

Agile Metrics

For the Team, for the Managers
For the customers and shareholders



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WIIFM

- 🎯 **What does a team cost, per year?**
- 🎯 **What does a team bring back, per year? Net present value (return on investment).**
- 🎯 **If we can double team ROI (productivity), would that be interesting?**

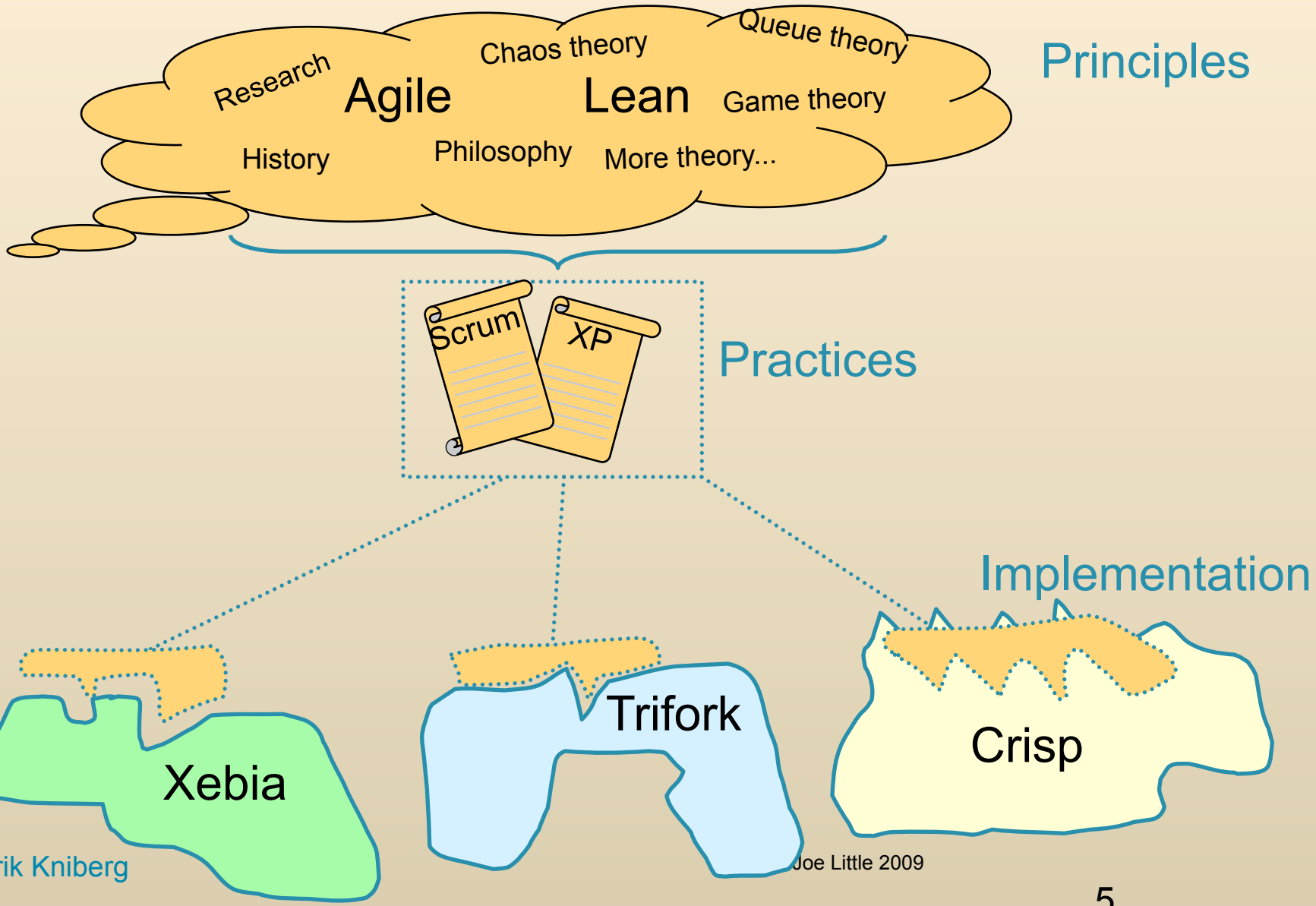
One design goal for Scrum

- 🎯 **Increase team productivity 5x-10x**

Big Assumption

- You understand Agile and like it
- You understand the practices of Agile as well as the values and principles behind Agile...your only question is...how do we do Agile metrics?

Topic: Introduction



Henrik Kniberg

Joe Little 2009

With help from...

With help from Accenture, Alliance Global Services, American Greetings Interactive, AOL, Applied Physics Laboratory, Argonaut Group, Asurion, Avid Technology, Booz Allen Hamilton, CA, CAE, Canada Post, Capital One, Charles Schwab, Citigroup, CNN/Turner, Comcast, Compuware, Cornell, Crisp, Dell, DST, EDR, Exigen Services, FedEx, GE Power Systems, Georgia Institute of Technology, Gilbarco, Google, HP, Huawei, IBM, iContact, INM, Intersect, J Ray McDermott, Mantech, McKesson, McKinsey & Co, Medco, Microsoft, Morrison Management, Motley Fool, MySpace, Nationwide, NC State University, NEA, Nortel, Northrop Grumman, NYSE Euronext, Ontario Legislative Assembly, Pearson, Philips, Polycom, Rally, RealTravel, Red Hat, REMITData, S1, SAIC, Scripps Network Interactive, Scrum Training Institute, Siemens, SirsiDynix, Smart Online, SolutionsIQ, Sonic Boom Media, SteamTheWorld, Sungard, Systematic Software Engineering, The Hartford, The Library Company, The New Teacher Project, Tradeware, Travelocity, Trifork, Ultimate Software, Vanguard, Version One, Vignette, Wake Forest University, Wells Fargo/Wachovia, Wireless Generation, Xebia, and others.

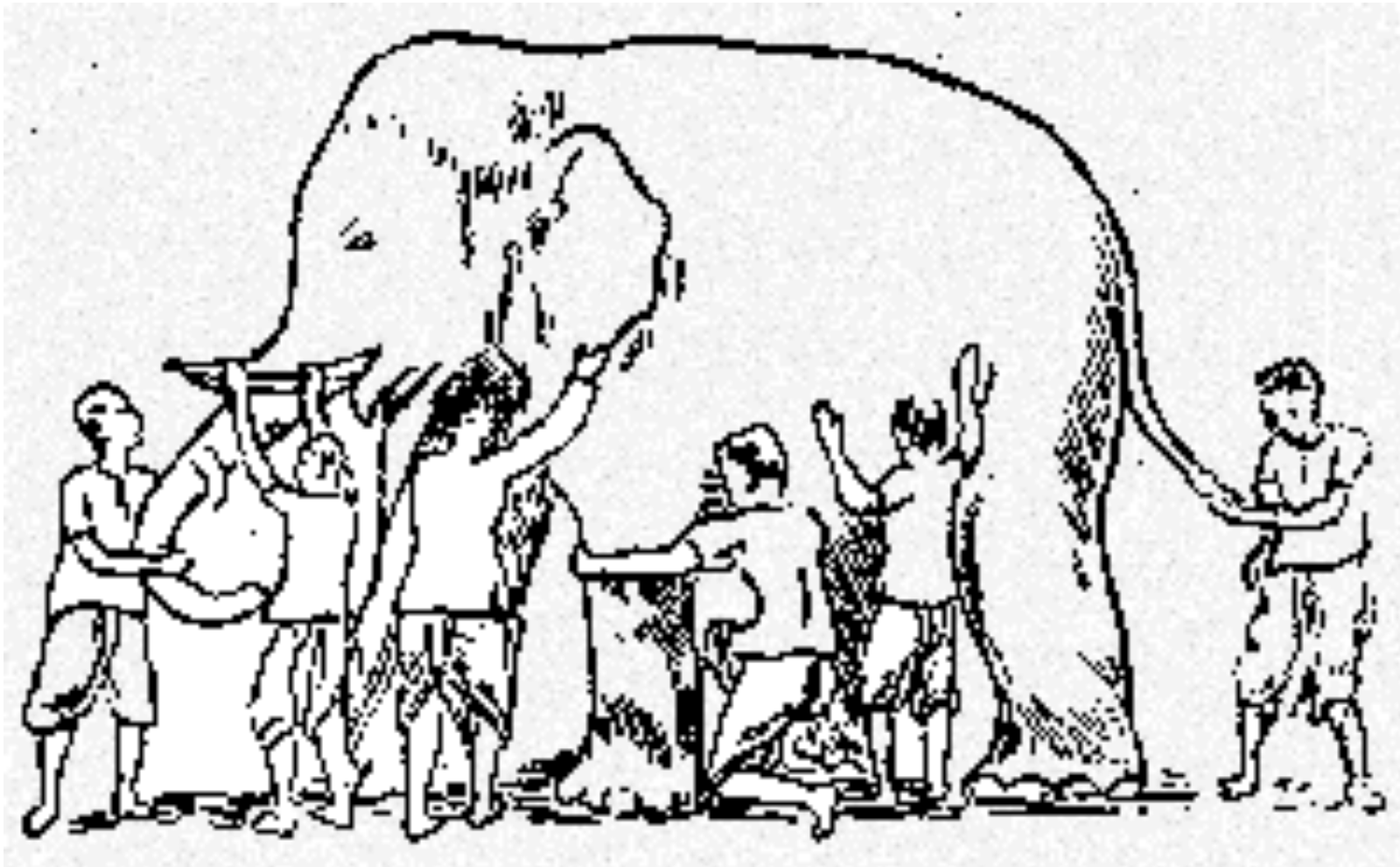
Attributions

- 🌐 **Jim York**
- 🌐 **Jeff Sutherland**
- 🌐 **Henrik Kniberg**
- 🌐 **Mike Cohn**
- 🌐 **Many others**

