



**T** TestCon  
VILNIUS 2018

***Next Generation Testing in the Age of Machines***

**Berk Dülger, October 2018**

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## BERK DÜLGER

DevOps And Testing Services Manager in  
Istanbul, Turkey

[☰ Read my blog](#)

I'm an IT Professional worked as a pure developer, software development engineer in test, consultant, manager and DevOps practitioner.

I have diverse experiences in international and local projects in telecommunication, media, e-commerce, retail, insurance and banking sectors. Currently, leading more than fifteen teammates in Keytorc for different clients.

I believe that total quality improvement can be achieved only with focus on both managerial and engineering agility. Thus, very excited with the DevOps movement in last few years.

### WORK

BA-Works, Keytorc

### EDUCATION

Boğaziçi University

THE

CHANGE

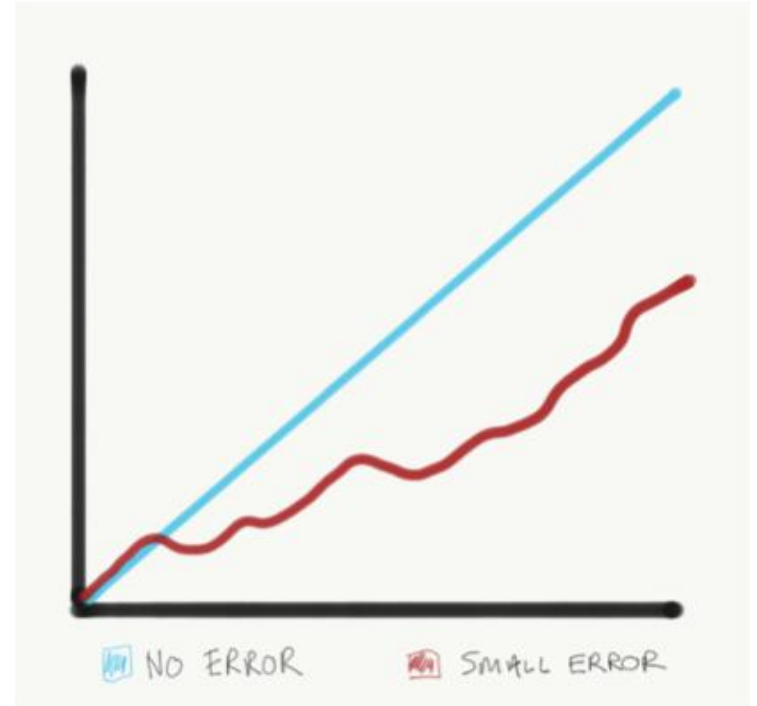
*There is nothing permanent except change*

— Greek philosopher, Heraclitus (BC 535 - 475)

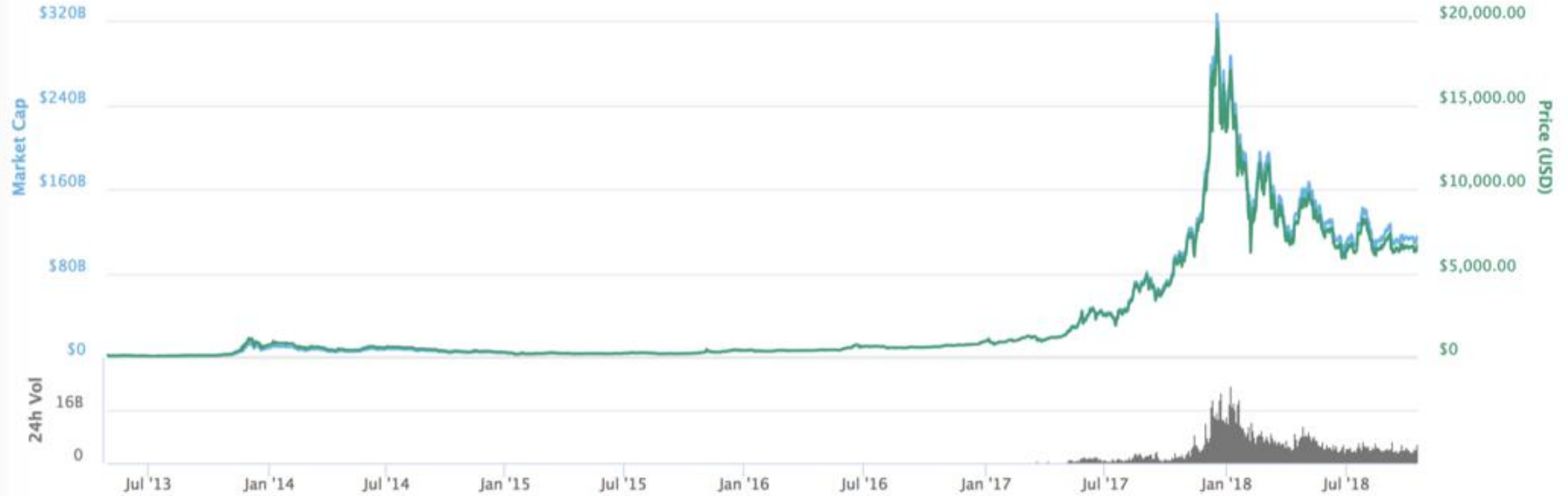
## *Edward Lorenz and the Discovery of the Butterfly Effect*

In basics, Edward Lorenz theorized that weather prediction models are inaccurate because knowing the precise starting conditions is impossible, and a **tiny change can throw off** the results.

In order to make the concept understandable to non-scientific audiences, Lorenz began to use the **butterfly analogy**.



# AN EXAMPLE OF UNCERTAINTY: BITCOIN PRICES





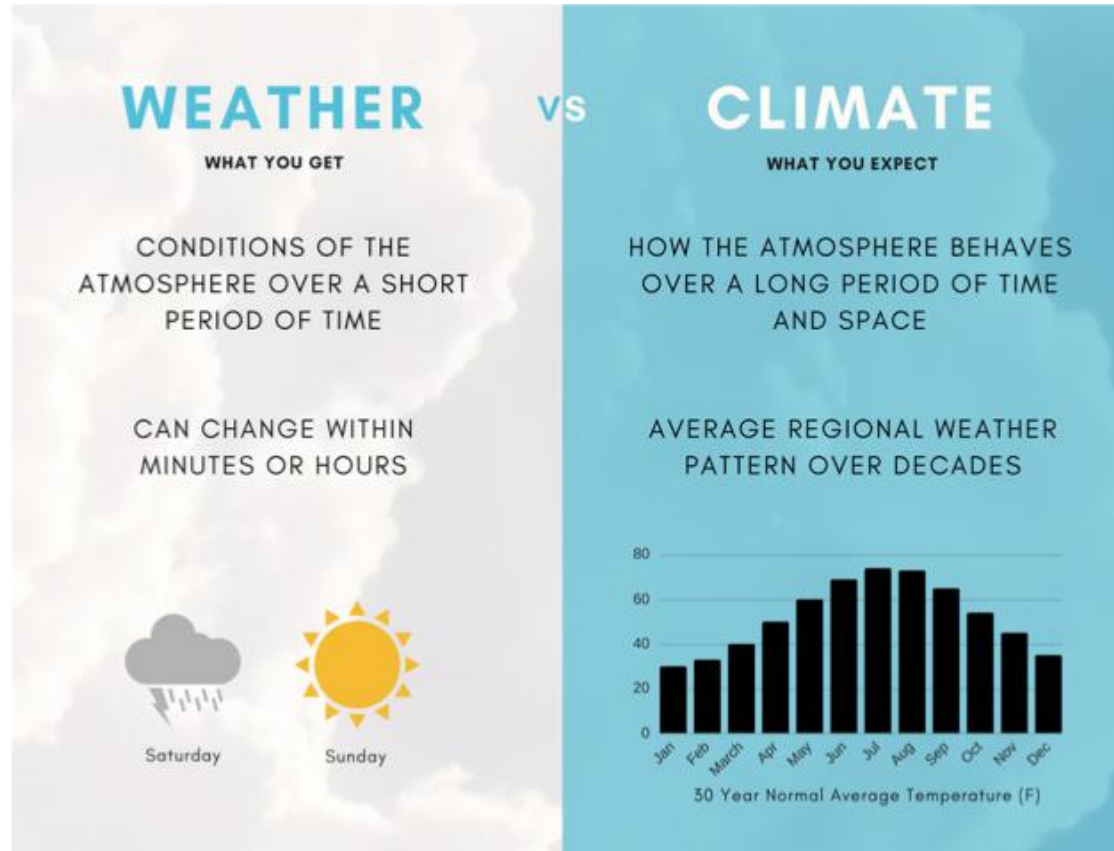
## WE ARE BAD AT PREDICTIONS



French artwork from 1899 that predicted society in the year 2000

*WATCH THE MAN NOT THE DOG*

— Neil Degrasse Tyson, Astrophysicist







10m.

