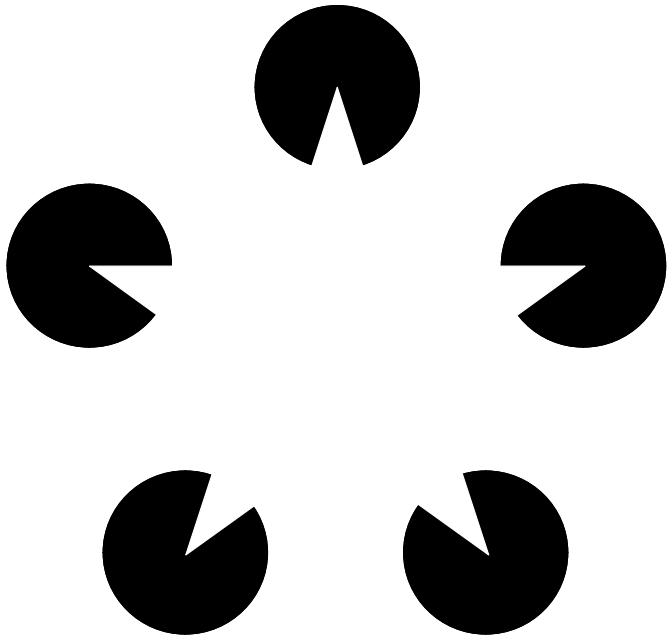
Wharton School – Mack Institute for Innovation Management
Spring Conference 2016: Digital Disruption and Empowered End-Users – June 9th, 2016

Carlos A. Osorio, PhD. International Faculty Fellow,
MIT Sloan School of Management