Joe Little

- Agile Coach & Trainer
 - 20+ years in senior level consulting to well-known firms in New York, London and Charlotte
 - Focus on delivery of Business Value; interest in Lean
 - CST, CSP, CSM; MBA
 - Was Senior Manager in Big 6 consulting
 - Head of Kitty Hawk Consulting, Inc. since 1991
 - Head of LeanAgileTraining.com
 - Started trying to do [Agile] before reading The Mythical Man-Month
-
- <http://agileconsortium.blogspot.com>
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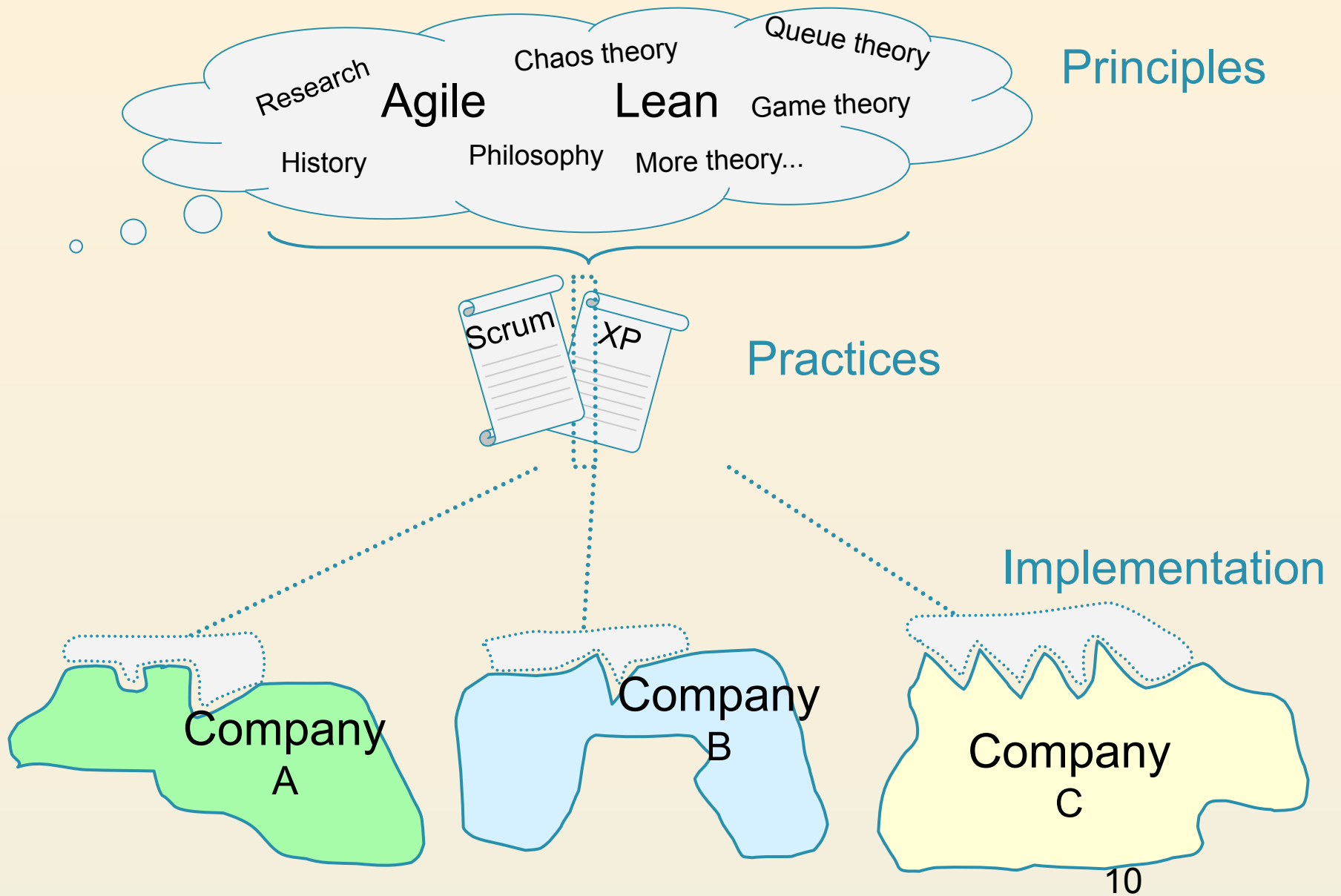




6 Blindmen and an Elephant

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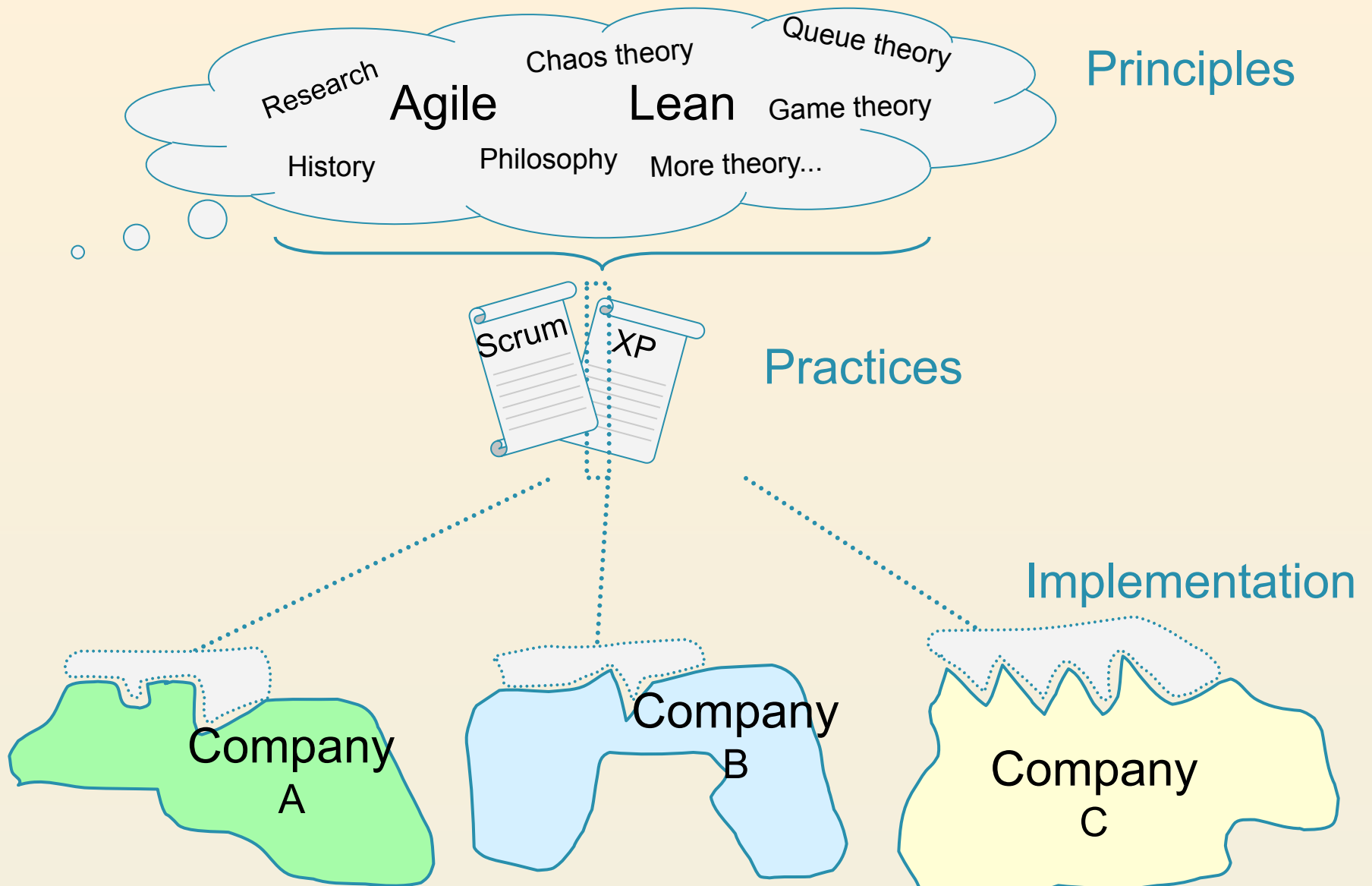
Topic: Design goals of good metrics



Good metrics should...

1. be accurate enough to enable better decision-making
2. enable better actions and serious improvement
3. not be seriously gamed (inaccurate); ideally “gaming” is actually better behavior
4. change the behavior of all members of team and related managers
5. motivate the team (or at least not de-motivate)
6. be simple enough that they are done, and used well
7. enable optimizing the whole

Topic: Why do we have metrics?



