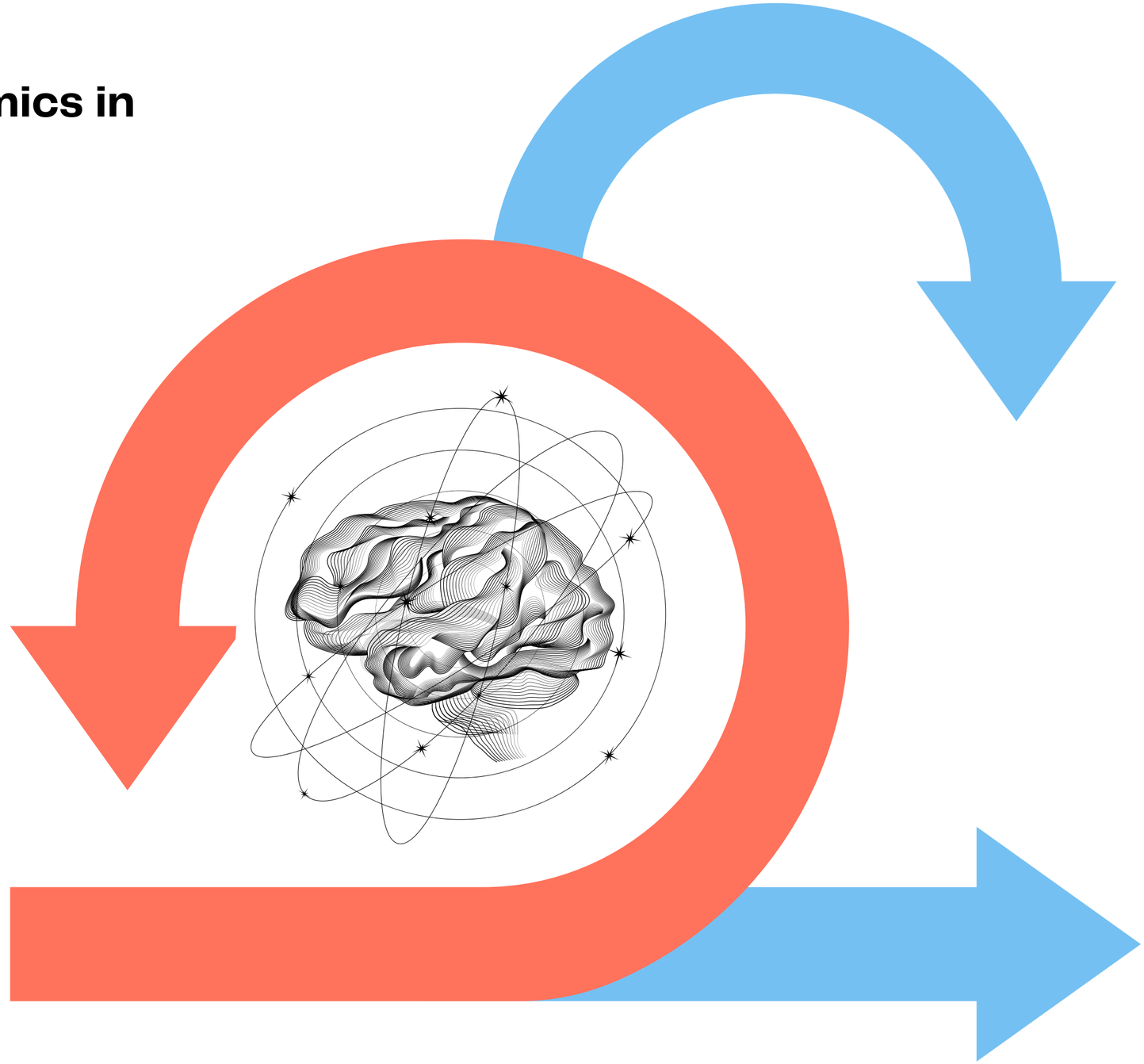
Leveraging behavioral economics in Agile Software development

Stefan Miteski



Stefan in few words

- Studied IT and Automation
- Done Master in Product Lifecycle management

  - thesis Behavioral Economics
- Run his own startup - Systems for Enterprise
- Agile Coach
- Done PSM III
- PO at TeamViewer and Mercedes-Benz

vs **Technik**

The product Owner is problem solver

The product Owner is communicator

The product Owner is an architect of context

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A: Bart Simpson bouncing

Like if you hear this text

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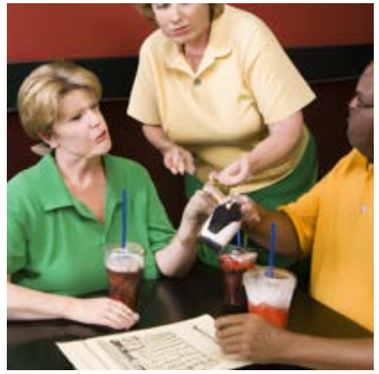

B: That isn’t
my receipt

Like if you
hear this text

The product Owner is problem solver

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C: Lobsters in motion

Like if you hear this text

The product Owner is problem solver

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D: Lactates in pharmacy

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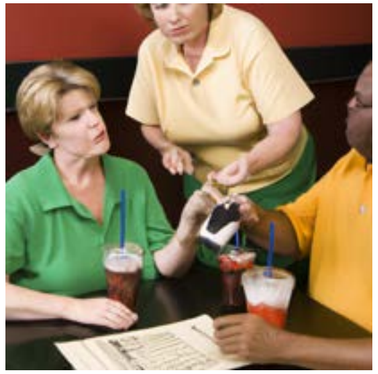