OVERCOMING BIASES IN YOUR INNOVATION MODEL

cosoriou@mit.edu

Our mind plays tricks on us…



cosoriou@mit.edu

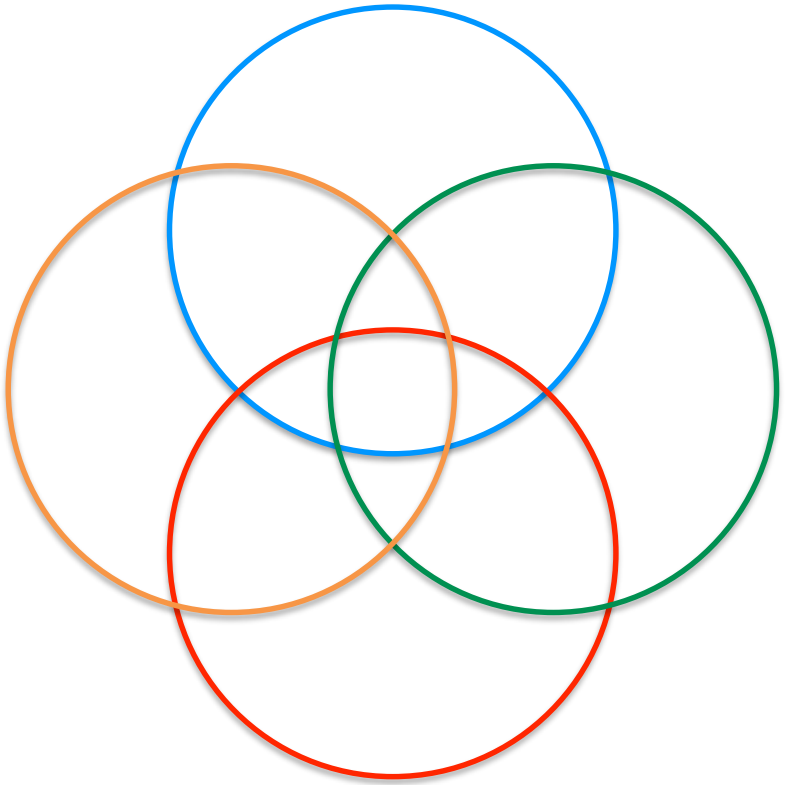
awareness & debugging

cosoriou@mit.edu


Aligning processes,
cognition, emotion and routines

Innovation Strategy

Top management subtle control

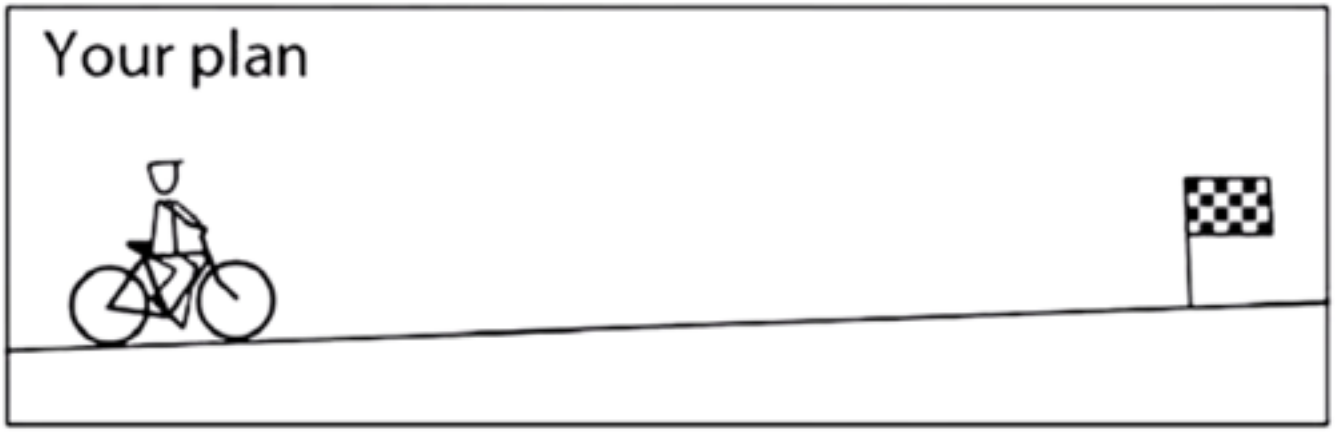


Market Strategy

Technology Strategy

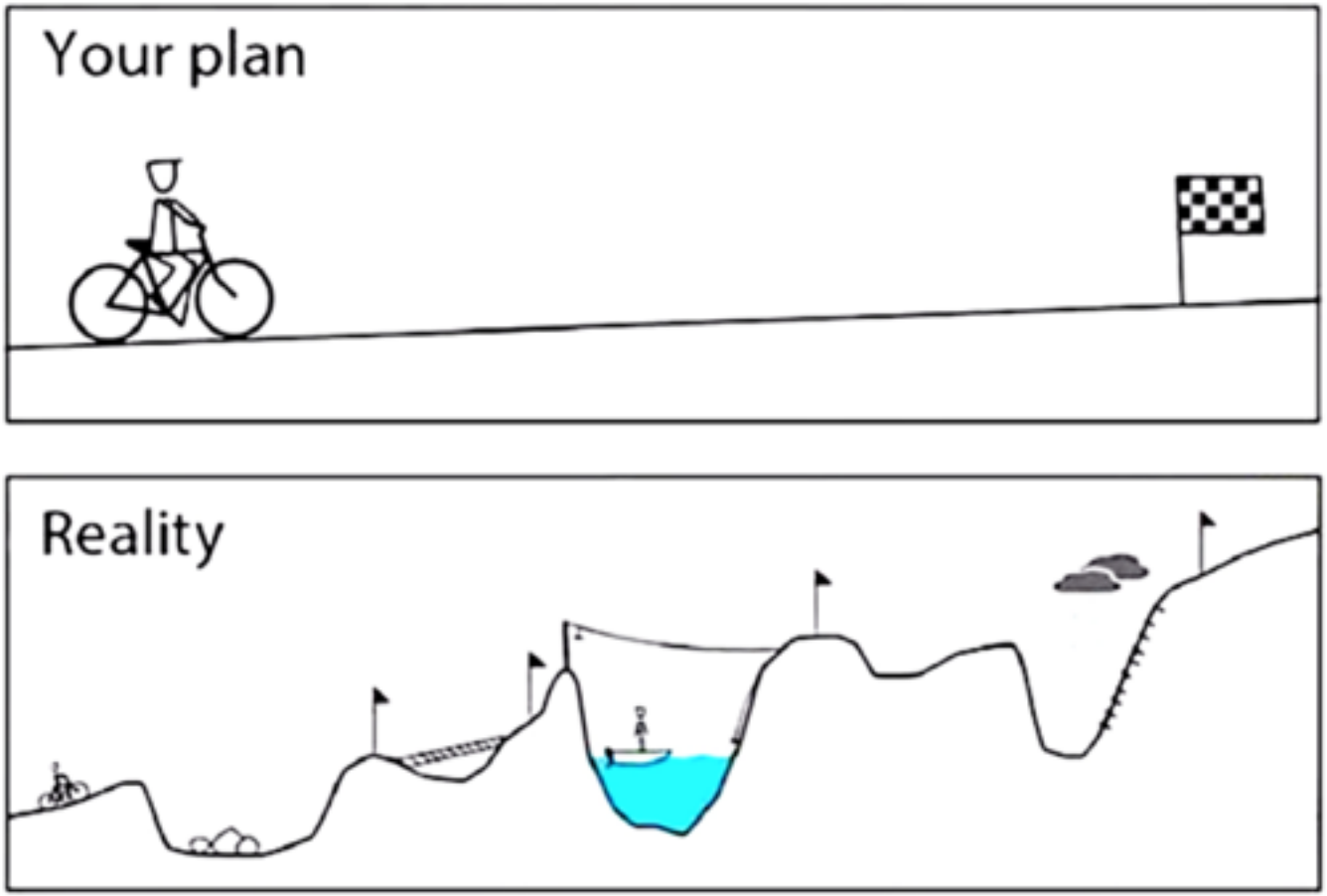
cosoriou@mit.edu

A typical development plan



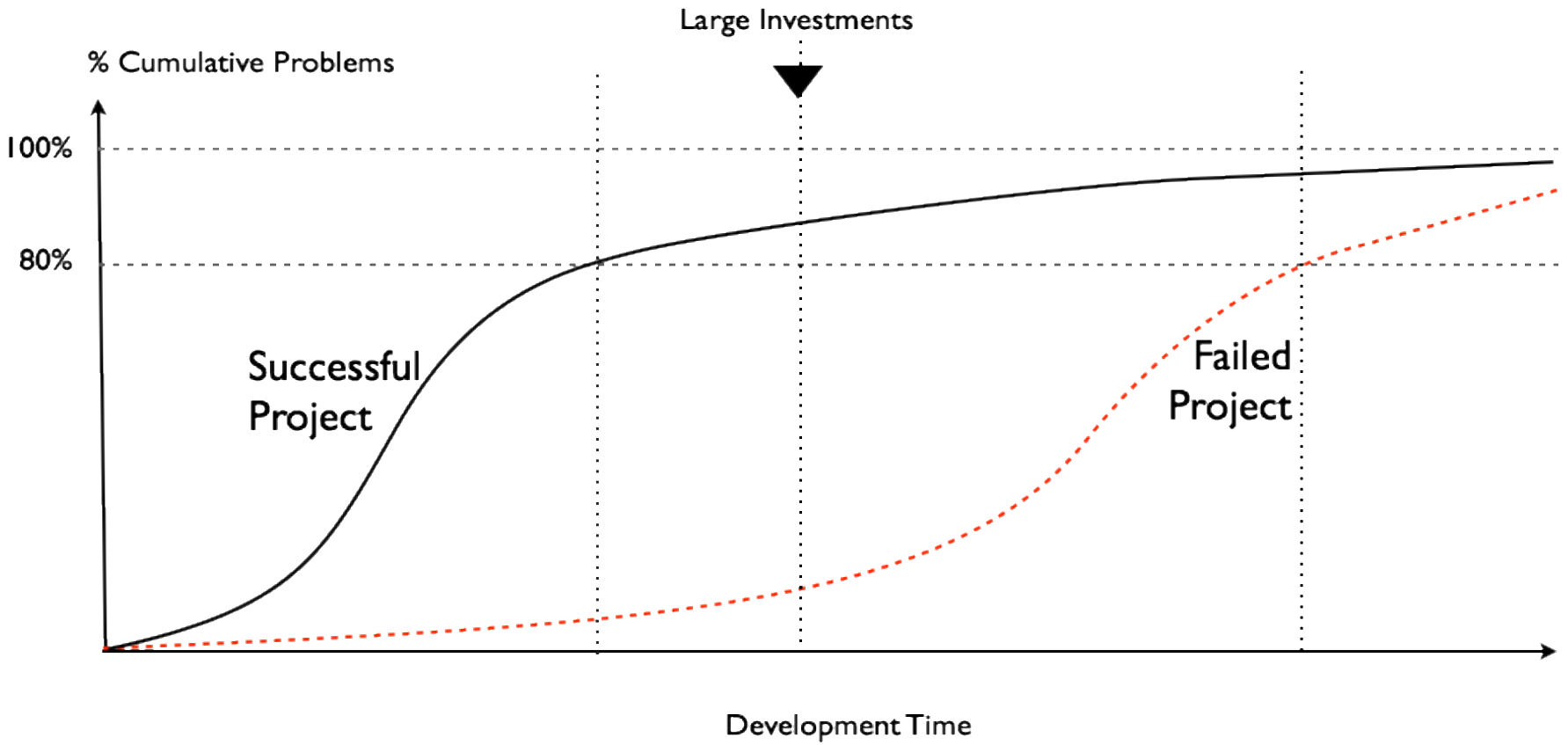
cosoriou@mit.edu

A typical execution



cosoriou@mit.edu

How do success and failure look like?



Most of the problems in a project are discovered at the beginning, and the late stages are used for refining

Most of the problems in a project appear at the end, when piloting or during sales.

Source: Osorio and Elola (2010)

cosoriou@mit.edu

How did this happen?

There are many reasons…

Anchoring
Similarity bias
Continuity bias
Confirming
Association by asymmetry
Projection
Systematic distortion bias
Halo effect
False uniqueness effect
Negativity bias
Disconfirmation bias
Asymmetric insight illusion
Dispositional bias
Clouded judgment effect
Empathy neglect
Correspondence bias
Male bias

Gambler's fallacy
Hindsight bias
"Ultimate" self-serving bias
Pessimistic bias
Conjunction fallacy
Positive outcome bias
Diagnosticity bias
Vulnerability bias
Labeling bias
External agency illusion
Intensity bias
Just world bias
Romantic bias
Bias blind spot
Empathy gaps
Common fate bias
Proximity bias

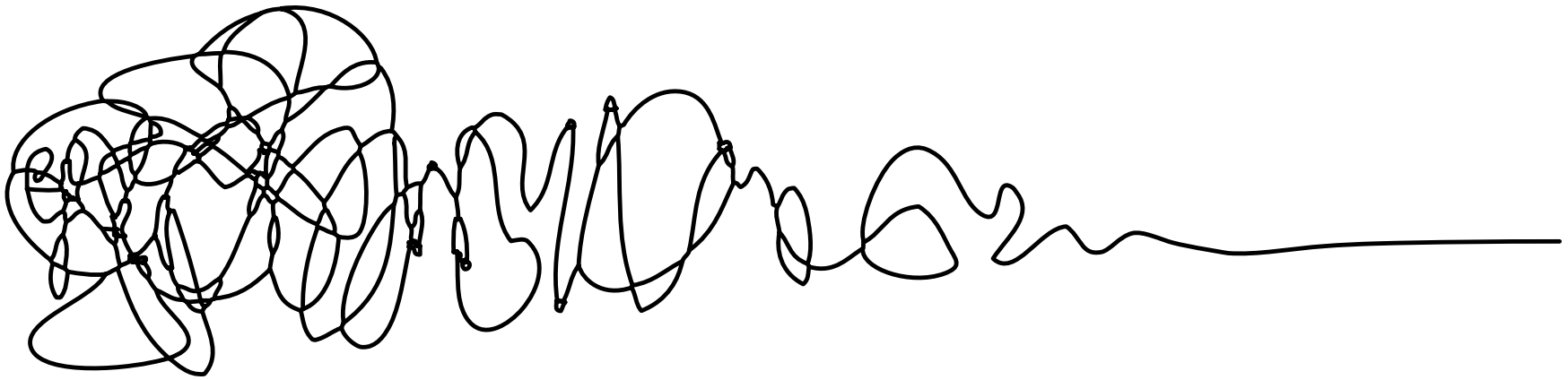
Overconfidence bias
Fundamental attribution error
False consensus error
Positive bias
Confirmation bias
Justice bias
Hot hand fallacy
Self-protective similarity bias
Self-serving bias
Optimistic bias
Sinister attribution error
Ingroup/outgroup bias
Hypothesis-testing bias
Durability bias
Self-image bias
Observer bias
Simplicity bias

Some types of cognitive bias

cosoriou@mit.edu


We often use the wrong lens to make sense of the reality we want to change, choose the wrong tools and make the wrong decisions to change it

Innovation as a discovery-driven journey under high risk, uncertainty and ambiguity



