# ENABLING COLLECTIVE IMPROVISATION in AGILE SOFTWARE DEVELOPMENT

ADRIAN CHO

"Modern Business is Pure Chaos"

Fast Company, January 2012

THE AGILE RESPONSE
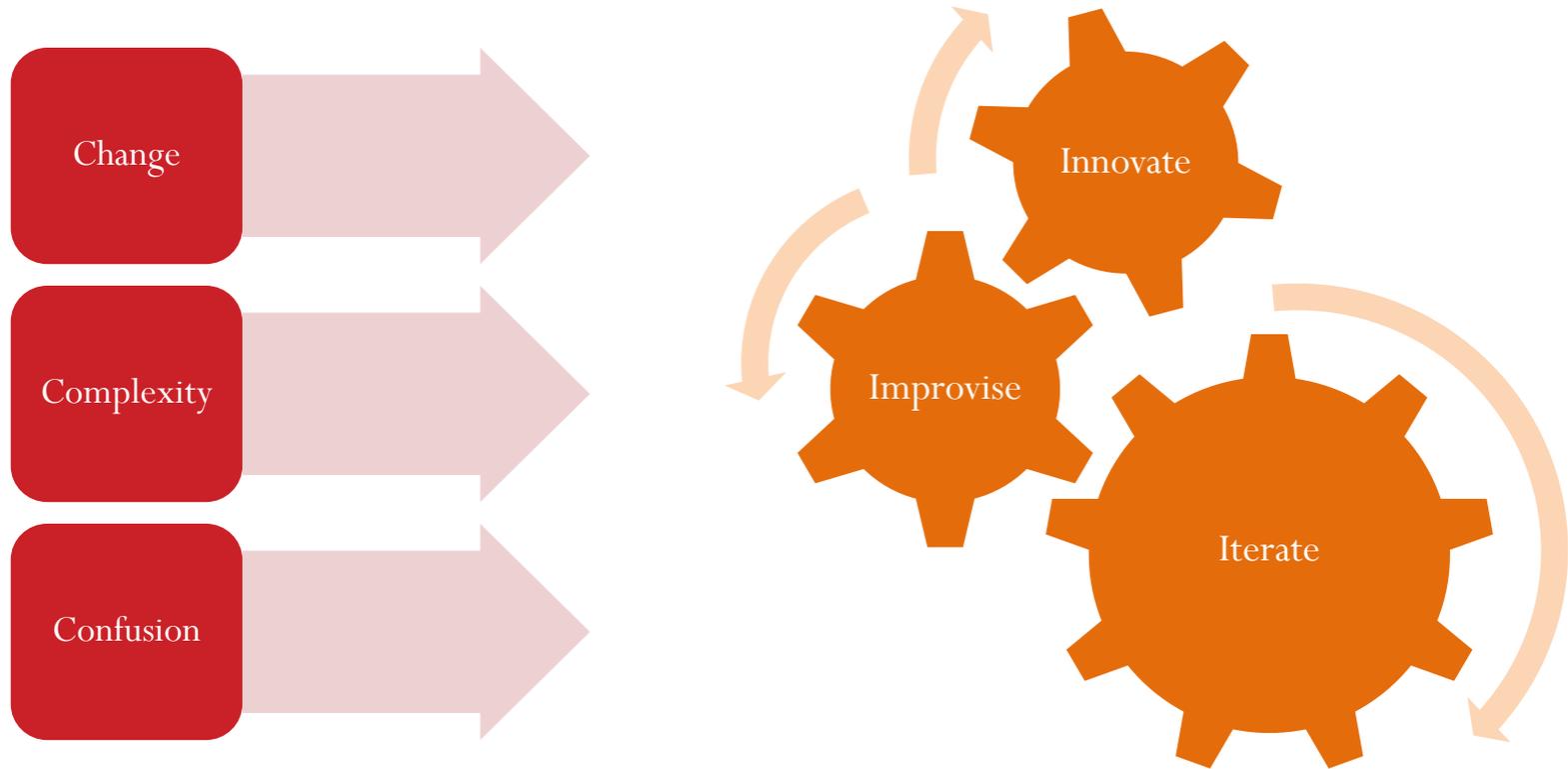
TAKING FALSE COMFORT IN RIGIDITY

PREDICT

| Tools | Technology | Processes | Practices |

LEARNING FROM THE MILITARY

"We know that the best equipment in the world without the right person operating it will not accomplish the mission. On the other hand, the right person will find a way to succeed with almost any equipment available."

Gen. Wayne A. Downing, Commander, U.S. Special Operations Command

"People, ideas, hardware — in that order"

Col. John Boyd, fighter pilot, instructor, strategist and aircraft designer

The Special Operations Forces Truths

1. Humans are more important than Hardware.
2. Quality is better than Quantity.
3. Special Operations Forces cannot be mass produced.
4. Competent Special Operations Forces cannot be created after emergencies occur.

Brig. Gen. David J. Baratto, Commander, JFK Special Warfare Center

LEARNING FROM MANUFACTURING
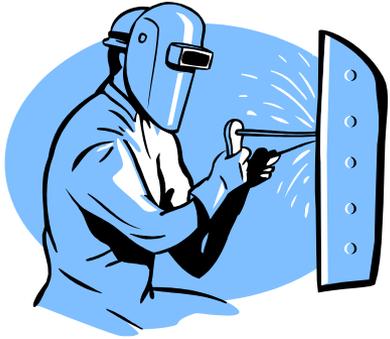
*"There is something called standard work, but **standards should be changed constantly. Instead, if you think of the standard as the best you can do, it's all over. The standard work is only a baseline for doing further kaizen.** It is kai-aku [change for the worse] if things get worse than now, and it is kaizen [change for the better] if things get better than now. **Standards are set arbitrarily by humans, so how can they not change?"***

Taiichi Ohno, originator of the Toyota Production System

- Aim for continuous improvement

- Conduct regular retrospectives

- Beware of taking false comfort in best practices

- Best practices are the best…until something changes

A MORE SCALABLE AND FLEXIBLE APPROACH

ADAPT

People	Principles

PREDICT

Tools	Technology	Processes	Practices

"Individuals and interactions over processes and tools"

Manifesto for Agile Software Development

100 YEARS OF AGILITY

	Early 20th Century	Early 21st Century
Change	The Great War The Great Depression Cultural and Social Changes	Global Conflict Global Financial Crisis Emerging and Liberated Societies
Collaboration	Automobile Commercial Air Travel	Virtual Presence Social Networks
Communication	Radio Movies with Sound	Social Media Mobile
Performing	Jazz	Agile

CLASSICAL   JAZZ

Organization

| Leadership | Centralized → | Decentralized |
| Composition | Uniform → | Diverse |

