

Digital Transformation & Testing

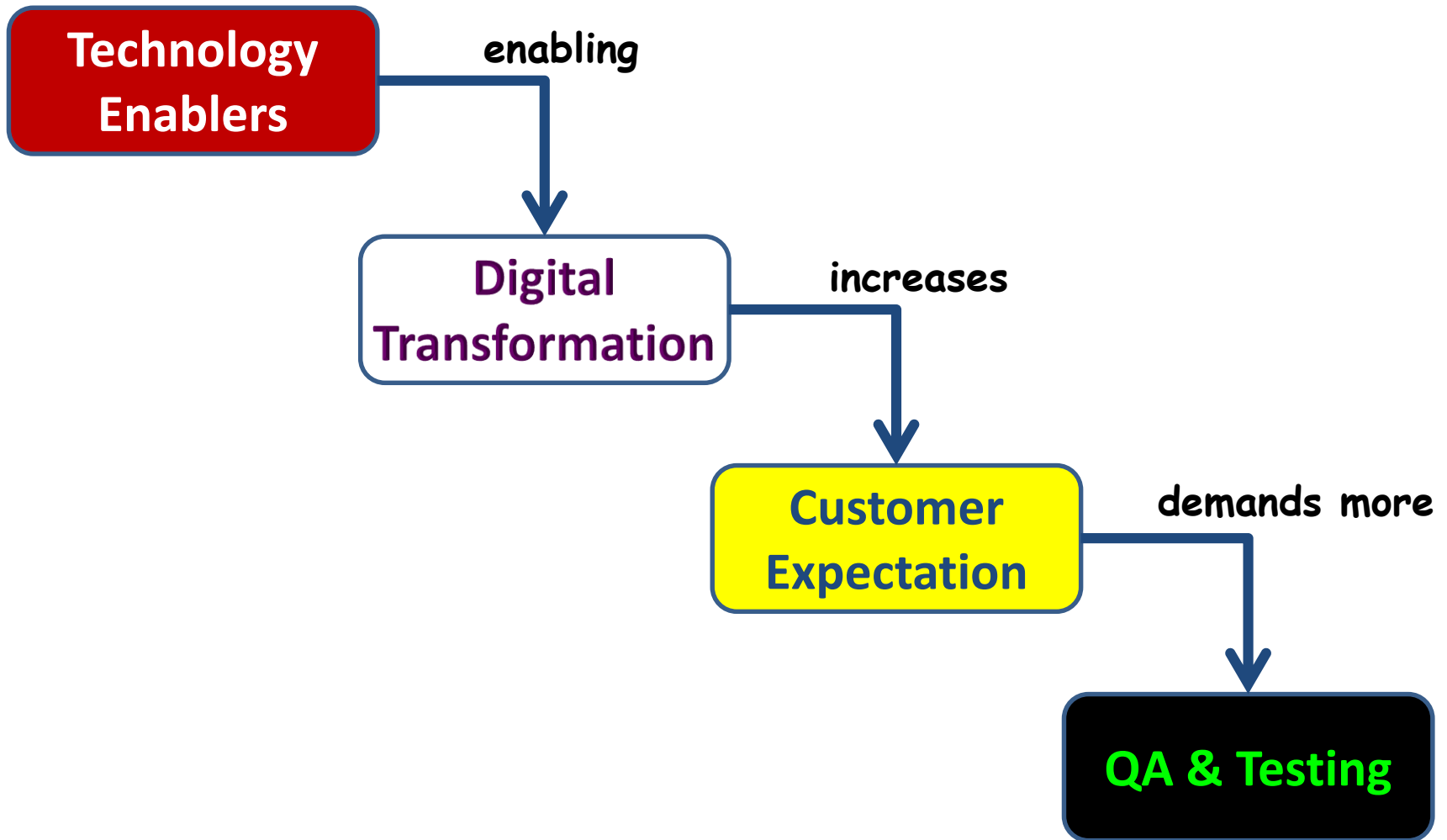
April 2016

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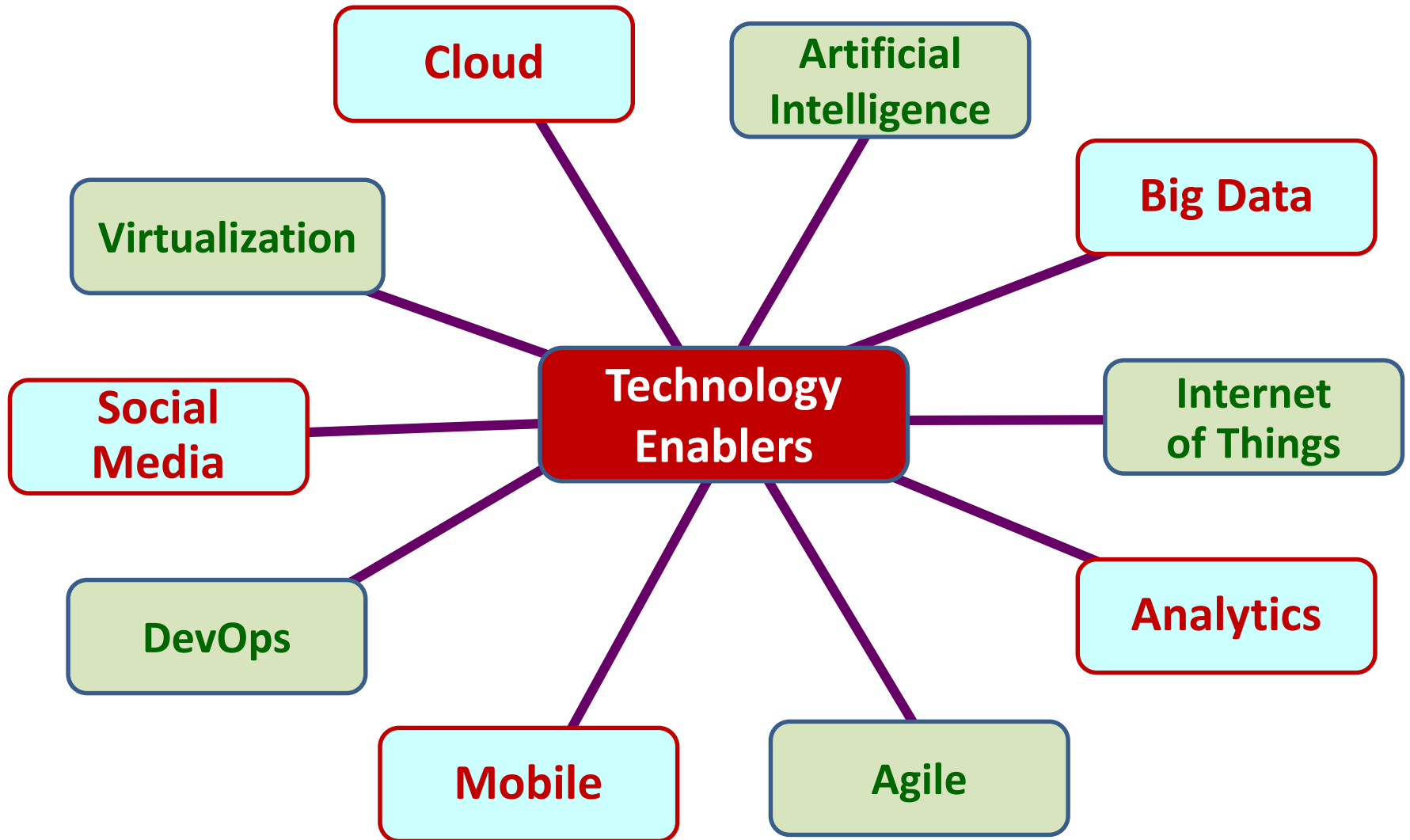
Scope

- **Digital Disruption** & **Technology Enablers**
- **Testing Budgets** & **Testing Centres of Excellence**
- **Mobile** & **Crowd Testing**
- **Big Data** & **Fuzz Testing**
- **Data Analytics** & **Model-Based Testing**
- **Cloud** & **Chaos Monkeys**
- **Social Media** & **A/B Testing**