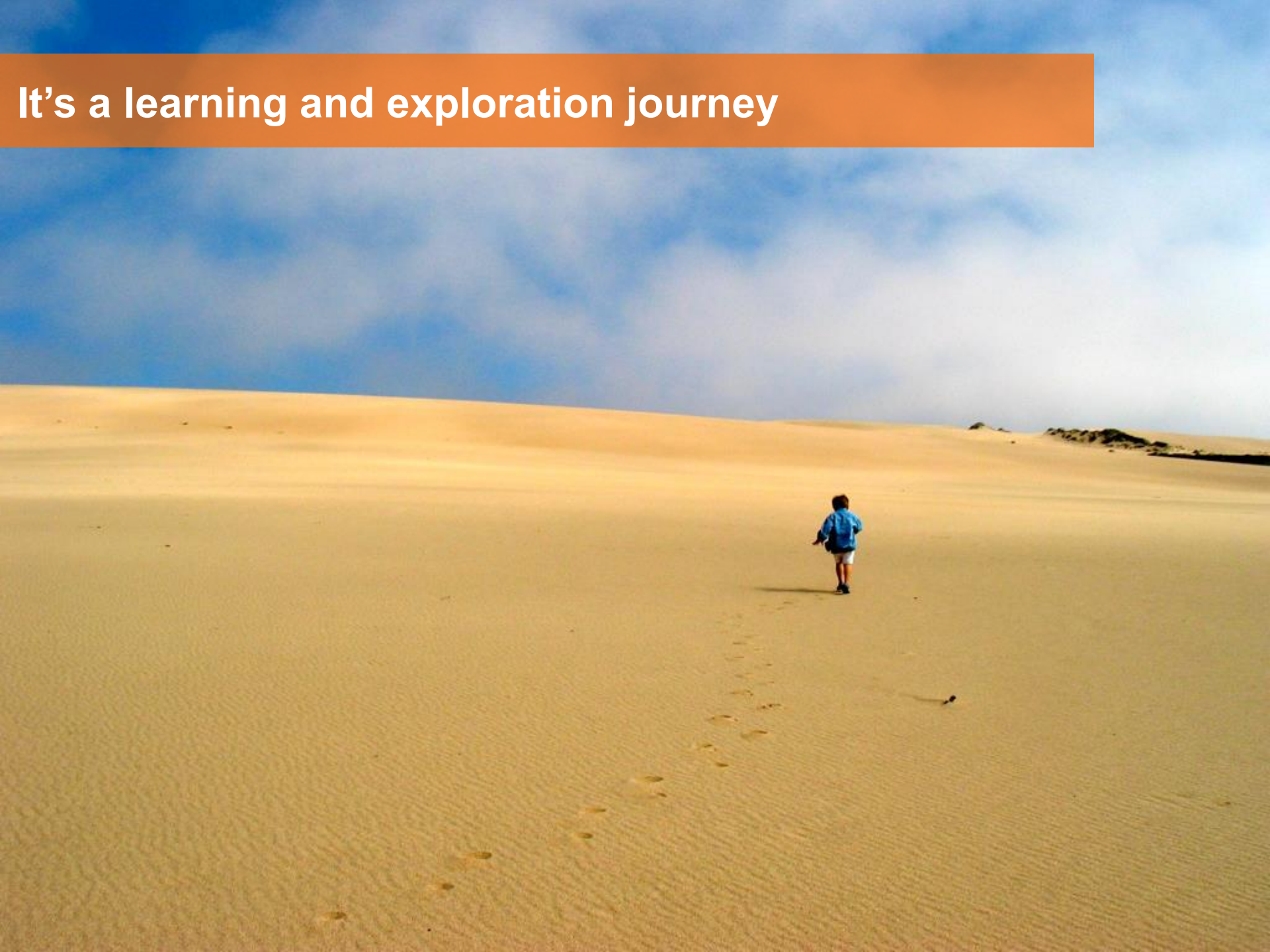
High
(100s -1000s of assumptions and hipotheses)

Risk, Uncertainty and Ambiguity

Low
(10s -100s of assumptions and hipotheses)

cosoriou@mit.edu

It’s a learning and exploration journey



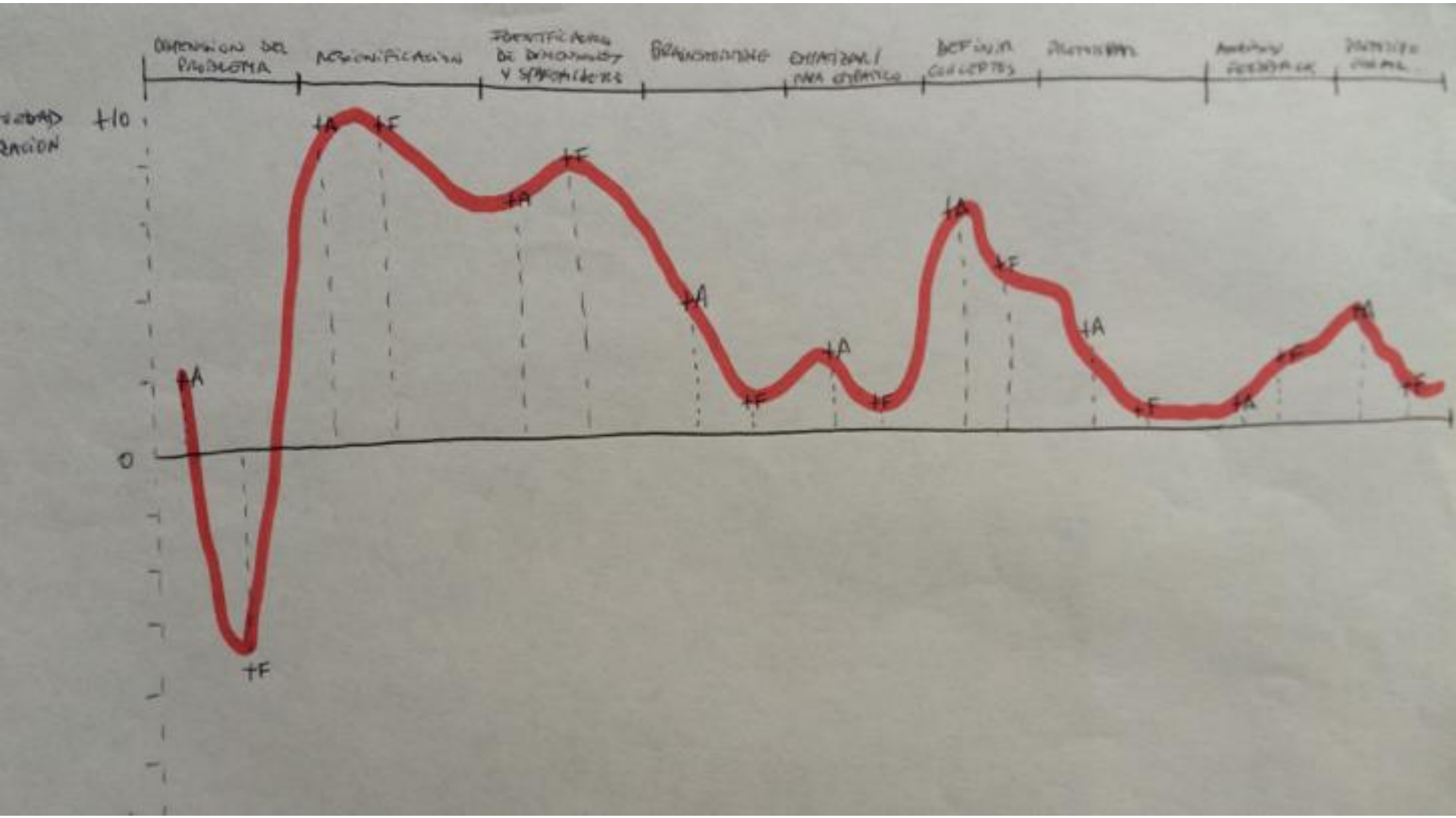
Information comes too fast…

… and we suffer from cognitive overload

Sometimes things get tough…

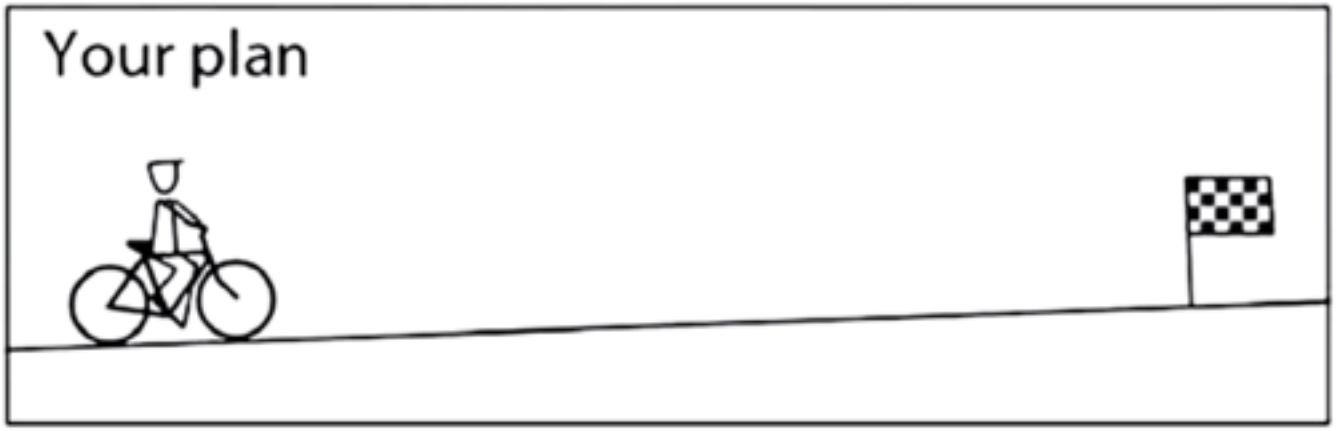
cosoriou@mit.edu

We fail because of our reactions on highly risky, ambiguous and uncertain environments



cosoriou@mit.edu

Teams tend to plan for solution-driven developments



Our reactions to risk, ambiguity and uncertainty makes us use coping mechanisms so we:

- **act by using proven and previously successful paths for taking control in insecure environments**
- **have positive illusions about our own qualities and capacities, ideas, future outcomes, and control over processes and environment**

cosoriou@mit.edu

Why do teams using similar processes and methods fail while others succeed?

cosoriou@mit.edu

risky and uncertain journey +
task technical difficulty +
biases +
cognitive load +
emotions

cosoriou@mit.edu

Previous research…

1. **Innovation and design processes can allow for better results** in consistent and predictable manners (Cooper 1979, Wheelwright & Clark 1992, Dougherty and Heller 1994, Graffin and Page 1996, Ulrich & Eppinger 2004, Salomo, Weise et al. 2007, Osorio 2010)

2. **Adequate decision making has an important role in successful innovation and new product development** (Brown & Eisenhardt 1995; Krishnan & Ulrich 2001; Osorio & Elola 2011)

3. **Our rationality is bounded** by our computational constraints for dealing with large and complex information, affecting our **decision-making and affecting how we solve complex problems** (Simon 1955).