B: That isn't my receipt

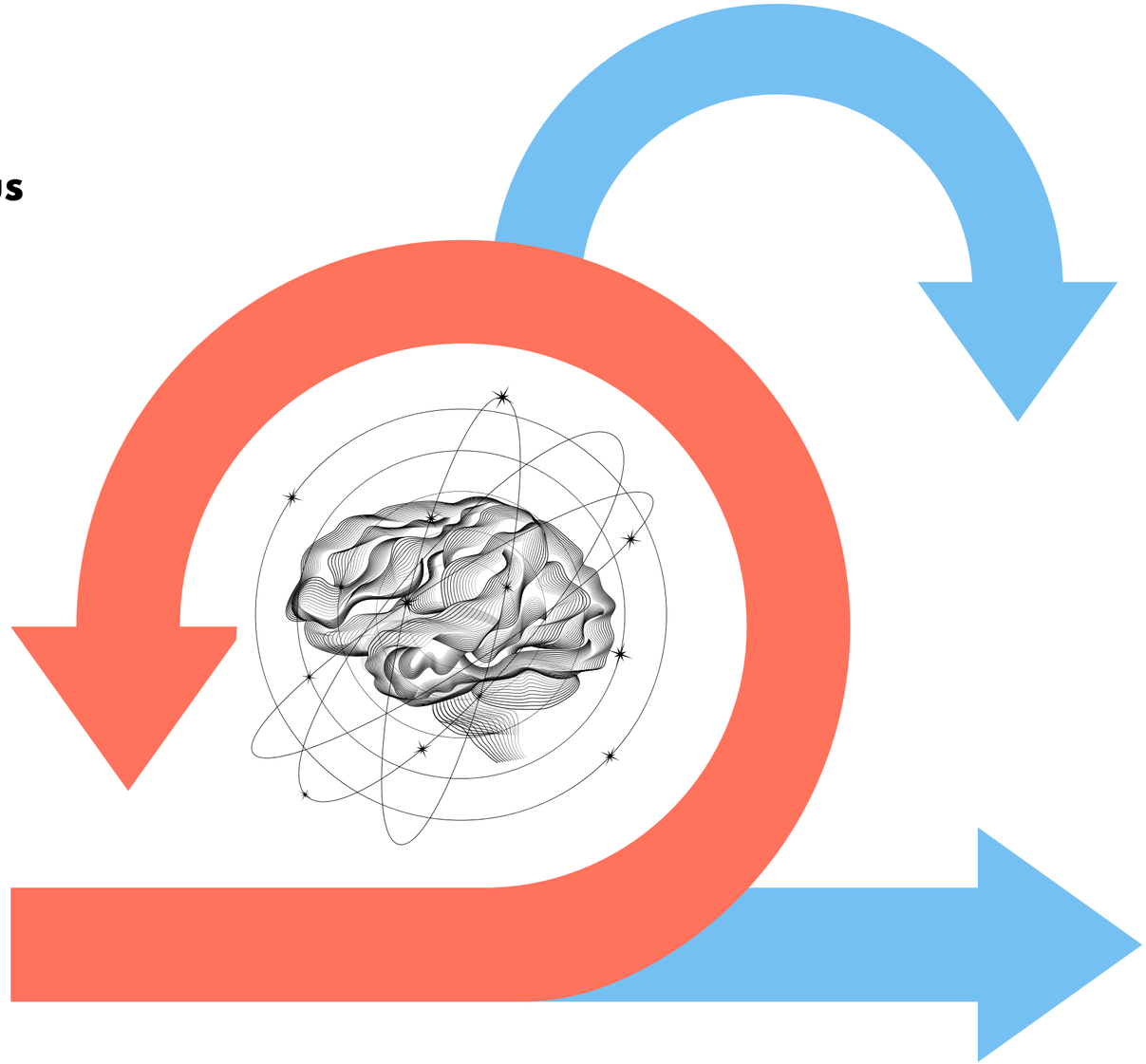
C: Lobsters in motion

D: Lactates in pharmacy

E: That is embarrassing

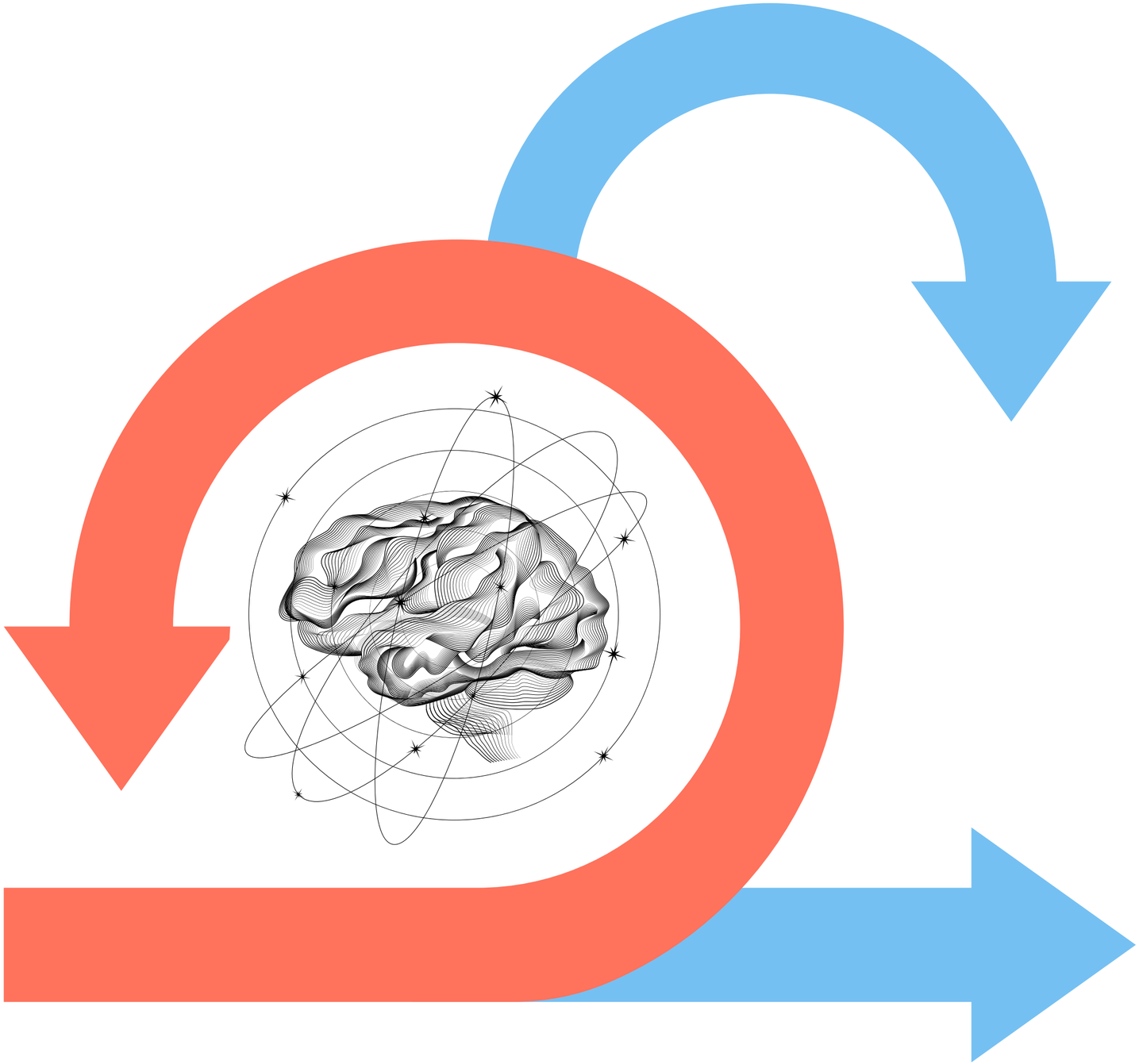
Leveraging behavioral economics in Agile Software development

- Homo Economicus, Homo Sapiens to Homo Agilicus
- Crafting the context
- Insights from BE embedded in Scrum



Chapter 1:

Homo Economicus, Homo Sapiens to Homo Agiligus



HOMO ECONOMICUS VS HOMO SAPIENS VS HOMO AGILICUS

We calculate utility as a multiplication of the value of the payoff multiplied by the probability!

Daniel Bernoulli, 1738 - “Exposition of a New Theory on the Measurement of Risk.”

People tend to maximize their own expected utility!

John von Neumann, 1944 - “Theory of Games and Economic Behavior” with Morgenstein

People are not always rational! Decisions are often influenced by cognitive biases which are predictable...

Daniel Kahneman, 1974 - “Judgment under Uncertainty: Heuristics and Biases” - 90 prospect theory with Tversky

People behavior should be discovered and tested

Hopefully you, in your next product development iteration

HOMO ECONOMICUS VS HOMO SAPIENS

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$$E(U) = \Sigma [p(x) * U(x)]$$

- **Expected value = the odds of the positive outcome X the value of the gain**
- **If the price to participate in a game of flipping coin is 4 EUR and the possibility to win 10 EUR, would participate?**

- This is how we operate in insurance, to get to the insurance premium, we estimate the possibility of a risk happening by analyzing historical data and then we estimate the value of the property. That is the insurance premium
- However, Bernoulli noticed that people have biases. He introduced the law of Diminishing Marginal Utility.
- The more wealth a person has, the less each additional unit of wealth contributes to their overall well-being.