Performance

Planning	Formulated →	Improvised
Content	Strict →	Free
Engagement	Closed →	Open
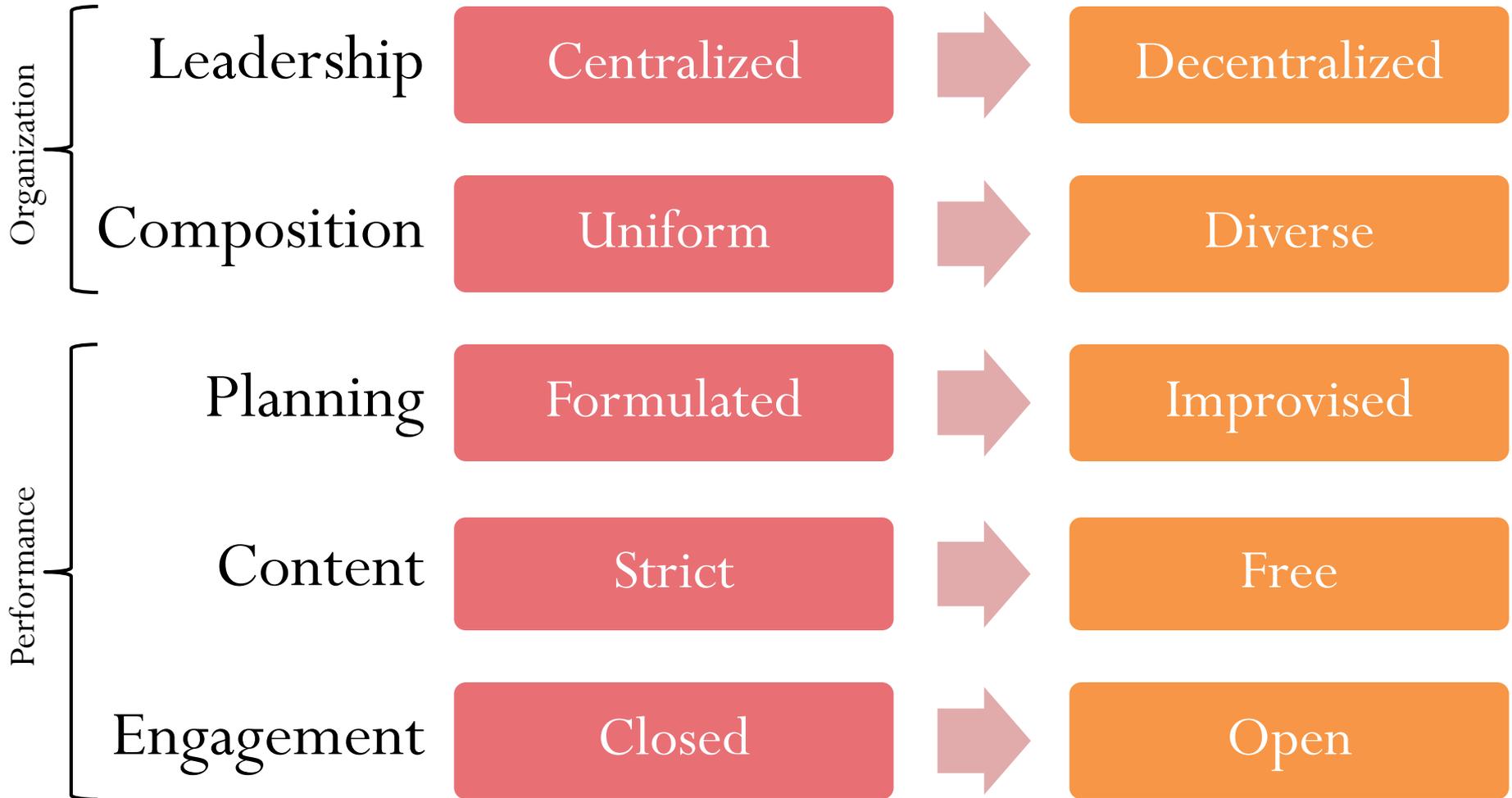
HOW TO PLAY JAZZ
(IN SOFTWARE DEVELOPMENT)

1. LEAD ON DEMAND

DECENTRALIZING LEADERSHIP

What is leadership?   Taking initiative!

Who are the leaders in your company?   Everyone!

In an agile organization…   Everyone must lead

People must have autonomy to lead   (Some must give up control)

BETWEEN JAZZ PERFORMANCES

Miles Davis' bands (1955 – 1964)

- Miles Davis (trumpet), John Coltrane (tenor sax), Red Garland (piano), Paul Chambers (double bass), "Philly" Joe Jones (drums)
  - *Relaxin', Steamin',Workin', Cookin'* (1956)
- Cannonball Adderley joins (1958)
  - *Milestones*
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  - *Giant Steps (1959)*
- P.C. records over ten albums as a leader (1956-59) usually with Philly Joe or Art Taylor

DURING A JAZZ PERFORMANCE

Risk of instability as a result of innovation and leading on demand
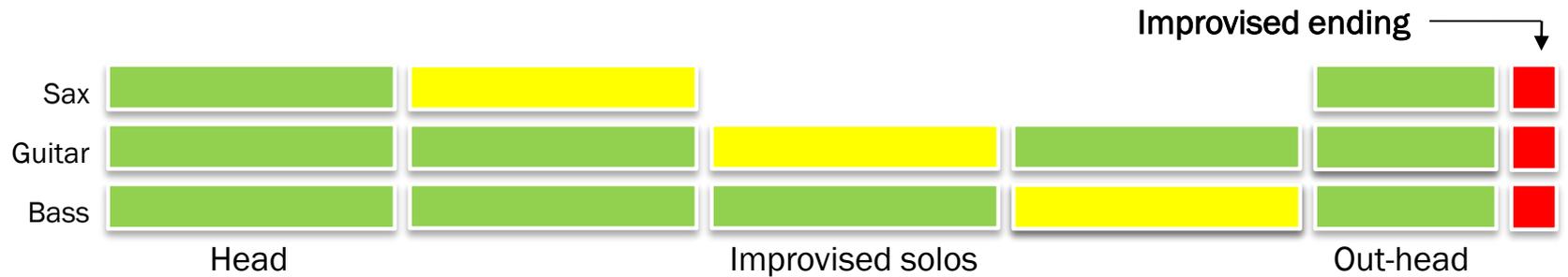
People must be good at both following and at leading and able to switch easily between the two

BUT WHAT HAPPENS IF EVERYONE TRIES TO LEAD AT THE SAME TIME?

PUTTING THE TEAM FIRST

"The way a team plays as a whole determines its success. You may have the greatest bunch of individual stars in the world, but if they don't play together, the club won't be worth a dime."

Babe Ruth, baseball legend

"It's the group sound that's important, even when you're playing a solo. You not only have to know your own instrument, you must know the others and how to back them up at all times. That's jazz."

Oscar Peterson, jazz pianist

"Good teams become great ones when the members trust each other enough to surrender the 'me' for the 'we.'"

Phil Jackson, coach of eleven NBA championships

STAY HEALTHY

- Everyone needs to be mindful of organization and project health
- Trust in everyone's respect for health allows measured risk-taking
- High-performance systems are more susceptible to health issues
- Poor health can be restored through recovery, but if left untended, it can degrade to a point at which recovery is impossible (debt becomes too much of a burden)
- Poor health is a positive feedback loop
- Prevention is better than cure
- No one wants to work on a sick team or project