Reason #1

- We have to
- Self-defense

Reason #2

- **To make business-decisions**
 - **Decision-making frequency increases multi-fold**
- **Such as:**
 - **Should we start this effort**
 - **Which team needs the most help now**
 - **When do we stop doing this product backlog**
 - **Do we understand the customer better**
 - **Did it actually help to remove that impediment**
 - **Many others...**

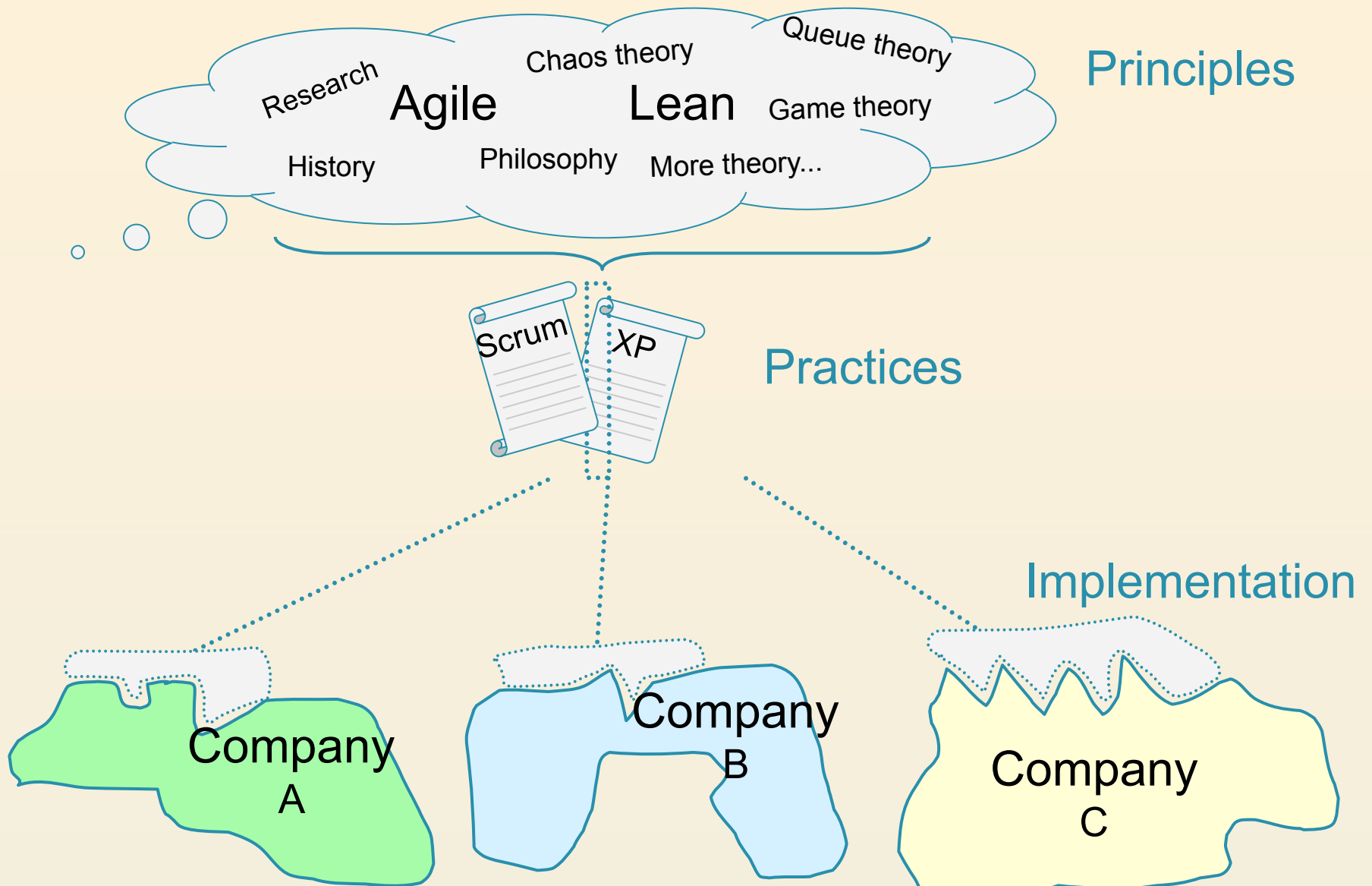
Reason #3

- **To get feedback, so that forward-looking guesses have a higher probability of being right**
- **We make a guess (aka estimate), and then we check later how good the guess was**
- **If it is off a lot...maybe: "gee, we need to learn how to estimate better"**

Reason #4

- **To change behavior...**
 - **Not just the key business-decisions**
 - **But as close as possible to all the behavior on a day-to-day basis**

Topic: Some ideas about metrics



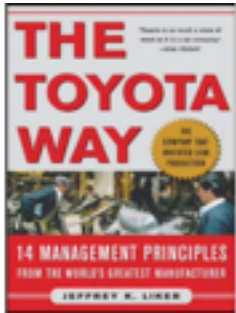
Lean principles

- Eliminate waste
- Build quality in
- Create knowledge
- Defer commitment
- Deliver fast
- Respect people
- Optimize the whole



Source: Mary & Tom Poppendieck

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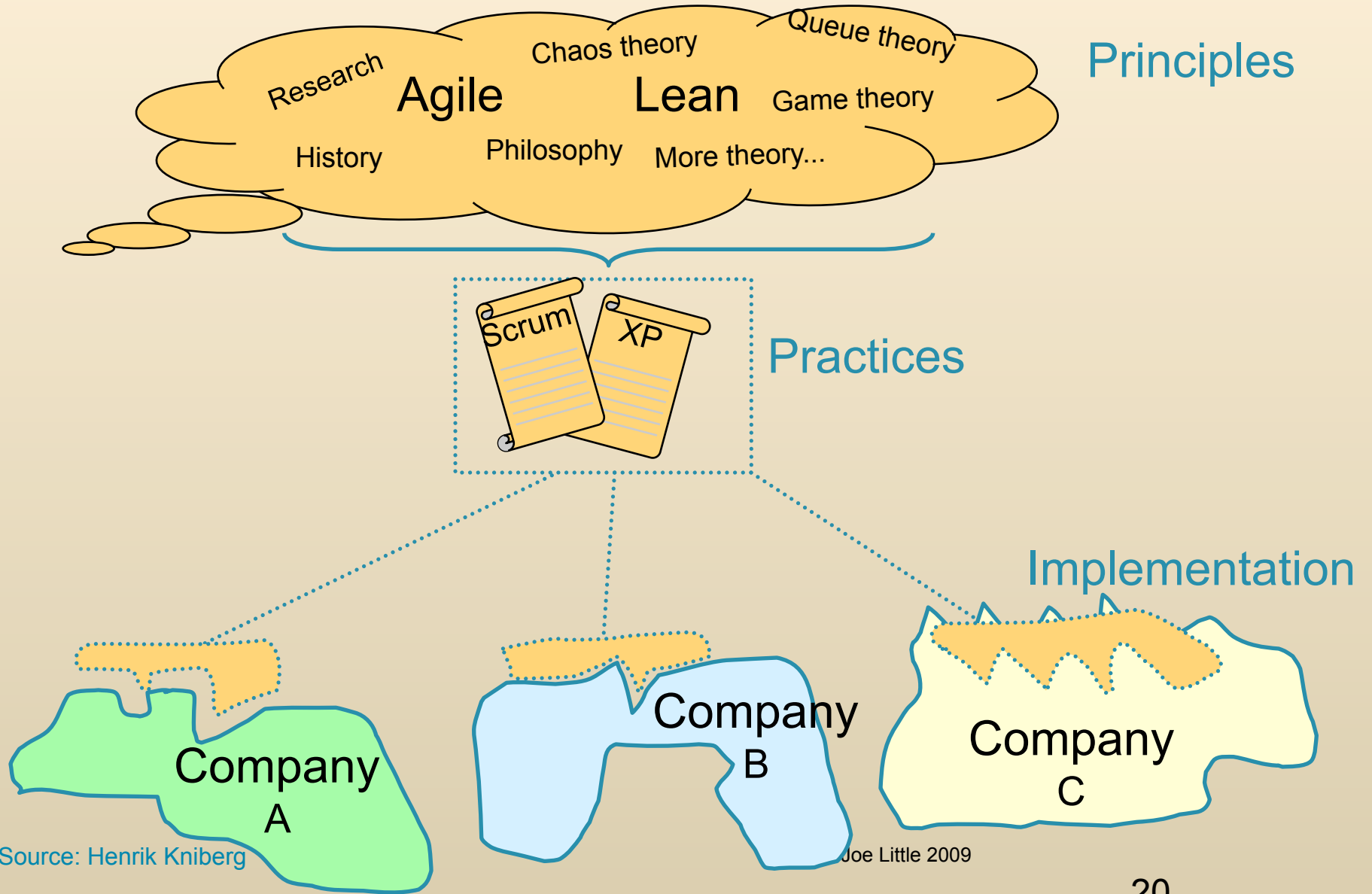
Toyota Way: Learn by Doing

Fujio Cho, Board Chairman

- **We place the highest value on actual implementation and taking action.** *Agile Principle #1*
- **There are many things one doesn't understand, and therefore we ask them why don't you just go ahead and take action; try to do something?** *Agile Principle #3, #11*
- **You realize how little you know and you face your own failures and redo it again and at the second trial you realize another mistake ... so you can redo it once again.** *Agile Principle #11, #12*
- **So by constant improvement ... one can rise to the higher level of practice and knowledge.** *Agile Principle #3*

"Anyone who has never made a mistake has never tried anything new." Albert Einstein

Topic: Recommendation



Source: Henrik Kniberg

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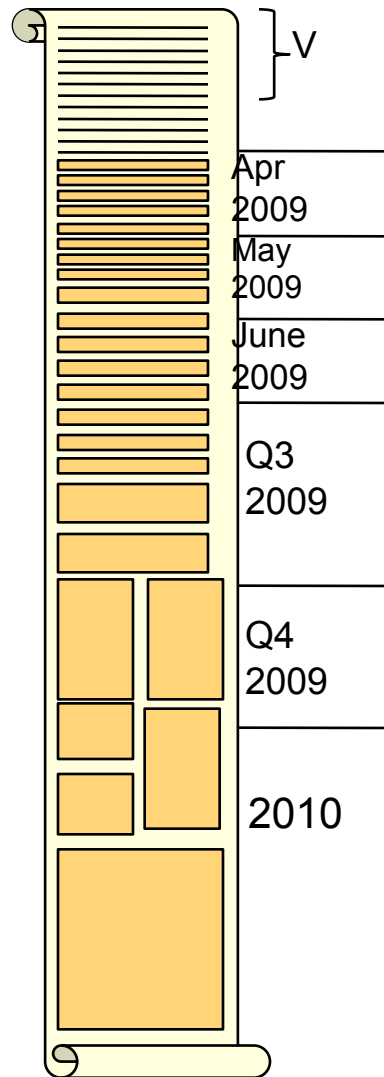
Focus on two metrics

At the team level, or some aggregation...