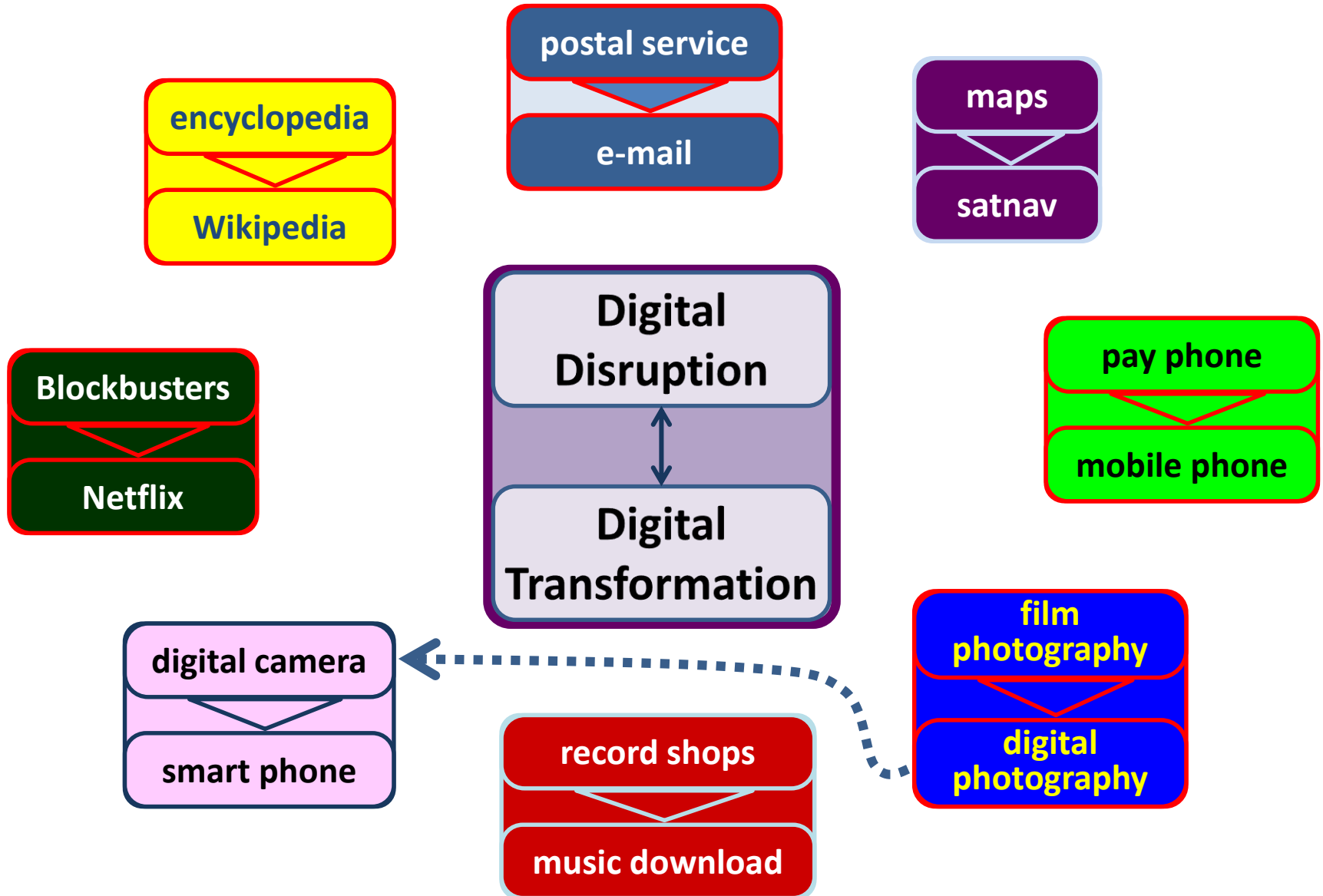
The Changing Landscape



Technology Enablers



Digital Disruption - Examples



Accelerating - Digital Transformation

25% of the world's economy will be digital by 2020



PayU**biz**



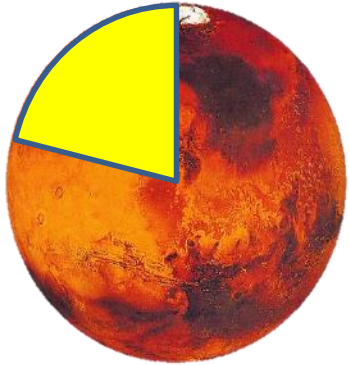
- 64% of retail sales over the 2015-16 Xmas period were based on digital interactions up from 50% a year before



PayPal

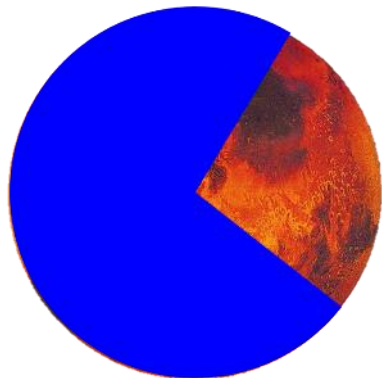
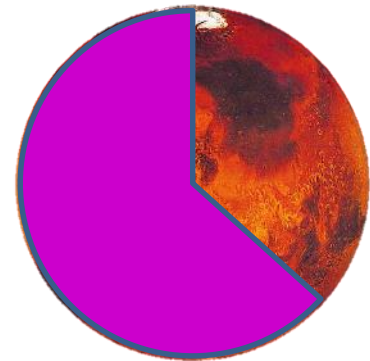
- 4.2 Billion internet users
- 4.61 Billion mobile phone users

Digital Transformation - Recognition



80% - the amount CEOs expect their digital revenue to increase by 2020

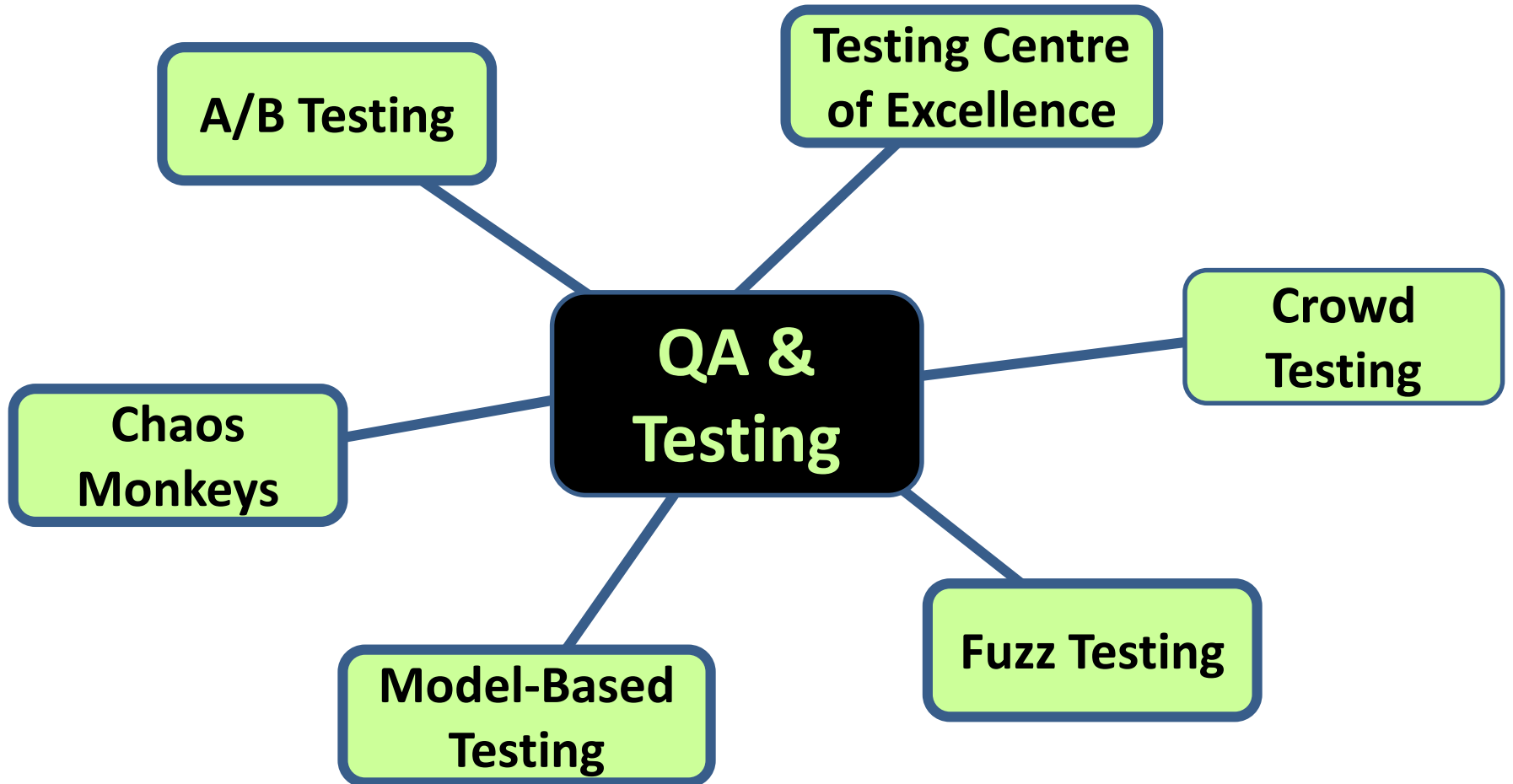
67% of CEOs will have digital transformation at the centre of their corporate strategy by 2018