TEST  
PEOPLE



10m.

TEST  
ORGANIZATION



10m.

TEST  
TECHNOLOGY

TEST

PEOPLE

WHAT WE HAVE LEARNT...

**PAST**

WHAT DO WE SPEAK ON...

**NOW**

**BUG DETECTION**

**TESTING AT THE END**

**TESTER RESPONSIBILITY**

**RELYING on SPECIFICATIONS**

**CHECKING**

**TESTER SKILLS**

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**PAST**

**BUG PREVENTION**

**TESTING THROUGHOUT**

**TEAM RESPONSIBILITY**

**DEFINING ACCEPTANCE CRITERIA**

**EXPLORING**

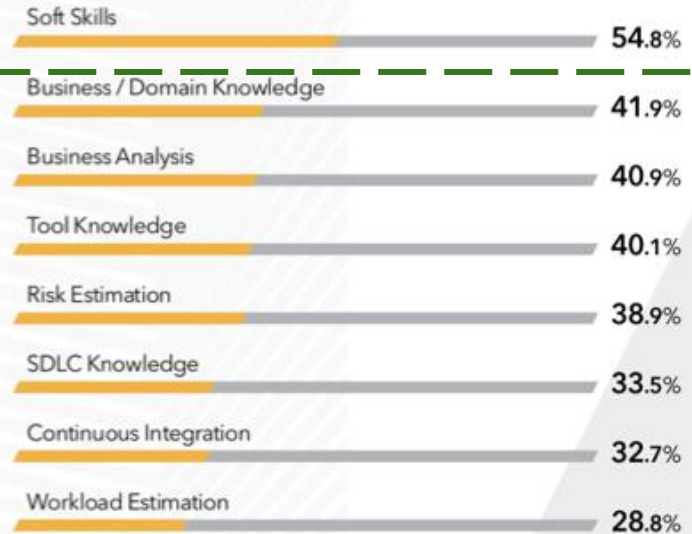
**CODING/TECHNICAL SKILLS**

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**NOW**

## WHICH OF THE FOLLOWING NON-TESTING SKILLS ARE MOST EXPECTED FROM AN AGILE TESTER IN YOUR ORGANIZATION?

\* Selecting multiple choices were available

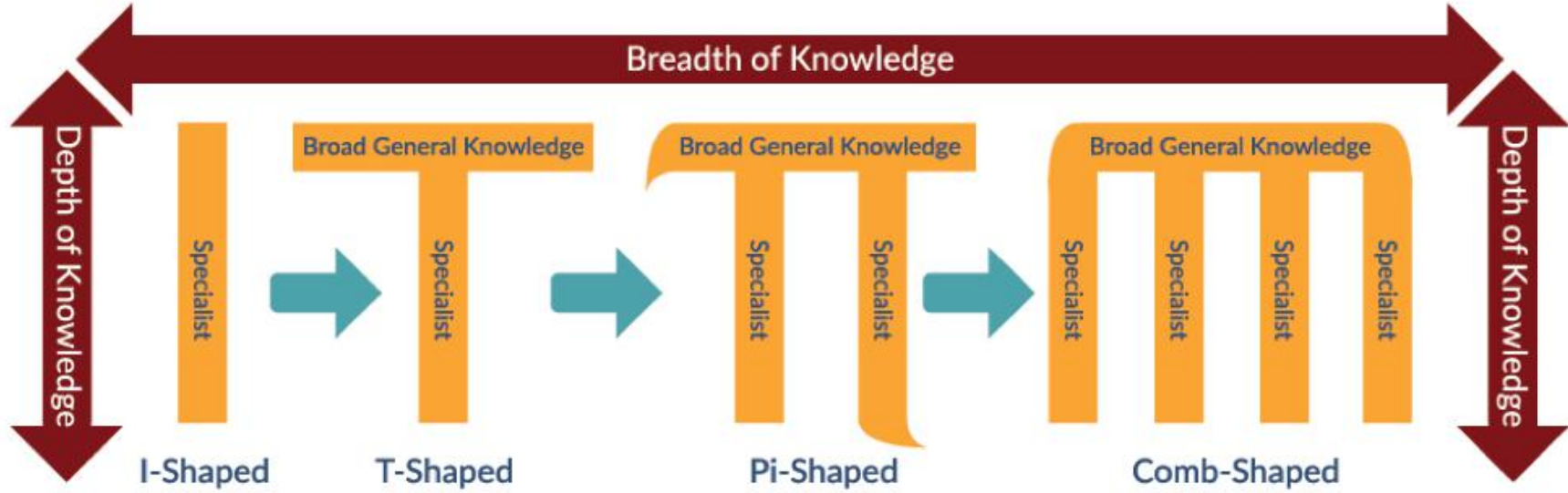


*Take the initiative of your life, job, anything you care.*





## 2 - TTT-SHAPE rather than I-SHAPE



“While we teach, we learn,” said

— Roman philosopher Seneca (AD, 1st Century)