- **BV produced per month or quarter**

- **Velocity improvement**

Pareto Rule



If you have business value points...
...after working on the Product Backlog for 20% of the estimated time, you will ask:
“have we produced 80% of the value yet?”

Goals behind the scenes

- **Lean: Process cycle efficiency (eg, value-added time over total time for a feature)**
- **Just-in-time knowledge creation**
- **Minimizing knowledge decay**

Are there other agile metrics?

- **Yes, of course....**

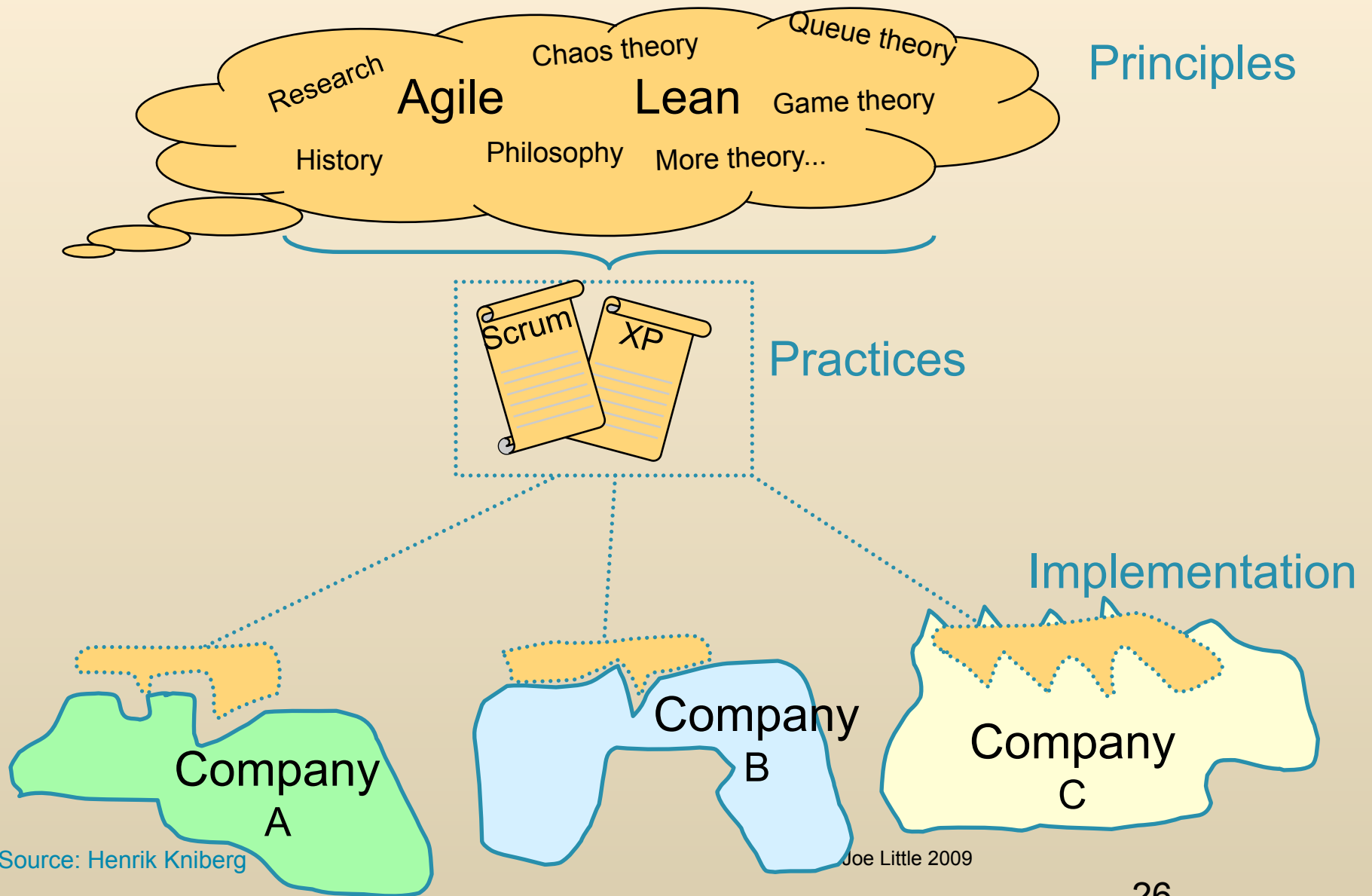
- **... and we will survey them later**

- **key risk: mostly, if used alone, they will sub-optimize the whole**

Some problems

- **It often feels very difficult at first to estimate the BV of an effort in \$**
 - **While hard, it is still worthwhile**
- **Velocity feels vague to some. Some teams won't do it well enough without coaching**
- **Any metric can be mis-used. These will too if not done professionally**

Topic: The Team wants metrics



Source: Henrik Kniberg

Joe Little 2009

The true situation must show through

- **No gaming by the Team**
- **No “obfuscation” by middle managers**
- **Truth accurately reflected by senior management**

- **Senior managers can visit a team at any time to see the meaning of any numbers**
 - **Senior managers have the patience and respect to observe the Gemba**

How to approach the truth?

- **Respect that Teams typically want to do their best**
- **No one is to blame for the current situation**
- **Everyone can contribute to improving it**
 - **Impediment removal is key**
- **Respect does not mean inaction about a few bad apples**
- **Transparency is a key value**

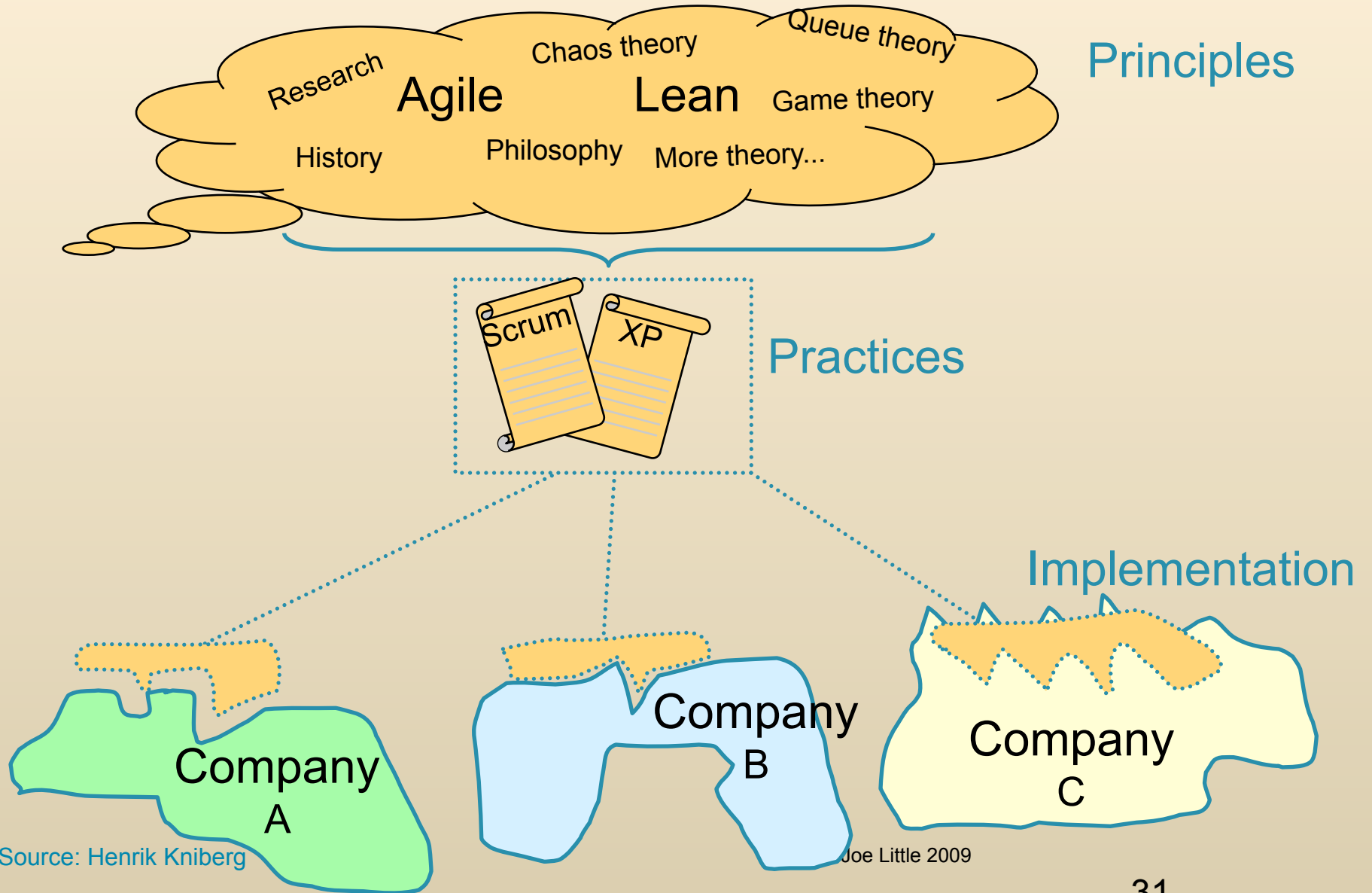
The Team wants metrics. Why?