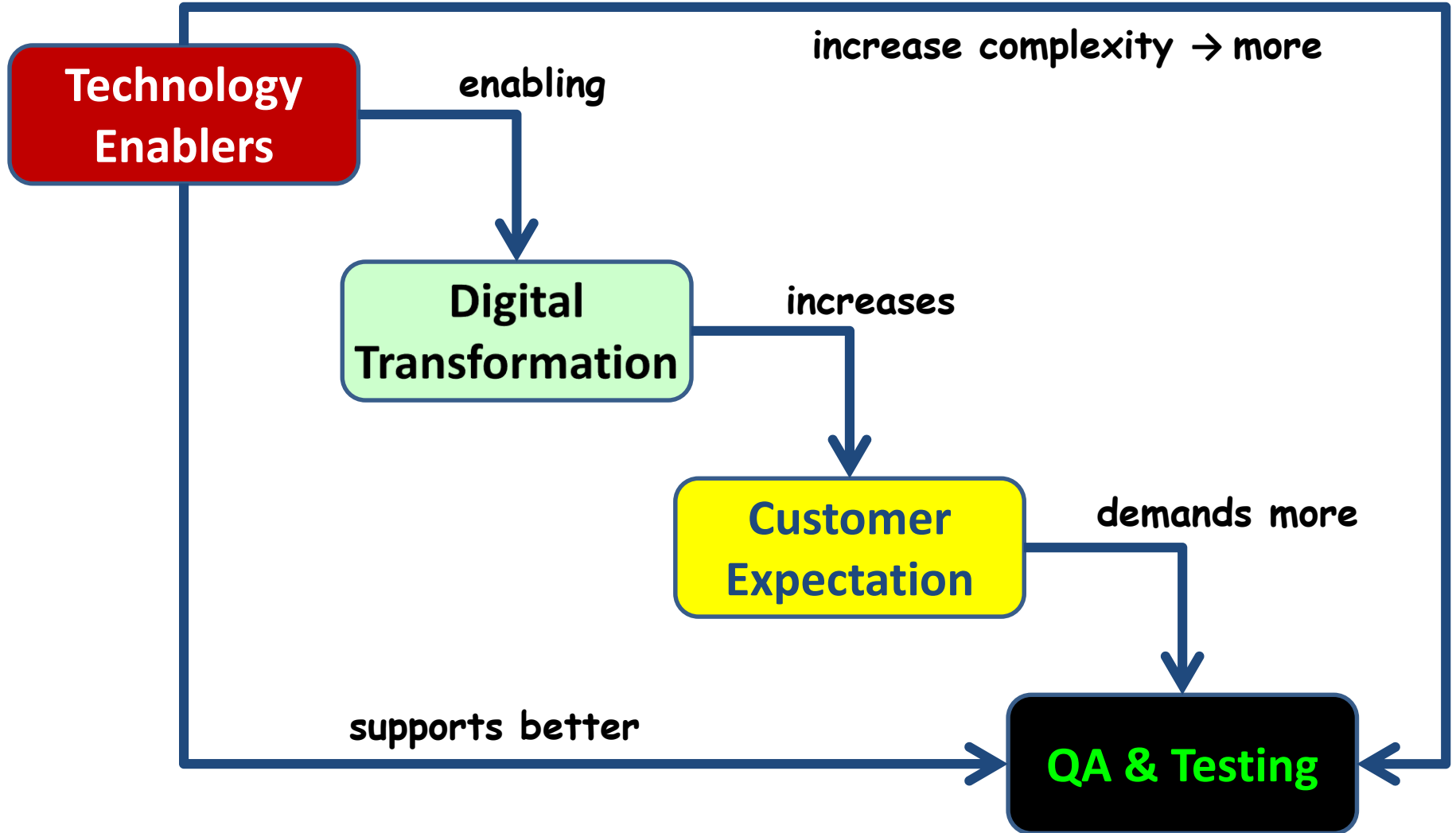
27% of executives rate management of digital disruption as a matter of survival



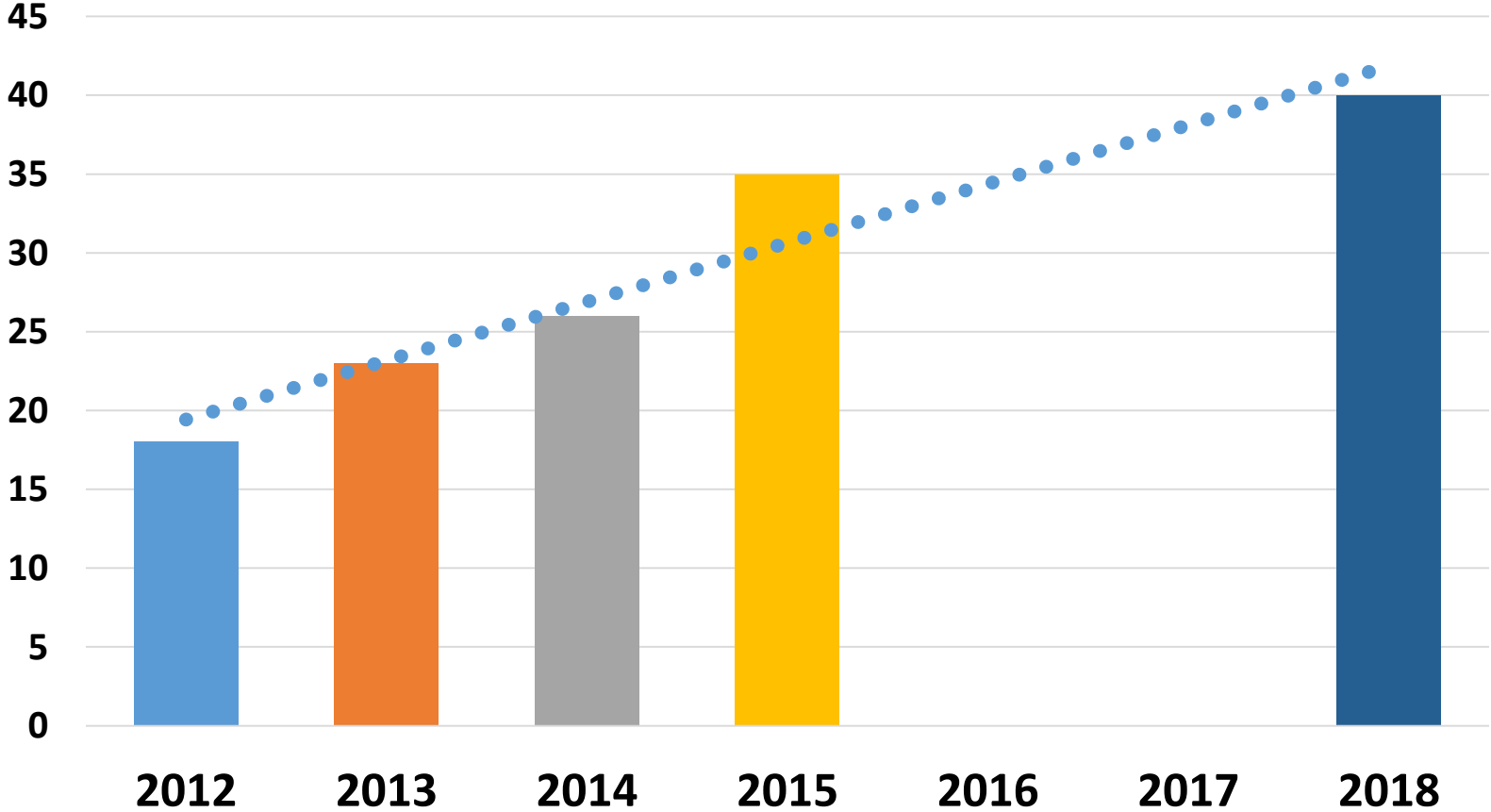
QA & Testing



Technology complicates, but also helps...



