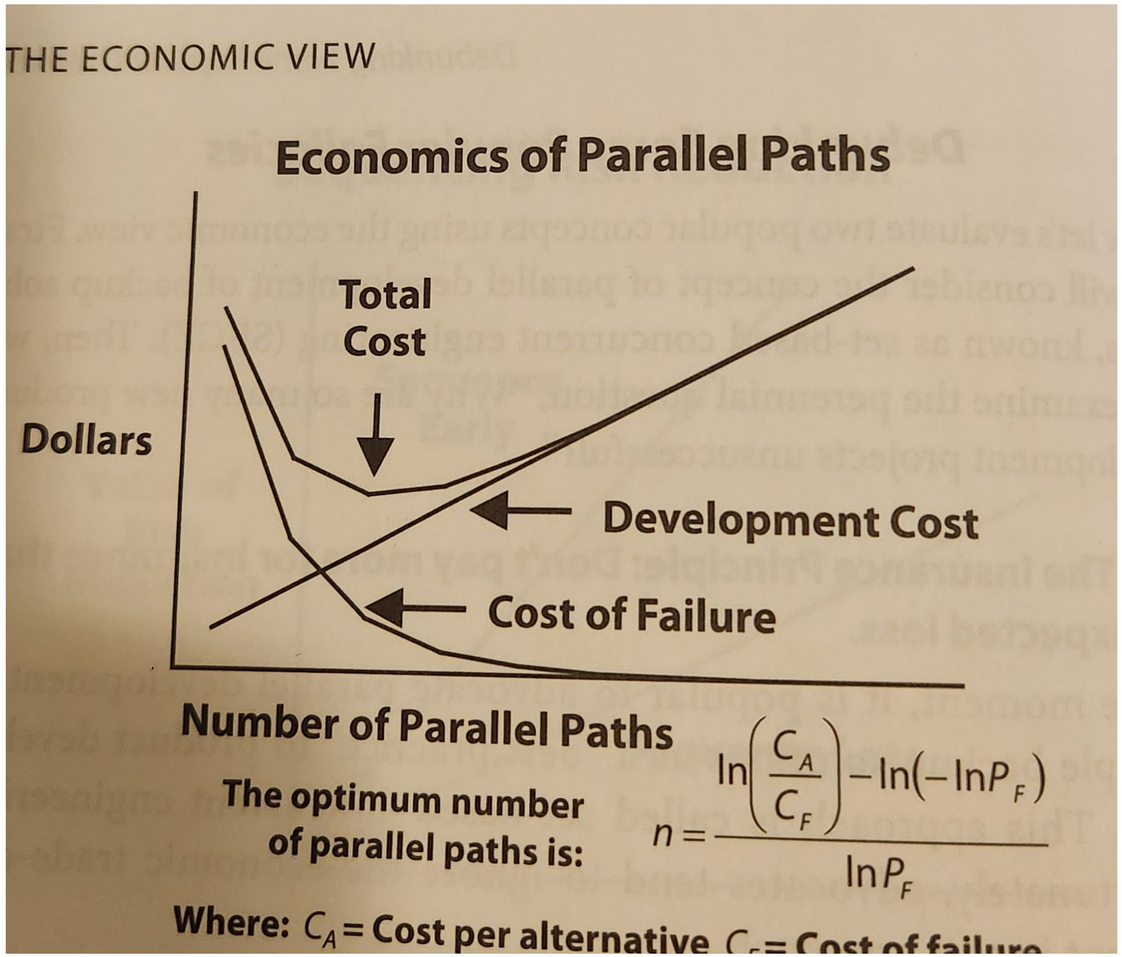
What U-curves do you see in software development?

# U-CURVE OPTIMIZATIONS




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

# U-CURVE OPTIMIZATIONS

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# 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

And Many More


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

# TELL THE STORY
# CHANGE THE STORY

# 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?’

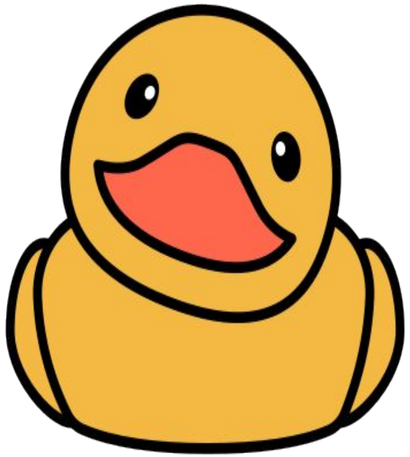
Create a causal loop diagram

Share your story internally

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

Share with us! Would love to hear how it went!

# SIMULATION W/ CURIOUSDUCK.IO



curious duck
digital laboratory, llc

# 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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