3 WAYS TO LEAD ON DEMAND

➢Institute stop-the-line to improve quality

➢Use team-wide retrospectives to improve process

➢Form virtual teams to improve responsiveness

2. EMBRACE DIVERSITY

WHEN THERE'S NO DIVERSITY

Hire people with similar skills and experience

Promote people who agree with you

Ignore questions and concerns

Suppress opposing ideas

Force early consensus

Claim success

Fail

GROUPTHINK EXAMPLES

1941   The failure of the U.S. military and government to anticipate the attack on Pearl Harbor

1962   The decision of JFK and his advisors to authorize the Bay of Pigs invasion of Cuba

1986   The failure of NASA administrators to prevent the Challenger Space Shuttle disaster

2001   The collapse of Enron

2003   The Bush administration's decision to invade Iraq

THE BENEFITS OF DIVERSITY

Potential
Losses

Potential
Benefits

Synergy

Loss of order

Innovation

Loss of control

Robustness

Loss of predictability

Risk mitigation
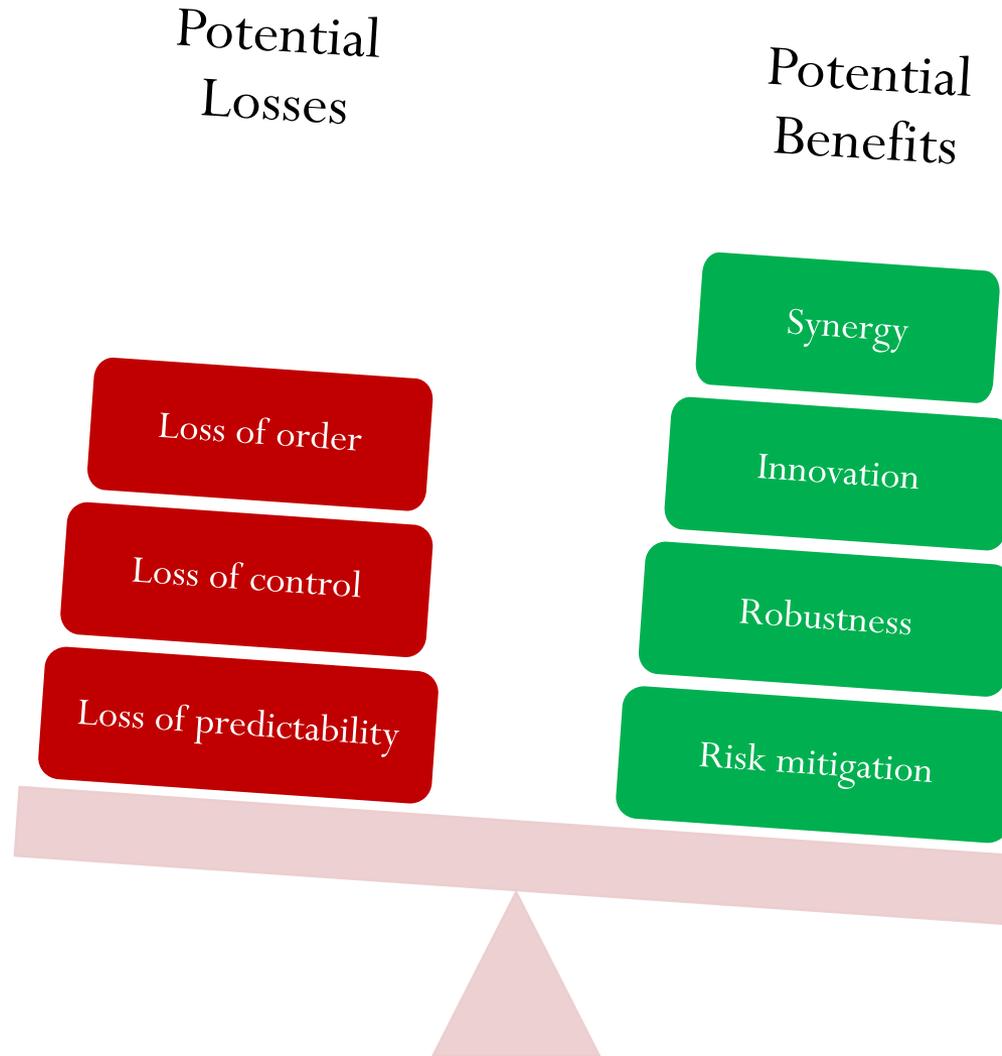
STAFFING CONSIDERATIONS

Value individuality

Seek out the outliers!

Diversity over uniformity

Meritocracies over "mirrortocracies"

Starters	and those who are good at finishing
Risk-takers	and those who are risk-averse
Rushers	and those who tend to hold back
Initiators of change	and those who favor the status quo
Prolific contributors	and those who say more with less

INNOVATION THROUGH COGNITIVE DIVERSITY

Col. Joy Paul Guilford
Chief of Psychological Research Unit
U.S. Army Air Forces Training Command HQ
Fort Worth, TX
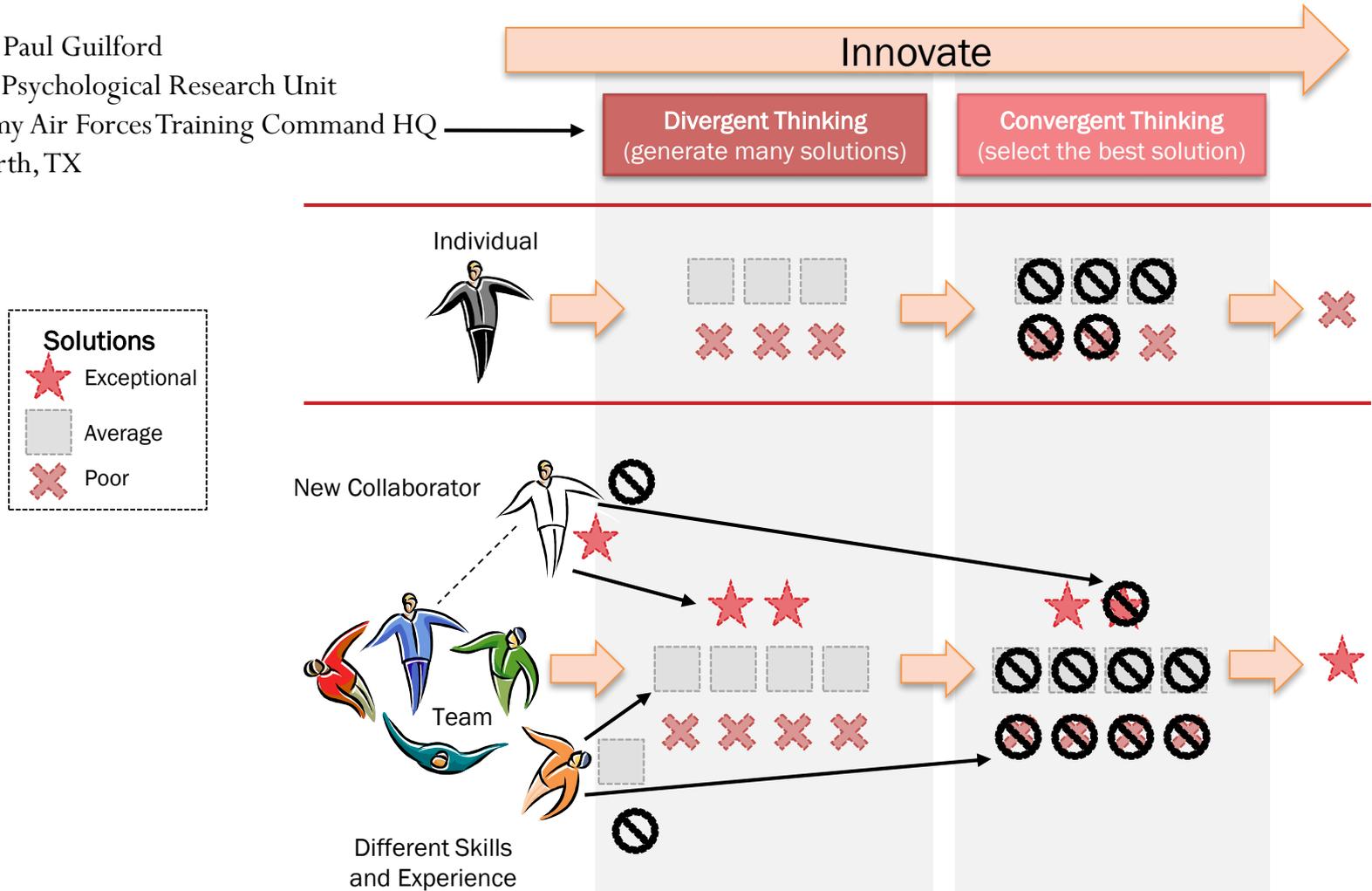
2009 - Jasjit Singh of INSEAD and Lee Fleming of Harvard Business School studied more than half a million patented inventions