- **To help them see their work**
- **To plan with**
- **To determine when successful**
- **To push back on magical-thinking managers**
- **To challenge themselves**

The Team wants the truth

- **The Team is not blamed for the truth**
- **The Team is not complacent with the current situation (it can be better)**
- **The metrics are available to all (transparency)**
- **The Team uses each metric probably more than anyone**

Topic: Metrics change for the Manager



Source: Henrik Kniberg

Joe Little 2009

Old info gone

- Well, a lot of it
- So, can't manage with that missing stuff

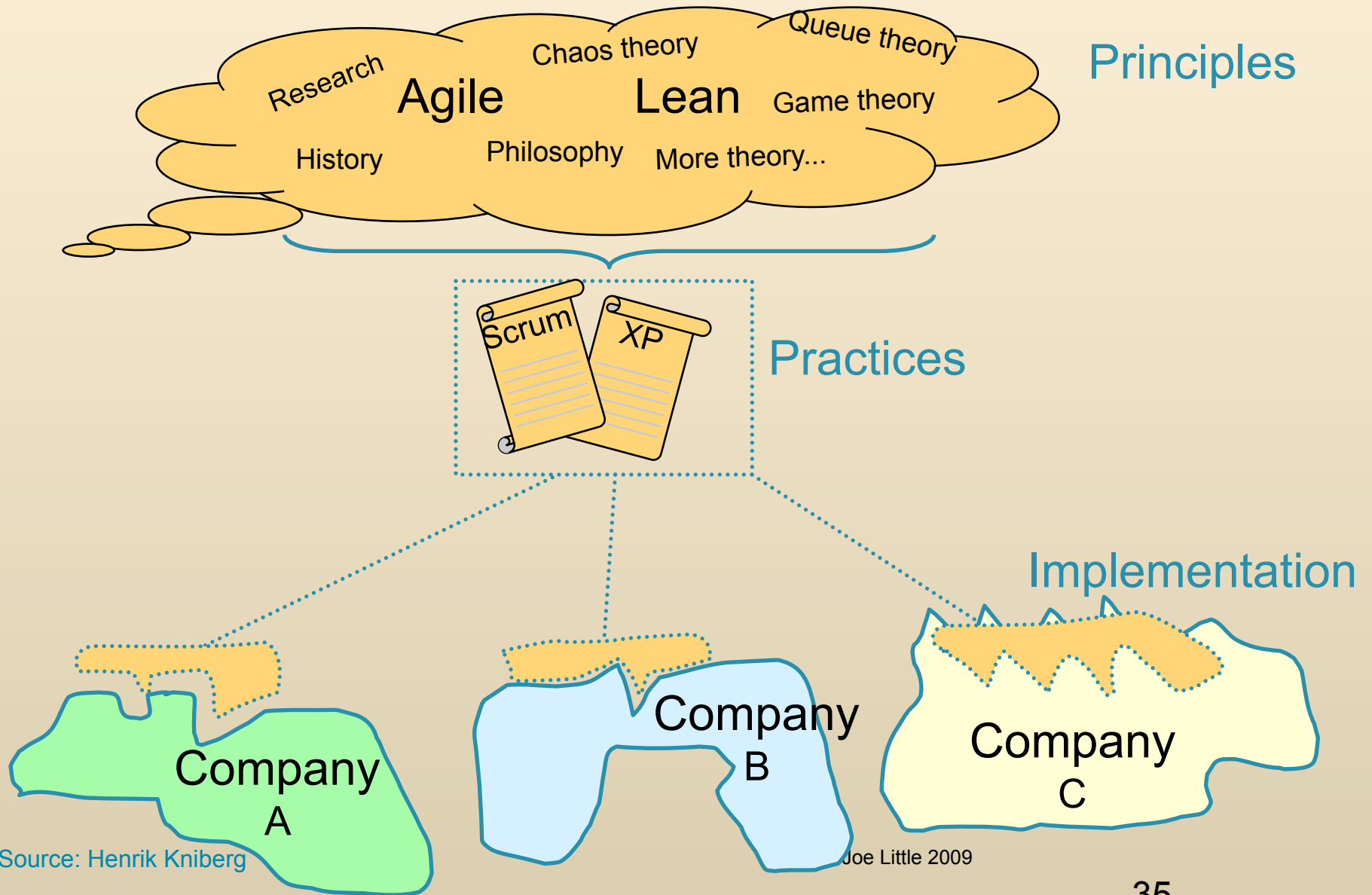
Old attitudes are gone

- **We don't use metrics to brow-beat the team, or whip them into a Death March**
- **Managers now help the team remove impediments**
- **Managers follow genchi genbutsu ("go and see for yourself").**
 - **They go to the Team room**
 - **They "don't manage from behind the desk"**

Managers -> New tools/levers

- **Challenge the Team to identify the top impediment to remove to increase velocity**
- **Challenge the Product Owner to execute closer to the 80-20 rule**
- **Other tools.**
- **...and managers help remove impediments.**

Topic: BV Engineering



Source: Henrik Kniberg

Joe Little 2009

A Start

“You’ve got to be very careful if you don’t know where you’re going, because you might not get there.” Yogi Berra

What are the costs and benefits of your teams?

- **Cost per year, all-in. Assume 8 people, FT, including SM and PO.**
- **Net Present Value produced annually (the return on that investment in the team)**
- **How many of you know these numbers, or a serious semblance of them?**

Is BV Engineering Important?

- **We make the stories 20% better**
- **We use “Pareto’s” 85-33 rule to get the most important stuff done in less time**
- **We identify more high value epics**
- **Maybe: We motivate the team, so that they are more productive**
- **Maybe: We hit the mark of what the customer really wants more.**

- **What’s that worth?**

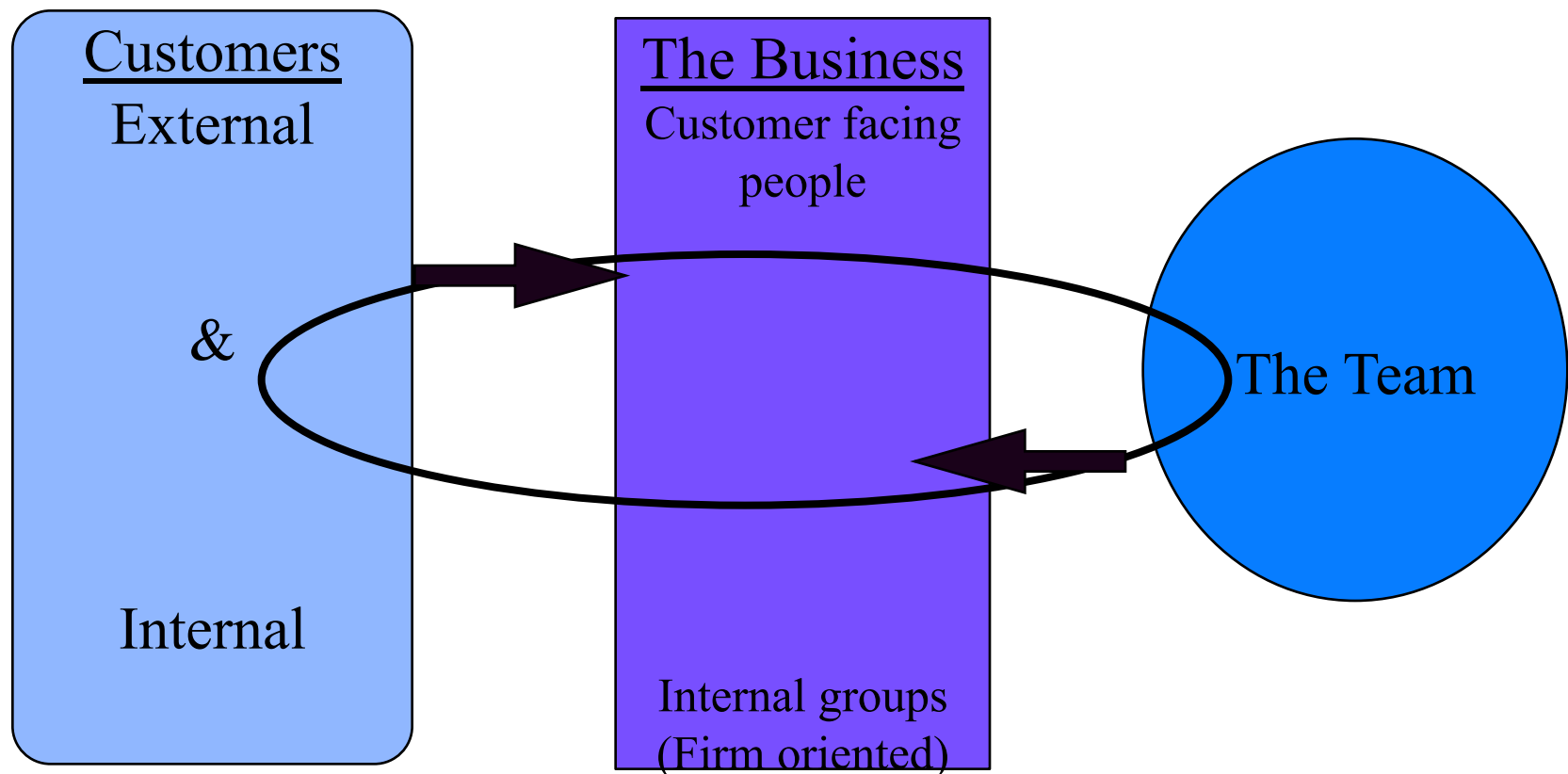
Let's do a thought experiment...