HOMO ECONOMICUS VS HOMO SAPIENS

We calculate utility as a multiplication of the value of the payoff multiplied by the probability!

$$E(U) = \Sigma [p(x) * U(x)]$$

RICE

Priority = Σ [p(x) * U(x)] / Cost (Effort)

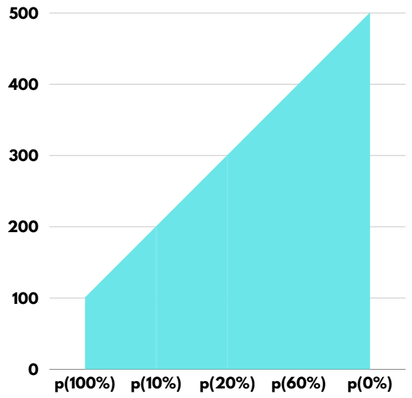
Utility = Impact * Reach

- **Reach: Reach refers to the number of users or customers who will be impacted by a particular feature or task. It quantifies the extent of the impact in terms of how many people will be affected.**
- **Impact: Impact represents the magnitude of the change or the significance of the feature. It measures how much the feature will improve the product or address a specific need.**
- **Confidence: Confidence is a measure of how sure the team is about the estimates for reach, impact, and effort. It's often expressed as a percentage or a level of confidence in the estimates.**
- **Effort: Effort indicates the amount of work, time, and resources required to complete the task or feature. It's typically measured in story points or other units of work.**

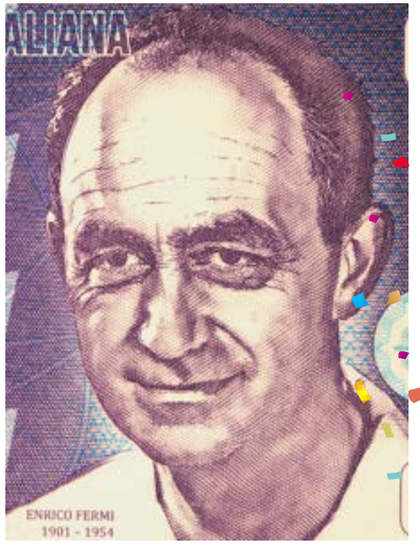
How to measure reach?

What is the Total Obtainable Market?

How much of the TOM would we capture?



Enrico Fermi



Darrell Huff - How to lie with statistics?

How to measure impact?

The Kano Matrix and the Currency zones

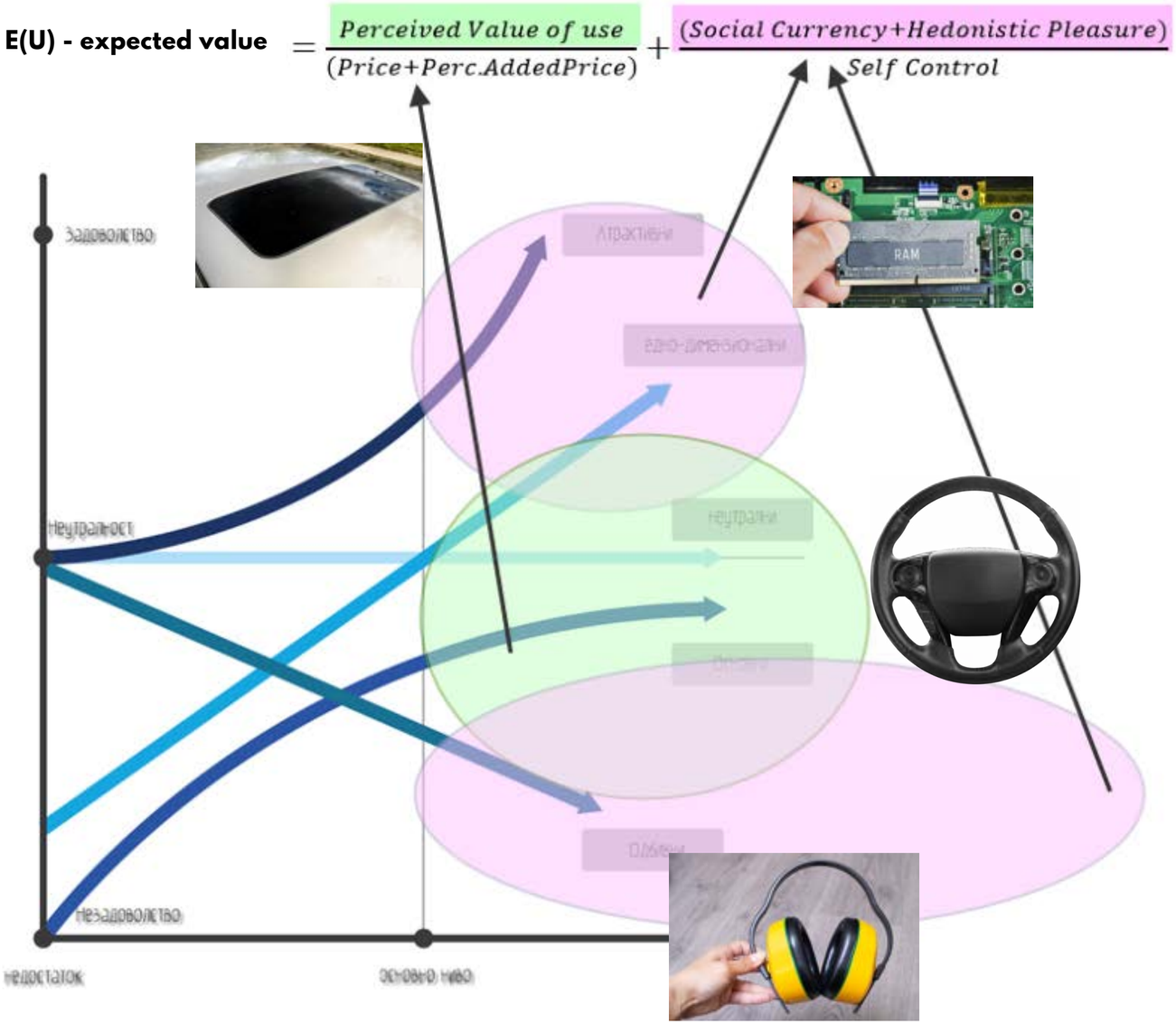


$$\text{E(U) - expected value} = \frac{Perceived\ Value\ of\ use}{(Price+Perc.AddedPrice)} + \frac{(Social\ Currency+Hedonistic\ Pleasure)}{Self\ Control}$$



> LAST YEAR OVER ONE MILLION QUARTER-INCH DRILLS WERE SOLD—NOT BECAUSE PEOPLE WANTED QUARTER-INCH DRILLS BUT BECAUSE THEY WANTED QUARTER-INCH HOLES.

LEO MCGIVENA



HOMO ECONOMICUS VS HOMO SAPIENS

People tend to maximize their own expected utility in the long run!

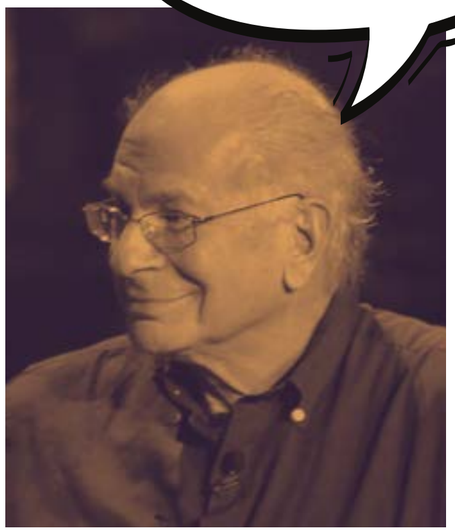
John von Neumann, 1944 - “Theory of Games and Economic Behavior” with Morgenstein

BONUS

Maximize the Customer Lifetime Value

HOMOS ECONOMICUS VS HOMOS SAPIENS

People often use irrational but predictable shortcuts in their decision making process!