**86%**  
TESTING BOOKS  
AND BLOGS



**60%**  
ON-LINE COMMUNITIES  
AND FORUMS



**46%**  
TESTING CONFERENCES  
AND SEMINARS



**44%**  
TESTING  
MAGAZINES



**26%**  
FORMAL  
COURSES



**8.5%**  
WEEKEND  
TESTING

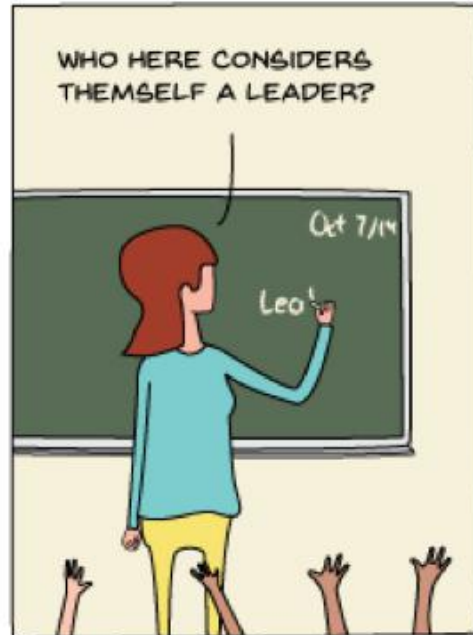


**8%**  
TESTING  
COMPETITIONS

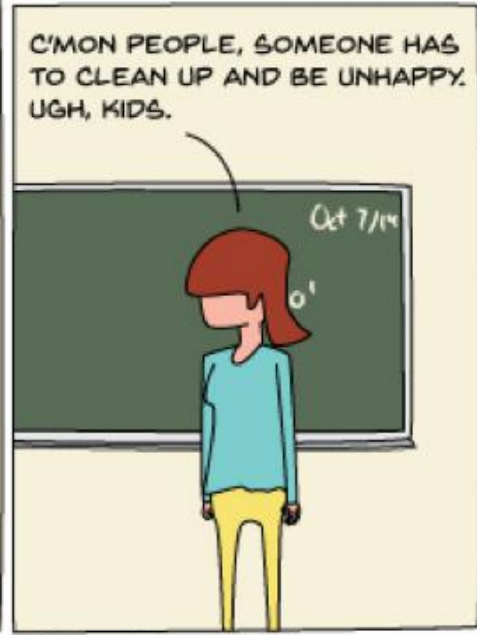


**8%**  
OTHER

## 4- LEADER rather than FOLLOWER



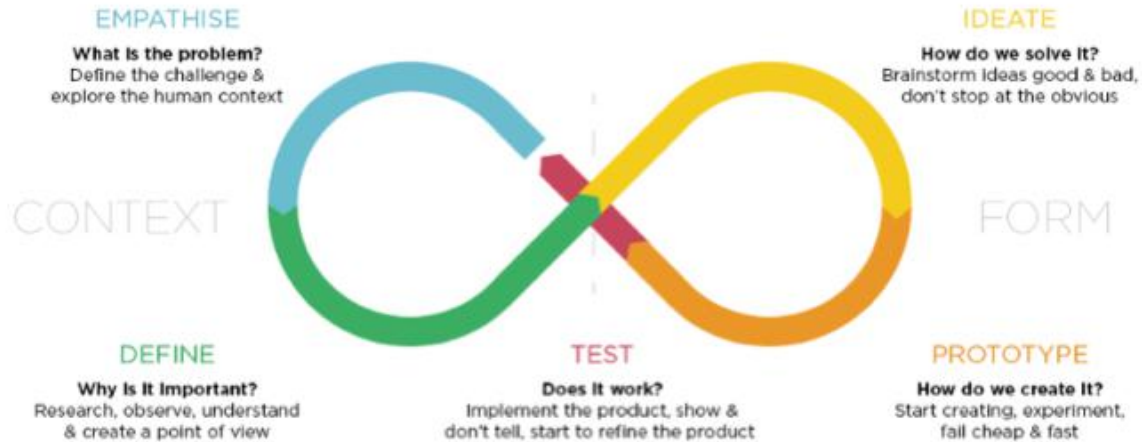
@STEVEPADAMS



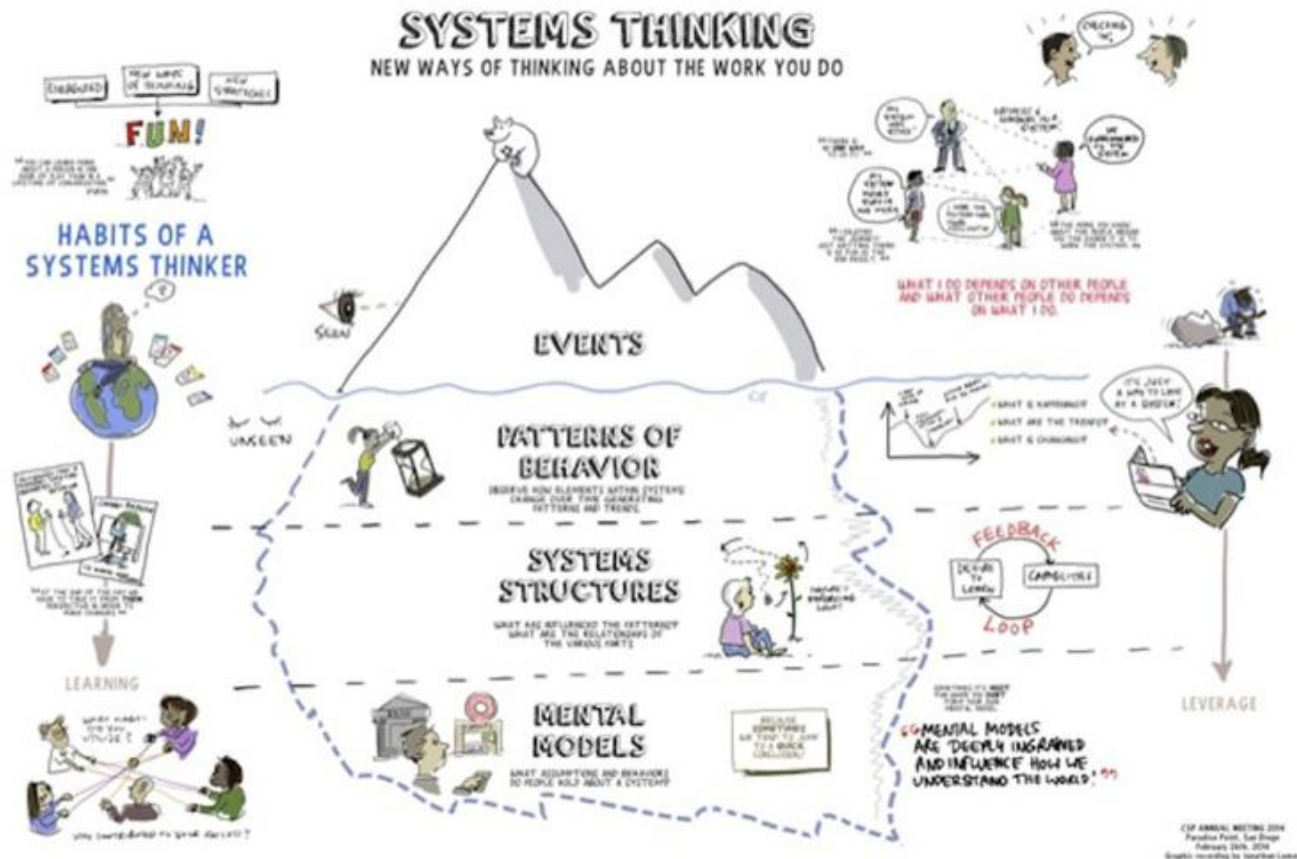
STEVEPATRICKADAMS.COM

# DESIGN THINKING

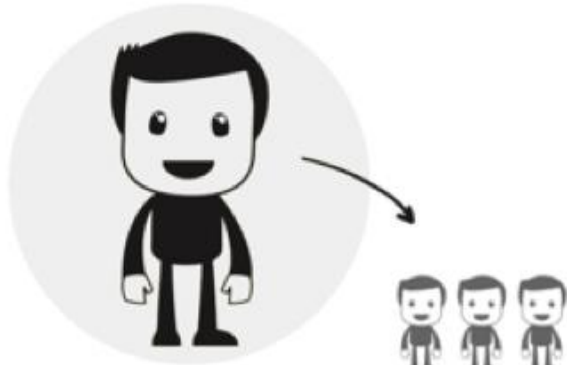
A FRAMEWORK FOR INNOVATION



# 6 - SYSTEM rather than COMPONENT THINKER



## 7 - UX AWARE: USERS ARE SHARING!

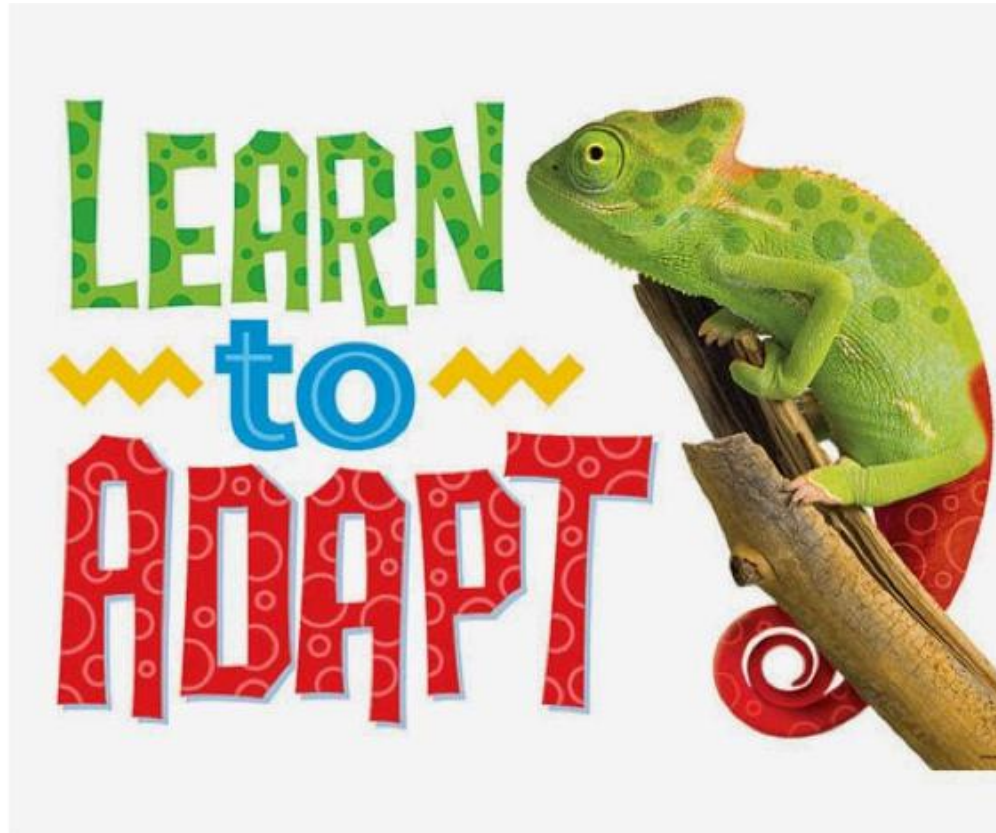


A satisfied user,  
shares his/her  
experience with  
**4-6 people**



An unsatisfied user,  
shares his/her bad  
experience with  
**at least 20 people**







- Created team mail groups
- Empowered team members to contribute something different than their core responsibility i.e charity
- Conducted “Design Thinking Workshops” to facilitate ideation
- Organized “Talent 4.0 Workshops” focusing something completely different than testing
- Encouraged people to organize their own events

SURVEY 1: TEST PEOPLE

[goo.gl/JuS1Nr](https://goo.gl/JuS1Nr)



