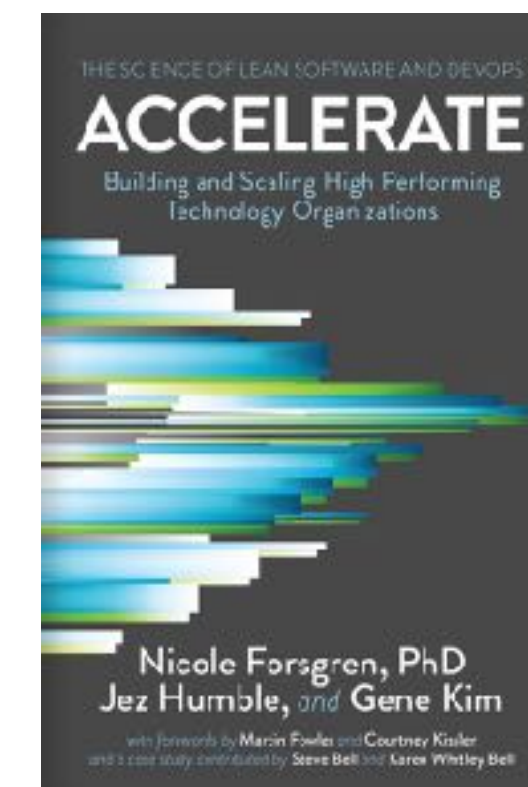
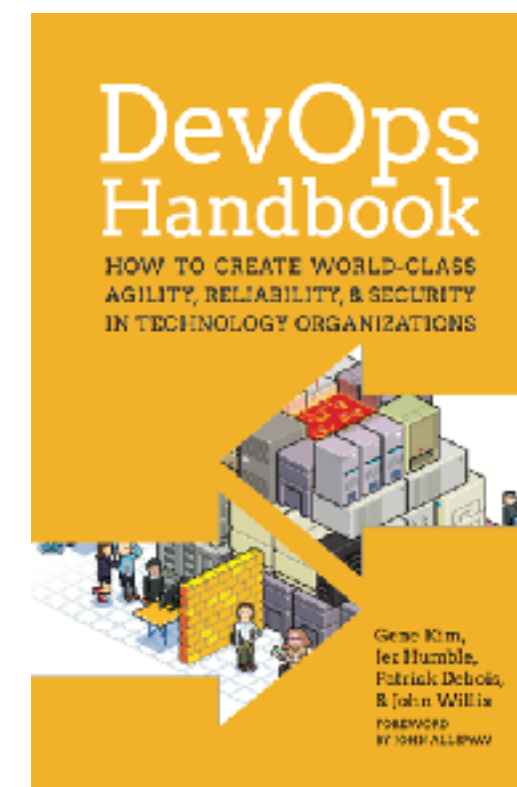
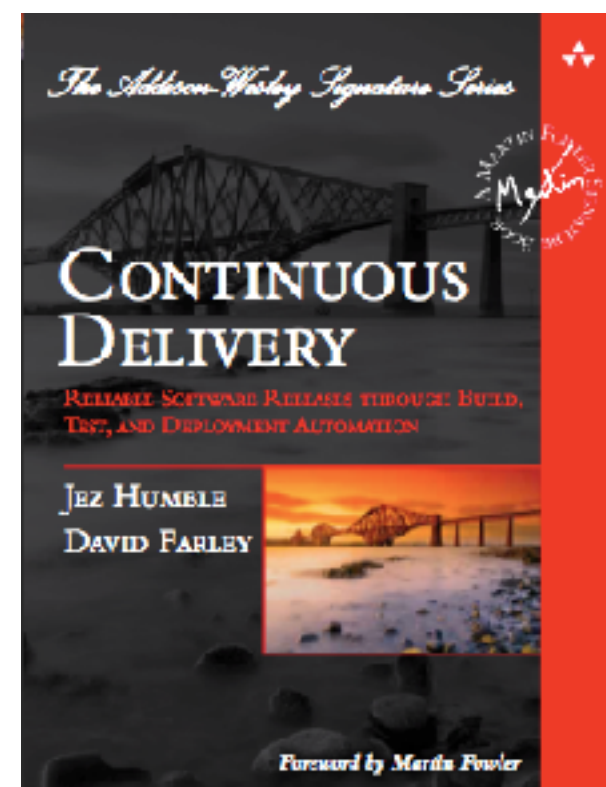




what i learned from 4 years sciencing the crap out of devops

@jezhumble | #dodbeijing | may 4, 2018



agenda

how to make your data suck less:

- * writing good survey questions
- * making sure the survey questions are good - with SCIENCE
- * (these methods also apply to your system and log data)