Daniel Kahneman, 1974 - “Judgment under Uncertainty: Heuristics and Biases” - 90 prospect theory with Tversky

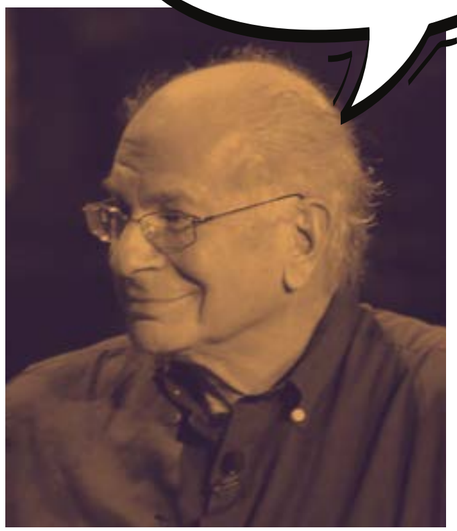
Recently, Chrome announced that a library deeply embedded within the code of our web app will no longer be supported due to security reasons. This announcement was made on very short notice, leaving us in a precarious position to quickly patch our app to maintain its functionality. Our current user base stands at 6 million. In response to this situation, our diligent developers have engineered a solution that successfully mitigates the issue for all Chrome and Chromium-based users, as evidenced by the green status of our Automated Quality Assurance (AQA) tests in our Continuous Integration (CI) pipelines. However, the senior solution architect has expressed concerns over the riskiness of deploying this new implementation. This stems from its lack of thorough testing across various browsers, which has led to issues in similar past scenarios. Additionally, it's important to note that the new implementation has resulted in our app performing slower. We now find ourselves at a crossroads, faced with the crucial decision of how to proceed.

Scenario A: "Do not expedite the deployment process. Instead, continue to refine the solution, ensuring that the 2 million users on non-Chrome browsers will not experience any service disruptions. Allow the team the necessary time to conduct comprehensive tests before proceeding with the deployment."

Scenario B: "Proceed with deploying the current solution. While there's a 1/3 probability that the solution will seamlessly work for all 6 million users, the senior team estimates a 2/3 probability that service disruptions may occur across the board due to insufficient manual testing."

HOMOS ECONOMICUS VS HOMOS SAPIENS

People often use irrational but predictable shortcuts in their decision making process!



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Scenario C: "Should we opt not to deploy the update, an estimated 4 million Chrome users most likely will be unable to use the app properly."

Scenario D: "In the event we choose not to deploy the solution, there's a 1/3 probability that the service will continue to function normally for all users (we have stats from other products).

However, there's a concerning 2/3 probability that all 6 million users can be hacked."

HOMOS ECONOMICUS VS HOMOS SAPIENS

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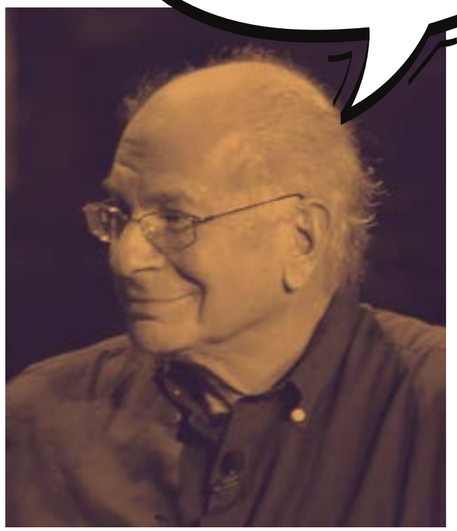


Daniel Kahneman, 1974 - “Judgment under Uncertainty: Heuristics and Biases” - 90 prospect theory with Tversky

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed:

Program A: "200 people will be saved."

Program B: "There is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no one will be saved."

Program C: "400 people will die."

Program D: "There is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die."

Despite the fact that Programs A and C, as well as Programs B and D, are mathematically equivalent, the framing of the question significantly affected participants' choices.

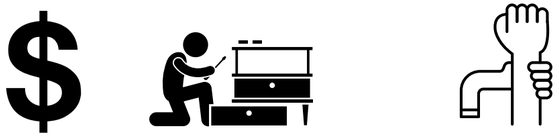
When the programs were framed in terms of lives saved (gains), a majority of participants preferred Program A, the sure gain. However, when the programs were framed in terms of deaths (losses), a majority of participants preferred Program D

SYSTEM ZERO - HOMO AGILIGUS

The key finding of the study was that judges were more likely to grant parole immediately after a meal break (when they were less hungry) than they were later in the session (when they were hungrier). The study suggested that the cognitive and emotional state of the judges, which could be influenced by factors like hunger and fatigue, had an impact on their decision-making.

Most likely explanation - blood sugar levels: when blood sugar levels are low, people are more likely to be irritable and have difficulty concentrating. This can make it difficult for judges to make fair and impartial decisions.

$$\text{E(U) - expected value} = \frac{Perceived\ Value\ of\ use}{(Price + Perc.AddedPrice)} + \frac{(Social\ Currency + Hedonistic\ Pleasure)}{Self\ Control}$$



SYSTEM ZERO - HOMO AGILIGUS

- A study published in the journal "Social Cognitive and Affective Neuroscience" found that people with lower levels of testosterone were more likely to exhibit prosocial behavior, such as helping others and donating to charity.
- A study published in the journal "Neuropsychopharmacology" found that women in the luteal phase of their menstrual cycle had poorer memory performance than women in the follicular phase.
- Testosterone, a hormone present in both males and females but at different levels, has been linked to risk-taking behavior.

Is it realistic that you would be able to predict all factors?