1. **Satisficing - "People solve problems by searching selectively through a problem space defined by a particular problem representation"** (Simon 1991), and when reach to a "complete" design the solution is compared with "**standards defined by aspiration levels**" instead of alternative designs (Simon 1972).

cosoriou@mit.edu

Previous research…

5. **Intuition and heuristics for decision-making under uncertainty work better in contexts known or analogous to previous problems**, but fail in new and difficult problems (Tversky and Kahneman 1974, and others)

6. **Our understanding of a challenge results from our cognitive representations of that reality** (Kiesler and Sproull 1982), **which is triggered by our cognitive "budget"** (Gilbert, Pelham & Krull 1988) **and how we potentially fall for a large list of cognitive biases** (too many authors to list)

5. **The initial "framing" of problems has direct relation with its design space and solutions, and can lead to political or internal battles** (framing contests) (Simon 1969; Tversky and Kahneman 1981, Kaplan 2008, Kaplan and Tripsas 2008, Powell, Lovallo et al 2011)

cosoriou@mit.edu

There is plenty where to choose from…

cosoriou@mit.edu

Types of development process

Software

1. Waterfall (1970)
2. Spiral (1988)
3. Iterative (1988)
4. Scrum (1995)
5. Agile (1998)
6. XP (1999
7. Google V. Sprint Method (2015)

Product Development

8. Edison (circa 1880)
9. Stage-gate I (1988), II, III
10. Lead-user innovation (1988)
11. Innovation Funnel (1992)
12. Product Design and Development (2012-2016)

Business Model / Startup

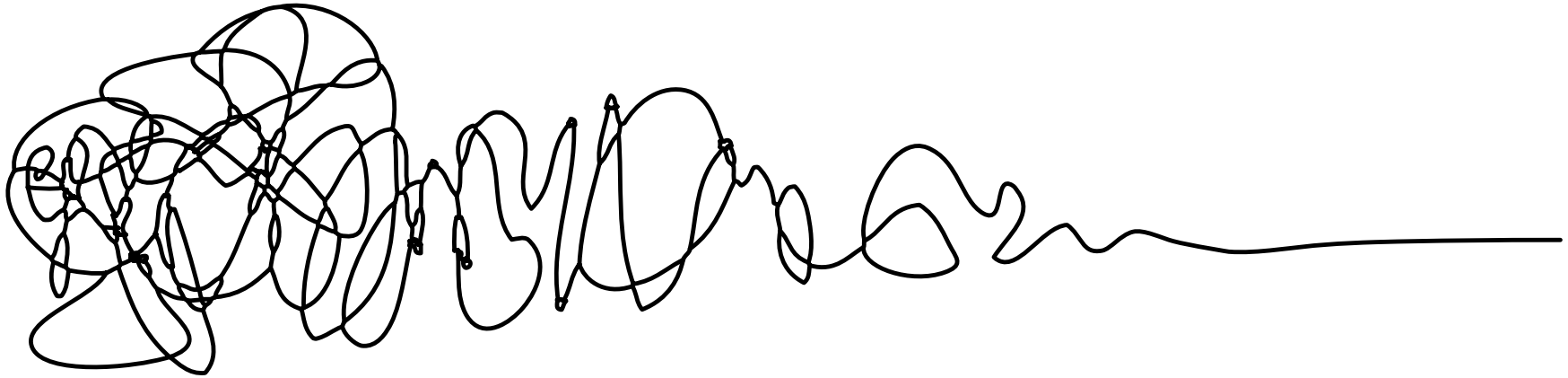
13. Discovery-Driven Planning (1995)
14. Four Steps to Epiphany (2007)
15. Business Model Design (2010)
16. Lean Startup (2011)
17. Lean Canvas (2012)

Design

18. Simon (1969)
19. Continuum Innovation (2000)
20. IDEO (2001)
21. Stanford (2010)
22. IIT/101 Design Methods (2009)
23. Design Thinking Business Innovation (2011)
24. Frog Design Toolkit (2013)

cosoriou@mit.edu

Innovation as a discovery-driven journey under high risk, uncertainty and ambiguity



High
(100s -1000s of assumptions and hipotheses)

Risk, Uncertainty and Ambiguity

Low
(10s -100s of assumptions and hipotheses)

What is the "real" problem, and why is it worthy?

(Multiple problem representations)

Knowing why?

What is the best possible solution?

(Multiple design spaces)

Knowing what?

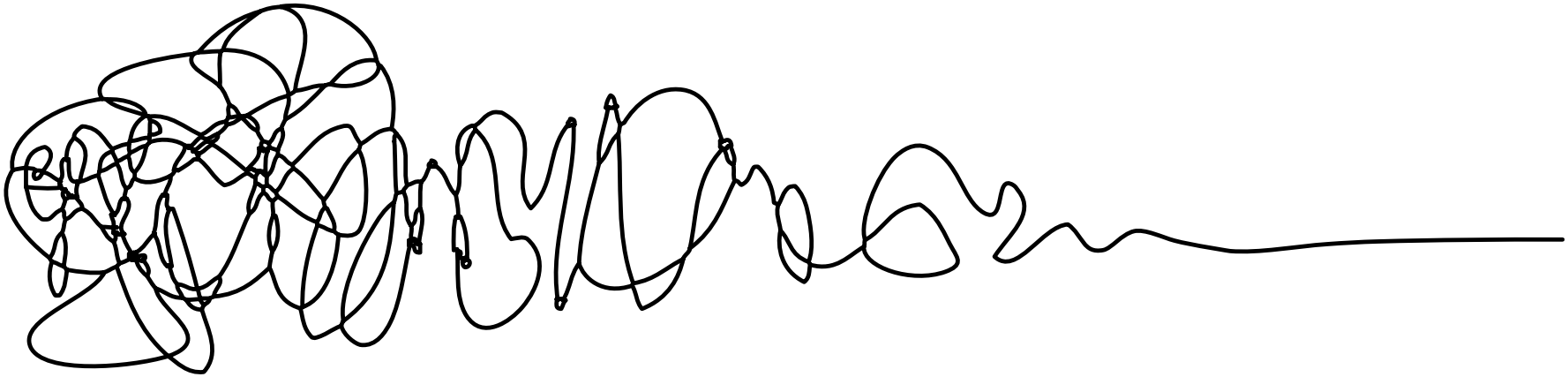
How to best implement such solution?

(Implementation strategy)

Knowing how?

cosoriou@mit.edu

THIS IS HOW A DISCOVERY-DRIVEN JOURNEY LOOKS LIKE



High
(100s -1000s of assumptions and hipotheses)

Risk, Uncertainty and Ambiguity

Low
(10s -100s of assumptions and hipotheses)

GENERAL INNOVATION PROCESS: THIS IS HOW YOU MANAGE THE JOURNEY OF DISCOVERY

PLANNING

Objectives:

> Planning development

> Team formation

> Securing space and time

> Defining process performance measures

LEARNING & DISCOVERY

Objectives:

> Modifying understanding

> Defining dimensions of the challenge

> Empazithing and involving stakeholders

> Discovering latent needs and unique insights

> Discovering a distinctive Point of View

IDEATION, EXPLORATION & EXPERIMENTATION

Objectives:

> Generating the largest space of possible solutions

> Finding a space of feasible solutions through iterations of prototyping and experimentation cycles

> Designing a fully functional and full resolution validation prototype

SYSTEM–LEVEL DESIGN

Objectives:

> Implementation of the best solution

> System integration, testing and validation

> Starting production ramp-up

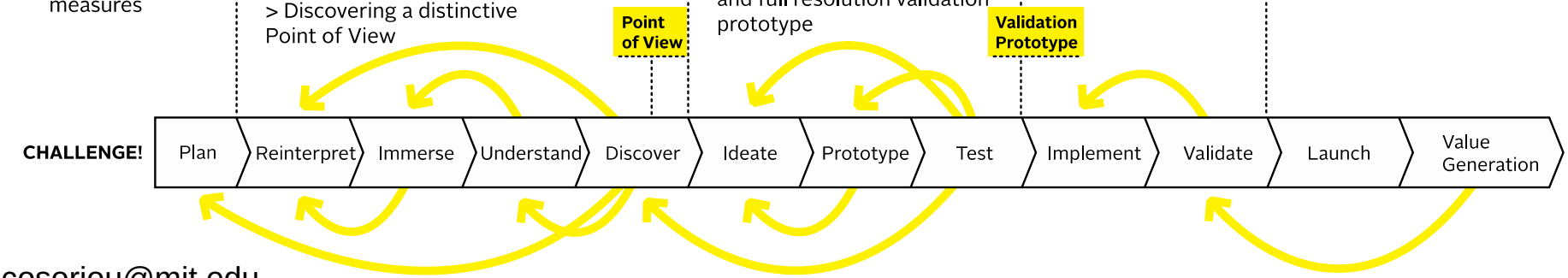
LAUNCH AND VALUE CAPTURING

Objectives:

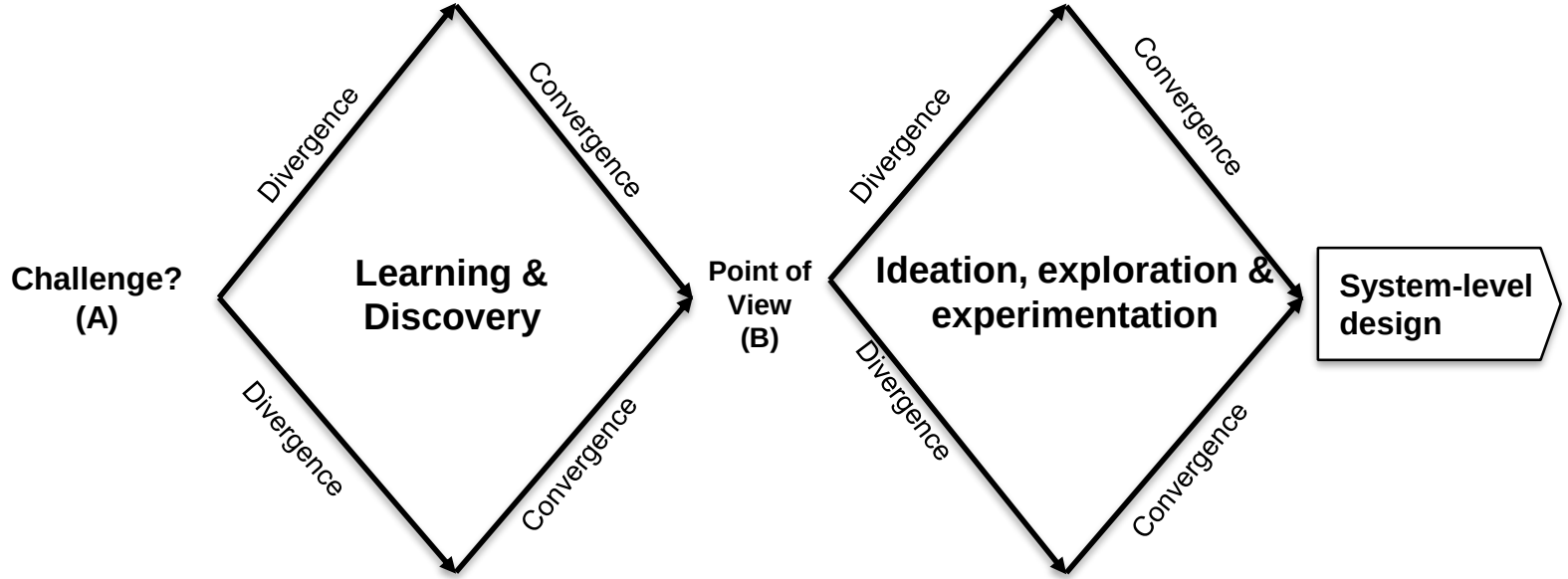
> Launching the initiative

> Creating and capturing shared value

> Managing the solution's life cycle



cosoriou@mit.edu



ATTITUDE:
Planning

Tasks:
1.Planning

ATTITUDE:
Reframing
& Empathizing

Tasks:
2.Reframing
3.Make explicit assumptions and hypotheses
4.Initial immersion
5.Defining challenge dimensions
6.Identifying stakeholders profiles
7.Brainstorm your questions
8.Defining methods for empathy-driven fieldwork
9.Designing protocol
10.Testing protocol
11.Fieldwork (observation, interviews, etc.)

ATTITUDES:
Synthesizing
& Defining

Tasks:
12.Processing fieldwork: getting the data
13.Analysis and synthesis of each interaction
14.Storytelling: team-based capture of information
15.Narrative Analysis: empathy maps
16.Identifying tacit and latent NEEDS
17.Generating INSIGHTS
18.Crafting your team's Point of View
19.If not satisfied, then ITERATE

ATTITUDES: Ideating /
Prototyping

Tasks:
20.Preparing questions for ideation
21.Securing sources of inspiration
22.Ideation
23.Eliminating bad ideas, and filtering good ones
24.Concept generation: synthesizing ideas by dimension
25.Testing concepts by dimension
26.Building integrated concepts & prototypes

ATTITUDE:
Experimenting

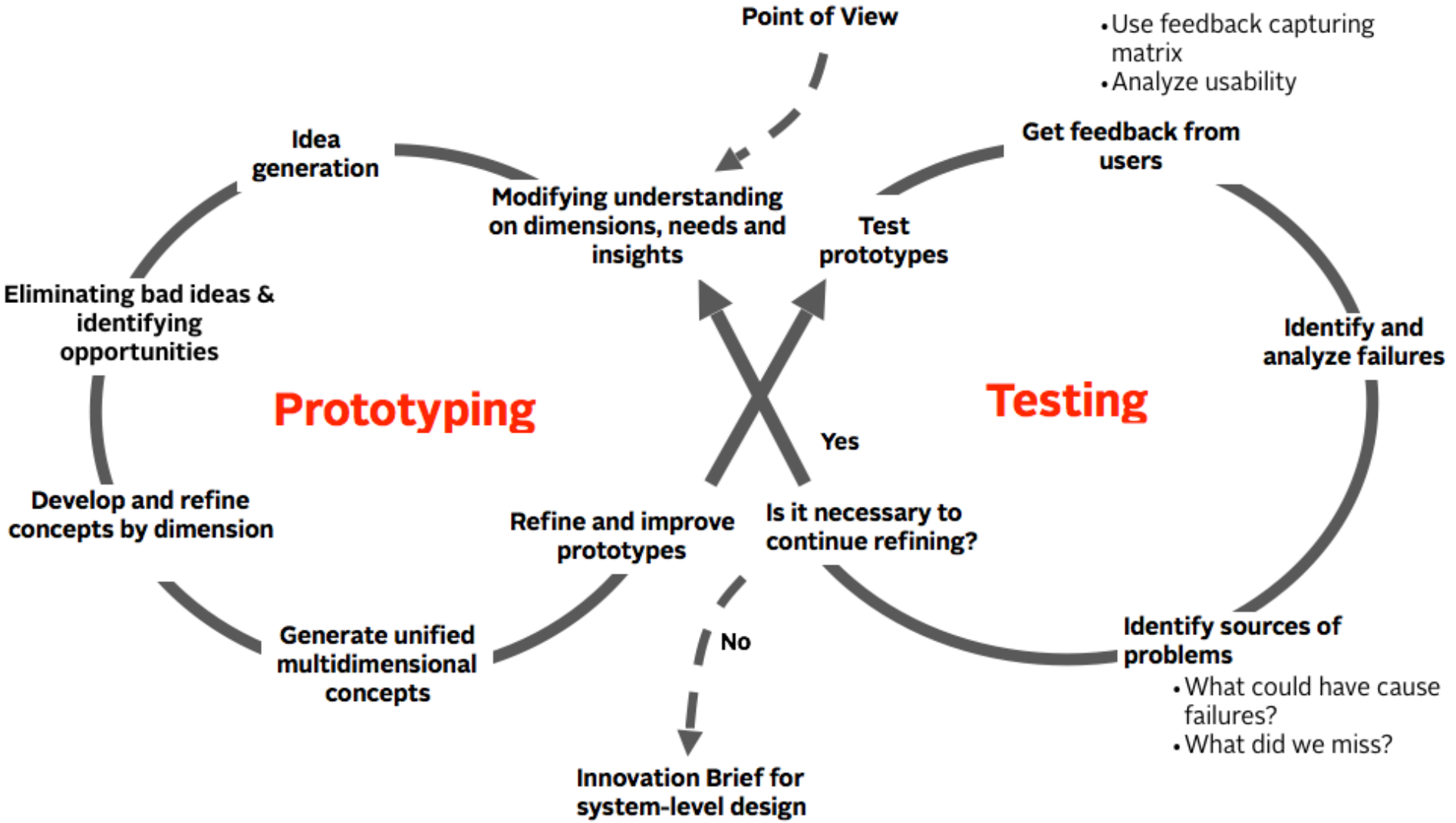
Tasks:
27.Testing prototypes
28.Processing feedback
29.Analyzing feedback
30.Identifying failures and their sources
31.Analyzing problems and modifying teams' understanding
32.Selecting best concepts, or opportunities for improvement
33.If not satisfied, iterate until 18
34. If so, Identifying best validation prototype
35.Creating Innovation Brief

ATTITUDE:
Executing

Tasks:
36.Development (it's a whole World on itself)
37.Experimenting with Minimum Viable Versions
38.Experimenting with Full Functionality-Full Resolution version
39.Launch
40.Exploitation and managing life-cycle