what we found... that we did (AND didn't) expect

things about continuous delivery

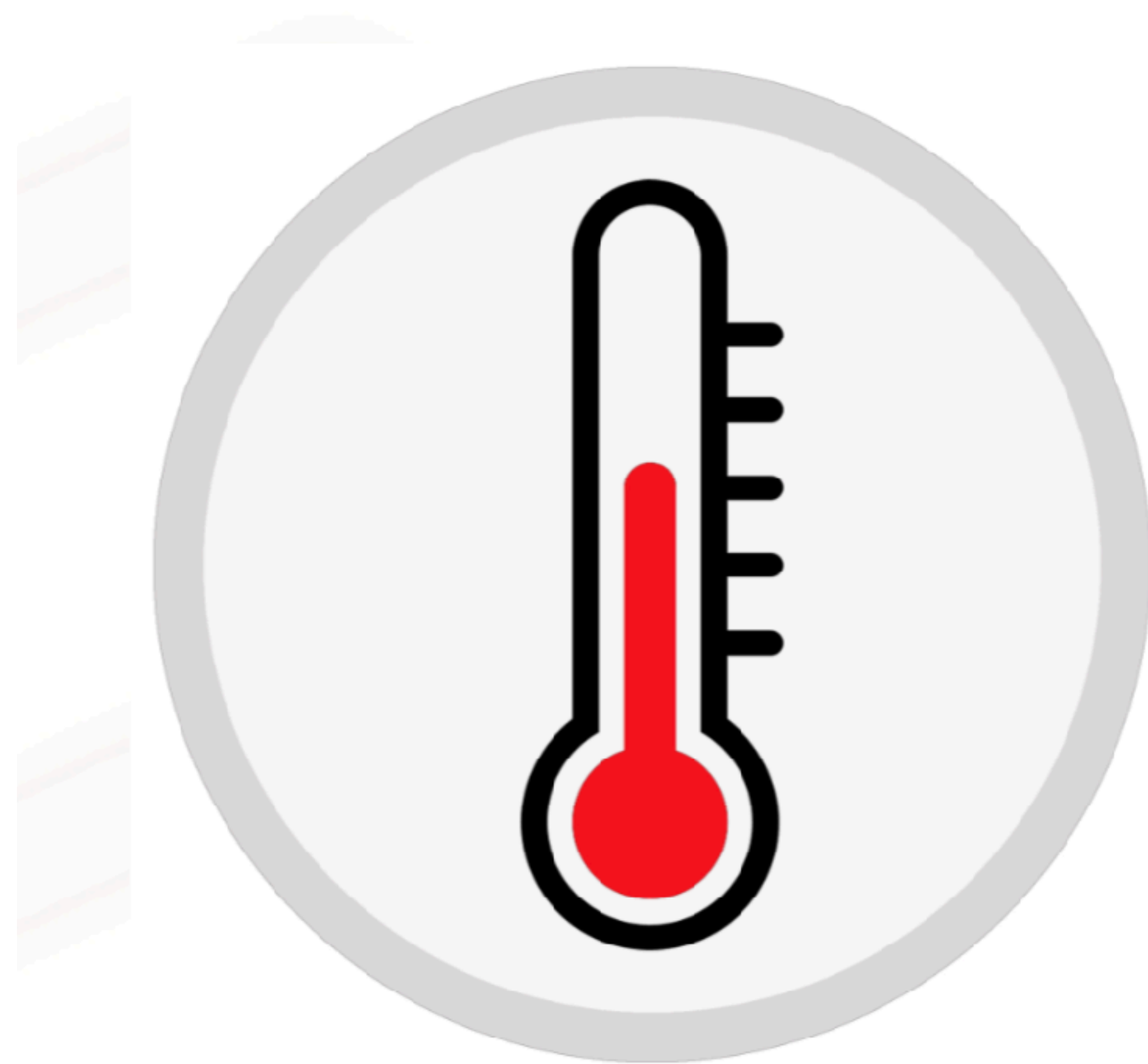
things about management

Not all data is created equal

who thinks surveys suck?

who LOVES the data from their logs?

what is a latent construct?



We use

PSYCHOMETRICS

to make our data look good*

** or give us a reasonable assurance that it's telling us what we think it's telling us (& some of this can also apply to your log data)*

psychometrics includes:

Construct creation (manual)

- When possible: use previously validated constructs
- Based on definitions and theory, carefully and precisely worded, card sorting task, pilot tested

Construct evaluation (statistics)

- Establishing validity: discriminant and convergent
- Establishing reliability

psychometrics writing example: culture

Does it matter to our study?

- More than just intuition?

What KIND of culture?

- National identity and norms
- Adaptive culture
- Value learning (2014 study)
- Value information flow and trust (2014 & 2015 studies: Westrum)


how organizations process information

Pathological (<i>power oriented</i>)	Bureaucratic (<i>rule oriented</i>)	Generative (<i>performance oriented</i>)
Low cooperation	Modest cooperation	High cooperation
Messengers shot	Messengers neglected	Messengers trained
Responsibilities shirked	Narrow responsibilities	Risks are shared
Bridging discouraged	Bridging tolerated	Bridging encouraged
Failure leads to scapegoating	Failure leads to justice	Failure leads to enquiry
Novelty crushed	Novelty leads to problems	Novelty implemented

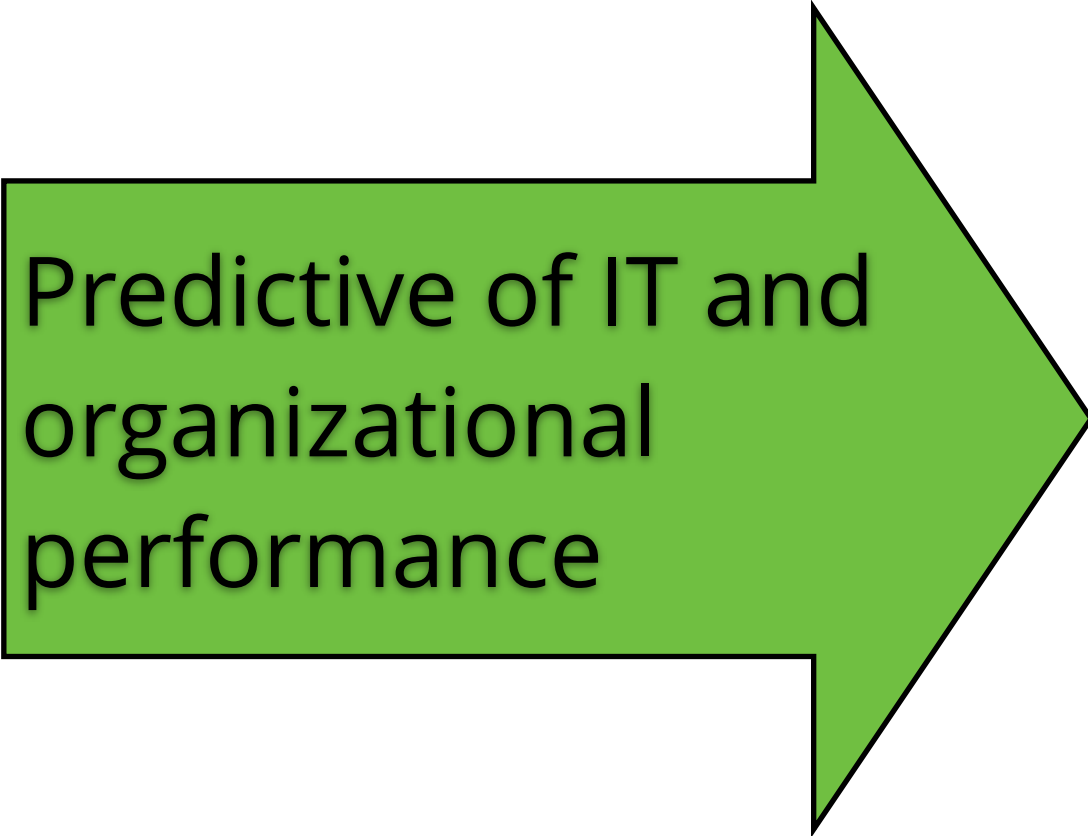
try writing items yourself!