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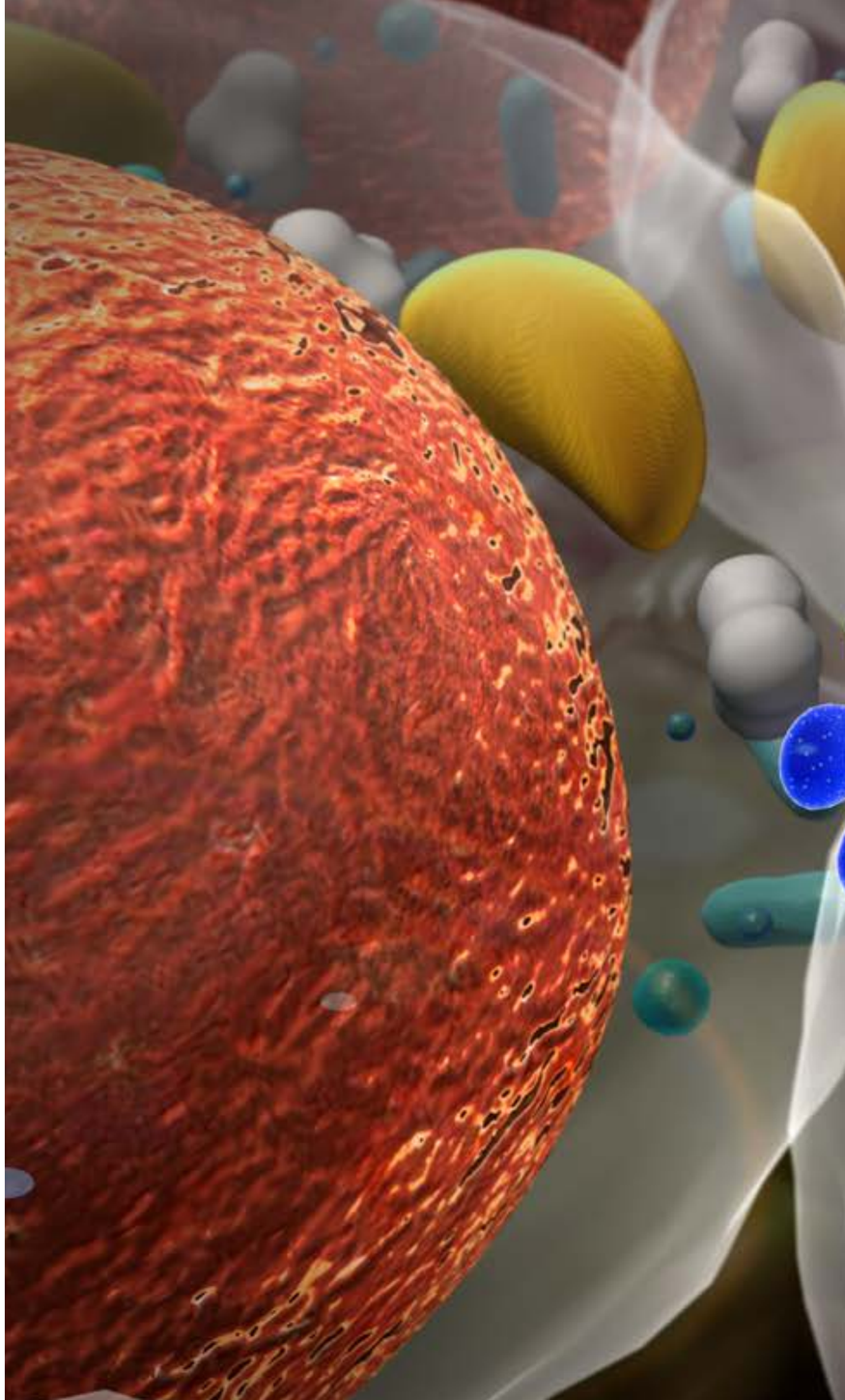

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People behavior should be discovered and tested

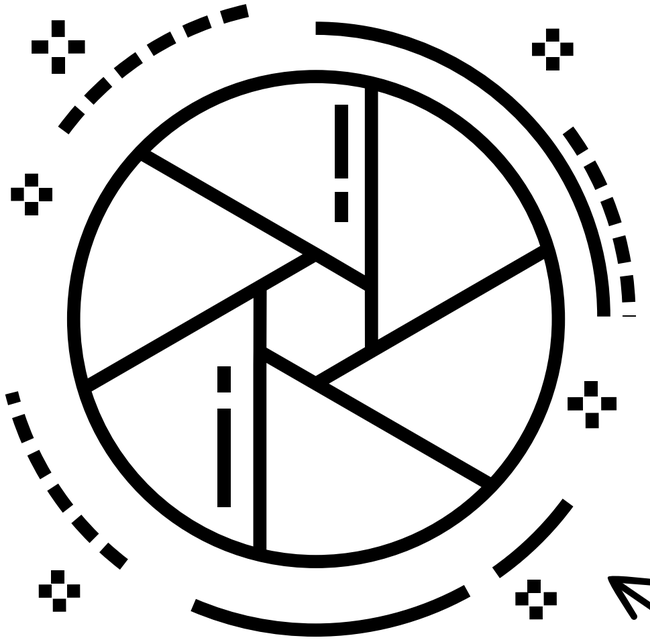
You, in your next product development iteration

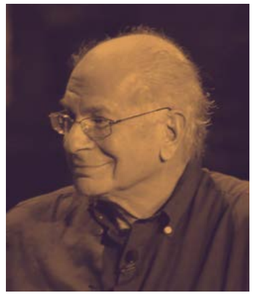
- **RICE with Bernoulli:**
  - **Deep dive in the problem statement (5 whys method)**
  - **Assess total obtainable market (with Fermi method)**
  - **Create probability curve and plot few points (historical data)**

δ

Asses the delta of the market
Asses the predictability

- **Games with Von Neumann:**
  - **Define the market and create market segmentation**
  - **Position your product**
  - **Define expected customer lifetime interactions and design the product for maximizing Customer Lifetime Value**





- **Kahneman**
  - **Create Kano matrix (feature breakdown)**
  - **Create currency zones**
  - **Define the choice triggers**
  - **Define the choice question and format the wording accordingly**

LUCK

Luck = Opportunity X Readiness

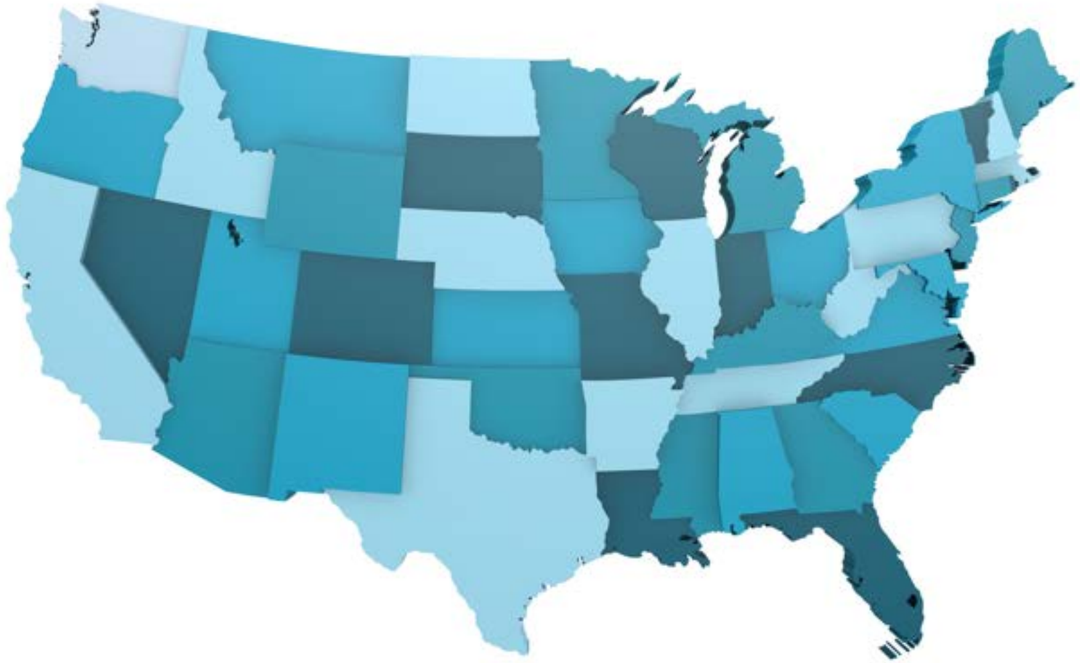
While we see value in the upfront research, we tend to re-asses our plans in short cycles by measuring the customer value we have delivered.

While we rush to ship a product in fast iterations to test and learn faster, we don't test just the technical solution but our ability to create a context of value

TEST AND CONCLUDE

Instead of trying to predict everything - TEST!