3 WAYS TO LEVERAGE DIVERSITY

➢Avoid "mirrortocracies" by embracing opposition

➢Increase coverage and mitigate risk with balanced teams

➢Diverge and converge to find the best solutions

3. INNOVATE, IMPROVISE & ITERATE

EVERY ACTIVITY HAS A FORM

Jazz Performance (10 minutes)	Basketball Game (2.5 hours)	Software Project (6 months)	Political Campaign (18 months)	Military Operation (5 years)
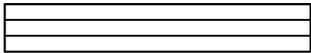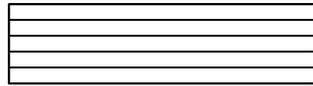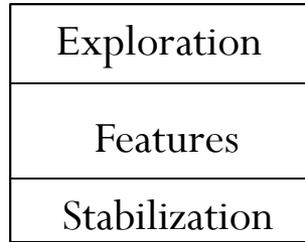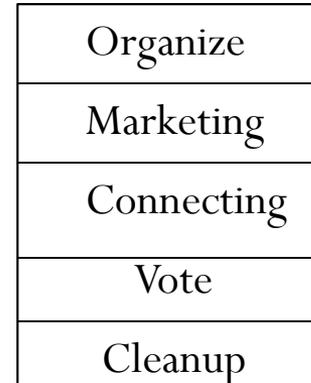
Software Project

Exploration
Features
Stabilization

Political Campaign

Organize
Marketing
Connecting
Vote
Cleanup

Military Operation

Initiating
Planning
Deployment
Engagement
Withdrawal
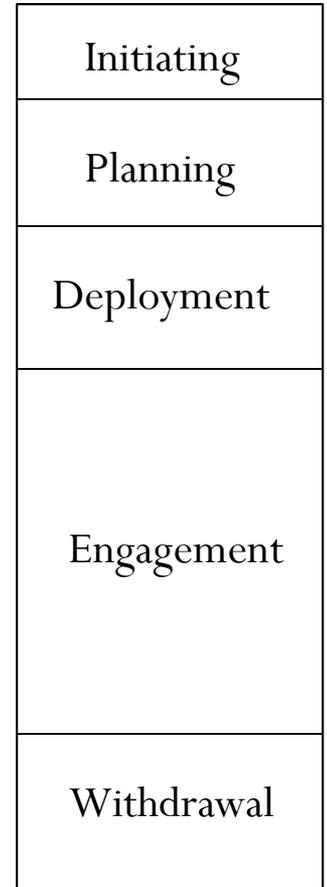
(Not to scale!!!)

PERFORM TOGETHER IN TIME AND ON TIME

- Structure provides the framework in which to improvise by helping people to:
  - Set goals
  - Time deliveries
  - Shape contributions
  - Co-ordinate group efforts
- Build and maintain momentum by leveraging entrainment
  - Navigate the <u>Form</u> (roadmap with checkpoints)
  - Align with the <u>Tempo</u> (set by the business leaders)
  - Base your activity level on the <u>Pulse</u> (set by the project leaders)
  - Lock in with the <u>Groove</u> (synchronizes repeating activities)
- Respect deadlines (iterations are timeboxes)
- Iterate, iterate, iterate, iterate

RHYTHM IN JAZZ

A	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
A	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
B	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
A	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4

- Form defines 4 sections (A, A, B and A)
- Tempo (beat)
- Pulse (2-feel in the A sections and walking in the B section)
- Groove (emphasize every 2nd and 4th beat)

FORM IN SOFTWARE DEVELOPMENT

Annual Release Groove

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
					MAJOR						
								FIX			
											MINOR
		FIX									

Milestone Plan for a Release

M1	M2	M3	M4	RC1	RC2	RC3	RC4
3 weeks	3 weeks	3 weeks	3 weeks	2 wks	2 wks	1	1
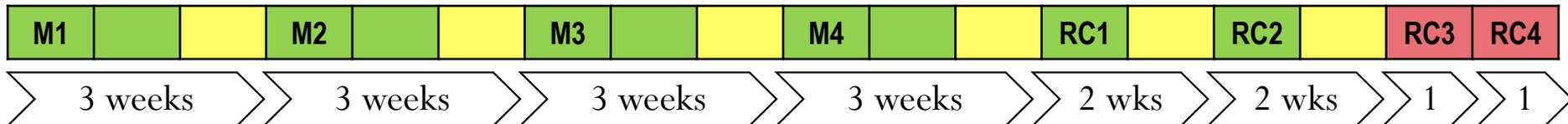
GROOVE

	Week 1	Week 2	Milestone Week
Mon	Build Code **Project Management Call** Build	Build Code **Project Management Call** Build	Build Code **Project Management Call** Build
Tue	Build Code **Planning Call** Build	Build Code **Planning Call** Build	Build Code **Planning Call** Build
Wed	Build Test	Build Test	Build **Planning Call** Test
Thu	Build Fix **Planning Call** Build	Build Fix **Planning Call** Build	Build Fix **Planning Call** Build
Fri	Build Fix Optional Build Distribute build	Build Fix Optional Build Distribute build	Build **Planning Call** Fix Optional Build Distribute build Self-host on build

INNOVATION MUST ALLOW FOR MISTAKES

"There are no mistakes in jazz – only opportunities."
     Miles Davis

"Please fail very quickly—so that you can try again."
     Eric Schmidt, Chairman, Google

"I'm so glad you made this mistake. Because I want to run a company where we are moving too quickly and doing too much, not being too cautious and doing too little. If we don't have any of these mistakes, we're just not taking enough risk"
     Larry Page, CEO, Google

"Mistakes occur because systems at the edge of chaos often slip off the edge. But there is also quick recovery and, like jazz musicians who play the wrong note, there is the chance to turn mistakes into advantages"
     Shona Brown, Senior Vice President of Business Operations, Google
     Kathleen M. Eisenhardt, Professor of Strategy and Organization at Stanford University

IMPROVISATION IS A NECESSITY

*"**I used to think that running an organization was equivalent to conducting a symphony orchestra. But I don't think that's quite it; it's more like jazz.** There is more improvisation. Someone once wrote that the sound of surprise is jazz, and if there's any one thing that we must try to get used to in this world, it's surprise and the unexpected. In this world of chaos, there's no other way of doing things. Truly, we are living in a world where the only thing that's constant is change.*

> Warren Bennis, management guru

- You can only plan so much

- Blindly following an unrealistic plan is worse than having no plan

- Aberrational /Black Swan events really do occur

- Being first is often the most important thing

FACTS ABOUT IMPROVISATION

- Improvisation is not just doing random things as you go
- Improvisation is making do with limited time and resources
- Improvisation can be practiced (jazz musicians do it all the time)
- Improvisation is real-time composition (planning, doing, checking)
- Improvisation draws on deep knowledge of existing work
- Improvisation reacts to current events
- Improvisation seeks to turn mistakes into opportunities

3 WAYS TO INNOVATE, IMPROVISE & ITERATE

➢ Get into the groove to synchronize efforts

➢ Do less more frequently to respond to change

➢ Take calculated risks to advance innovation

4. USE JUST ENOUGH RULES

WHEN SMALL THINGS CAUSE BIG PROBLEMS

"Everything is very simple in war, but the simplest thing is difficult. The difficulties accumulate and end by producing a kind of friction that is inconceivable unless one has experienced war …

Countless minor incidents – the kind you can never really foresee – combine to lower the general level of performance, so that one always falls far short of the intended goal …

Friction is the only concept that more or less corresponds to the factors that distinguish real war from war on paper …

Friction, as we choose to call it, is the force that makes the apparently easy so difficult."