cosoriou@m

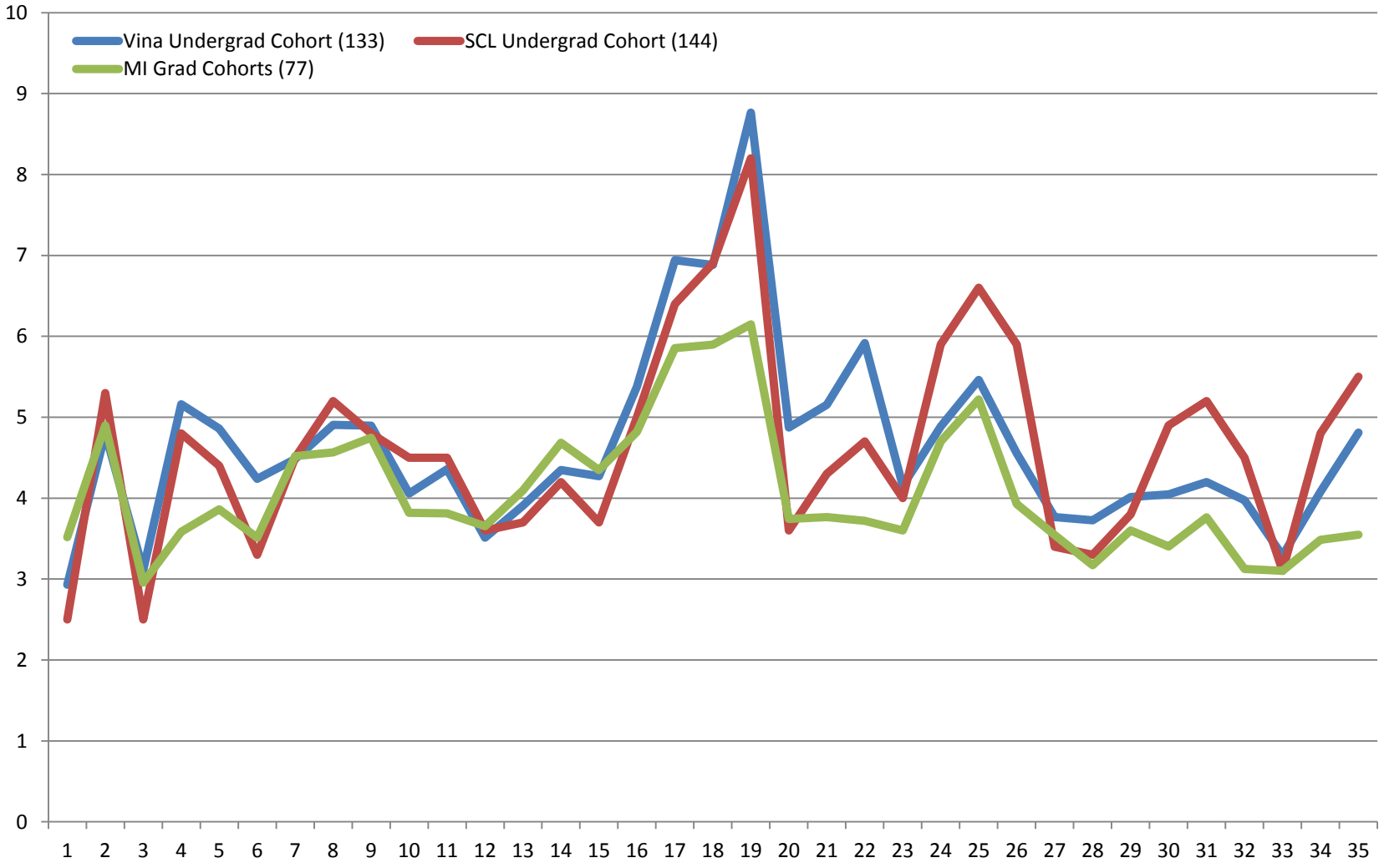
Mode for Experimentation



Source: Osorio (2012)

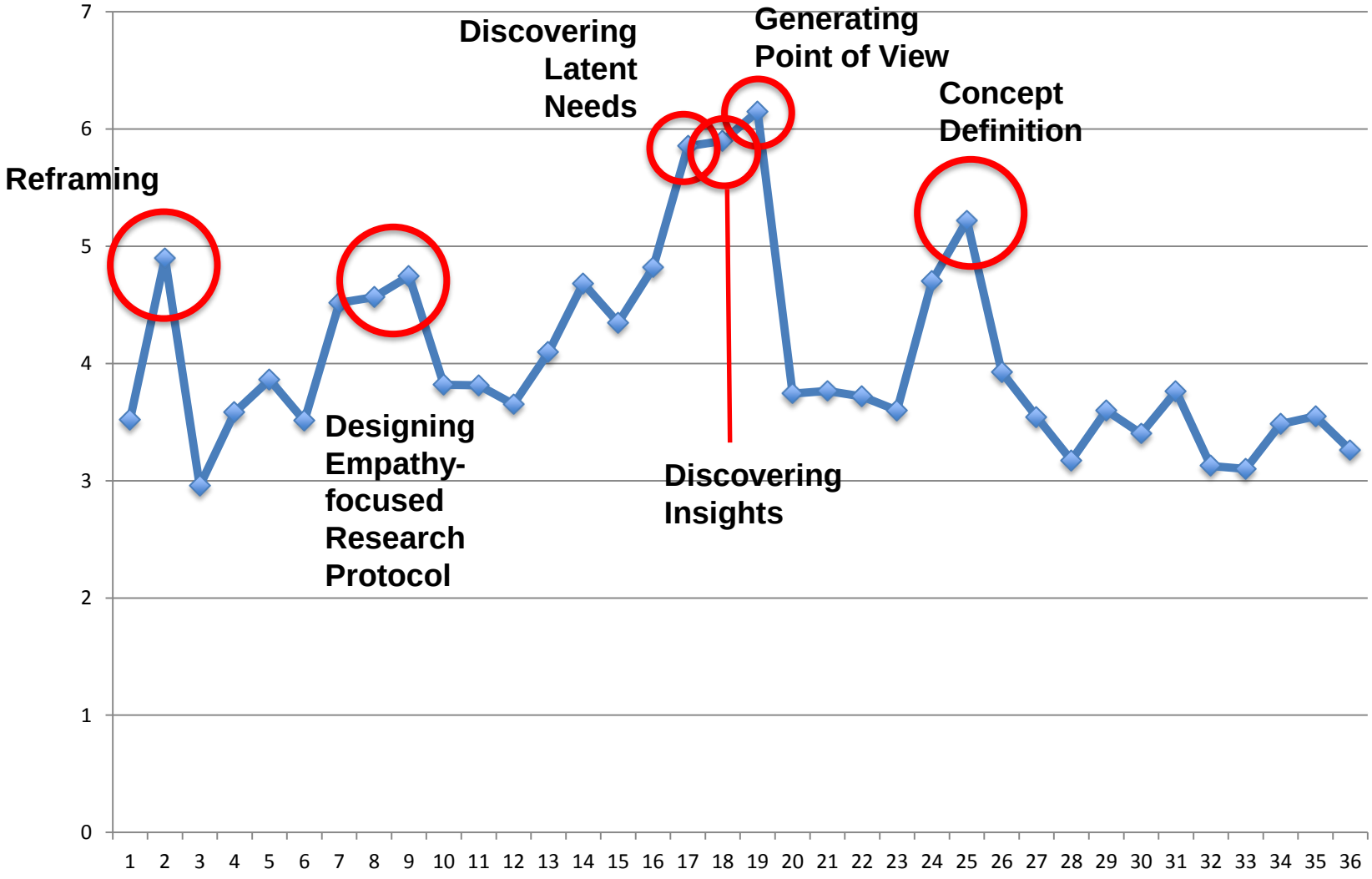
cosoriou@mit.edu

Average frustration over a process (1-10 range)



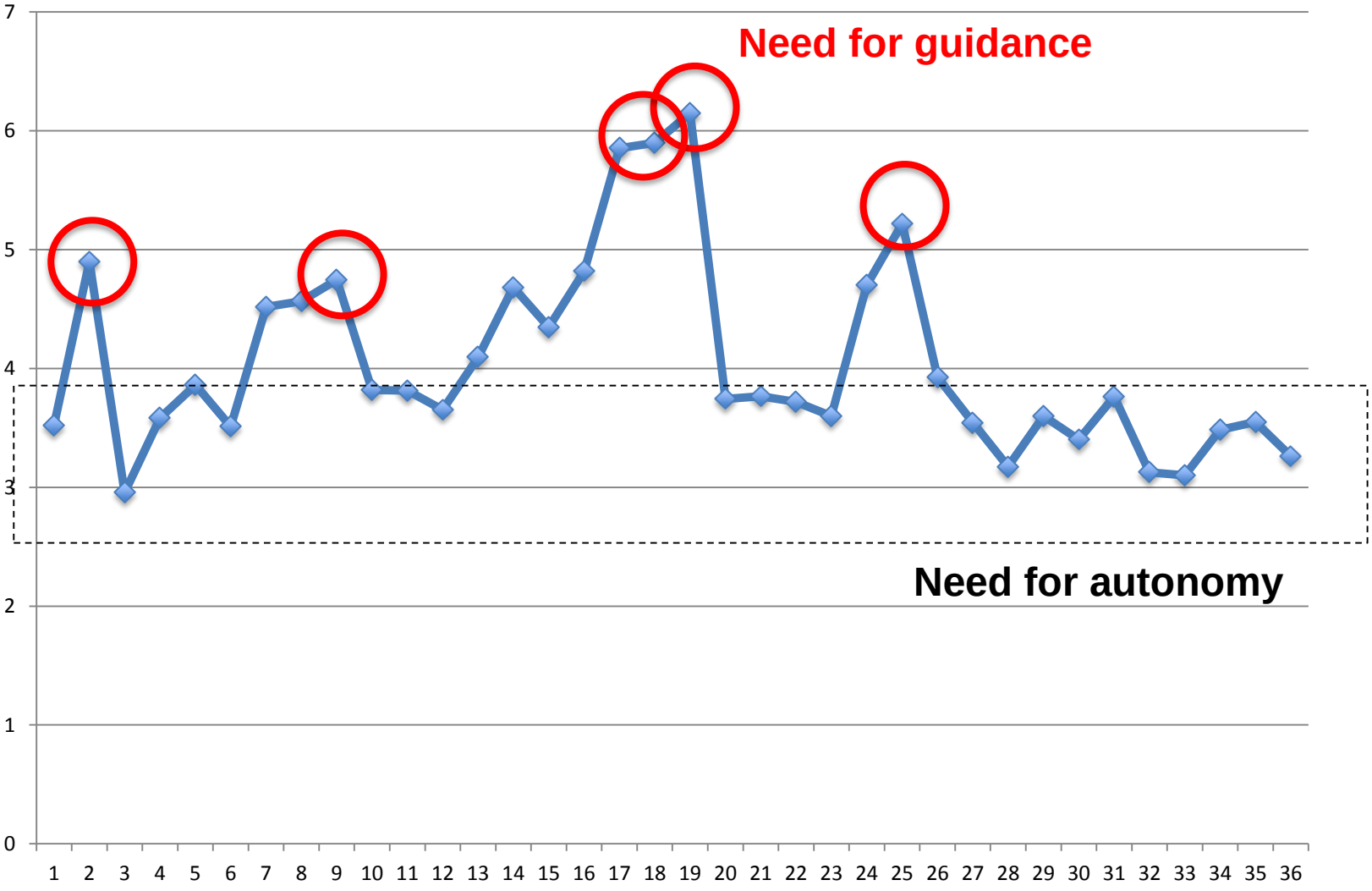
cosoriou@mit.edu

Average frustration over a process (1-10 range)