- Assume team costs \$1,000,000 per year
- Assume normal multiple is 3x (ie, team delivers \$3,000,000 in BV)
- Assume the "real work" itself does NOT get any faster

One version....

	Year 1	Year 2	Year 3
Cost of Team	\$1,000,000	\$1,000,000	\$1,000,000
Orig Value Delivered per Year	\$3,000,000	\$3,000,000	\$3,000,000
NPV	\$7,460,556		
ID Better Stories (+20%)	\$3,600,000		
Deliver Top 33% (85% of BV)	\$3,060,000		
Deliver Top 33% again	\$3,060,000		
Deliver Top 33% again	\$3,060,000		
TOTAL FIRST YEAR	\$9,180,000	\$9,180,000	\$9,180,000
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			40
Better NPV	\$22,829,301		

Is it better this way?



Some axioms

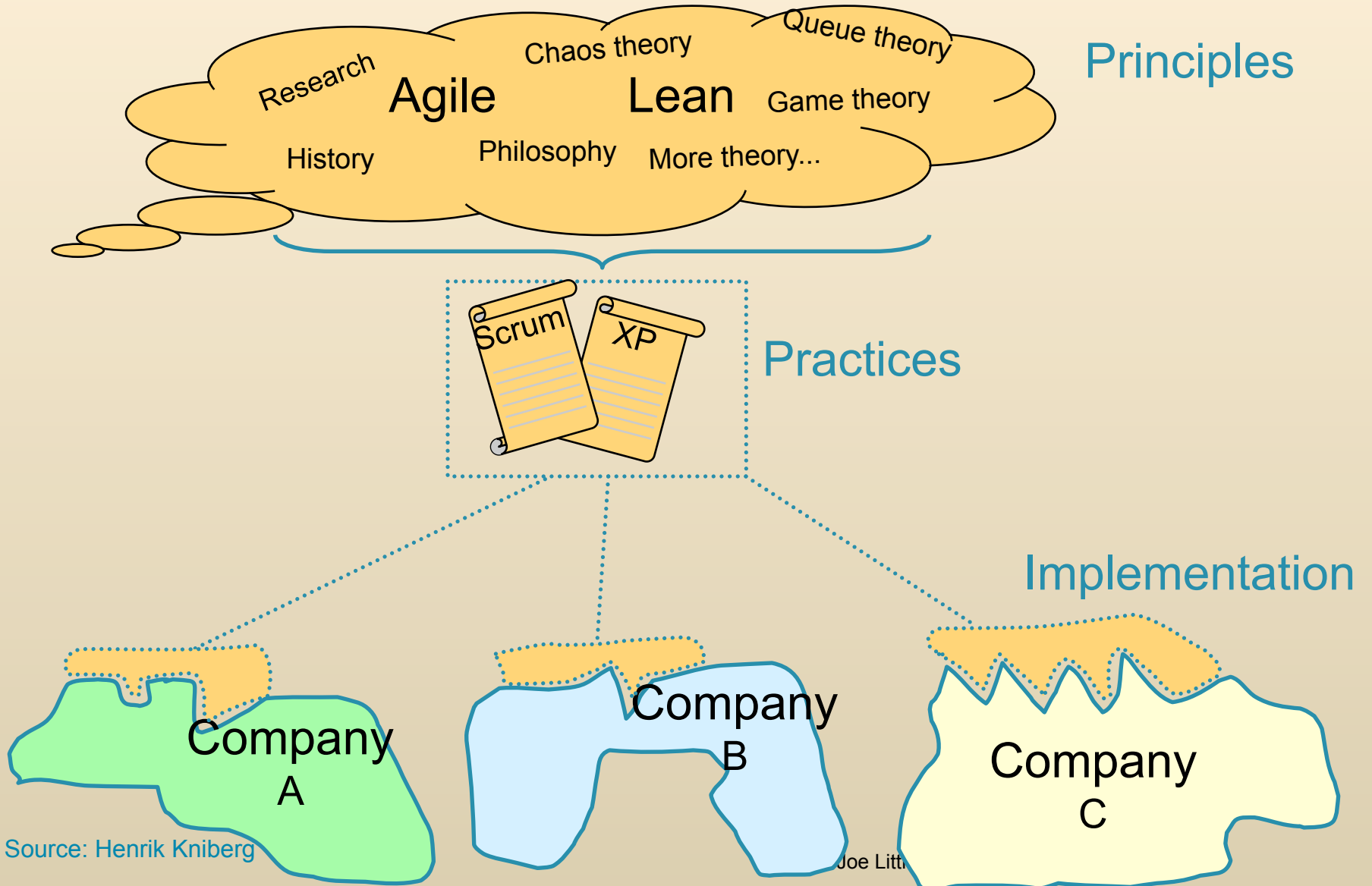
1. A “technical success” is no success at all
2. The most important thing is satisfying the customer; making money is only a constraint
3. You win by learning faster than the next firm
4. You win with small “scientific” experiments; frequent and fast
5. The numbers never get precise, but that does not mean ‘use no numbers’
6. Numbers can be useful, but that does not mean ‘human judgment is no longer needed’
7. There is no one best approach to BV engineering

Theories & Practices

- **BV Engineering is based upon theories of**
 - **what BV is (for our firm)**
 - **how it changes**
 - **how we will learn about it and communicate it**
 - **how we should deliver it**

- **BV Engineering is instantiated in a wide set of practices that possibly operate in a kind of virtuous cycle...each practice building on the other**

Topic: BV Engineering (cont)

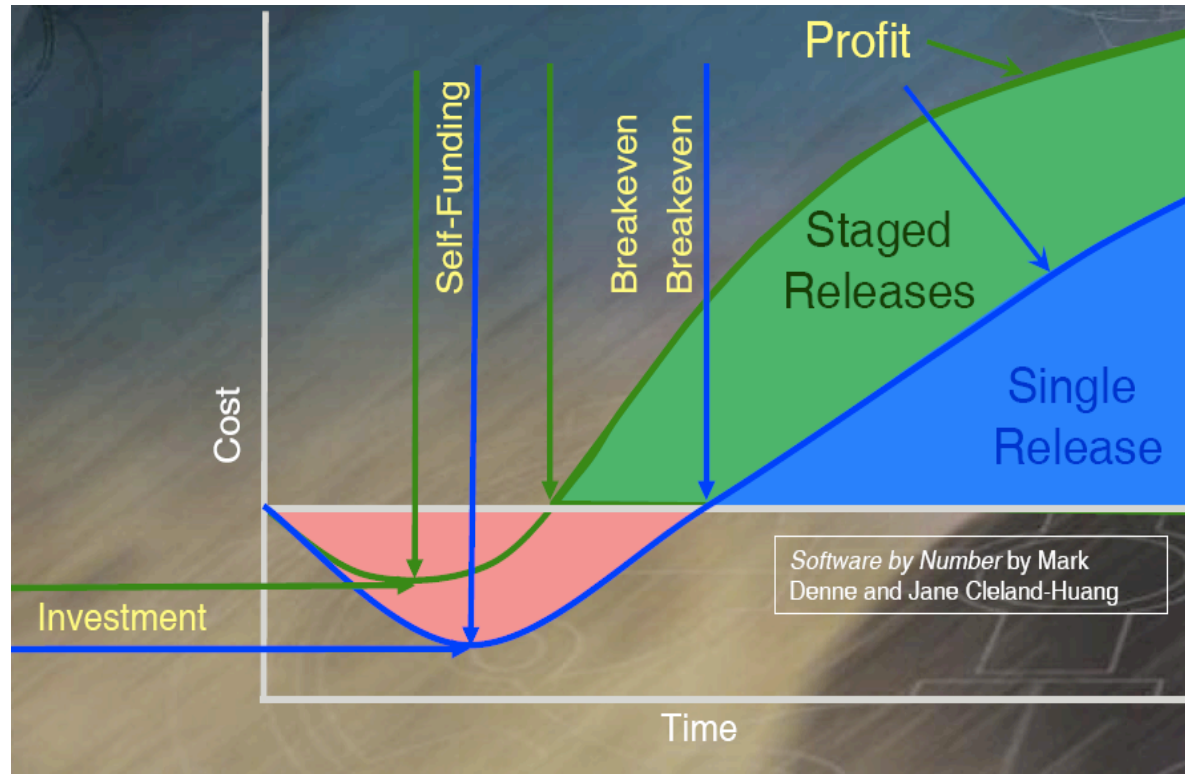


Source: Henrik Kniberg

Joe Litt

Financial Implications

- **Financial**
- Less investment
- Increased NPV
- Earlier self-funding
- Earlier break-even
- More revenue
- Customer lock-in



Software by Numbers, [Mark Denne](#) and [Jane Cleland-Huang](#)

65% of all software in production is never or rarely utilized. (2002 Standish Report)

Hallmarks of good BV Engineering

- 1. The process is visible and articulated & improved**
- 2. Failures in BV communication are identified and corrected frequently, quickly**
- 3. There is a theory, and a concerted attempt to prove out the theory**
- 4. There is appropriate dynamism and change**
- 5. Business & Technology are partners**
- 6. Success is forecast and also measured after the fact**
- 7. Human judgment is involved (it's not just the numbers)**
- 8. Multiple parts of the process are given attention**

A theory, that is being proved out

- **Is the theory stated as such, or is it assumed to be right?**
- **How it is being proved out?**
- **What happens when (not if) it is (somewhat) wrong?**