Carl von Clausewitz , "Friction in War" from *On War*

THE COST OF COLLABORATION
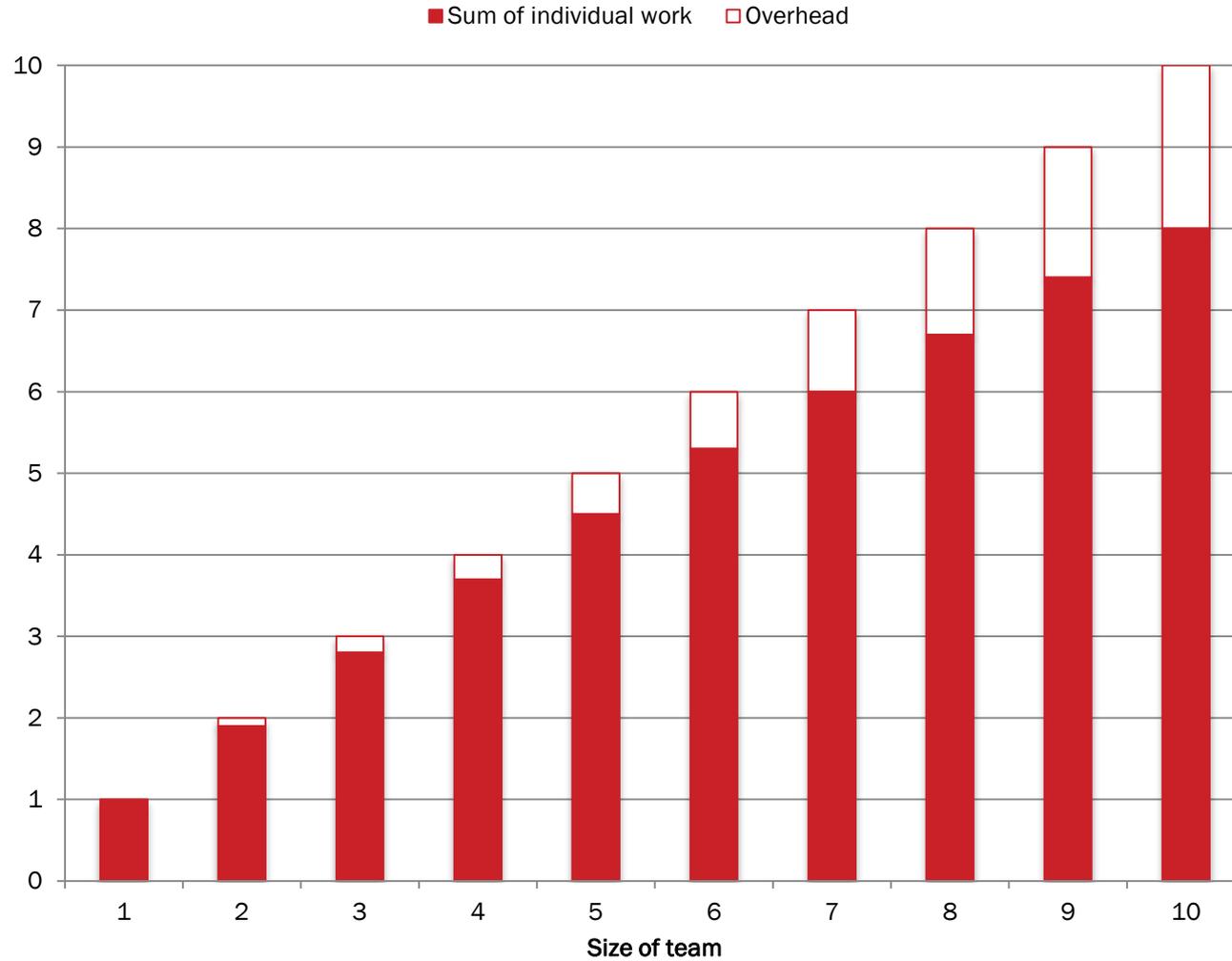
THE EFFECT OF SYNERGY