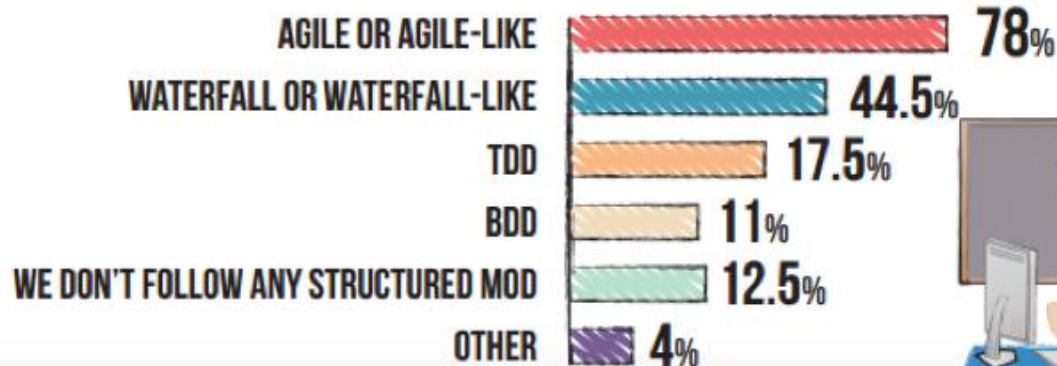
TEST

ORGANIZATION

## STRONG AGILE ADOPTION OF 78%

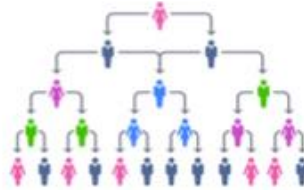
*(more than one answer per participant ->  
total is more than 100%)*

It is interesting to see that many teams are following two or more development models at once. Still, over three quarters (78%) of respondents say they are working under agile or agile like development models, with 44.5% working waterfall or waterfall-like, and even 12.5% that in the 21st century still do not follow any structured model. As a note, our favorite among the "other" answers was the respondent who wrote that his team followed an "unholy agile-waterfall hybrid" :-)

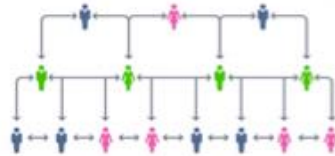


## The 5 Types of Organizational Structures

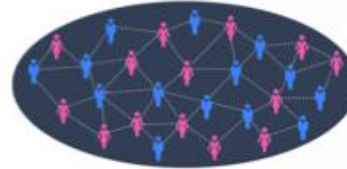
1. HIERARCHICAL ORGANIZATIONS



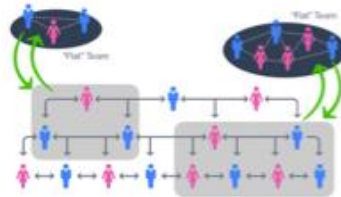
2. FLATTER ORGANIZATIONS



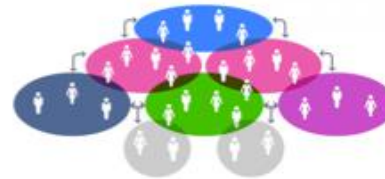
3. FLAT ORGANIZATIONS



4. FLATARCHIES



5. HOLACRATIC ORGANIZATION





## 2 - ONE OF THE PRINCIPLES OF STRATEGIC LEADERSHIP - SAFE TO FAIL



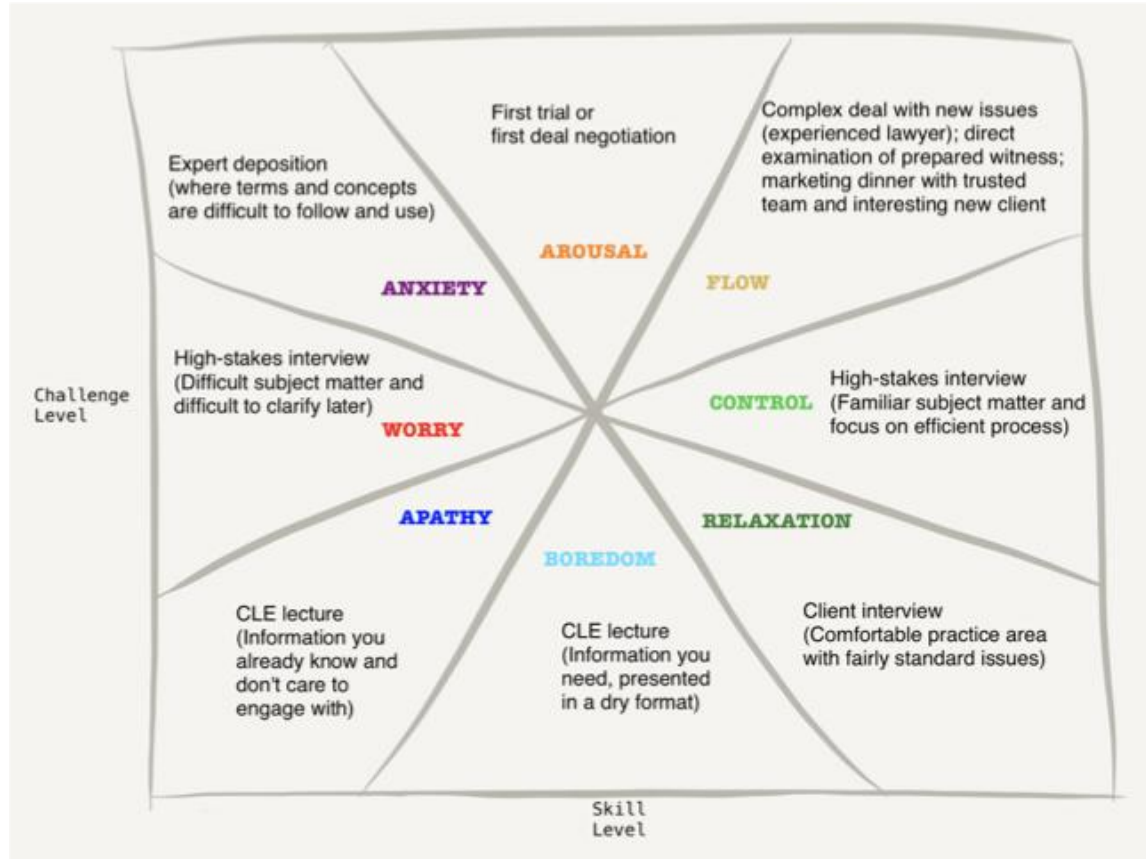
Anyone who says, "***Never change a working software***" basically admits not having a safe-to-fail environment.