- If your target market is US, test in Australia
- If Australia is too risky, test in New Zealand



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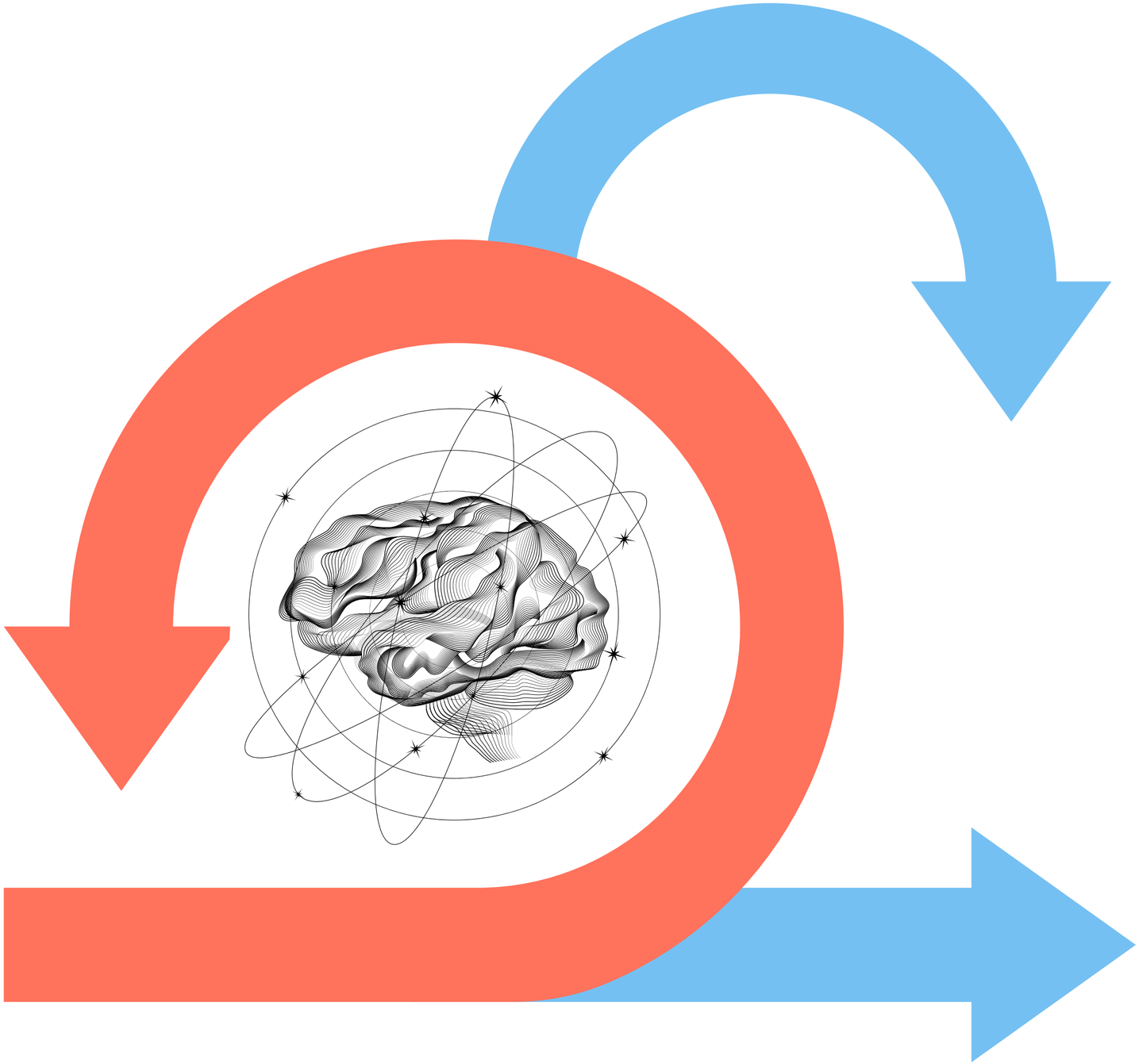
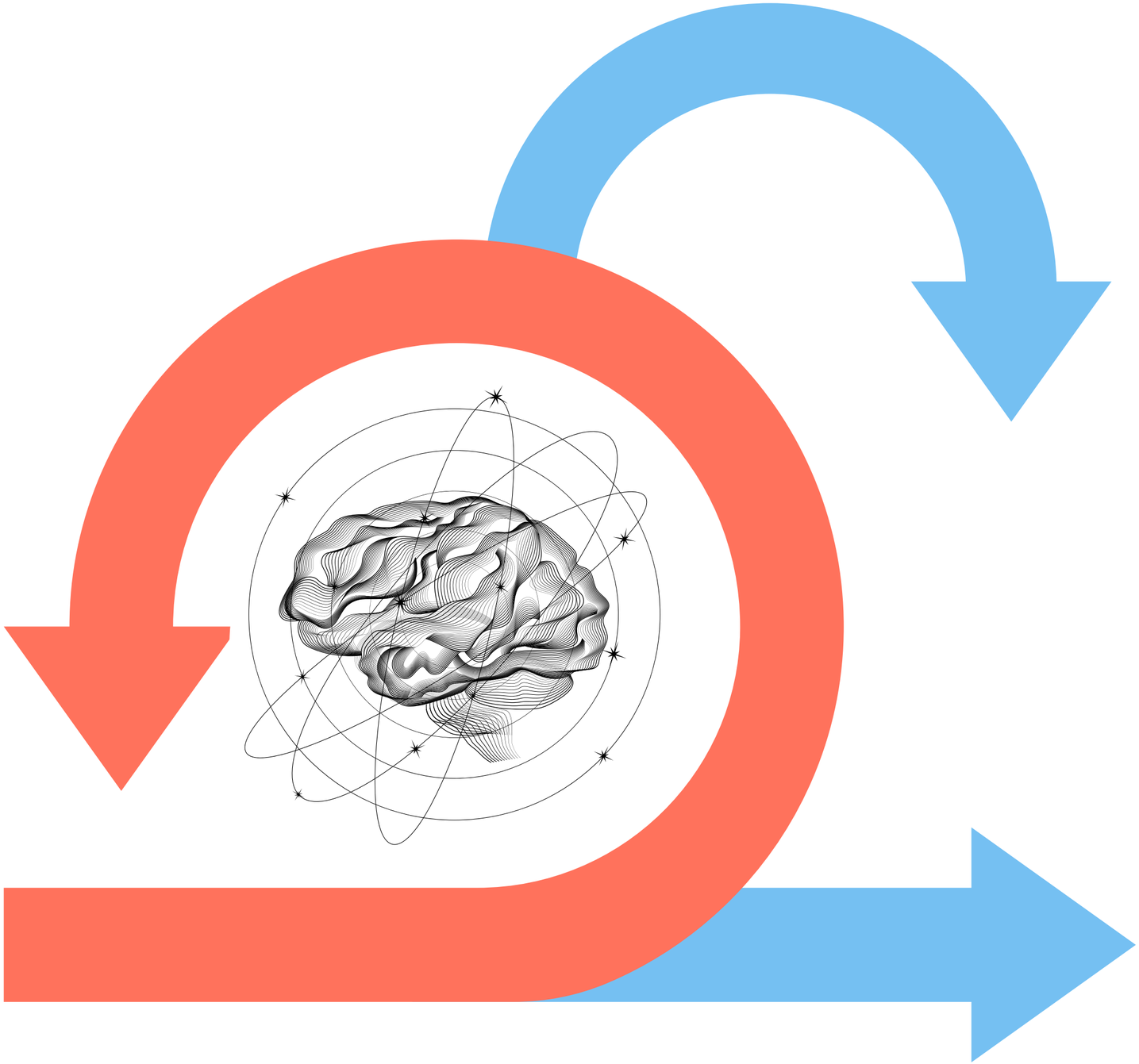