JUST ENOUGH FRICTION

| Risk	Impediment	Action	Risk
Immobilization	Friction	Movement	Chaos
Inactivity	Approvals	Contribution	Defects
Frustration	Tension	Resolution	Monotony
Argument	Discussion	Agreement	Stagnation
Indecision	Consideration	Purchase	Indifference
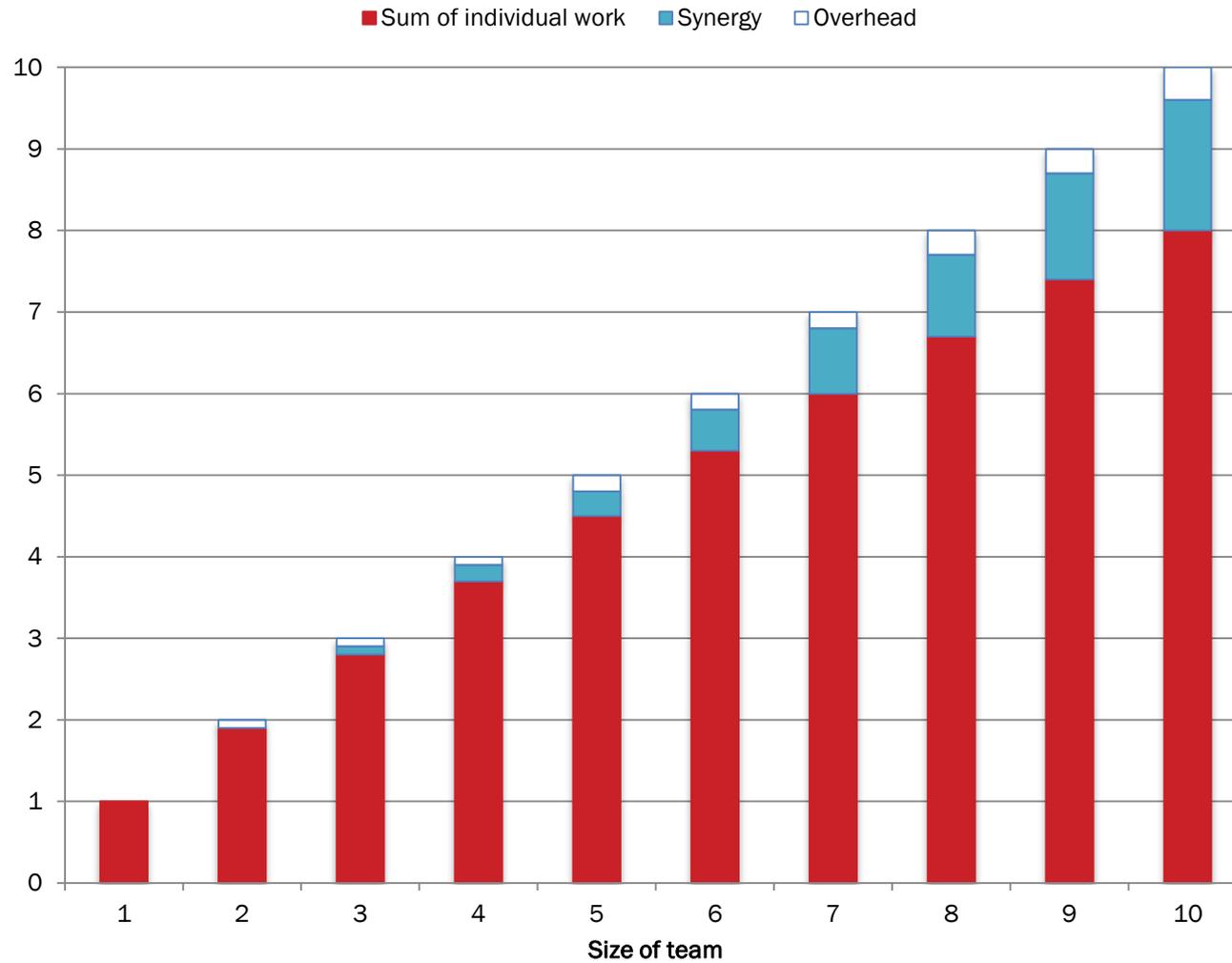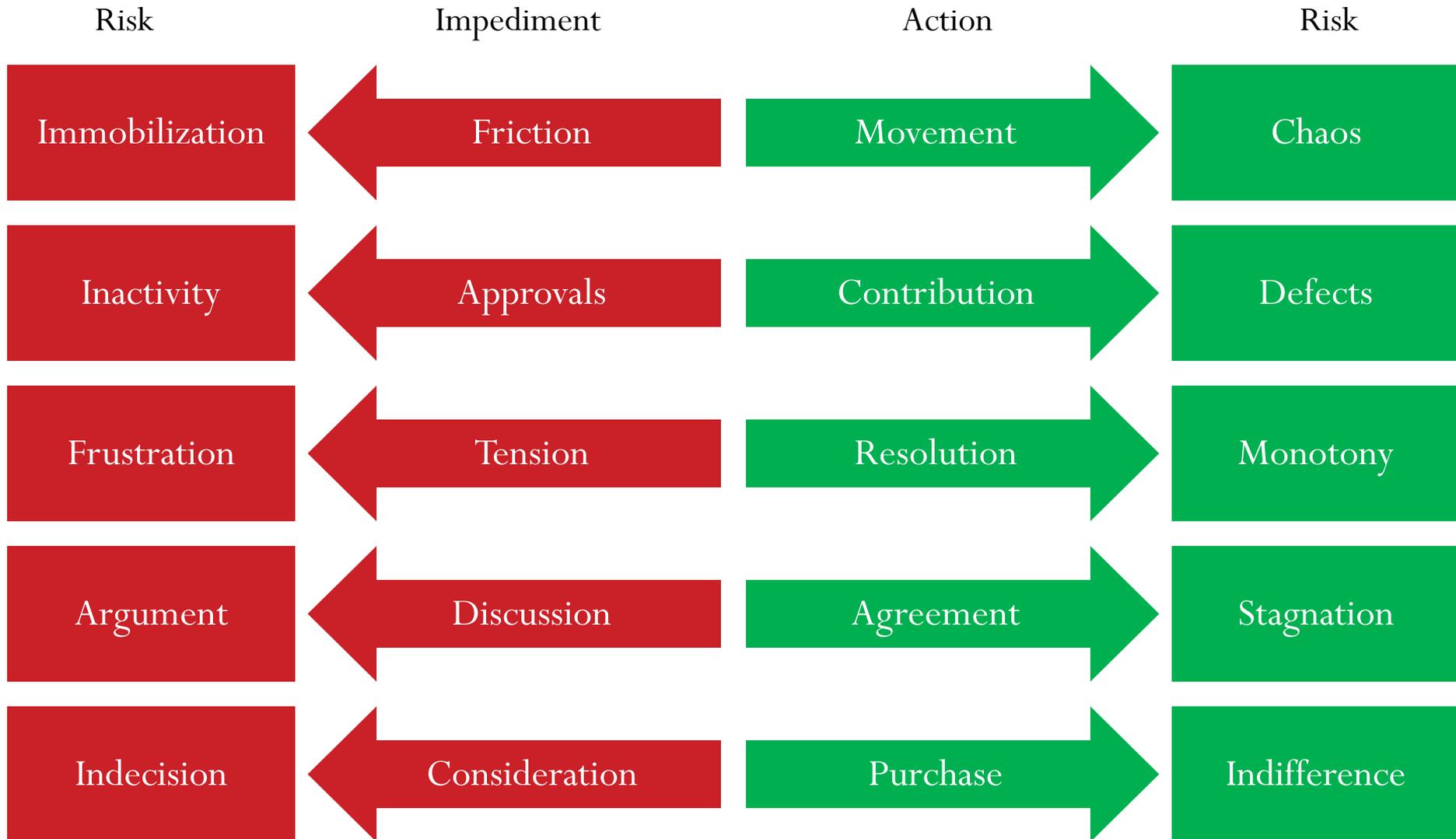
3 WAYS TO USE JUST ENOUGH RULES