Success is measured

- **1 to 3 key “end” metrics. Identified. Forecast.**
- **Then the real results are obtained.**
 - **Perhaps not perfectly, but reasonably**
- **And learned from. (Was the product wrong?
Was the theory wrong?)**
- **And communicated back to the Team**

Human judgment

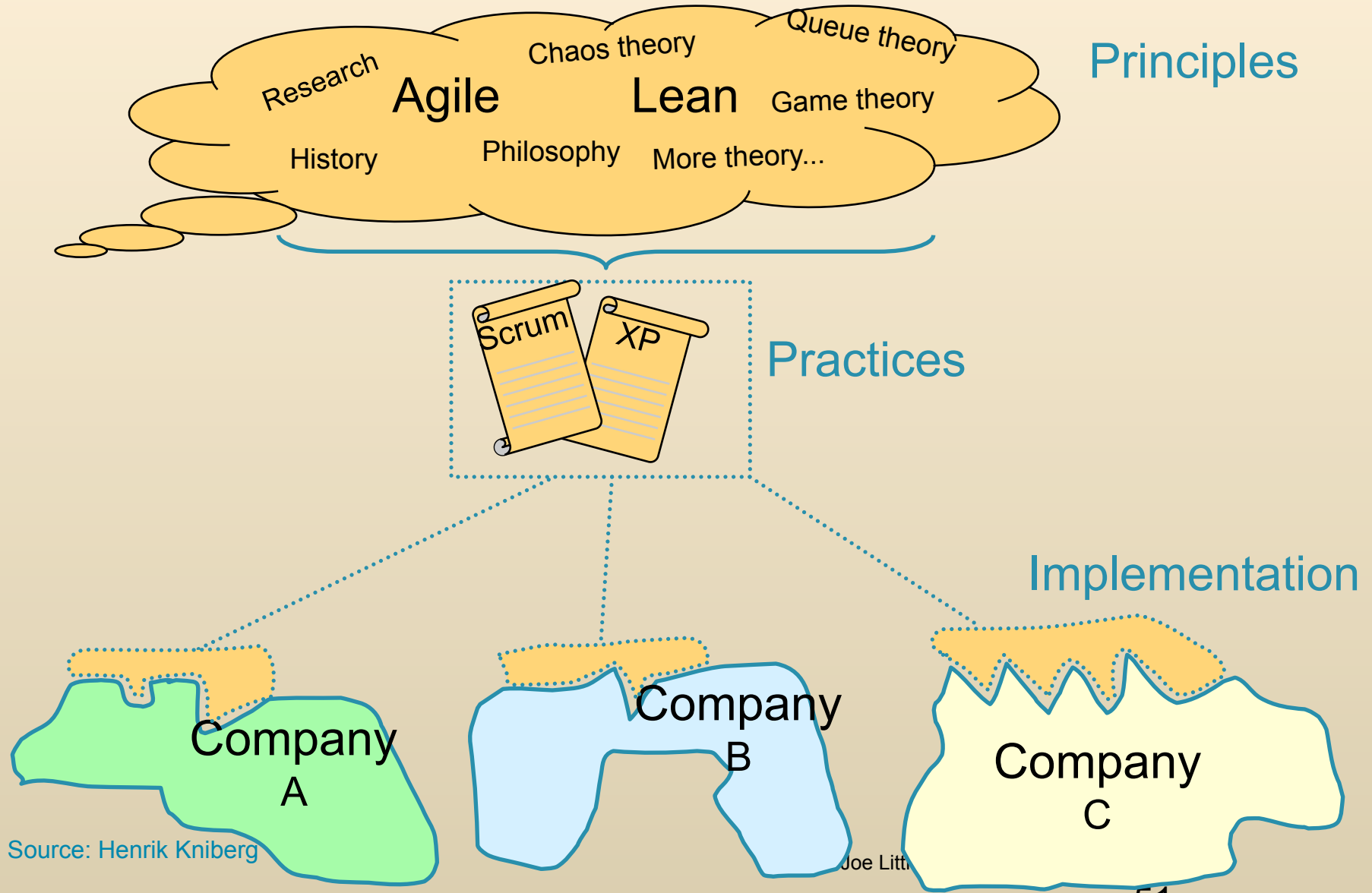
- **Yes, stuff happens that makes one question whether the 'scientific' experiment was fair**
- **Yes, one can still have a hunch that the future will be different than the recent past**

- **So, metrics do not absolve managers from tough human judgment about the actuals and other information they get back**

The unbearable lightness of metrics

- **We use metrics (about the past) to take forward-looking action**
- **Metrics help us see how bad we are at predicting the future**
- **Metrics help us learn (perhaps first, by helping us see how much we don't know)**

Topic: Agile Metrics



Source: Henrik Kniberg

Joe Litt

Scrum Information

1. Velocity history
2. Working Software (and related benefits)
3. Stories Completed (done, done)
4. Number of Passing Unit or Functional Tests (today or with growth trend)
5. Bugs open today
6. Sprint Burndown chart
7. Scrum Board
8. Release Burndown chart
9. Stories/Sprints to next Release (Release Plan)
10. Product Roadmap

More Scrum Information

1. Full Product Backlog (remaining stories)
2. Impediments List (current impediments)
3. % BV completed (if use BV points or similar)
4. % Change in Velocity since (inception, last year)
5. Number of story points completed to date; % of total.
6. Bugs that escaped the Sprint
7. Oldest bug open (with Sev level)
8. Sprints with stories incomplete
9. Sprints with added stories
10. Unplanned tasks (in the X Sprint); related hours

Yet More Scrum Information

1. Stories added to / subtracted from the Release
2. Age of each story to done, done; average age (not commonly done, easy to do)
3. Impediments removed to date
4. Builds that passed / failed initially, to date
5. Defects identified after done, done
6. Defects identified after release

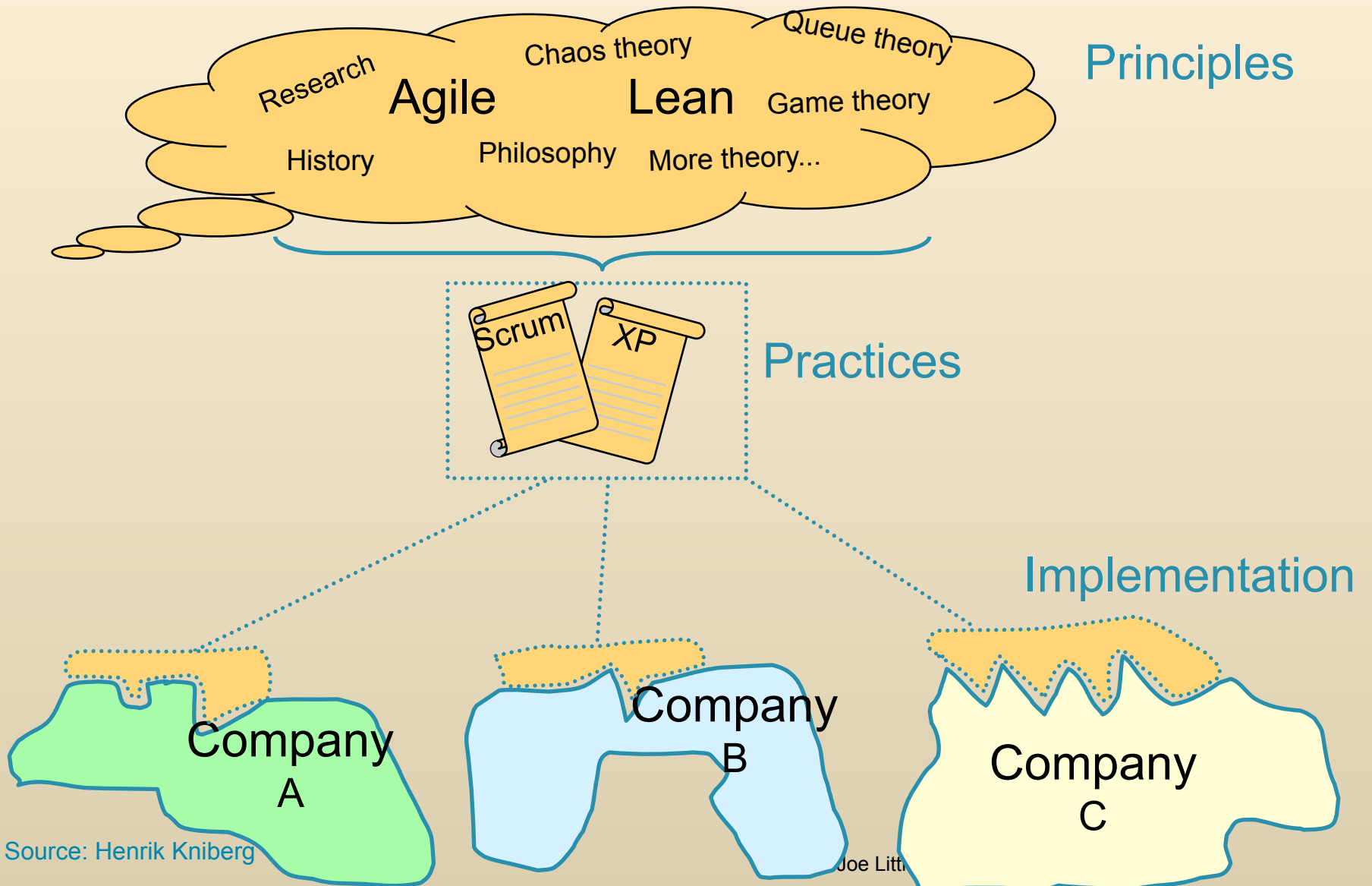
Additional metrics

1. If start with big bug list
 - Bugs added (old features) (per time)
 - Old Bugs resolved / closed (per time)
 - Old Bugs remaining (over time)
2. If starting with minimal automated tests
 - Number of automated tests (unit, functional, etc)
 - Number of manual tests (that could be automated)
 - Effort on manual testing
3. Metrics around quality of builds and regression tests
4. Metrics around quality of code (eg, cyclomatic complexity)
5. Code coverage by automated tests (unit, functional, etc.)