Use strong statements with clear language

westrum culture items



found to
be valid and
reliable



Predictive of IT and
organizational
performance


- On my team, information is actively sought.
- On my team, failures are learning opportunities, and messengers of them are not punished.
- On my team, responsibilities are shared.
- On my team, cross-functional collaboration is encouraged and rewarded.
- On my team, failure causes inquiry.
- On my team, new ideas are welcomed.

psychometrics analysis example

Notification of failure

At my organization:

- We are primarily notified of failures by reports from customers.
- We are primarily notified of failures by the NOC.
- We get failure alerts from logging and monitoring systems.
- We monitor system health based on threshold warnings (ex. CPU exceeds 100%).
- We monitor system health based on rate-of-change warnings (ex. CPU usage has increased by 25% over the last 10 minutes).



Original in
2014, but there
was a surprise,
can you spot
it?

psychometrics analysis example

Notification of failure

At my organization:



notification
from **FAR**



notification
from **NEAR**

- We are primarily notified of failures by reports from customers.
- We are primarily notified of failures by the NOC.
- We get failure alerts from logging and monitoring systems.
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more data tests!

Plus, we test to make sure the survey doesn't have other problems.

- Common method variance (CMV) (aka CMB for Bias)
- Early vs. late responders
- Survey drop-off rates and bias

a note about analysis methods

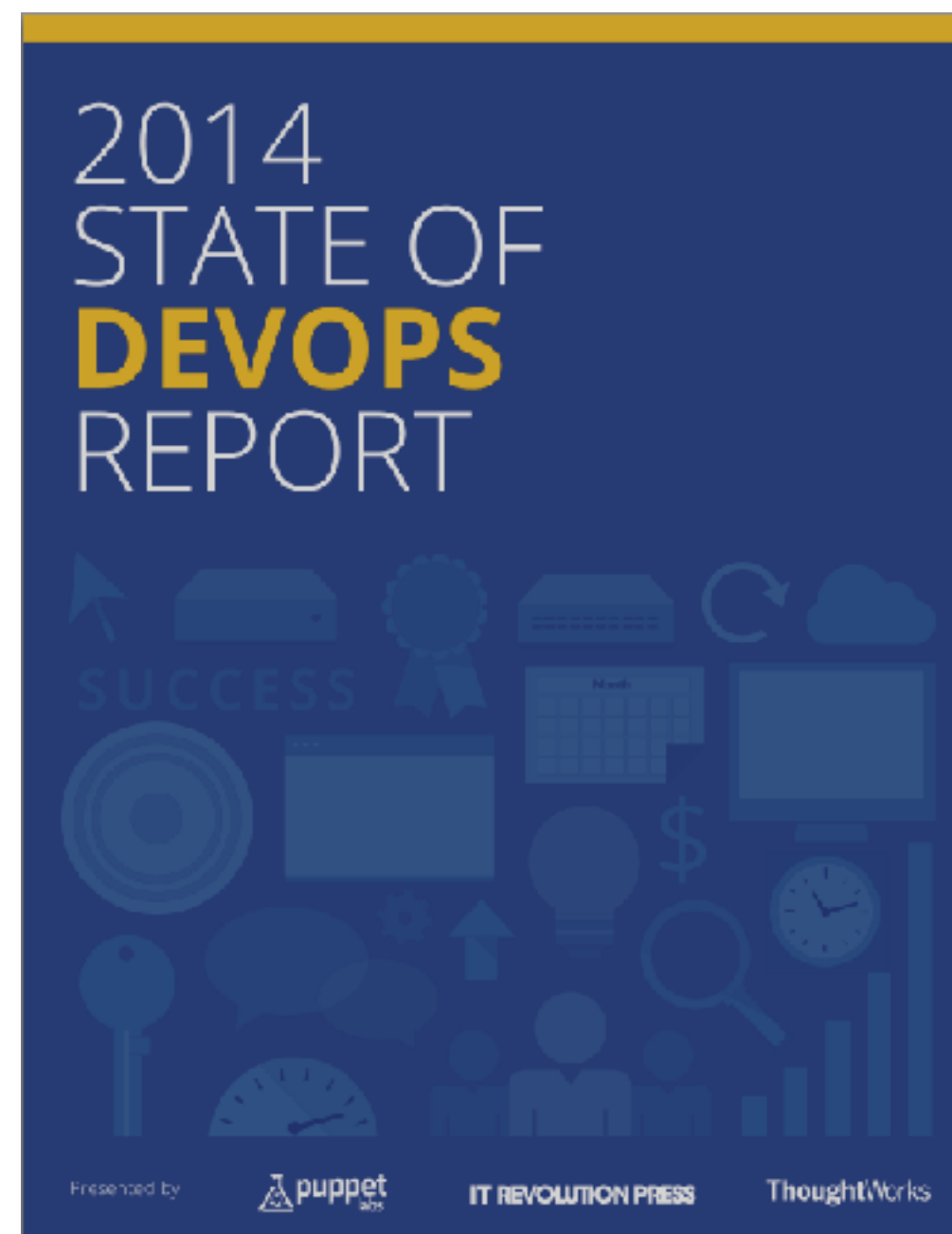
One of three conditions must be met:

- Randomized, experimental design (no, this is non-experimental)
- Longitudinal (no, this is cross-sectional)
- Theory-based design

When this condition was not met, only correlations were tested and reported .