➢Reduce friction to increase velocity

➢Break rules to overcome blockers

➢Make contributions count to raise efficiency

5. INCREASE ENGAGEMENT

THE OODA EXECUTION LOOP
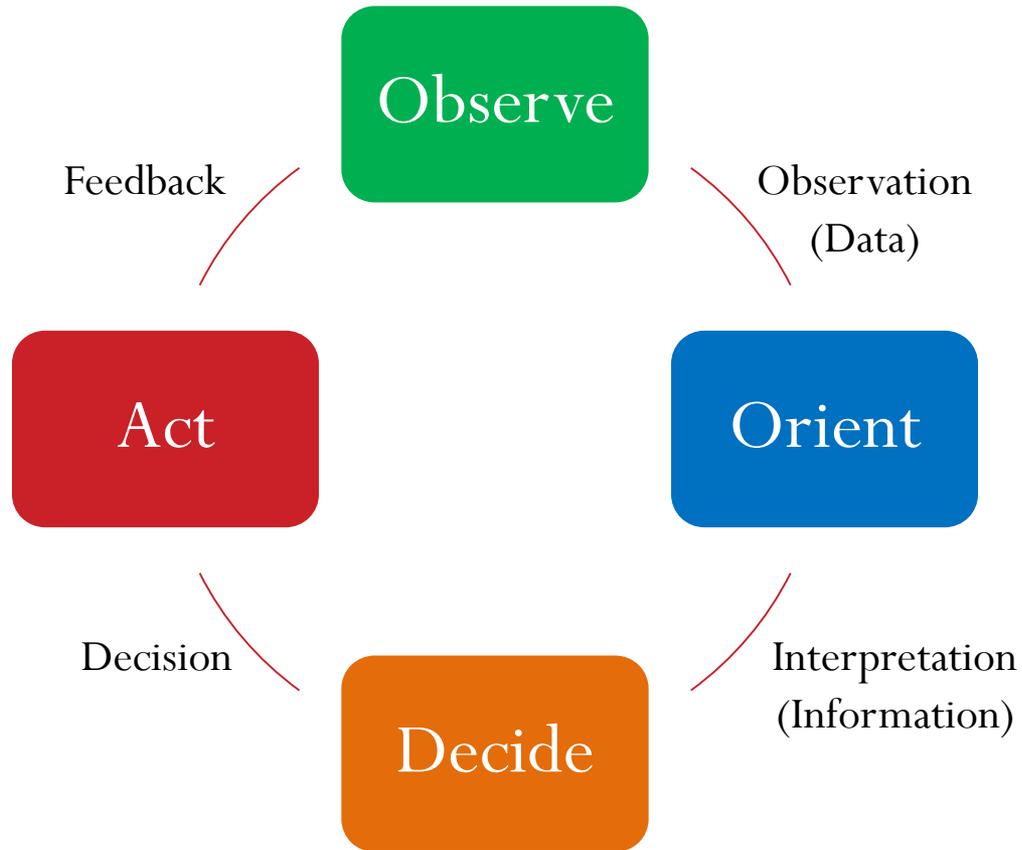
Col. John Boyd

OBSERVATION
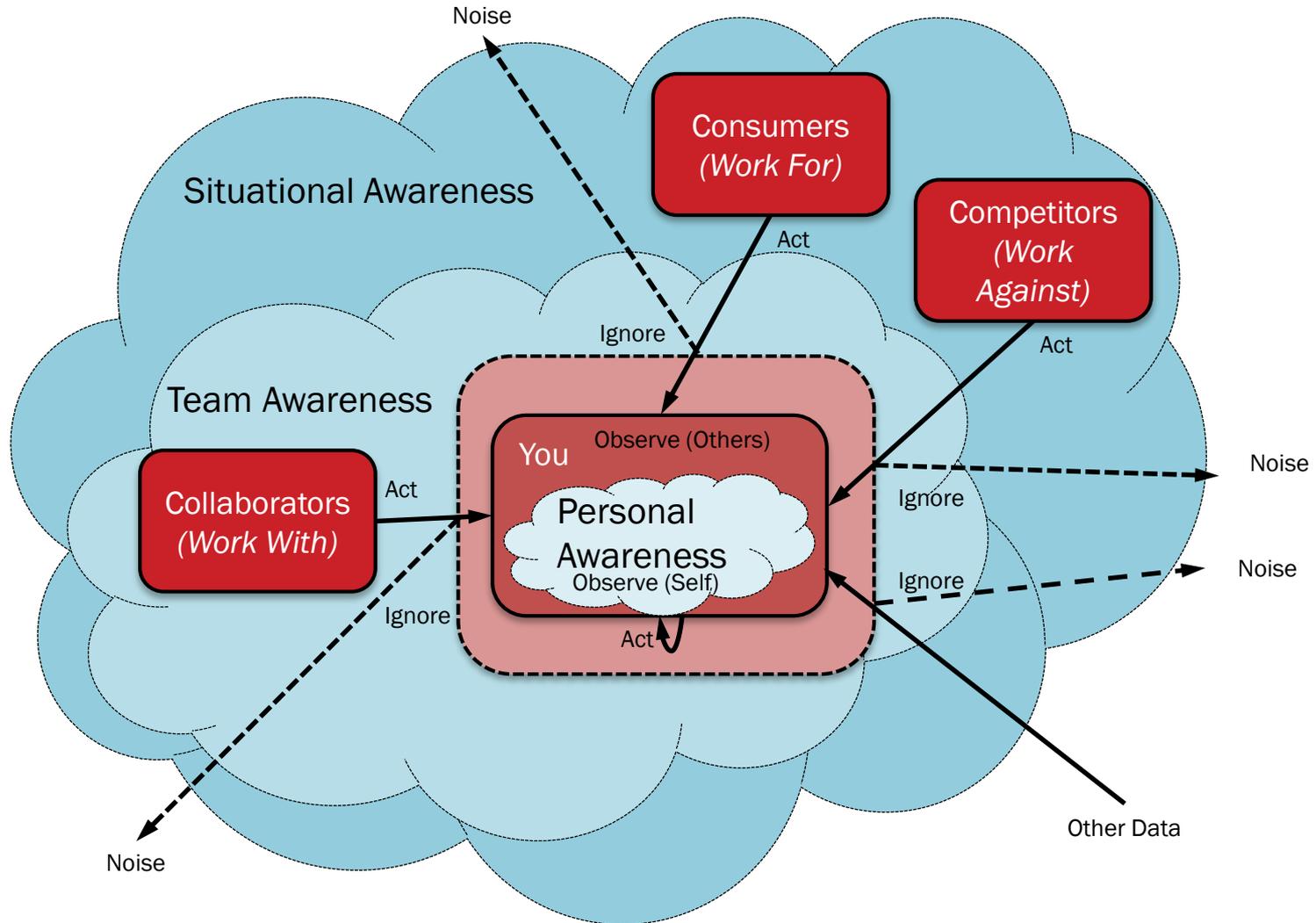
AWARENESS

"Being aware is more important than being smart."

Phil Jackson, coach of 11 NBA championships

"awareness is everything"

Red Holzman, coach of 2 NBA championships

"The most important thing I look for in a musician is whether he knows how to listen."

Duke Ellington

Attention

Proficiency: Strong, Weak

■ Personal awareness ■ Situational/social awareness

LOOK FOR THE SOLUTION

Don't just look at the problem
Look for the solution!