Testing as a Percentage of IT Budget



Manual vs Automated Test (2015)



Manual Testing

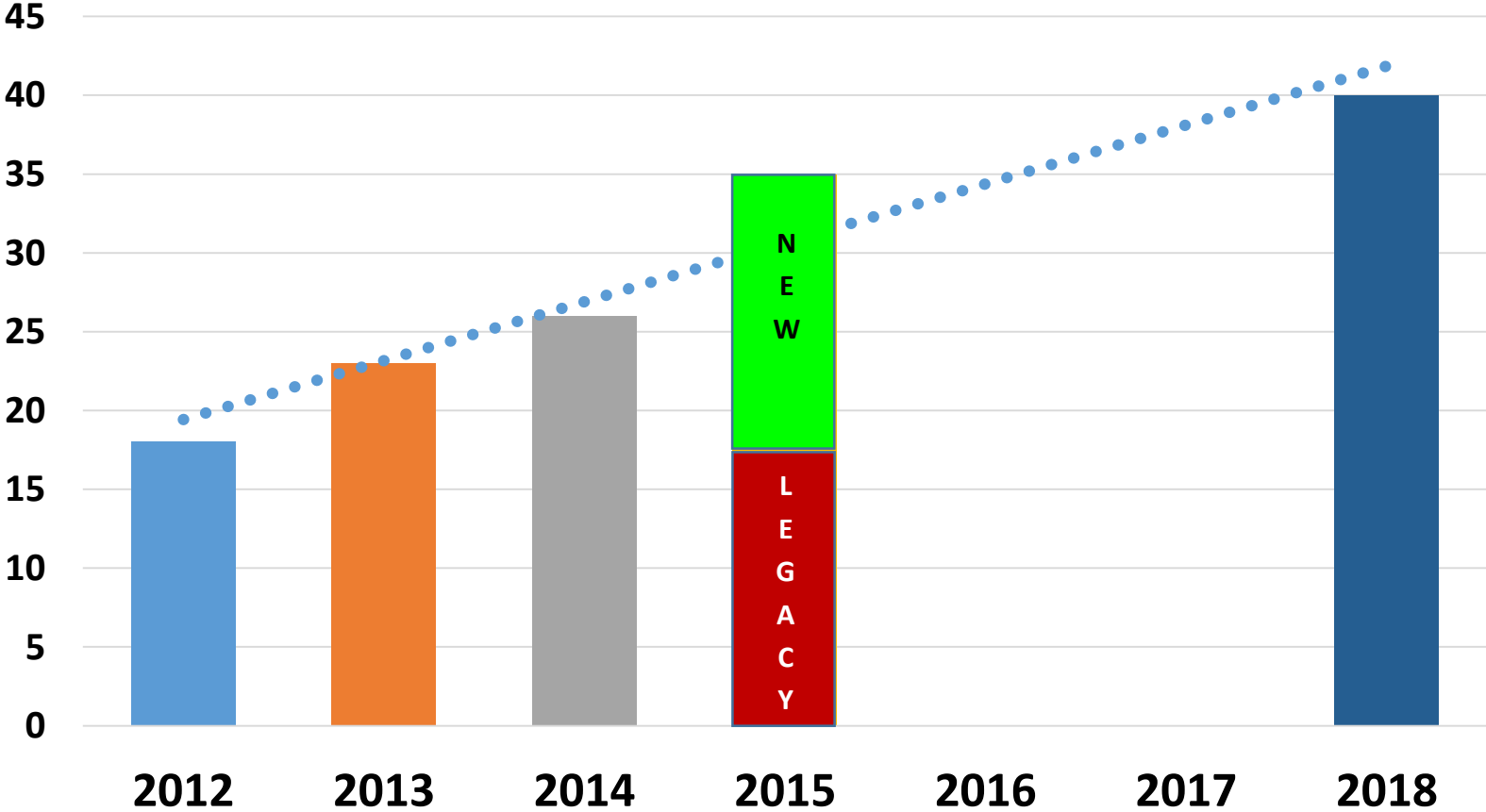
55%

45%



**Test
Automation**

Testing as a Percentage of IT Budget



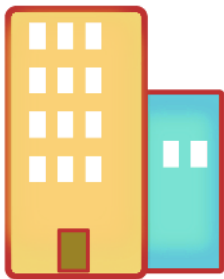
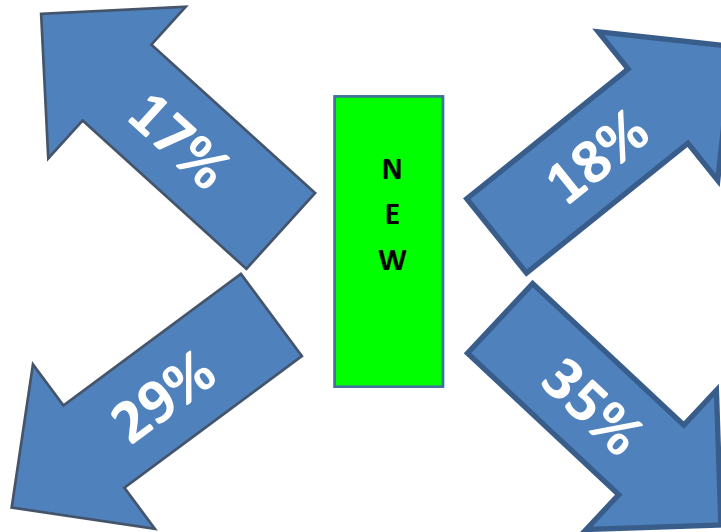
Where Does the Testing Budget Go?