Lies, damn lies & statistics

- **It is not having numbers...**
- **It is making good use of numbers (that are reasonably accurate)**

Topic: Some important issues



Source: Henrik Kniberg

Joe Litt

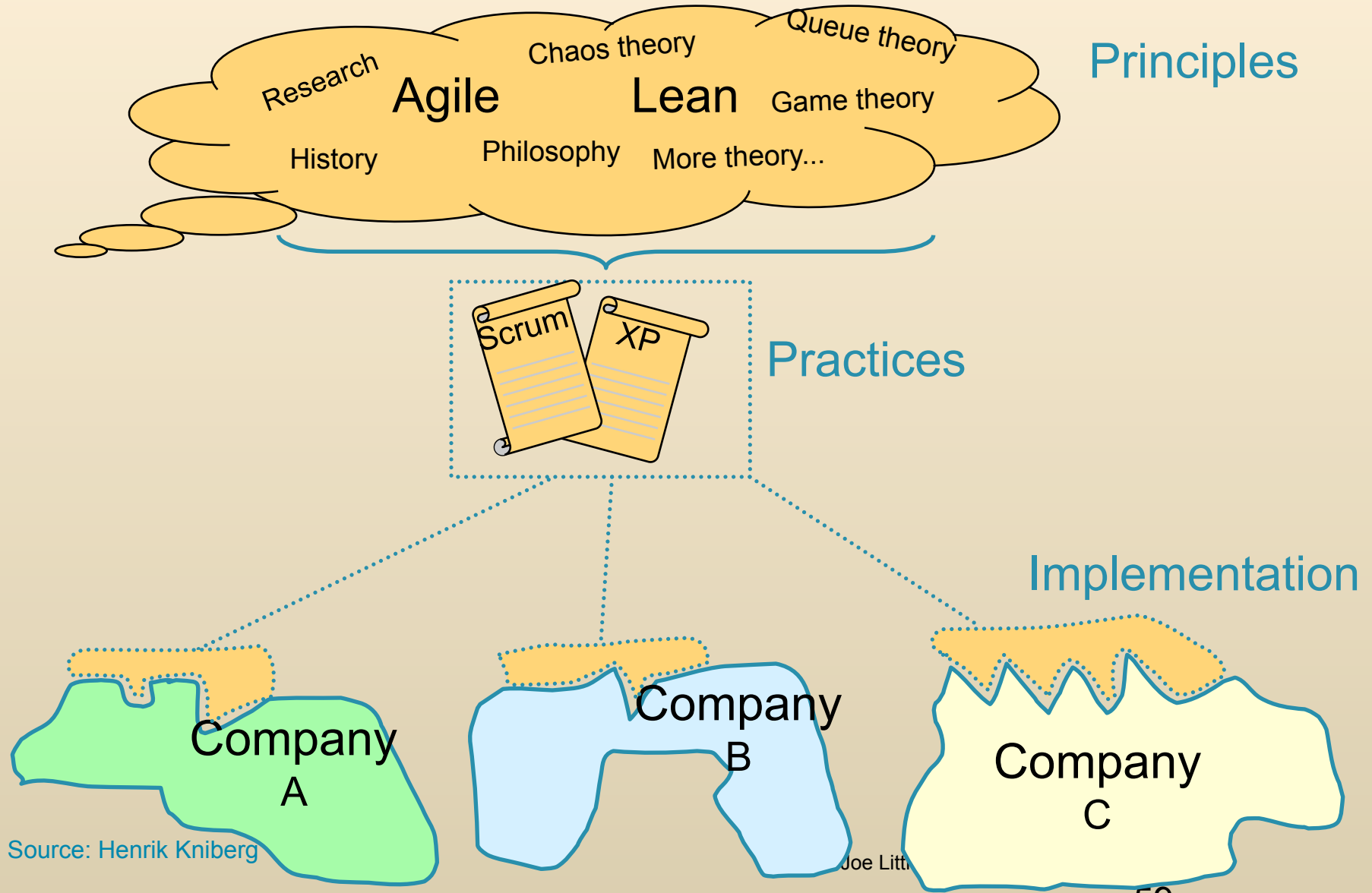
Some important issues...



Not addressed...

- a) The Team must invent metrics (as they need them)
- b) What if...[impediment X exists that keeps me from doing metrics right], what do I do?
- c) Transition from old metrics to new
- d) The business guys won't estimate \$ for a large effort or BV points for stories
- e) The Team won't do a decent velocity (using story points)
- f) How many metrics become too much
- g) How metrics fit with everything else

Topic: Real life experiences



Source: Henrik Kniberg

Joe Litt

This is where we were (begin. date)

**And this is where we were (“end”
date)**

We got serious success

 **...and you can too.**

Our business partners...

- ...hated Agile at the start
- ...want all projects Agile now

We also have metrics...

 ...that prove our success

Current metrics vs Future metrics

● For us...

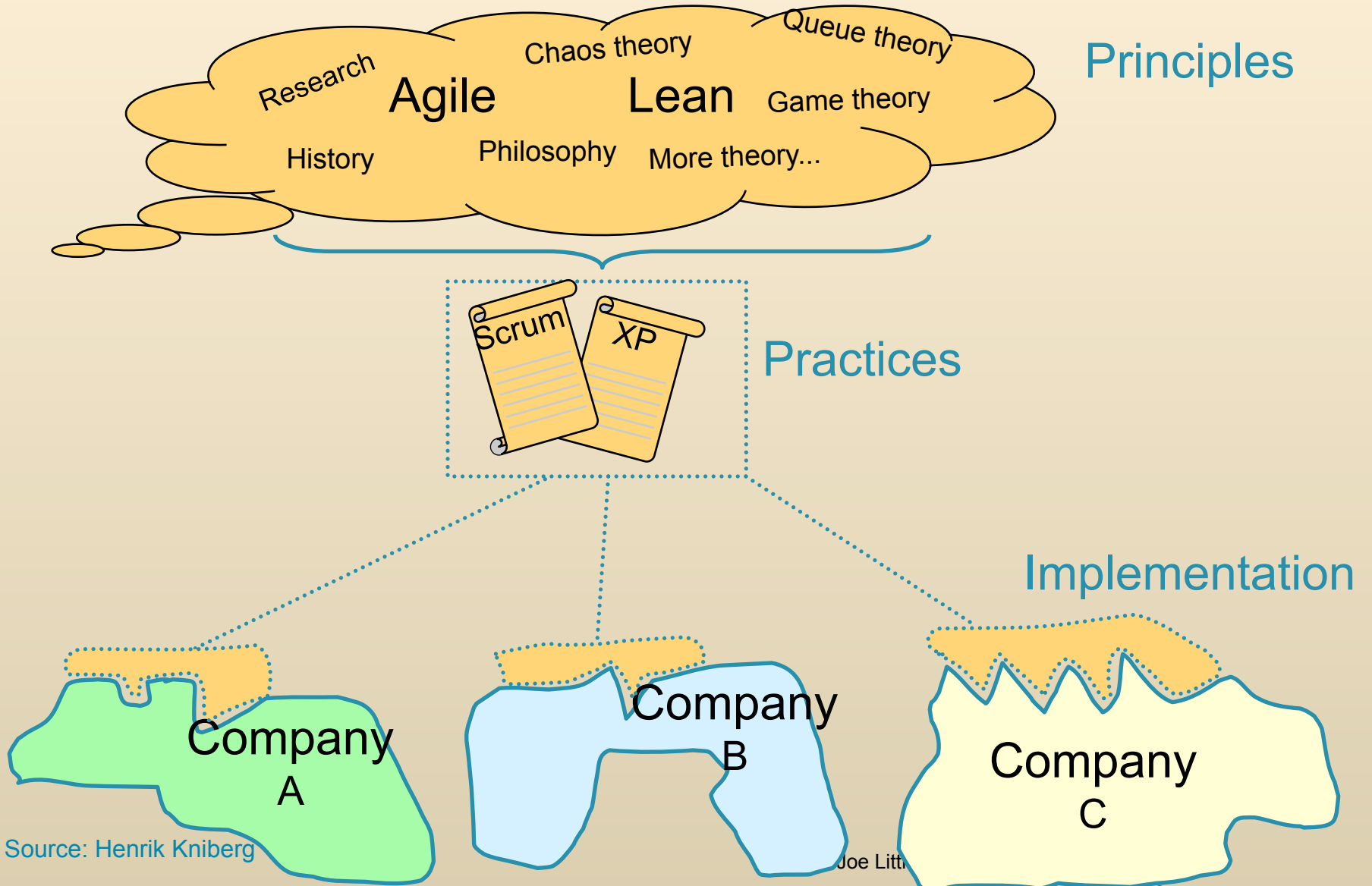
● Current Metrics

- Are Ok.
- We got to success
- Our main problems are...

● Future metrics

- Will be hard to implement
- Will look like...
- We expect them to enable yet greater success

Topic: Why you must have them



Source: Henrik Kniberg

Joe Litt

Why?

- 1. Team members can rest easier**
- 2. Team members can be proud**
- 3. The anti-agile people can't justify getting rid of Agile (or at least, you have more to fight with)**
- 4. The metrics can cause an increase in satisfaction for your customers -- not just a bit, but a LOT.**