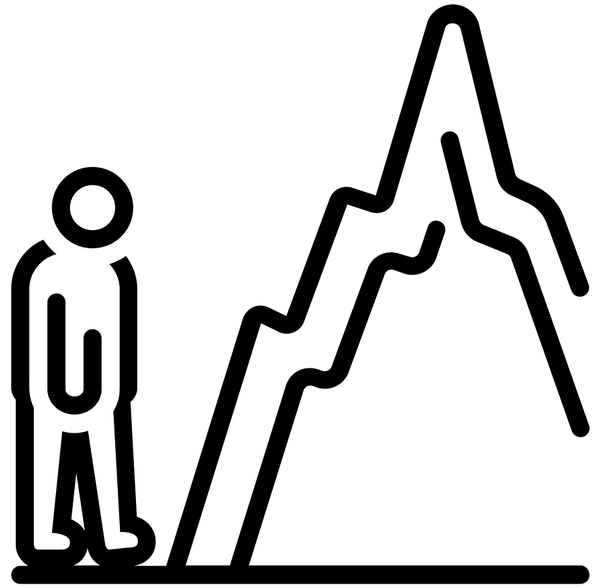
Chapter 2:

Practical implications in Product Design



The Fiat 500 test

"This project has a 70% chance of success"



"This project has a 30% chance of failure"

Managers are more likely to approve a risky investment project if the project is framed as a gain than if it is framed as a loss.

FRAMING AND COMMUNICATING WITH STAKEHOLDERS

Unfinished work bias:

- **Pizza coupons you have 3/10 in the beginning**
- **Duolingo approach**

COMMITMENT BIAS

"Commitment and Obedience: Testing a Two-Step Model of Persuasive Communication" by Cialdini, Petty, and Cacioppo (1976)

CREATE CHOICE IF LAUNCHING A NEW CATEGORY

THE DECOY EFFECT

First Scenario:

- **Premium Beer - $2.5**
- **Bargain Beer - $ 1.8**

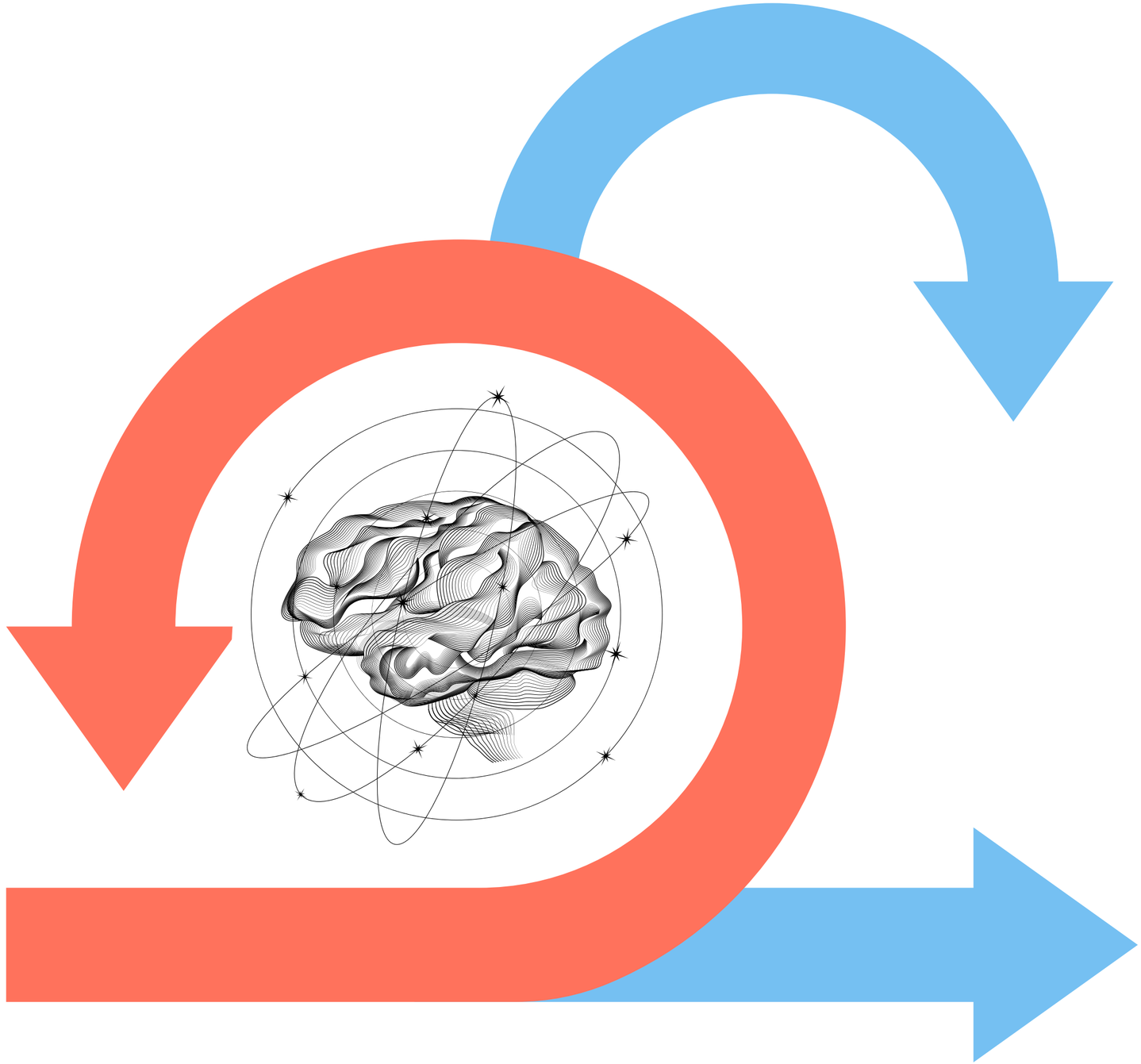
Modified Scenario:

- **Premium Beer - $2.5**
- **Bargain Beer - $ 1.8**
- **Super Bargain Beer - $ 1.6**

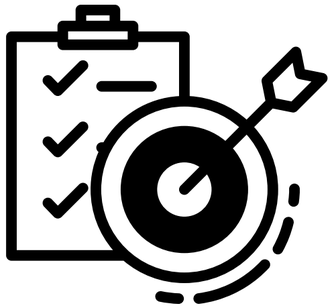
CREATE CHOICE IF LAUNCHING A NEW CATEGORY

Chapter 3:

Practical phrasing of Process Design

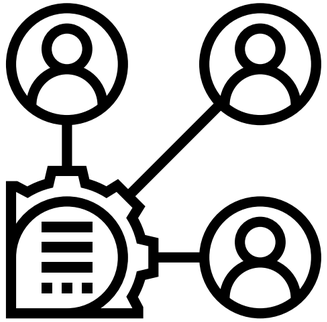


HOMOS AGILICUS



Product Goal

Nasa Approach for moon landing - one of the turning points of the modern management



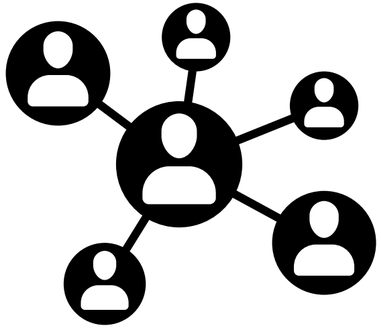
Stakeholder identification and management

- Create a sense of urgency. (Kotter, Samsung)
- Sell positive framing (70% chance of success, rather then 30% chance of failure) - Asian disease

PROCES

TOOLS

Culture



Why Sprints work?