Big Data - Analytics



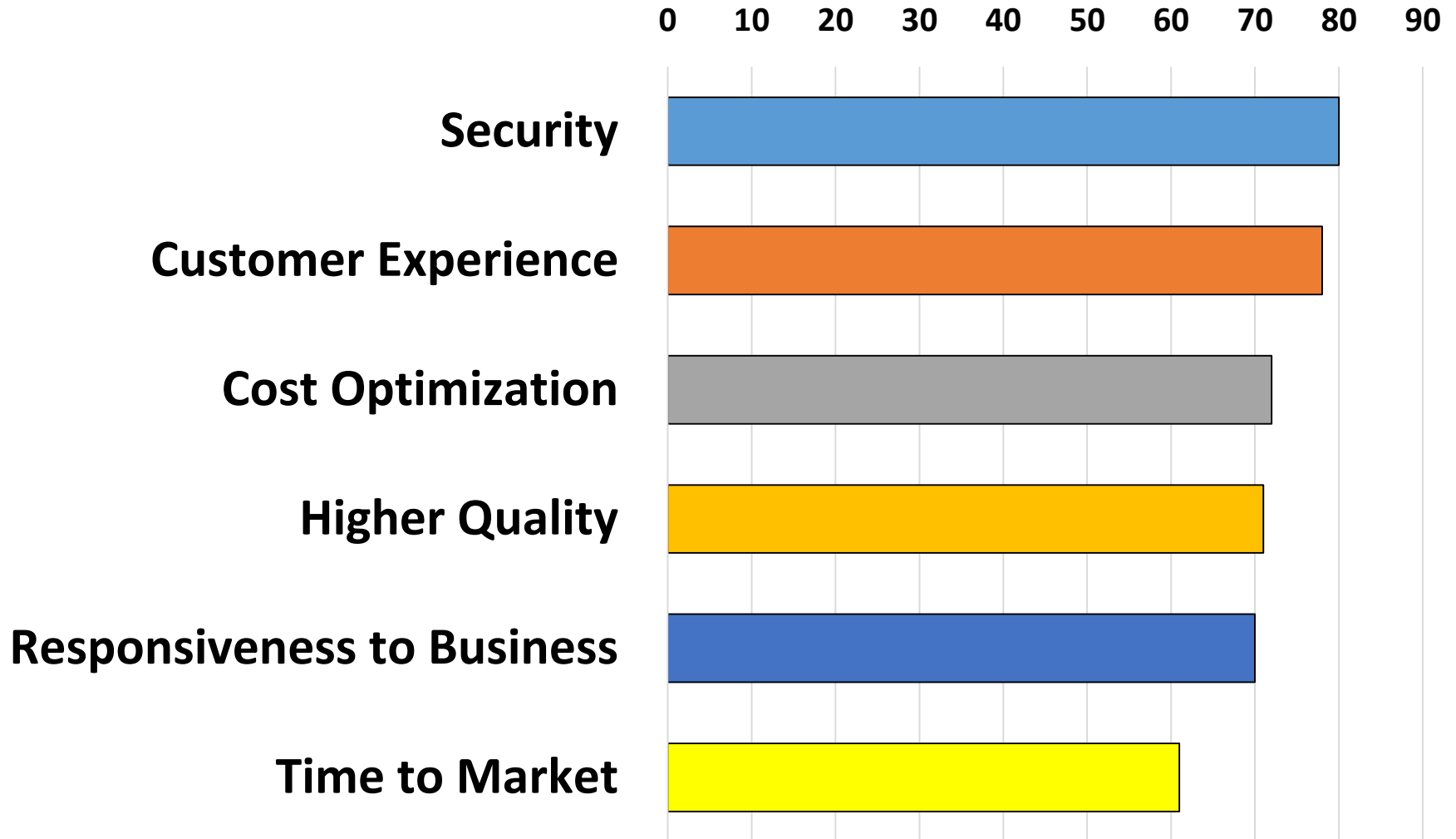
**N
E
W**



Back Office



QA & Testing Priorities



Testing Inefficiencies & Complexity

- **Technical complexity increases testing difficulty and adds more defects**
- **Too much manual testing (only 45% automated)**
- **Too much spent on tools (30% of budget)**
- **Limited Risk-Based Testing - difficulty identifying focus (risk) areas**
- **Lack of awareness of the importance of testing (objective #2)**
- **Limited reuse of test sets**
- **Dispersed testing knowledge (only 25% have a fully operational TCoE)...**

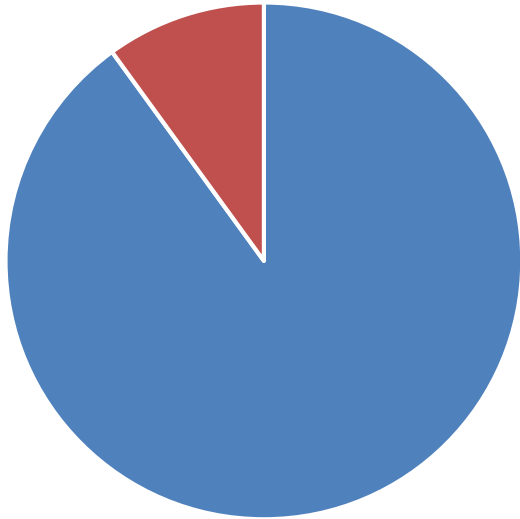
Testing Centre of Excellence

- **Specialists grouped into virtual shared service teams**
- **More specializations required**
 - 54% use specialists with data scientist skills for the testing of data analytics
 - 53% use mobile test specialists
 - 67% use specialists to predict expected usage and risk areas for new developments
 - 51% use their own internal security test teams
- **A standardized approach allows testers with a mix of abilities to be used effectively**

Mobile



Mobile Trends



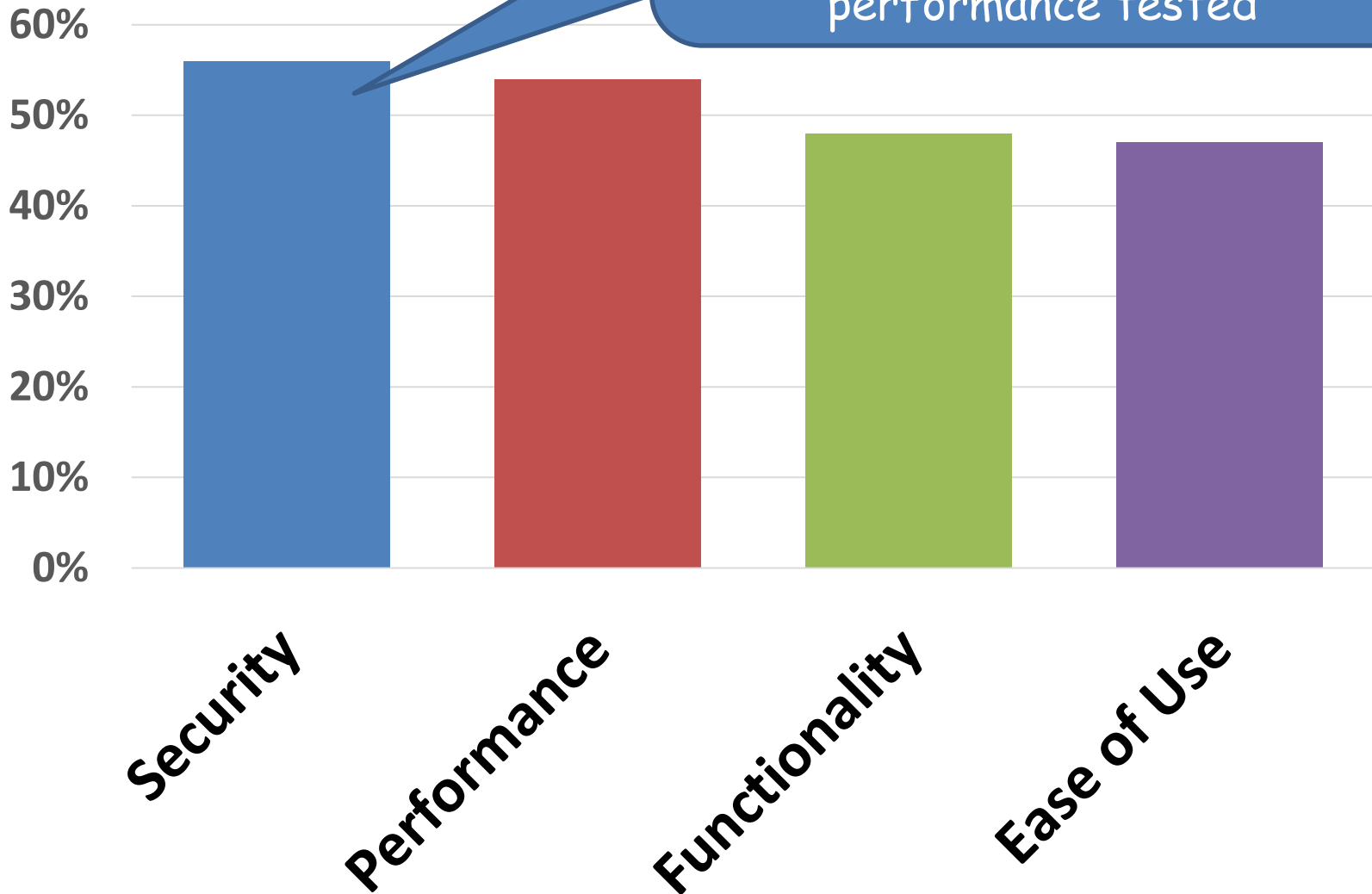
Almost all IT decision makers (90%) expect to increase spending on mobile app development (Nov 2015)