OK **now** we can look at the data
and how they relate to each other

software delivery as a competitive advantage



“Firms with high-performing IT organizations were *twice as likely* to exceed their *profitability, market share* and *productivity* goals.”

<http://bit.ly/2014-devops-report>

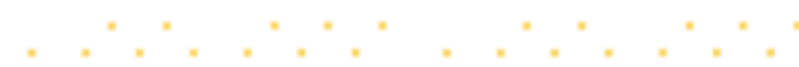
software delivery as a competitive advantage

2017 State of DevOps Report

Presented by:



Sponsored by:



<http://bit.ly/2017-devops-report>

high performers were more than twice as likely to achieve or exceed the following objectives:

- Quantity of products or services
- Operating efficiency
- Customer satisfaction
- Quality of products or services provided
- Achieving organizational and mission goals
- Measures that demonstrate to external parties whether or not the organization is achieving intended results

software delivery performance

lead time for changes

release frequency

time to restore service

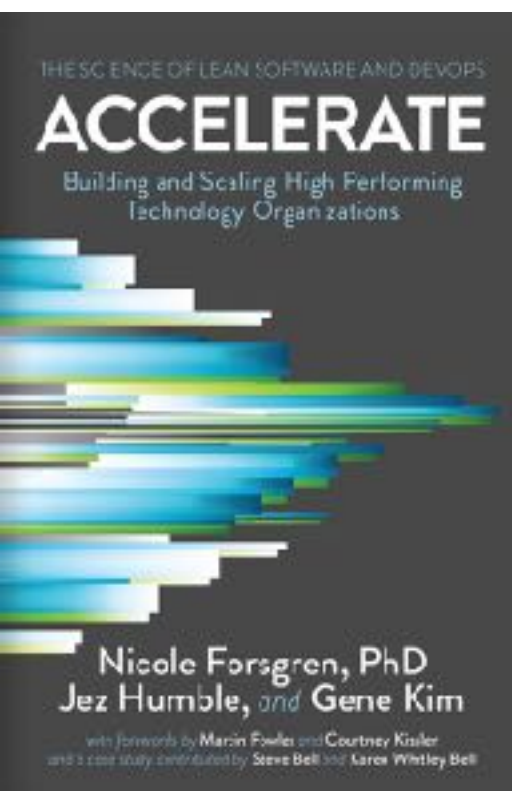
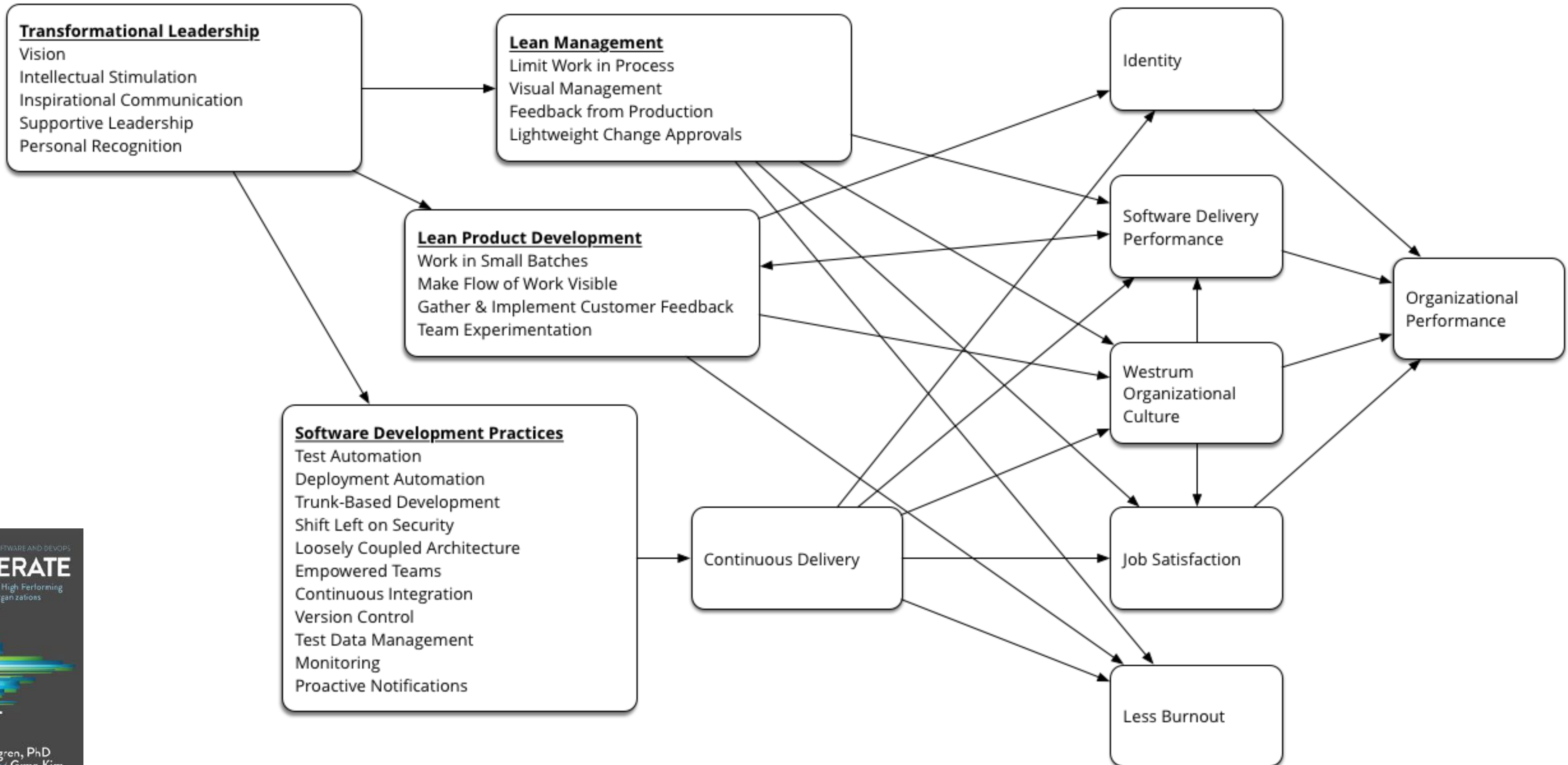
change fail rate