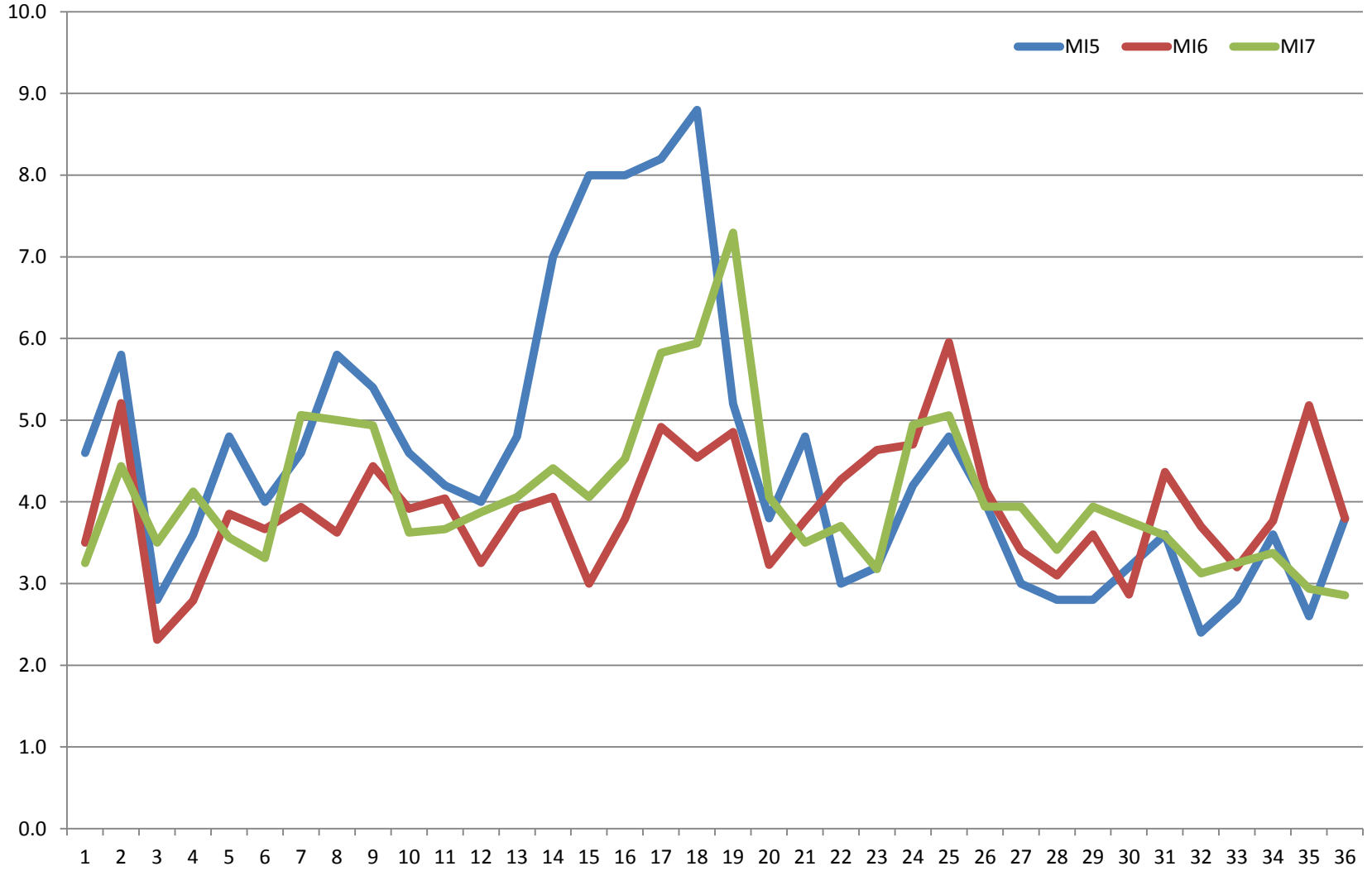
cosoriou@mit.edu

Average frustration over a process (1-10 range)



cosoriou@mit.edu

Average frustration over a process, by cohort (1-10 range)

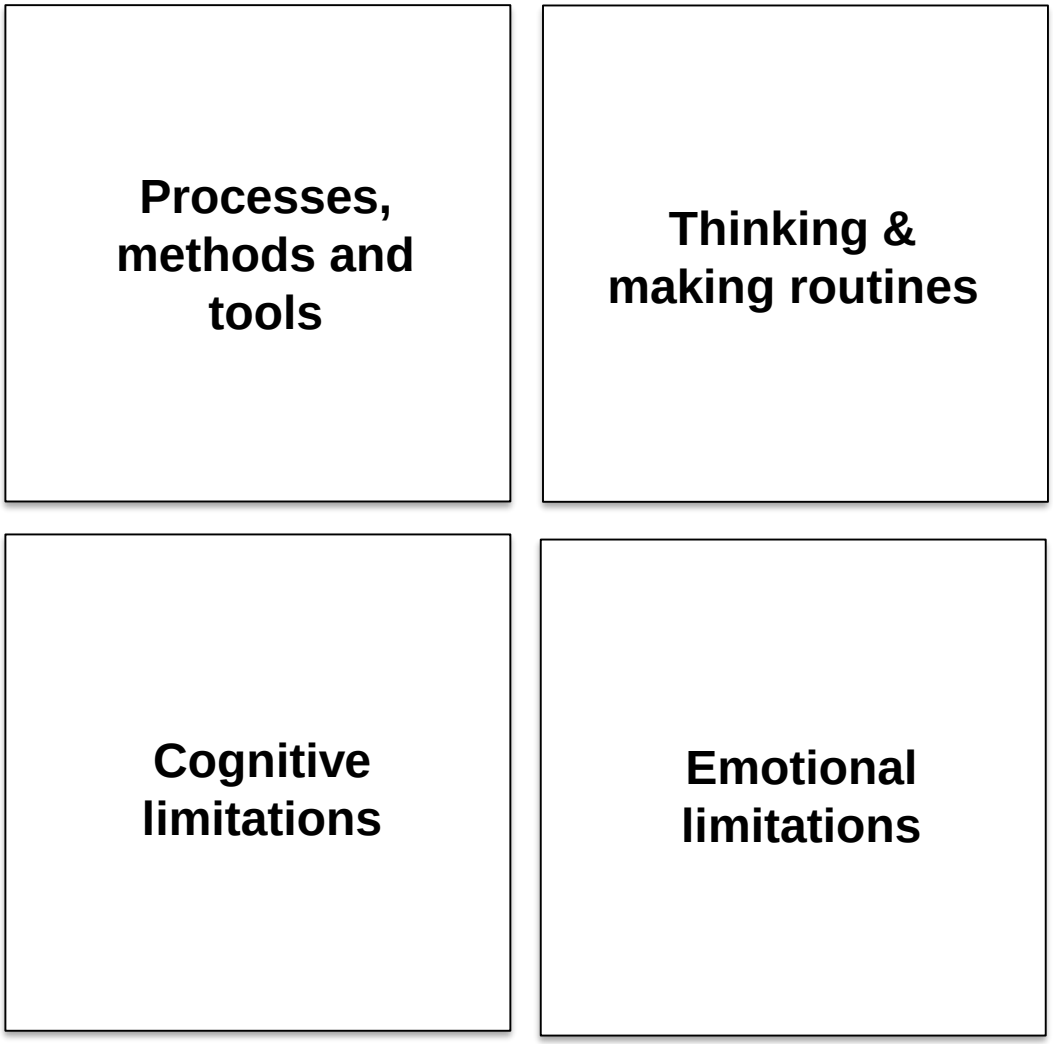


cosoriou@mit.edu

We have associated frustration with frequency and type of errors along innovation processes

cosoriou@mit.edu

Interrelated dimensions for enabling innovation



cosoriou@mit.edu

Innovation competencies

The common ones…

1. Analysis
2. **Synthesis**
3. **Empathizing**
4. Systems thinking
5. Communication
6. **Managing and deciding under high uncertainty, risk and ambiguity**
7. Team leadership and management

The innovation-specific ones…

8. **Identifying sources of innovation**
9. **Discovering latent needs**
10. **Reframing and modifying understanding**
11. **Creating and exploring ideas**
12. **Generating multiple concepts and design spaces**
13. **Learning to fail through prototyping and experimentation**
14. **Executing innovation projects**