## Measure the Process instead of People!!



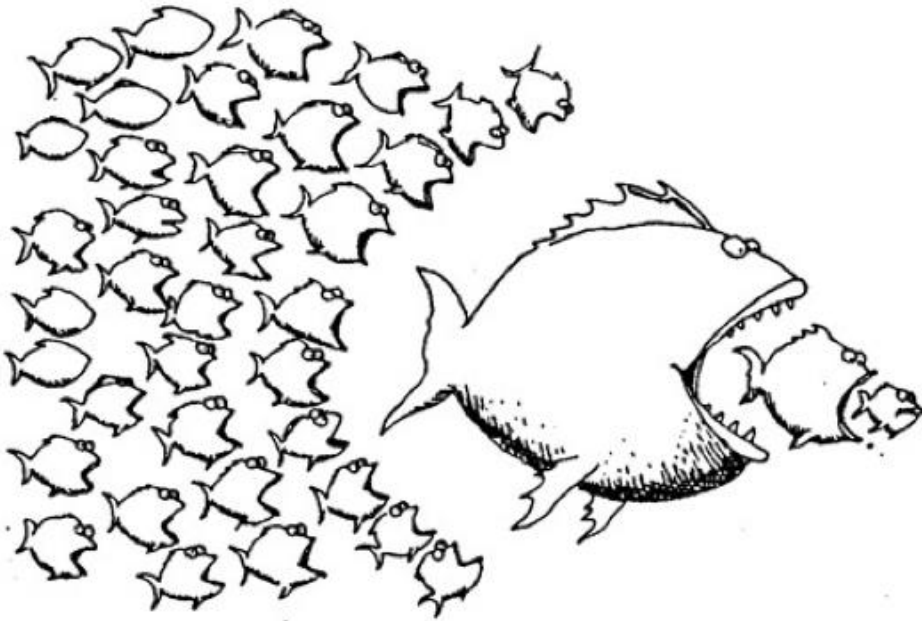


## 5 - FALL INTO THE ZONE

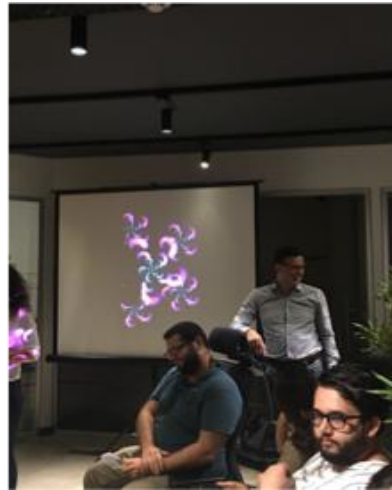


Mental state in terms of challenge level and skill level, according to Csikszentmihalyi's **flow** model

## Quality not always flow from top...



Sustainable success  
requires **bottom-up  
practices** and **top-  
down management  
support**



- Took a step toward to a flatter organization
- Made upper-management reachable
- Put some, but not much, challenge and stress on people
- Let people fail under control
- Put specific metrics away (i.e defect rejection rate, number of test cases etc. ) for performance evaluation to reduce unnecessary stress

SURVEY 2: TEST ORGANIZATION

[goo.gl/hu3ePW](https://goo.gl/hu3ePW)