<http://bit.ly/2014-devops-report>

	High IT Performers	Medium IT Performers	Low IT Performers
Deployment frequency <i>For the primary application or service you work on, how often does your organization deploy code?</i>	On demand (multiple deploys per day)	Between once per week and once per month	Between once per month and once every 6 months
Lead time for changes <i>For the primary application or service you work on, what is your lead time for changes (i.e., how long does it take to go from code commit to code successfully running in production)?</i>	Less than one hour	Between one week and one month	Between one month and 6 months
Mean time to recover (MTTR) <i>For the primary application or service you work on, how long does it generally take to restore service when a service incident occurs (e.g., unplanned outage, service impairment)?</i>	Less than one hour	Less than one day	Less than one day*
Change failure rate <i>For the primary application or service you work on, what percentage of the changes either result in degraded service or subsequently require remediation (e.g., lead to service impairment, service outage, require a hotfix, rollback, fix forward, patch)?</i>	0-15%	31-45%	16-30%

* Low performers were lower on average (at a statistically significant level), but had the same median as the medium performers.

what drives performance?



some surprises

which of these measure effective test practices?

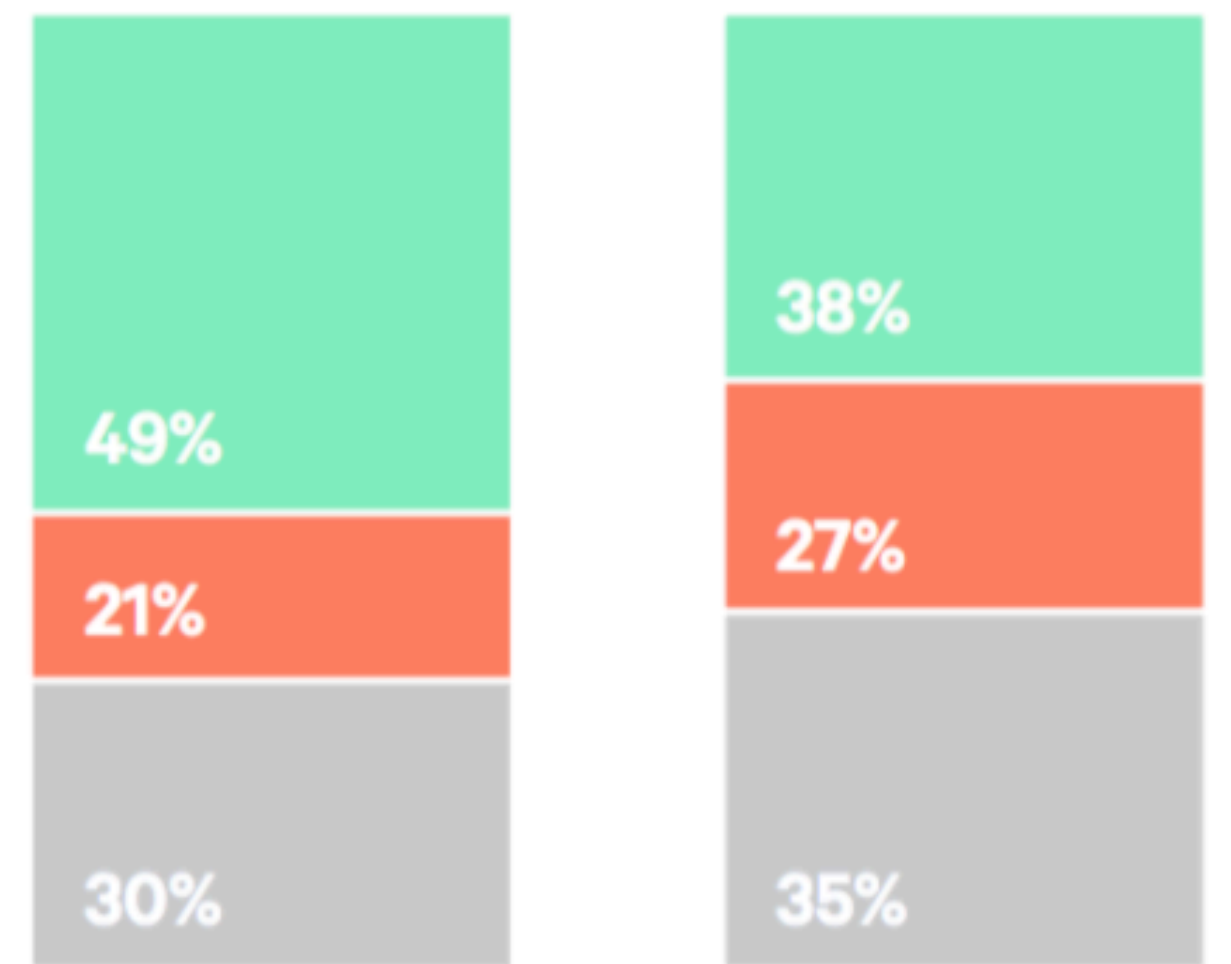
- Developers primarily create & maintain acceptance tests
- QA primarily create & maintain acceptance tests
- Primarily created & maintained by outsourced party
- When automated tests pass, I'm confident the software is releasable
- Test failures are likely to indicate a real defect
- It's easy for developers to fix acceptance tests
- Developers share a common pool of test servers to reproduce failures
- Developers create on demand test environments
- Developers use their own dev environments to reproduce failures