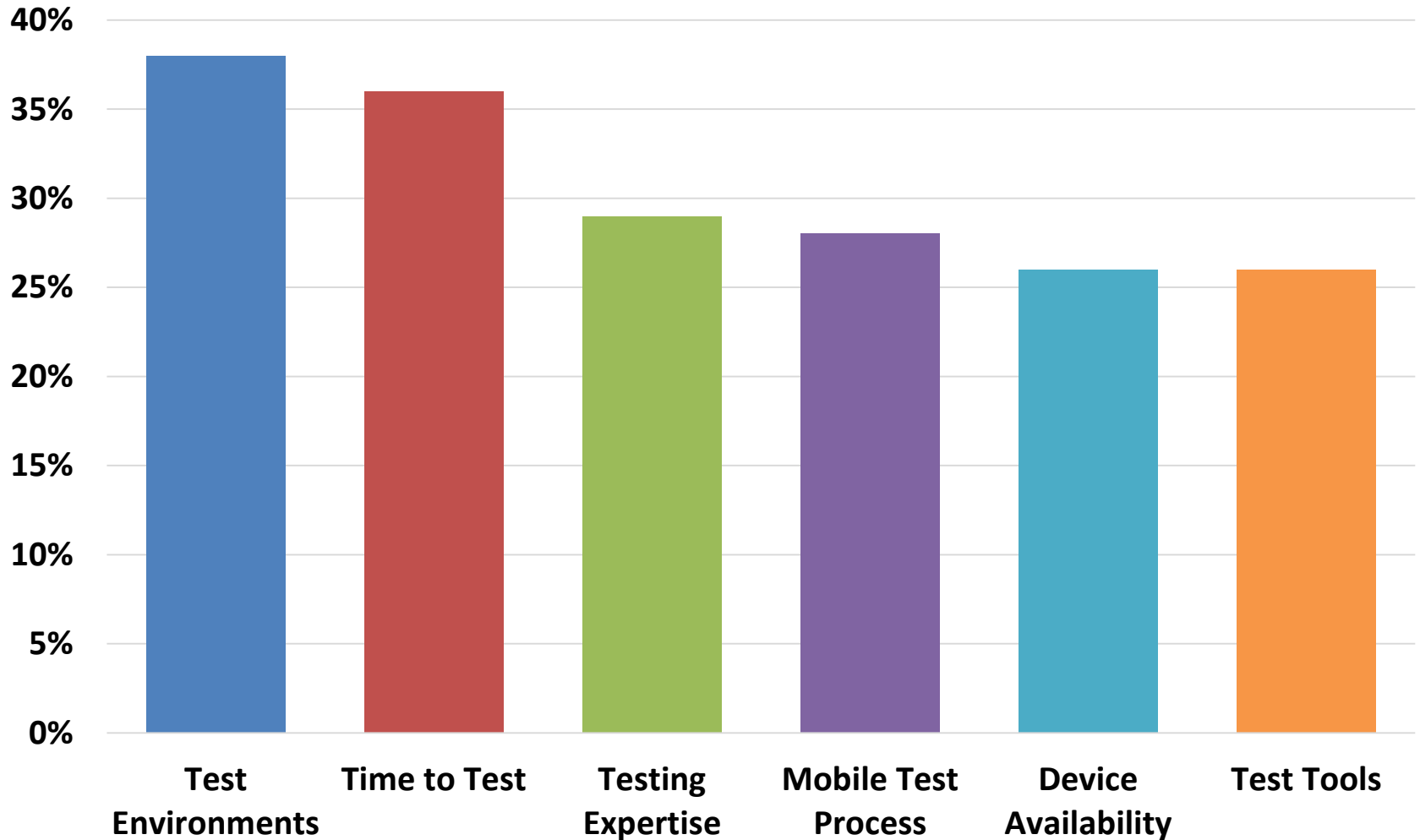
- Mobile services revenue will grow to \$1,200 Billion globally by 2018 (~2% of World economy)
- Mobile connections to reach 9 Billion by 2020 (now 7.9)

Mobile Focus Areas

Mobile opens up new touchpoints and so increases the number of security vulnerabilities and channels that need to have their performance tested