If they are in red-bold it means they are of higher cognitive complexity

cosoriou@mit.edu

Potential points of failure

1. **Project origins**
2. **Planning for uncertainty**
3. Planning for pre-development
4. **Problem framing**
5. **Assumptions and hypotheses**
6. **Generative research**
7. Exploring explicit needs
8. Exploring observable needs
9. **Exploring tacit needs**
10. **Exploring latent needs**
11. Narrative analysis
12. Reframing used needs
13. **Synthesis of qualitative data**
14. Divergent ideation
15. **Synthesis of ideas**
16. **Creating design spaces**
17. Concept development
18. Inspirational prototyping and testing
19. Evolutionary prototyping and testing
20. Validation prototyping and testing
21. System-level design
22. Production ramp-up
23. Launch
24. Process performance metrics
25. **Project management philosophy**

In red are the hardest for people to let their experience aside

cosoriou@mit.edu

People try to gain control by reducing and isolating risk and uncertainty


In innovation, we need to amplify and
manage risk and uncertainty

Ideas vs. challenges (with emotionally engaging intent)

cosoriou@mit.edu

Reframe your challenge to understand it in a completely different way

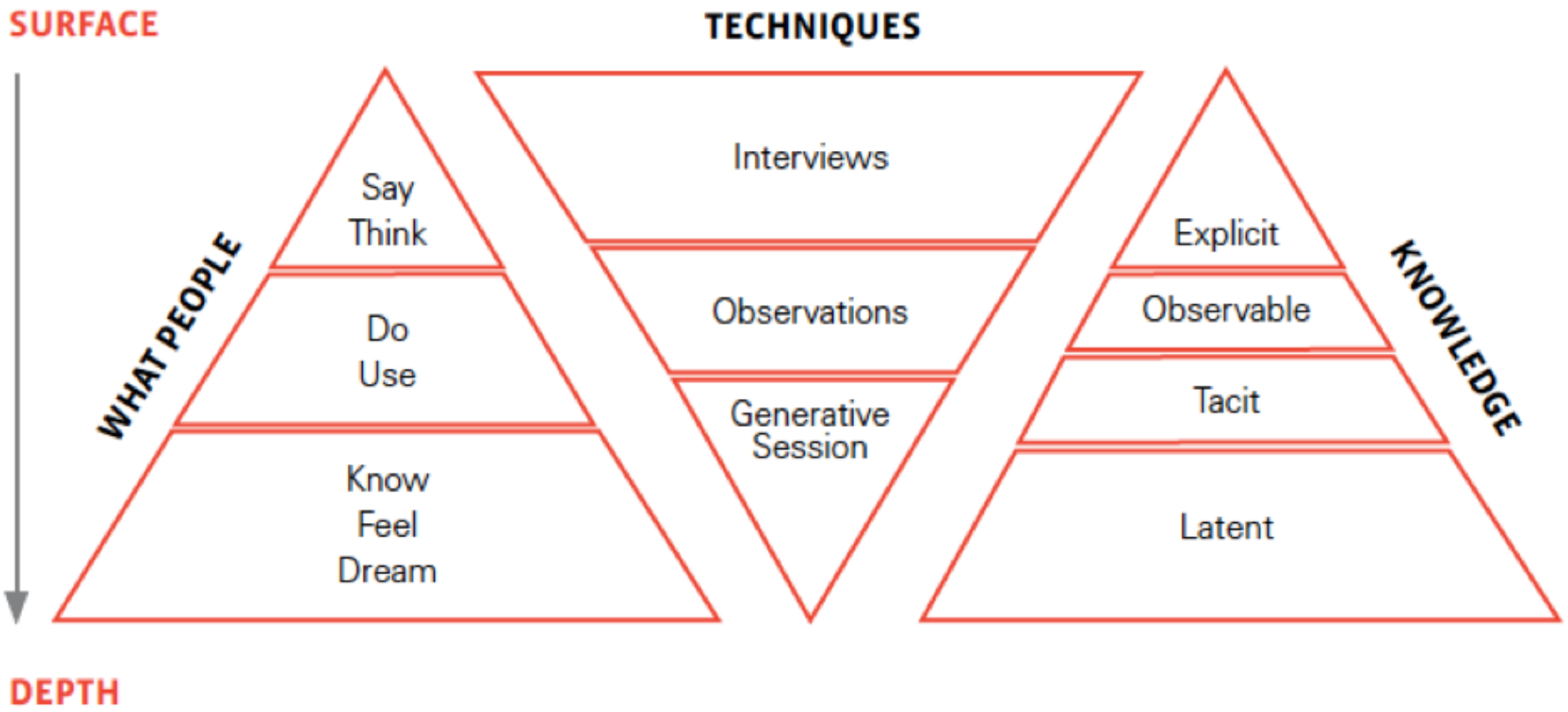
Discovery-driven planning (McGrath & MacMillan 1995)

cosoriou@mit.edu

Understand intuitive leaps as acts of recognition

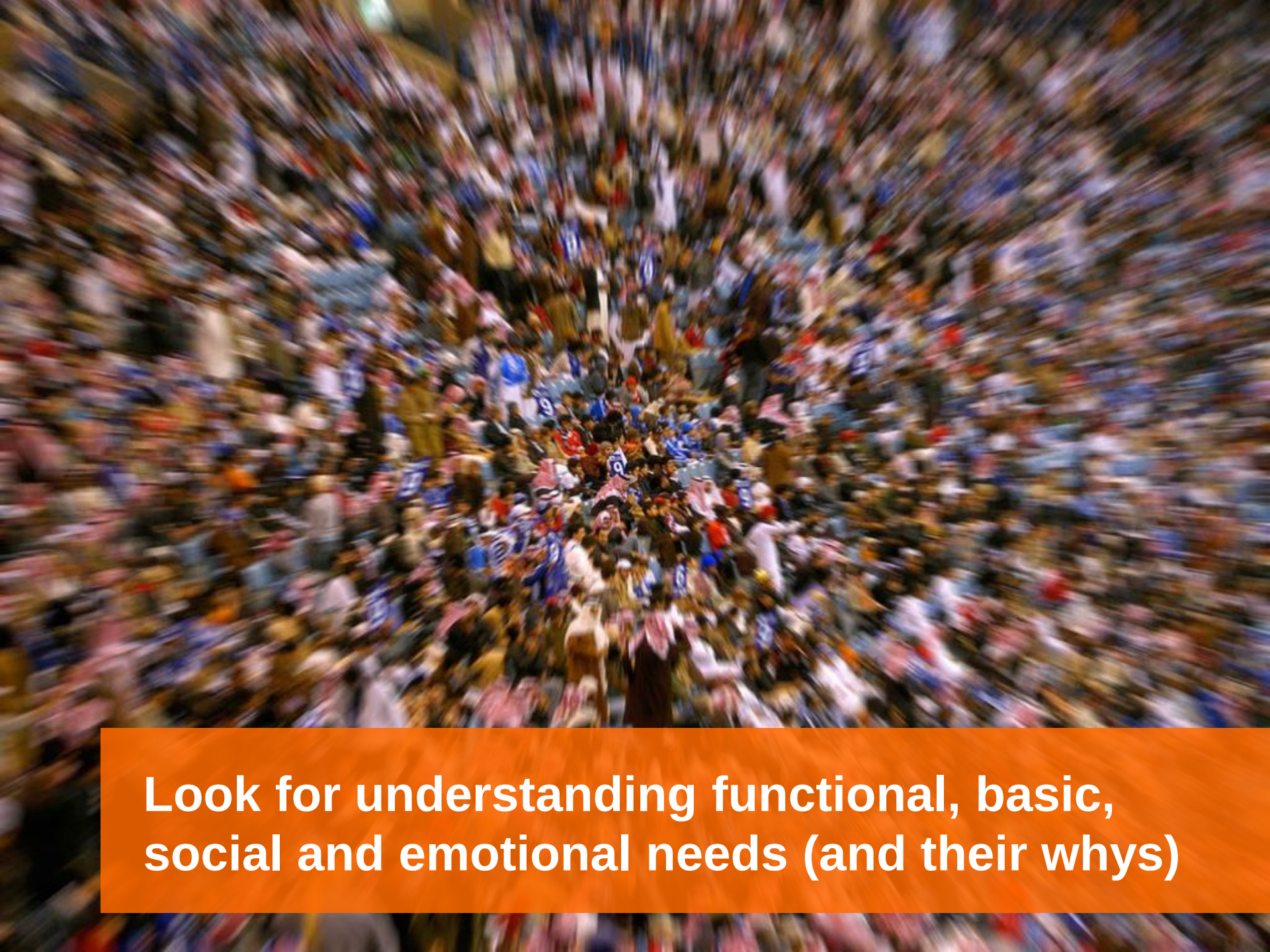
cosoriou@mit.edu

Discover the Emotional Gap (actual vs desired)



Source: Visser et al (2005)

cosoriou@mit.edu



Look for understanding functional, basic, social and emotional needs (and their whys)

For accomplishing **each task with high performance**, there are **guiding attitudes**, and a series of **interrelated competencies that need to be mobilized**

cosoriou@mit.edu

For **mobilizing each competency with high proficiency**, there are a number of **cognitive and emotional limitations that need to be conquered**

cosoriou@mit.edu

For **conquering these cognitive and emotional limitations** **teams need to reach proficiency in thinking and making routines**

cosoriou@mit.edu

If you have comments & questions please…

- email: cosoriou@mit.edu
- twitter: @carlos_osorio
- or let’s talk during the break ☺

Wharton School – Mack Institute for Innovation Management
Spring Conference 2016: Digital Disruption and Empowered End-Users – June 9th, 2016

Carlos A. Osorio, PhD. International Faculty Fellow, MIT
Sloan School of Management

OVERCOMING BIASES IN YOUR INNOVATION MODEL

cosoriou@mit.edu