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key finding: architectural outcomes

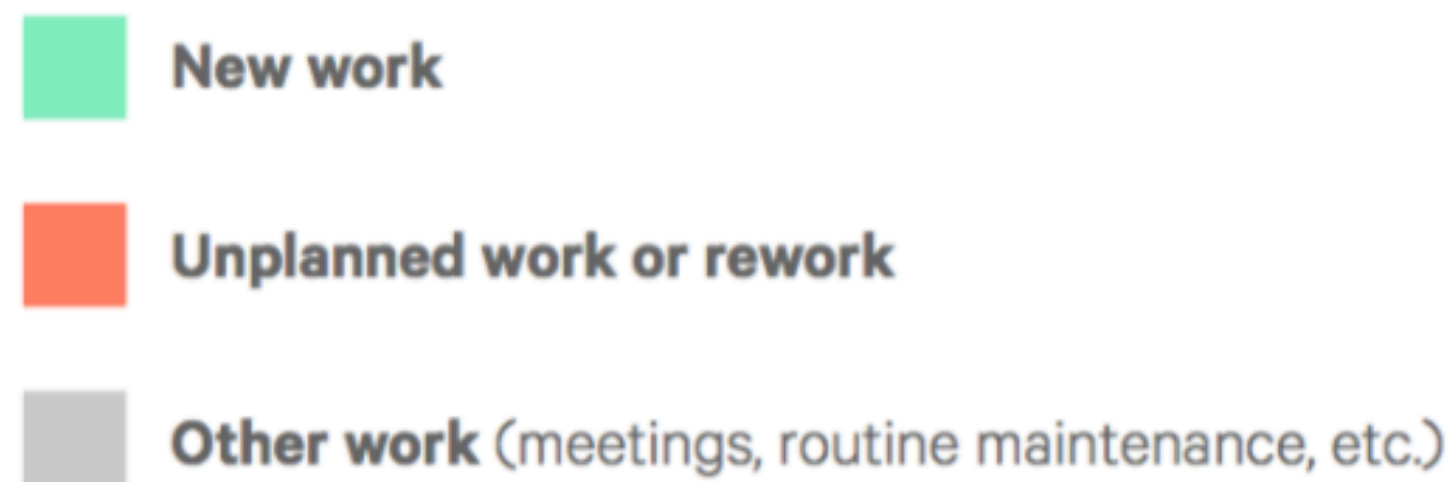
New work vs. unplanned work



High performers

Low performers

High performers spend 20% more time on new work than low performers, and 22% less time on unplanned work and rework.



key finding: architectural outcomes

can my team...

...make large-scale changes to the design of its system without the permission of somebody outside the team or depending on other teams?

...complete its work without needing fine-grained communication and coordination with people outside the team?

...deploy and release its product or service on demand, independently of other services the product or service depends upon?

...do most of its testing on demand, without requiring an integrated test environment?

...perform deployments during normal business hours with negligible downtime?

surprises with culture

We wanted to add additional measures of culture

- Google study
- Identity
- Retain Westrum culture

identity and Google items

- I am glad I chose to work for this organization rather than another company.
- I talk of this organization to my friends as a great company to work for.
- I am willing to put in a great deal of effort beyond what is normally expected to help my organization to be successful.
- I find that my values and my organization's values are very similar.
- In general, the people employed by my organization are working toward the same goal.
- I feel that my organization cares about me.

Adapted from adapted from Atreyi Kankanhalli, Bernard C.Y. Tan, and Kwok-Kee Wei (2005), "Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation," MIS Quarterly, 29, 113-143.