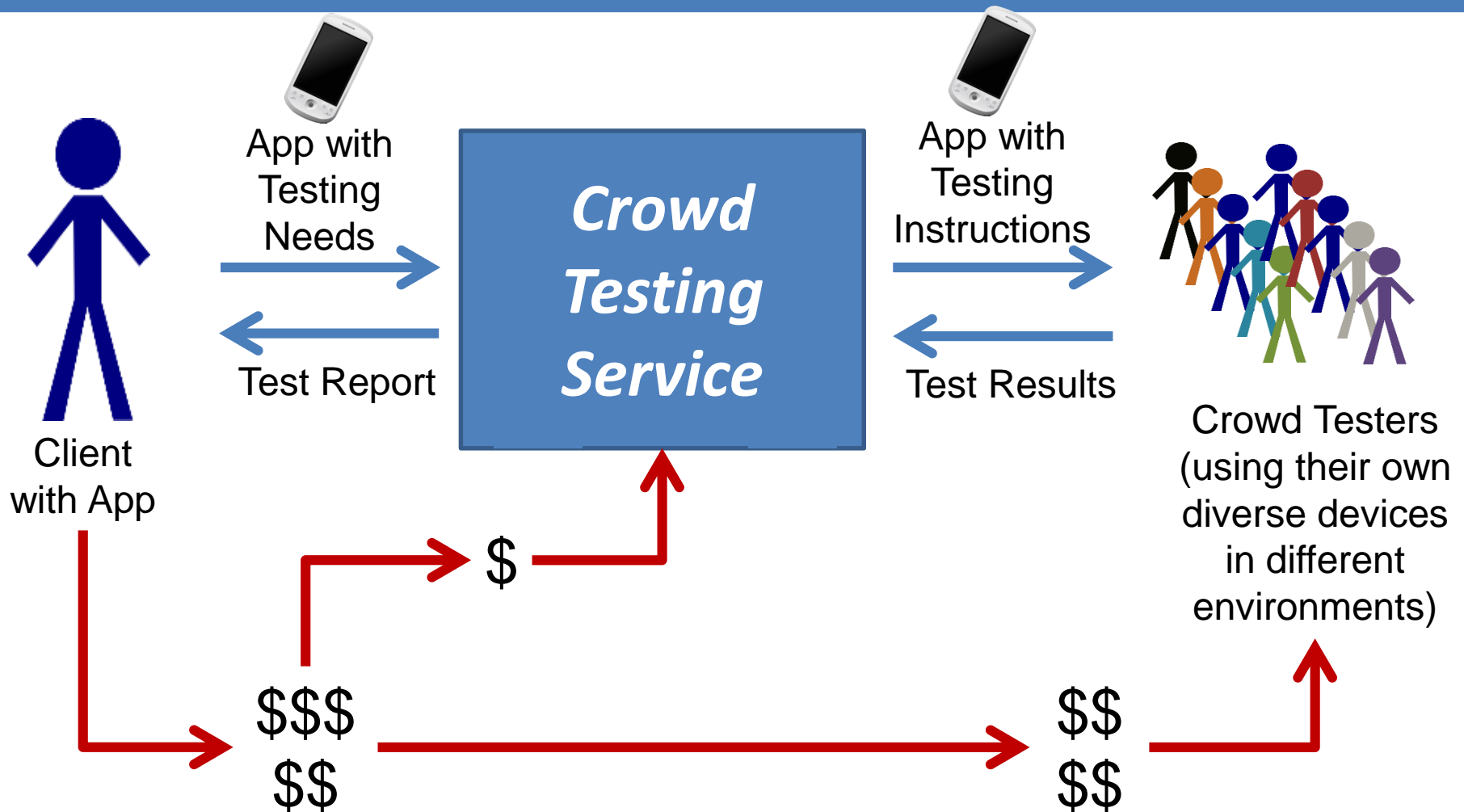
Mobile Testing Challenges



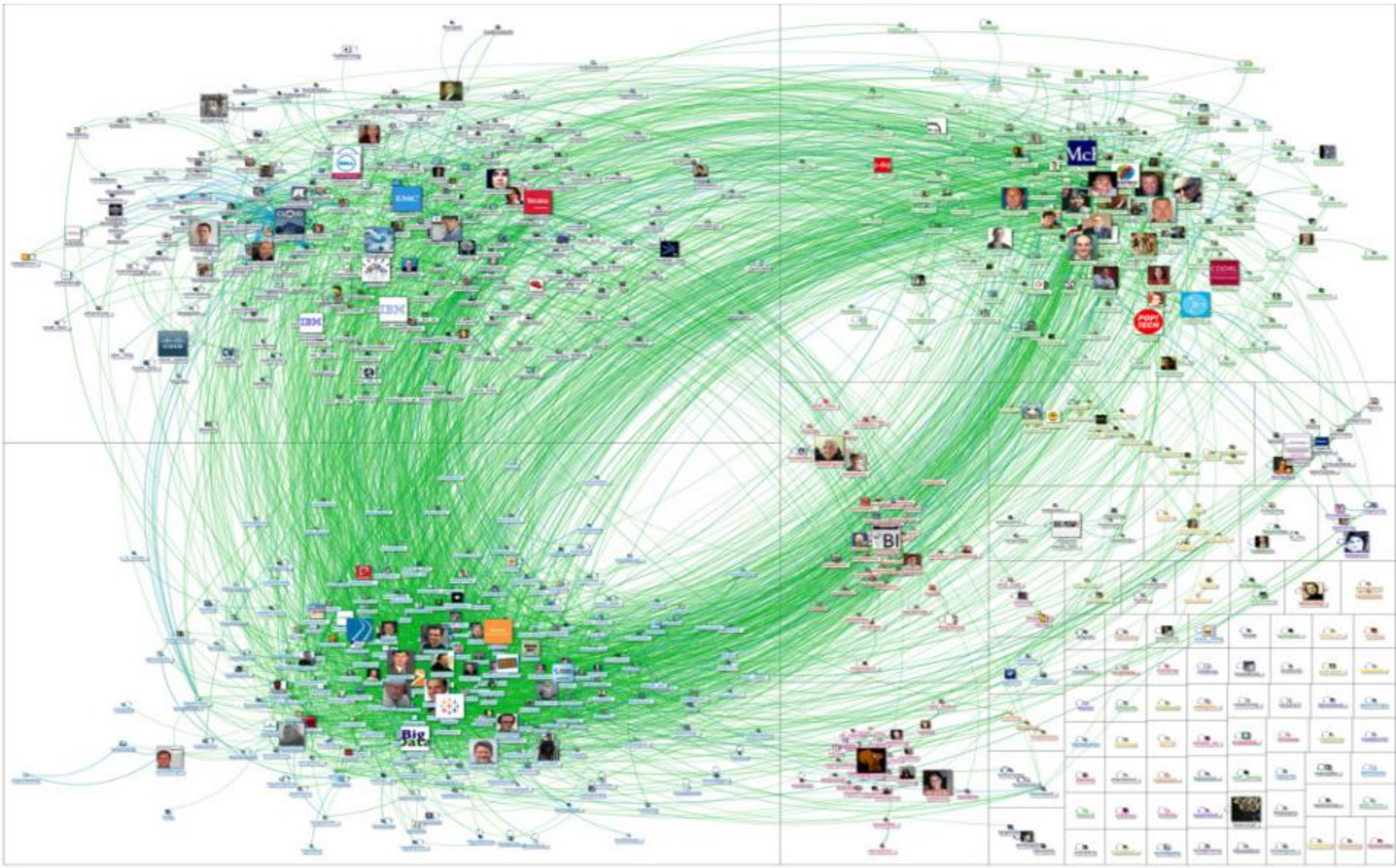
Android Handset Fragmentation



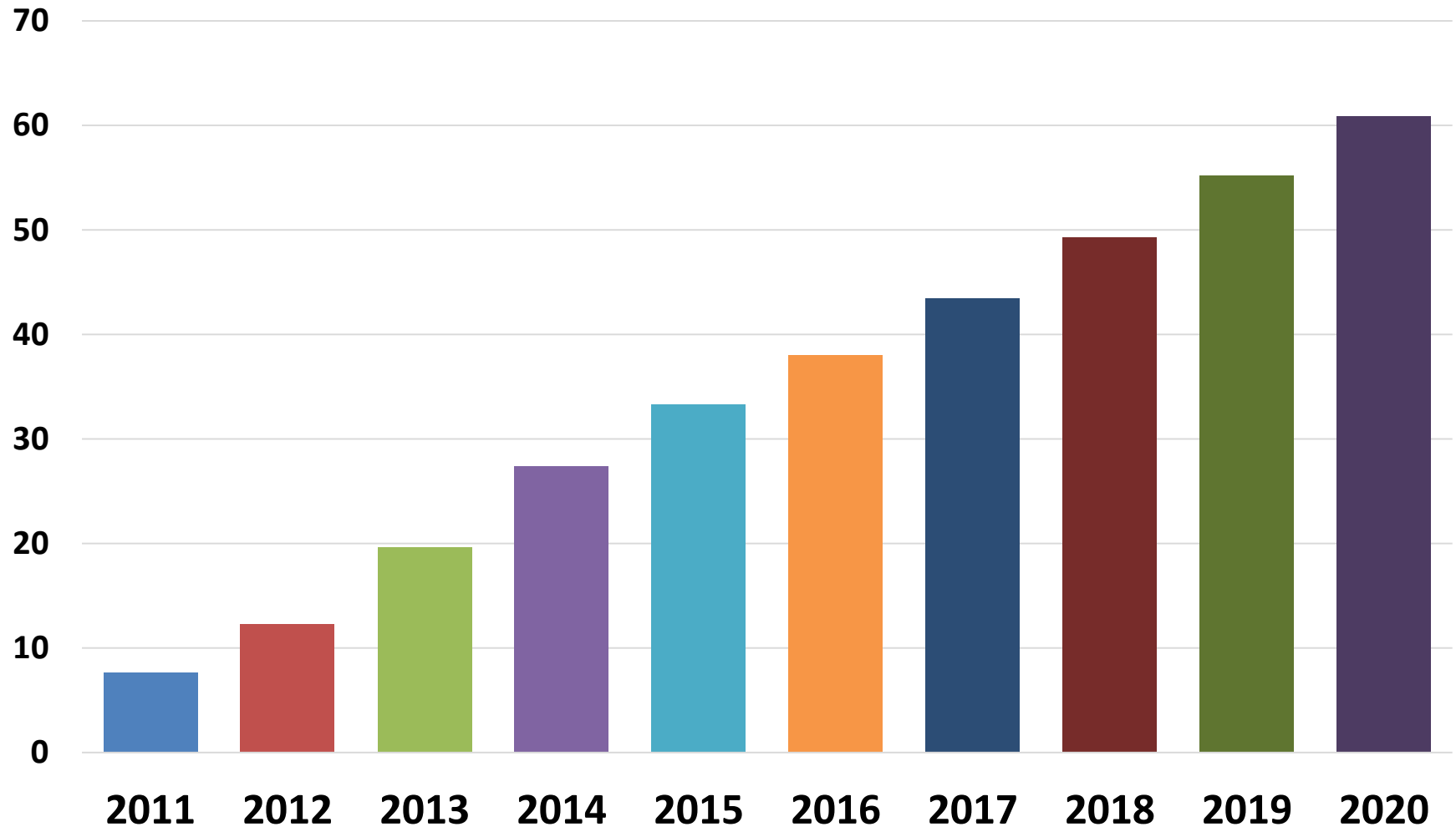
Crowd Testing for Multiple Devices/Env'ts



Big Data



Big Data Market Forecast (Billion \$)