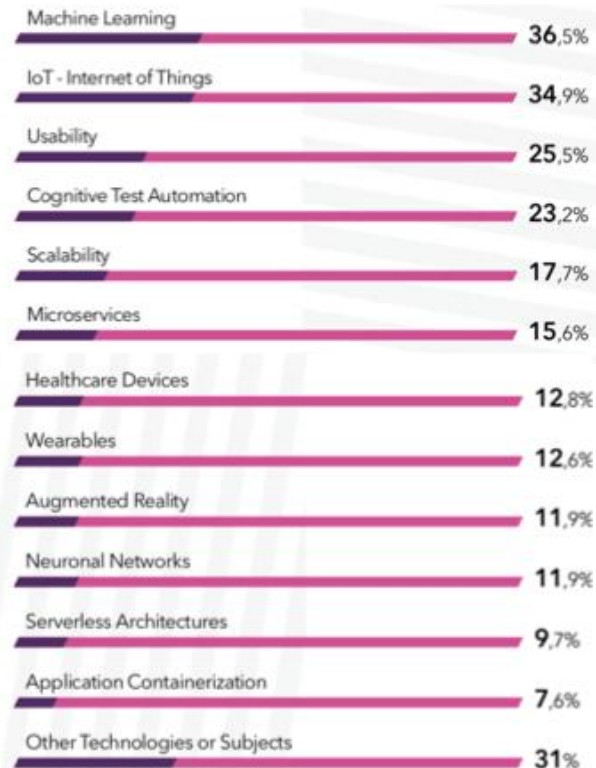
TEST

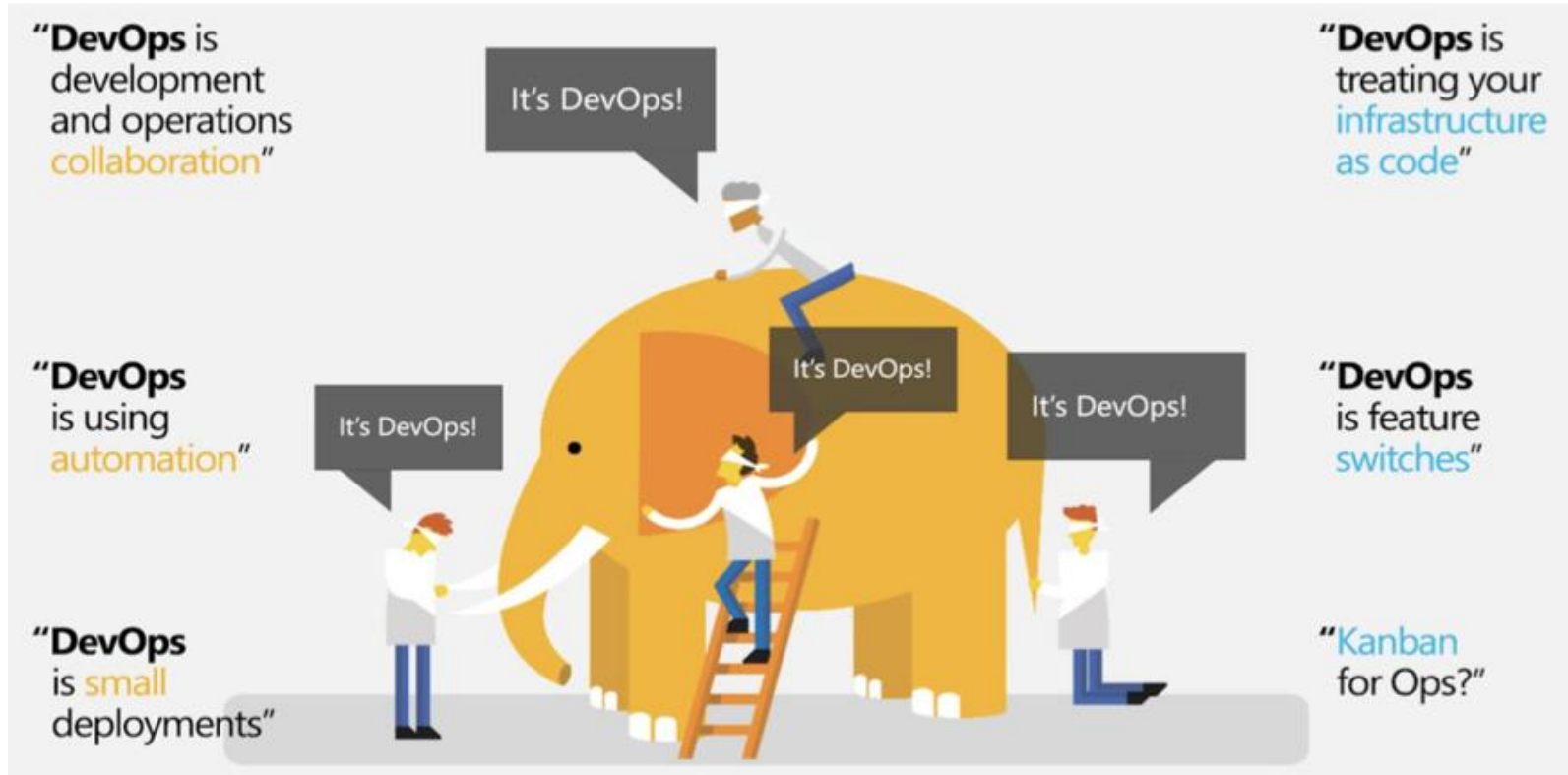
TECHNOLOGY



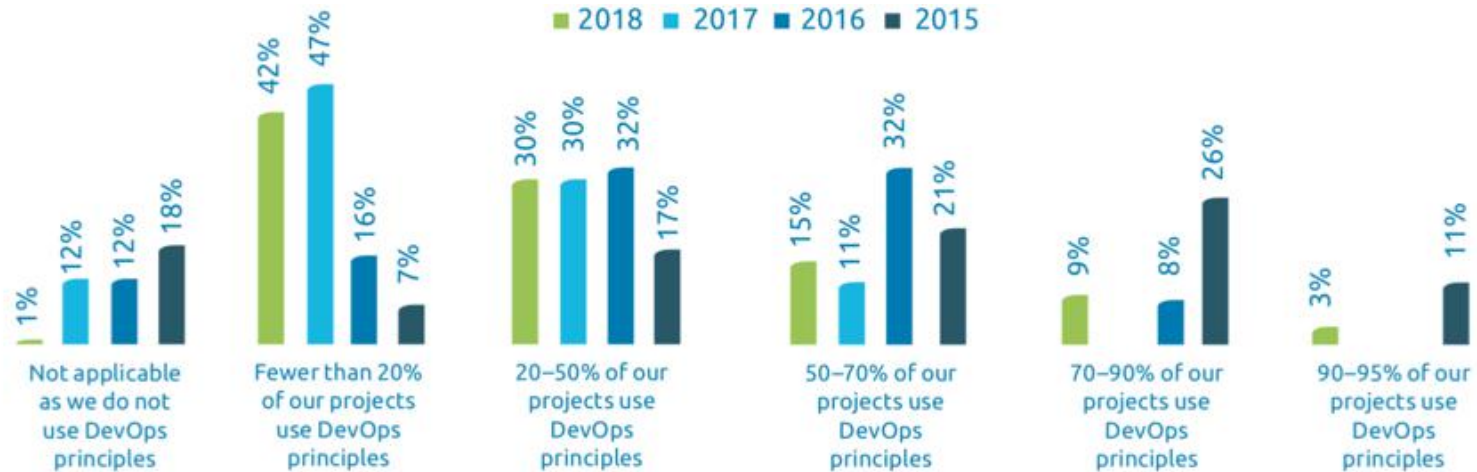
# WHICH NEW TECHNOLOGIES OR SUBJECTS WILL BE IMPORTANT TO THE SOFTWARE TESTING INDUSTRY IN THE FOLLOWING 5 YEARS?

\* Selecting multiple choices were available

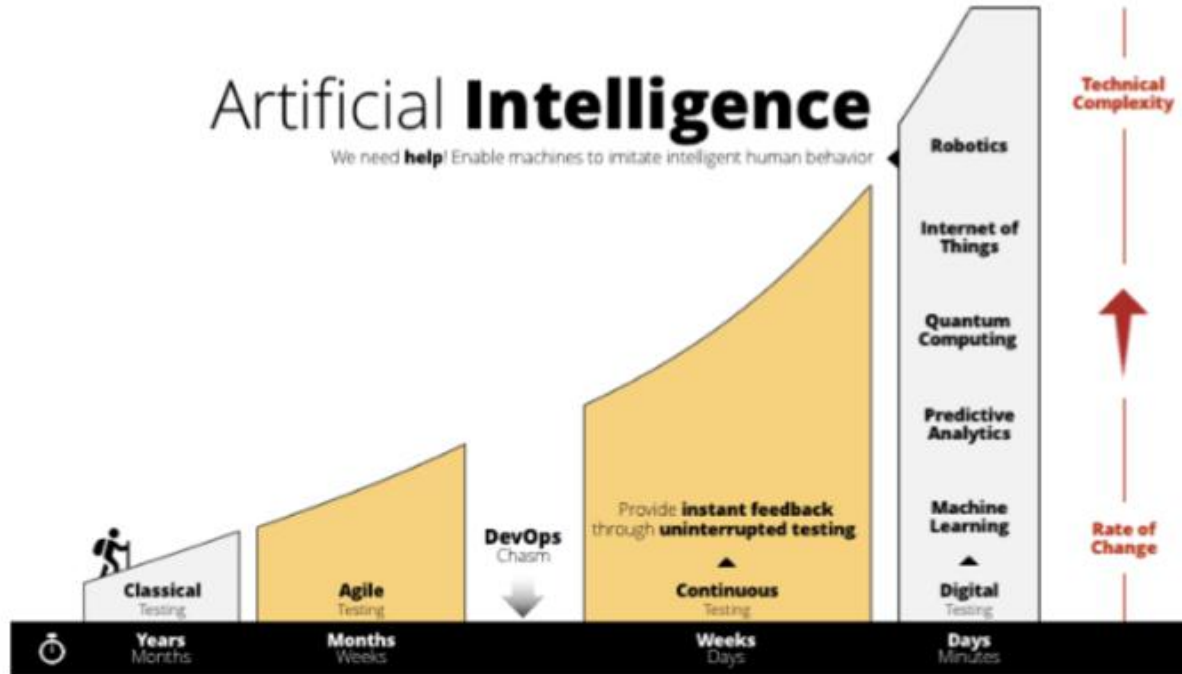




## Proportion of projects using DevOps principles



DevOps is not a goal, but a process of  
**continuous improvement**

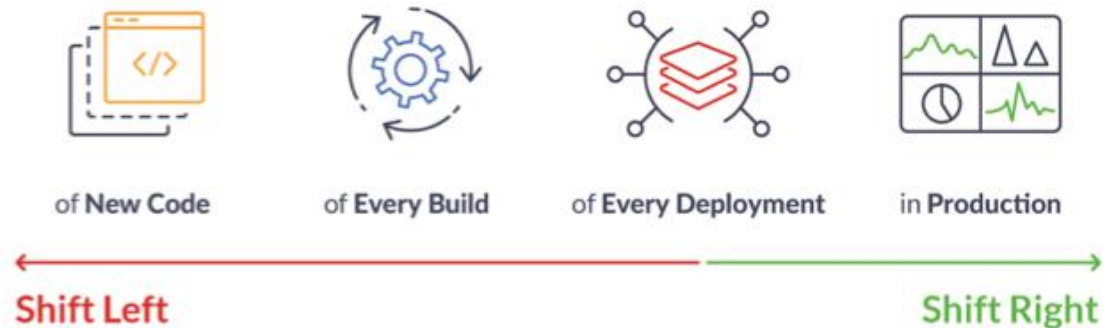




**Continuous Testing** takes place in the hearth of the everlasting feedback cycle. It makes testing fast, robust and provide higher coverage than conventional methods by shifting it left for better product quality.