Escape route

RESPECT THE FLOW OF WORK

Escape route

B

Downstream Problem

Upstream Problem

A
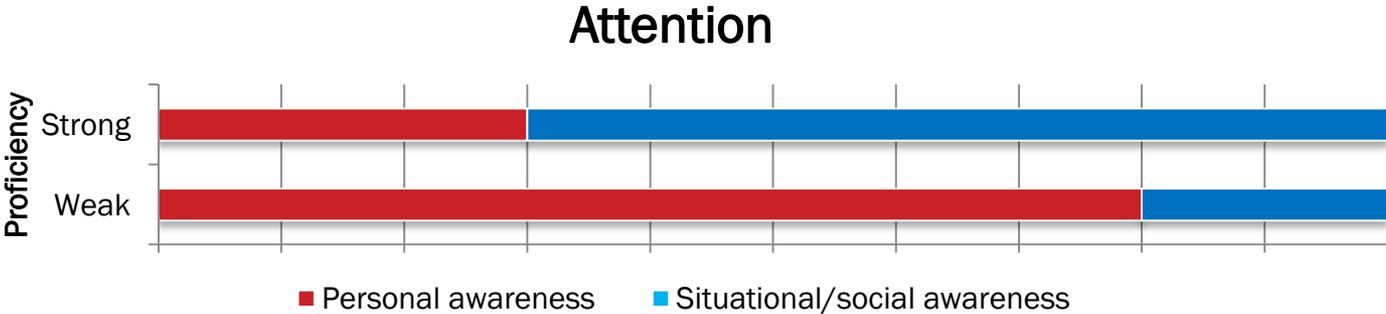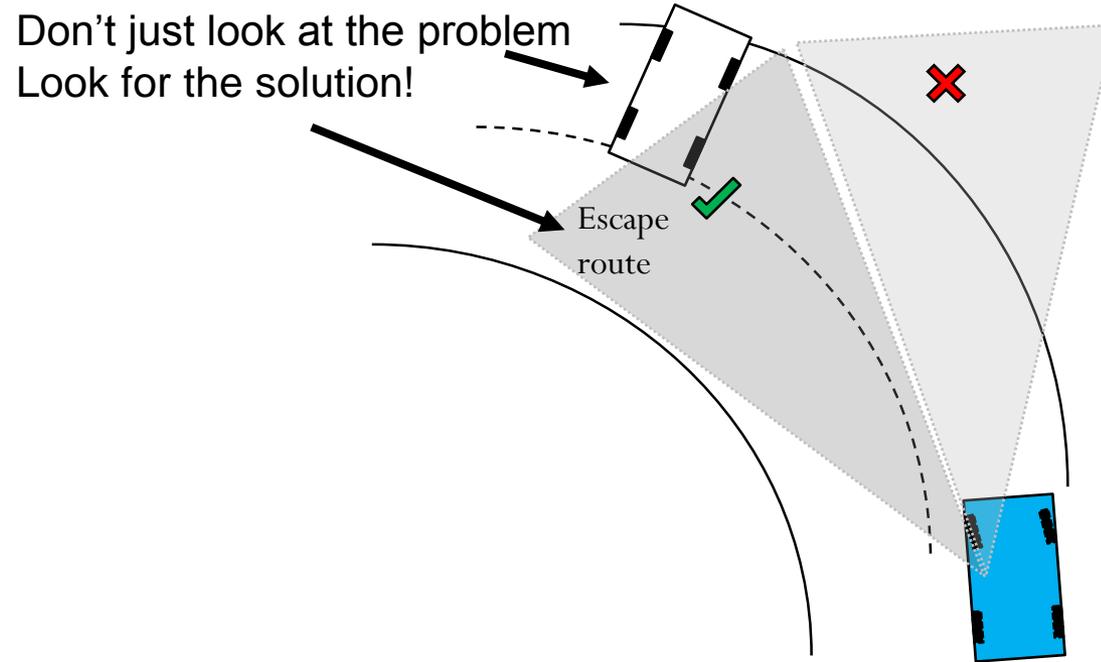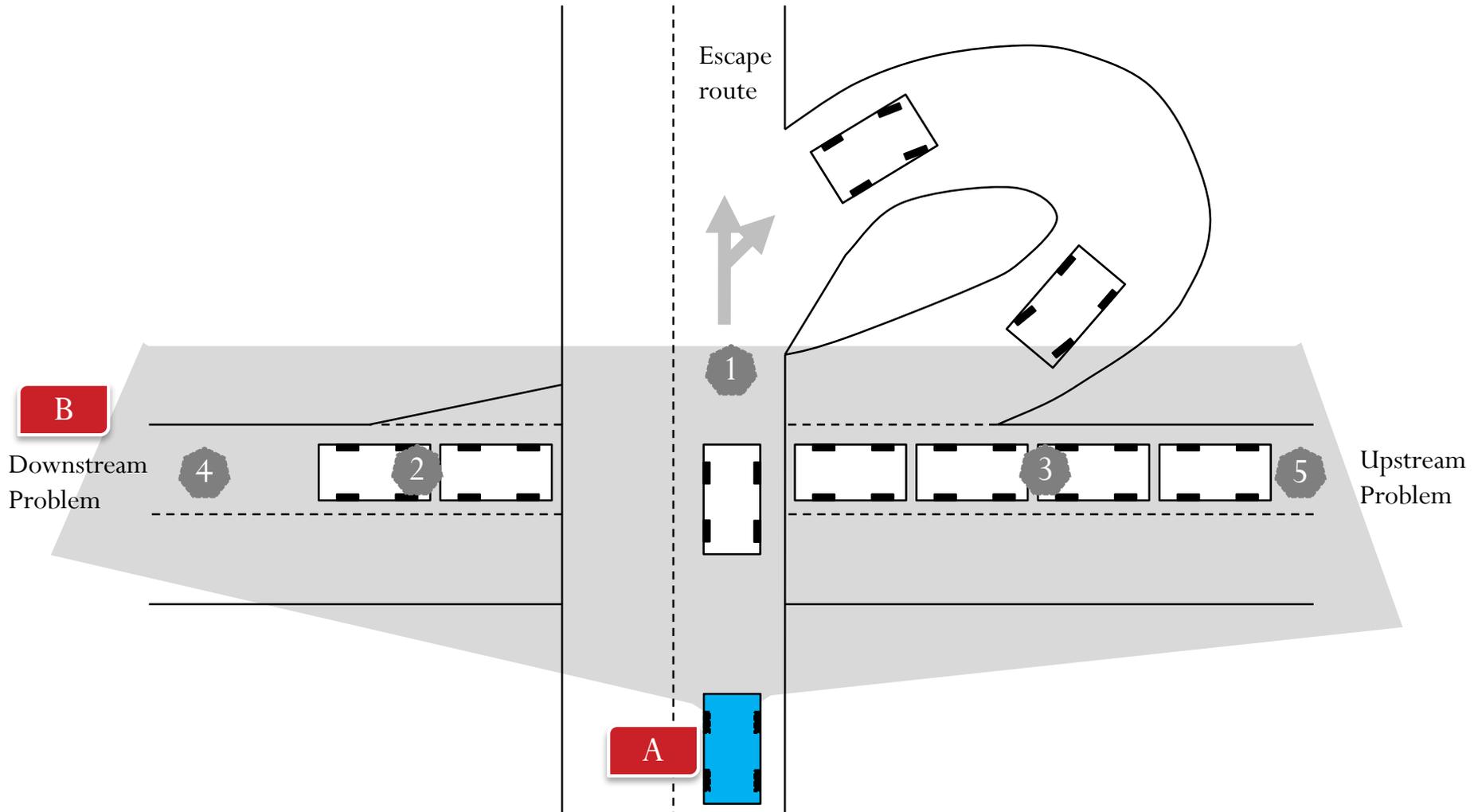
TRANSPARENCY

- Others can observe intently but execution can still suffer if people fail to communicate their intent in a way that is:
  - Authentic
  - Open
  - Clear
  - Timely
- Transparency is increasingly expected in the wake of failures
- Transparency speeds up and improves the quality of execution
- Transparency attracts collaborators and consumers
- Transparency helps to avoid strategies that can't be implemented

CREATE CONVERSATION

- The "Lone Innovator" is a myth

- You can't be original without knowing what's already been said

- Build up a pool of ideas

- Reinforce and evolve ideas contributed by collaborators

3 WAYS TO INCREASE ENGAGEMENT

➢Develop "big ears" to avoid missing opportunities

➢Act openly and transparently to enhance execution

➢Dialogue with collaborators and consumers to produce better solutions

CODA – ENABLING COLLECTIVE IMPROVISATION

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   - Institute stop-the-line to improve quality
   - Use team-wide retrospectives to improve process
   - Form virtual teams to improve responsiveness

2. **EMBRACE DIVERSITY**
   - Avoid "mirrortocracies" by embracing opposition
   - Increase coverage and mitigate risk with balanced teams
   - Diverge and converge to find the best solutions

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   - Get into the groove to synchronize efforts
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   - Take calculated risks to advance innovation

4. **USE JUST ENOUGH RULES**
   - Reduce friction to increase velocity
   - Break rules to overcome blockers
   - Make contributions count to raise efficiency

5. **INCREASE ENGAGEMENT**
   - Develop "big ears" to avoid missing opportunities
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   - Dialogue with collaborators and consumers to produce better solutions

START WITH ANY THREE

Learn More

Discussion of principles and practices

A live example of principles applied to software development
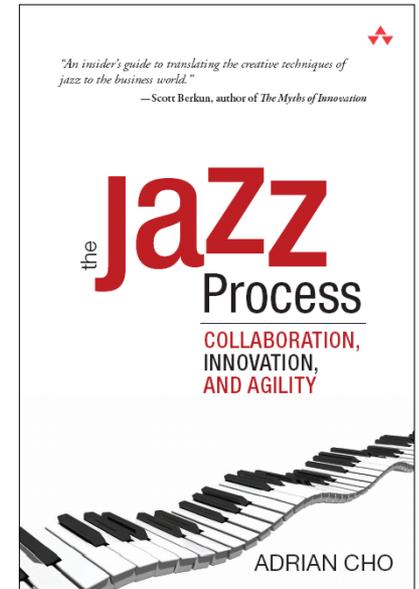
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