Westrum items



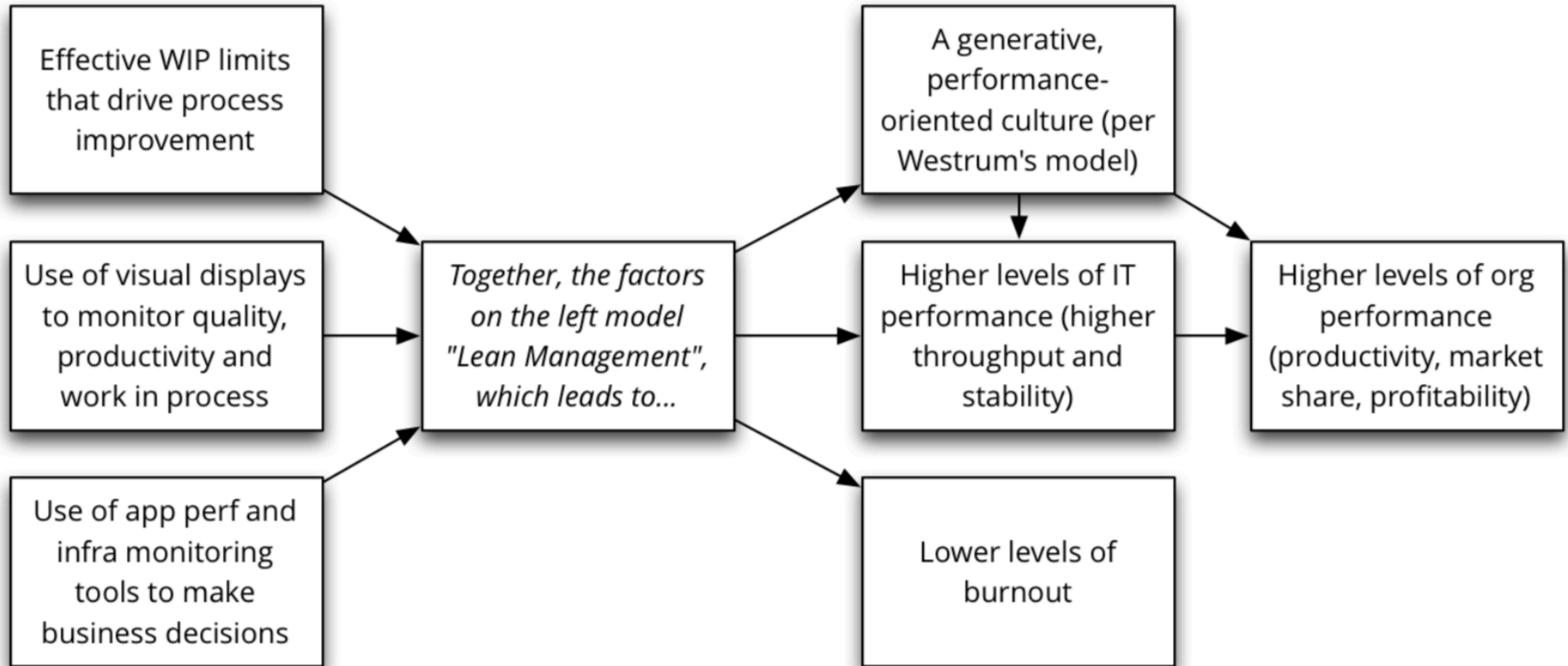
now for management stuff

we all know managing work in process (WIP) is important, right?

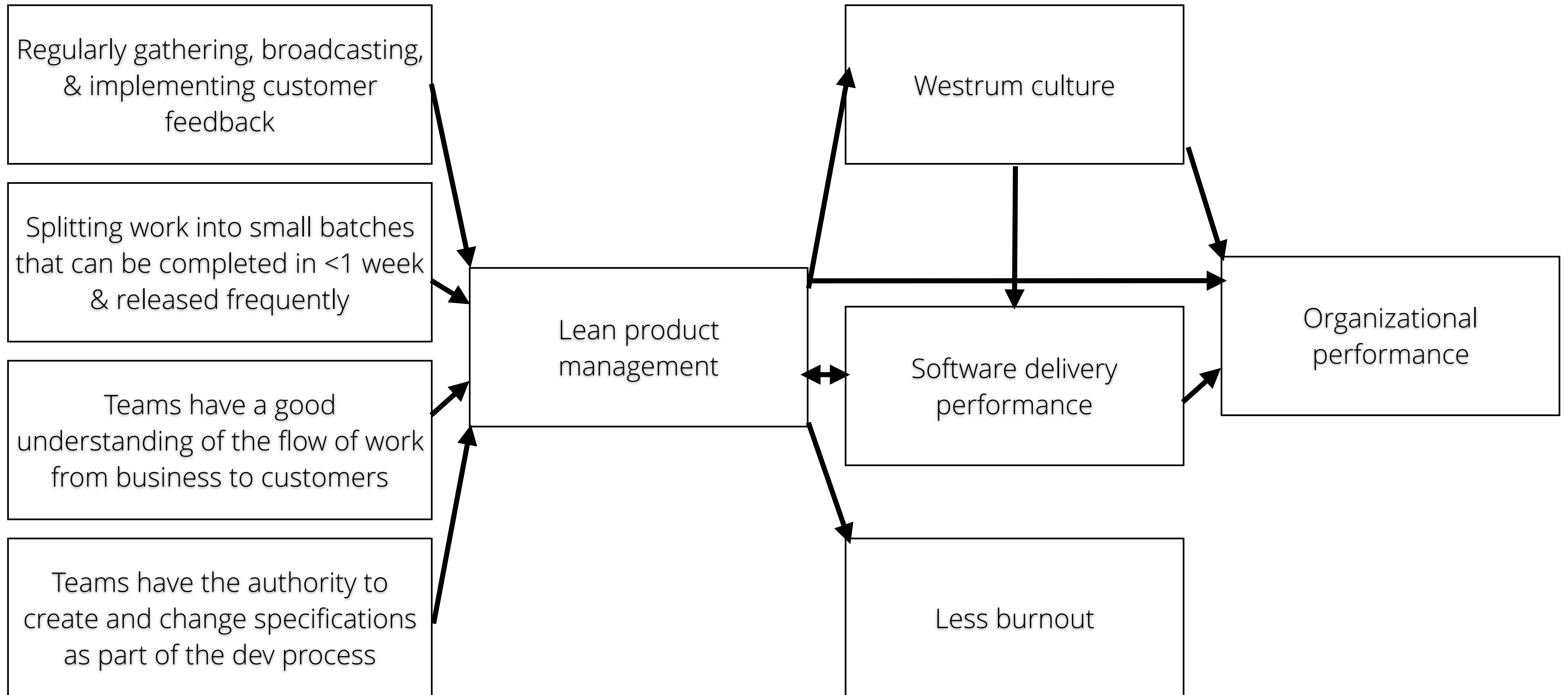
correlation between WIP and ITPerf is almost zero

what's going on?