Continuous Testing makes it able to manage end-to-end software lifecycle integrating with enterprise architectural components leading customer orientation.

- Extemelly short **feedback cycles**
- Immediate **regression analysis**
- Increased **product quality**
- Lower **technical debt**
- Decreased **business risk**

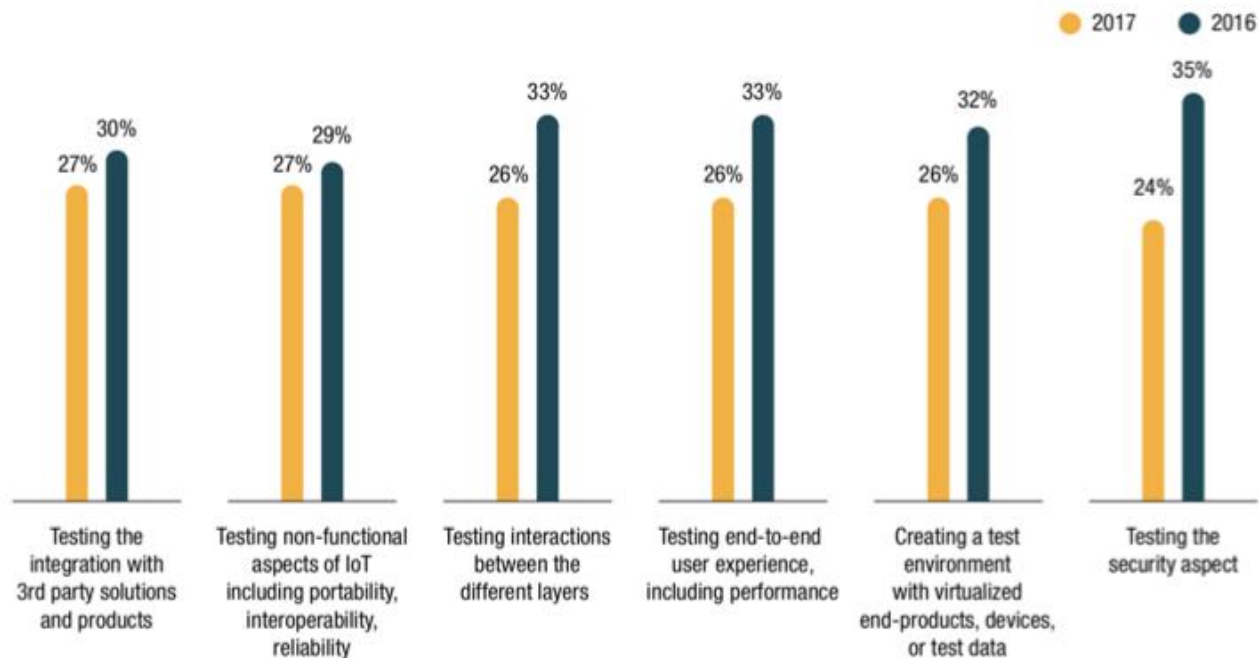




- Modelling the user behavior
- Pre-designing the product back-end and writing testable software
- Business stakeholder test automation involvement
- Effective communication among stakeholders
- End-to-end test readability and indirectly increased trust to software
- Updated, living documentation**

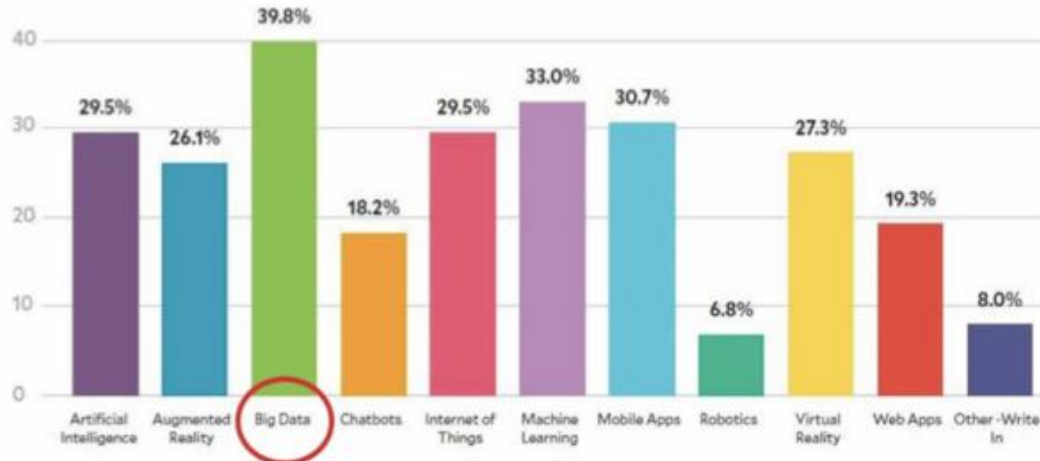


## Challenges with testing products in the Internet of Things environment

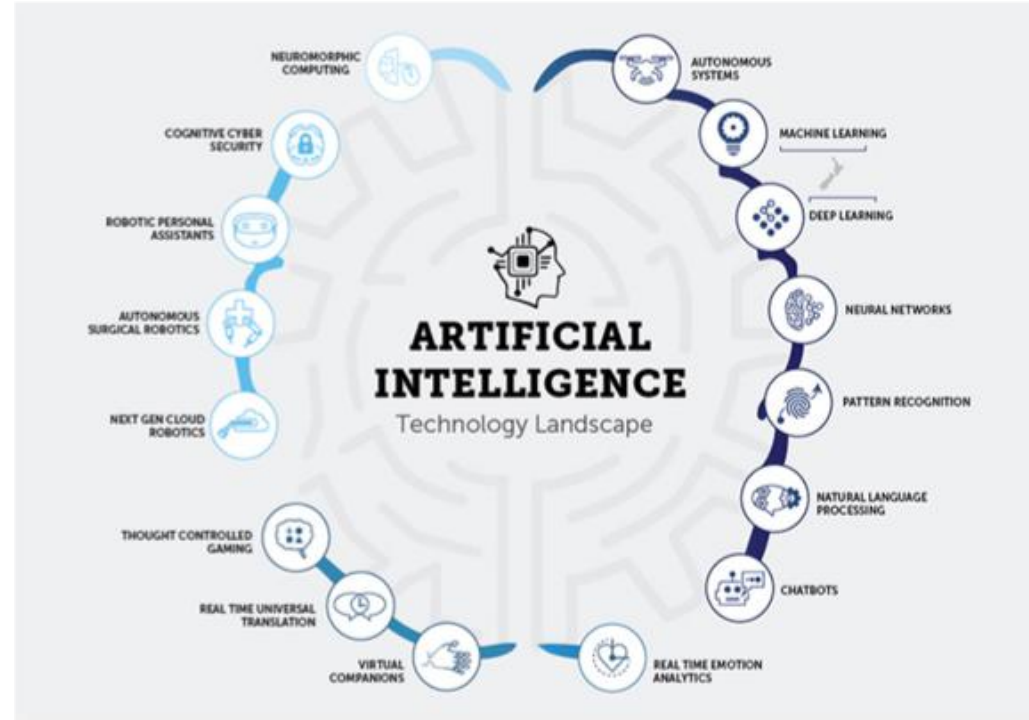


- Define what is Big Data. Any exadata is big?
- Use 5V Rule. **Variety, Velocity, Volume, Verification, Value**
  - Learn Statistics 101 (Mean, median, 95th perc. etc.)
- Learn a useful scripting language for analytical analysis, like “**R**”
- From **testing perspective**, consider adopting **DB agility** to your Continuous X cycle, because without data there is no real “Continuous” thing