- Commitment to the Sprint goals - Commitment and consistency
- But it is not only about product, Womack and T. Jones in Lean Thinking are talking about Continuous Improvement - process changes can be done better when they are done incrementally
- Constant retrospectives - are effective way of systematically gathering feedback to improve the proccesses
- Thaler on deadlines - deadlines bring constrains

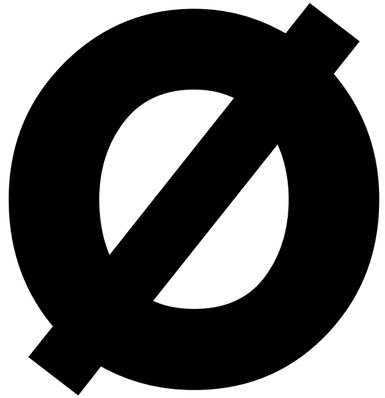
- Thomas, K. W., & Velthouse, B. G. (1990). Cognitive elements of empowerment: Measuring perceived control and strategic importance. Academy of Management Journal, 33(3), 667-681.

This study identified two key cognitive elements of empowerment: perceived control and strategic importance. Perceived control is the employee's belief that they have control over their work. Strategic importance is the employee's belief that their work is important to the organization. Thomas and Velthouse found that employees who scored high on these two dimensions were more satisfied with their jobs, more productive, and more engaged in their work.

TOOLS

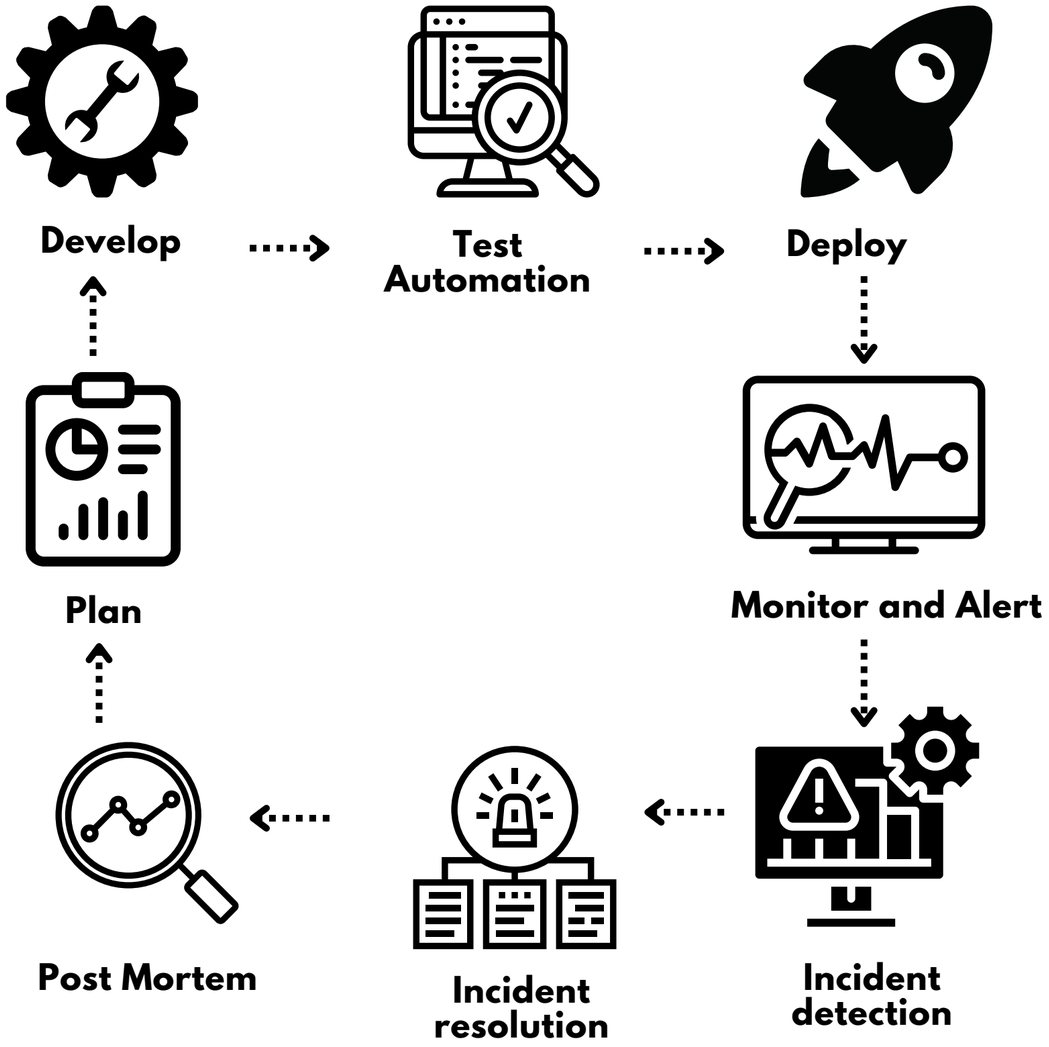
PROCESSES

Culture



TOOLS
PROCESSES
Culture

REAL LIFE SCENARIO



Typical problems of a feature factory:
- We do not pay too much attention to the logs and systematically analyze them to understand the pitfalls of our application
- We do not pay too much attention to creating smart alerts (we only have basic alerts and they are not customer centric)
- We do not pay too much attention to creating best practices during incidents (channel of communication, clear responsibility division…)
- We do not have clear protocol of actions during incidents
- We do not have blameless post mortems culture (neither we have them on regular basis, neither we use system thinking to build a system that can not fail rather than blaming people)
- We do not have book of knowledge for incidents response
- We do not have systematic approach to reducing the time to detection, time to mitigation and time to recovery (not treated as a process that needs to be managed).
- We are the tools and platform team and it is expected from us to lead the DevOps practices for all the other teams…

Our current solution is:
- Using the knowledge of a developer who is long time in the team and has coded a lot of the services in the current solution
- Always involving him in all incidents as he knows most and can resolve them fastest. (like Brent from the book – The Phoenix Project)

Our future problems are:
- The person is becoming a bottleneck and or might leave
- We will have 30-50% increase of work related to live markets support and maintenance, in the next 6
- 9 months from now

Solution – change the culture trough workshops:
- Try to involve the developers in interactive sessions so that they also identify these problems, see the ops perspective and actively start thinking in the ops mindset.
- Get insights from more experienced teams/engineers

DECISION POWER INCREASES ENGAGEMENT

Don’t ask the kid which food he likes to eat, but which bowl would he like to use today

- **A study by Gallup found that employees who feel like they have a say in the decisions that affect their work are more likely to be engaged and productive.**
- **A study, published in the Journal of Organizational Behavior, found that employees who are empowered to make their own decisions about their work are more likely to be satisfied with their jobs and less likely to experience burnout.**
- **A study, published in the Academy of Management Journal, found that employees who feel like they have a voice in the workplace are more likely to be committed to their jobs and less likely to quit.**

Team decision matrix

	One	Majority	Some	All	Dice
Leave					
Office Layout					
Work process					
Team Retreat Location					
Office Music					
Office Party Theme					

- Gallup, "State of the American Workplace Report," 2023.
- Lee, J. S., & Lee, S. H., "The effect of employee empowerment on job satisfaction and burnout: A mediating role of perceived organizational support," Journal of Organizational Behavior, 39(1), 2018, pp. 53-69.
- Eisenberger, R., Huntington, R., Hutchison, S., & Sowa, D., "Perceived organizational support," Journal of Applied Psychology, 80(1), 1995, pp. 1-14.