lean management



lean product management



conclusions

even if you think it's obvious, **test with data**

- *if the results don't surprise you, you're doing it wrong*
- *if you don't also confirm some things you expected, you're doing it wrong*

we can have it all, or at least throughput and stability

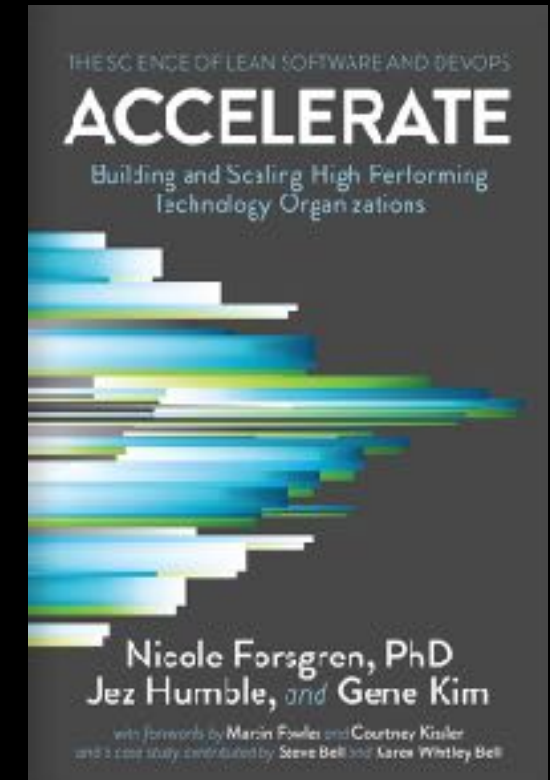
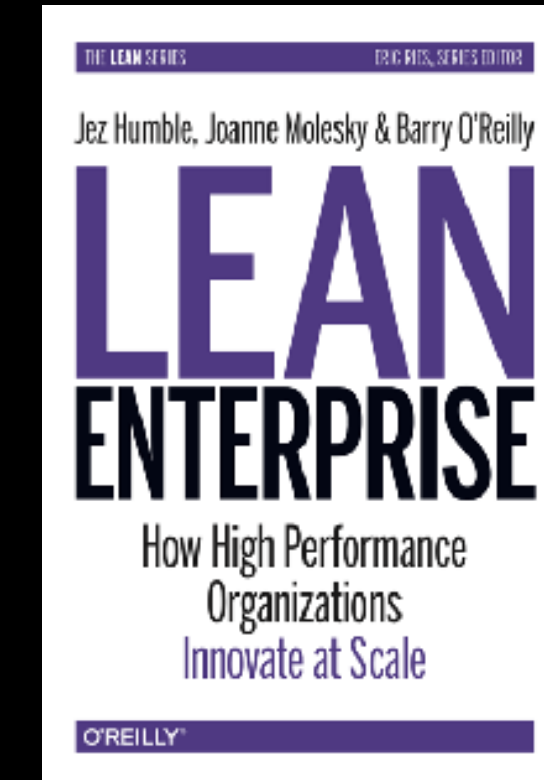
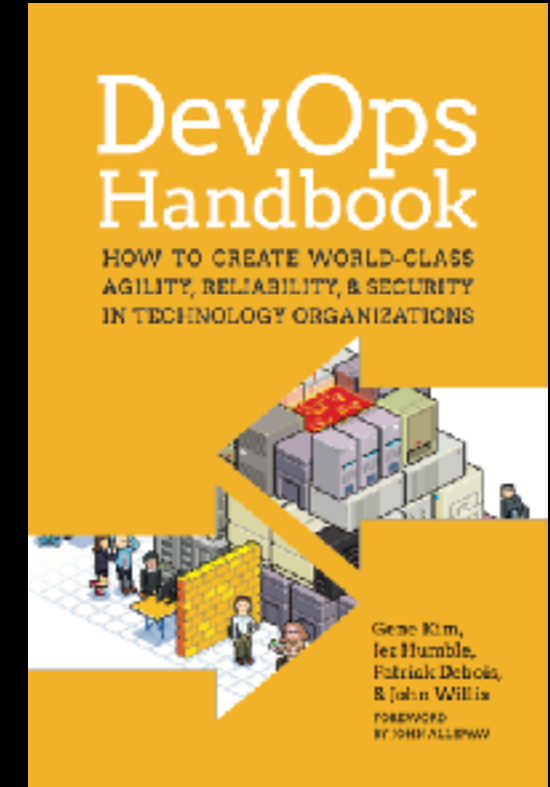
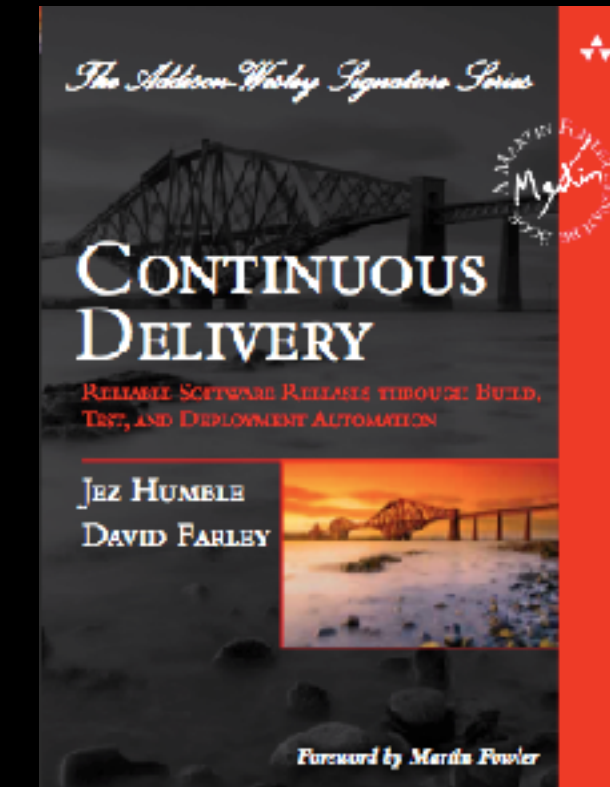
software delivery matters (but you have to do it right)

devops culture and practices have a measurable impact on software delivery performance

thank you!

To receive the following:

- A copy of this presentation
- A 100 page excerpt from *Lean Enterprise*
- Excerpts from the *DevOps Handbook* and *Accelerate*
- A 20m preview of my Continuous Delivery video workshop
- Discount code for CD video + interviews with Eric Ries & more



Just pick up your phone and send an email

To: jezhumble@sendyourslides.com

Subject: devops