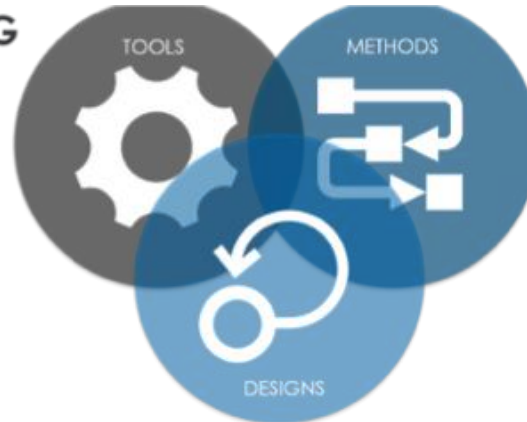
In 2017, for what project types do you expect increased budget? (Select all that apply)



- Becomes feasible with increasing computational power
- Many debates on moral side
- Different approaches, i.e in Machine Learning there are two major applications; **unsupervised learning** and **supervised learning**
- There are many algorithms; **ID3, Neural Networks etc.**
- Super diverse applications, Molecular Analysis to Self-Driving Cars
- From test perspective it promising in **Visual Automation, Virtualization of Interfaces, Defect Taxonomy, Predictive Behavior Analysis** and so on...



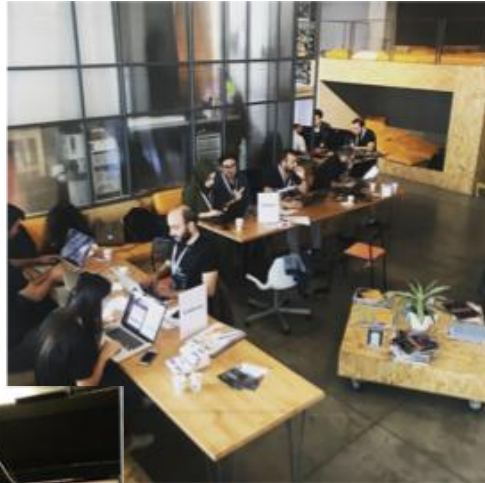
Focused on areas where AI is being used to identify software quality issues, apply test inputs, validate outputs, emulate users or other conditions.

**AI TESTING****TESTING AI**

Testing AI is focused on methods for testing software where AI is a major component of functionality or purpose. Issues such as measuring quality, testing training processes, data cleaning, sourcing test data, measuring 'drift', among others.

**SELF-TESTING**

Self-testing in the context of AI includes both leveraging AI in self-testing systems, and incorporating self-testing into AI systems. This new area of research focused on how to enable systems to, well, test themselves.



- Challenged ourselves! Participated competitions
- Created a corporate training portal
- Gave sponsorship for any paper acceptance
- Built a division for innovation
- Put %10 effort to research
- Started using DevOps, Continuous X and BDD practices even not charged to customer.
- Chosen an area of AI to study - Let's Start **Robotic Process Automation** -

BLOG: ROBOTIC PROCESS AUTOMATION

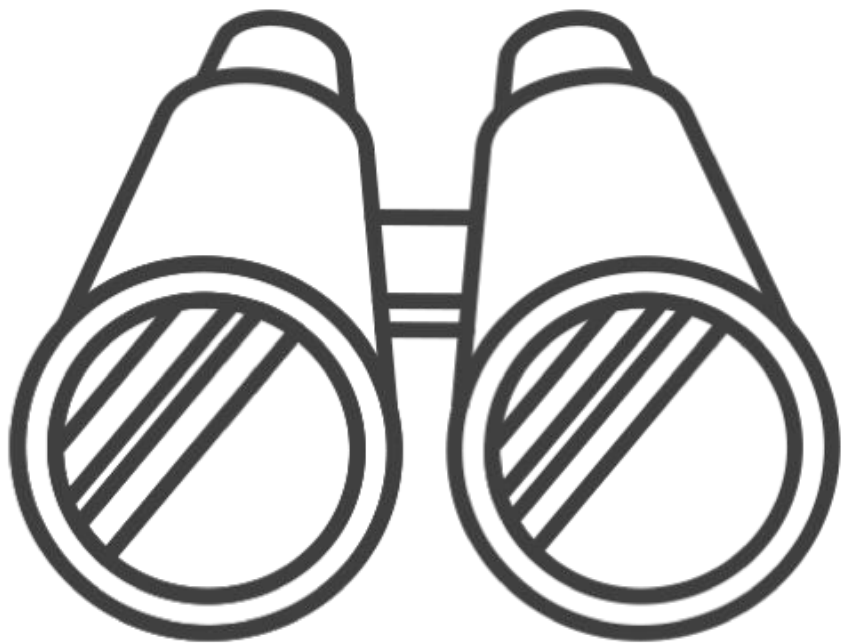
[goo.gl/T9iEZ2](https://goo.gl/T9iEZ2)



SURVEY 3: TEST TECHNOLOGY

[goo.gl/L2y2PB](https://goo.gl/L2y2PB)





# A SNEAK PEEK TO THE SURVEY

Test People

<http://goo.gl/8SRKdn>

Test Organization

<http://goo.gl/tqjH8q>

Test Technology

<http://goo.gl/ymjMfn>



[fs.blog/2017/08/the-butterfly-effect/](https://fs.blog/2017/08/the-butterfly-effect/)

[eaps4.mit.edu/research/Lorenz/Deterministic\\_63.pdf](https://eaps4.mit.edu/research/Lorenz/Deterministic_63.pdf)

[coinmarketcap.com/currencies/bitcoin/#charts](https://coinmarketcap.com/currencies/bitcoin/#charts)

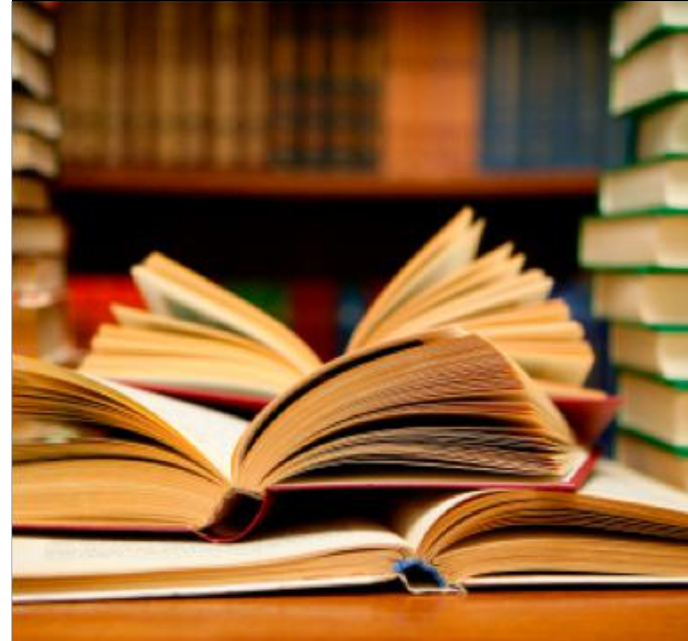
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[www.forbes.com/sites/jacobmorgan/2015/07/22/the-complete-guide-5-types-of-organizational-structures-for-the-future-of-work/#799e81b57705](https://www.forbes.com/sites/jacobmorgan/2015/07/22/the-complete-guide-5-types-of-organizational-structures-for-the-future-of-work/#799e81b57705)

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[callaghaninnovation.govt.nz](https://callaghaninnovation.govt.nz)

# REFERENCES





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***THANKS FOR ATTENDING***

**Berk Dülger, October 2018**

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