Most Important Big Data Issues

47%

Security



46%

Cost

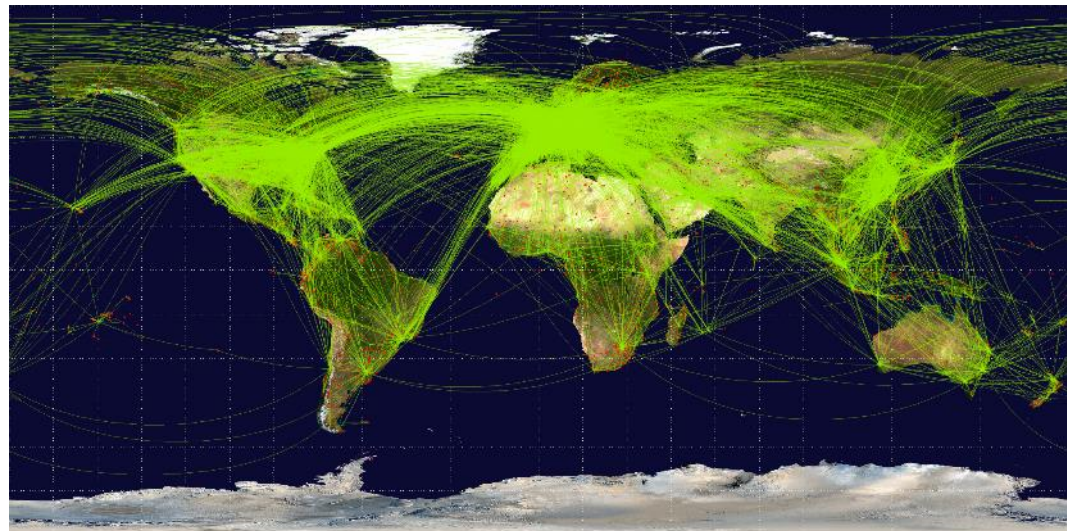


Big Data & Analytics - Testing

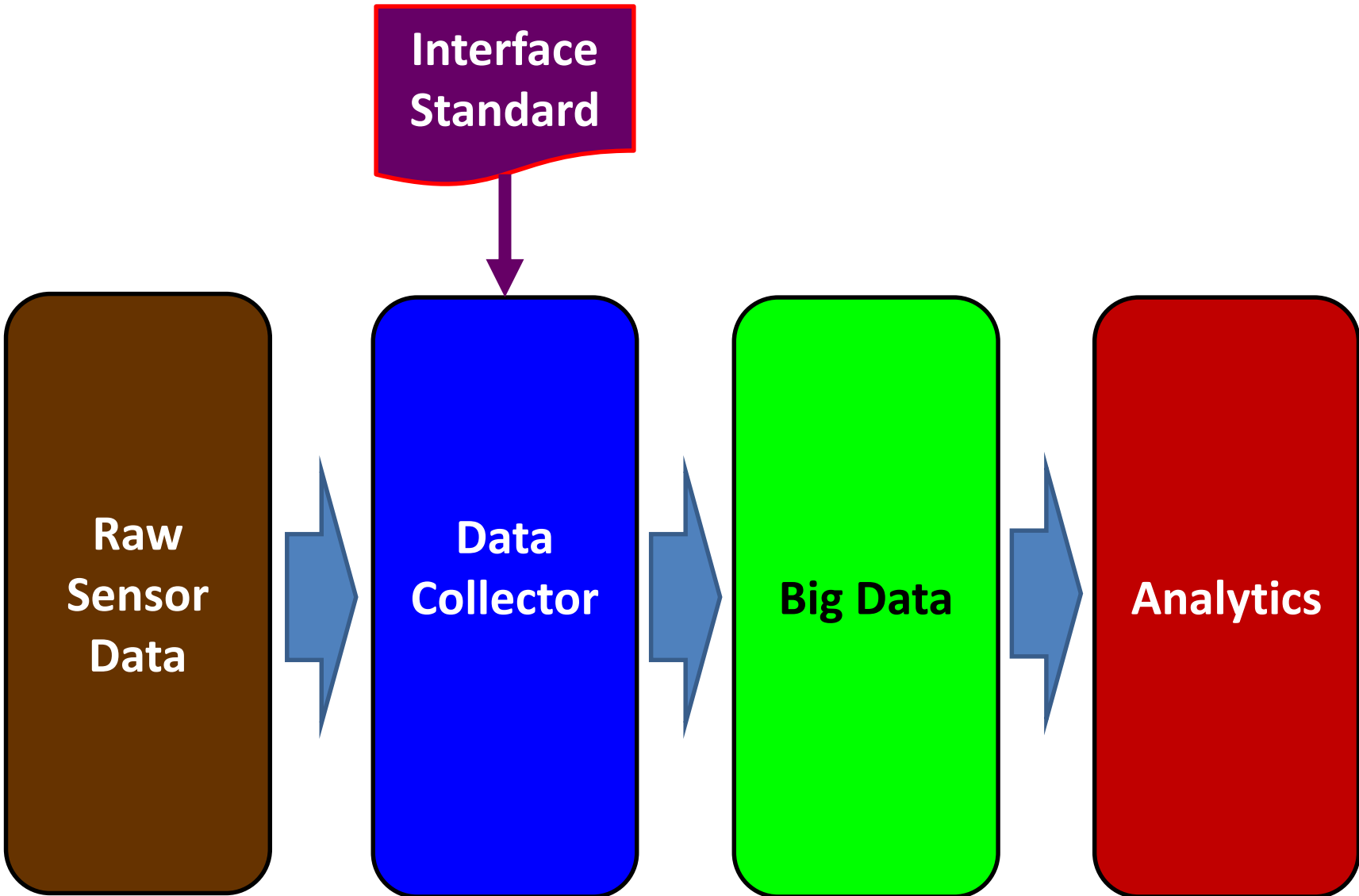
- **Testing using Big Data & Analytics**
 - Analytics provide information on security vulnerabilities to test
 - Analytics provide information on usage and defect profiles and so inform Risk-Based Testing
- **Testing of Big Data & Analytics**
 - Performance Testing
 - testing that results are available in a useful timeframe (esp. real-time)
 - Deterministic vs Probabilistic
 - Probabilistic results must be validated with users/experts
 - Test Data Availability
 - large scale
 - real-time
 - sanitized or real
 - Data Validity Testing
 - Data is secure and useful (filtered)...

Example Data Volumes

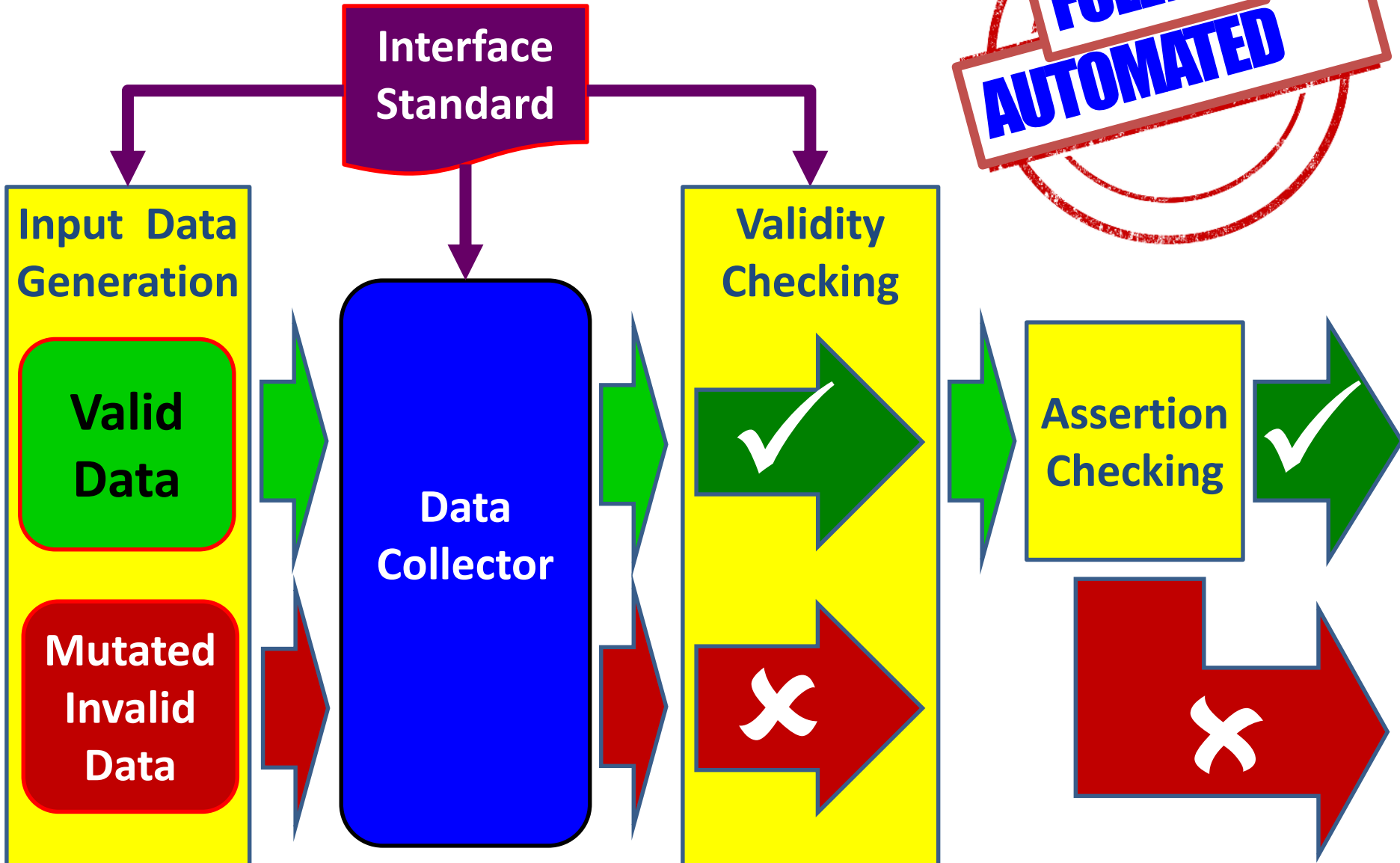
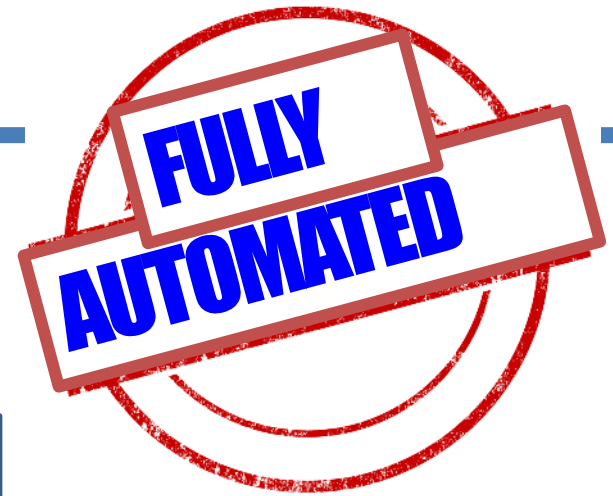
- **Airliner**
 - 3 GB/hour
- **CCTV**
 - 1 TB/month
- **Mobile Phone Operator**
 - 3 TB/day
- **Globally**
 - 2.5 Million TB/day



Data Validity



Fuzz Testing



Data Analytics

Data

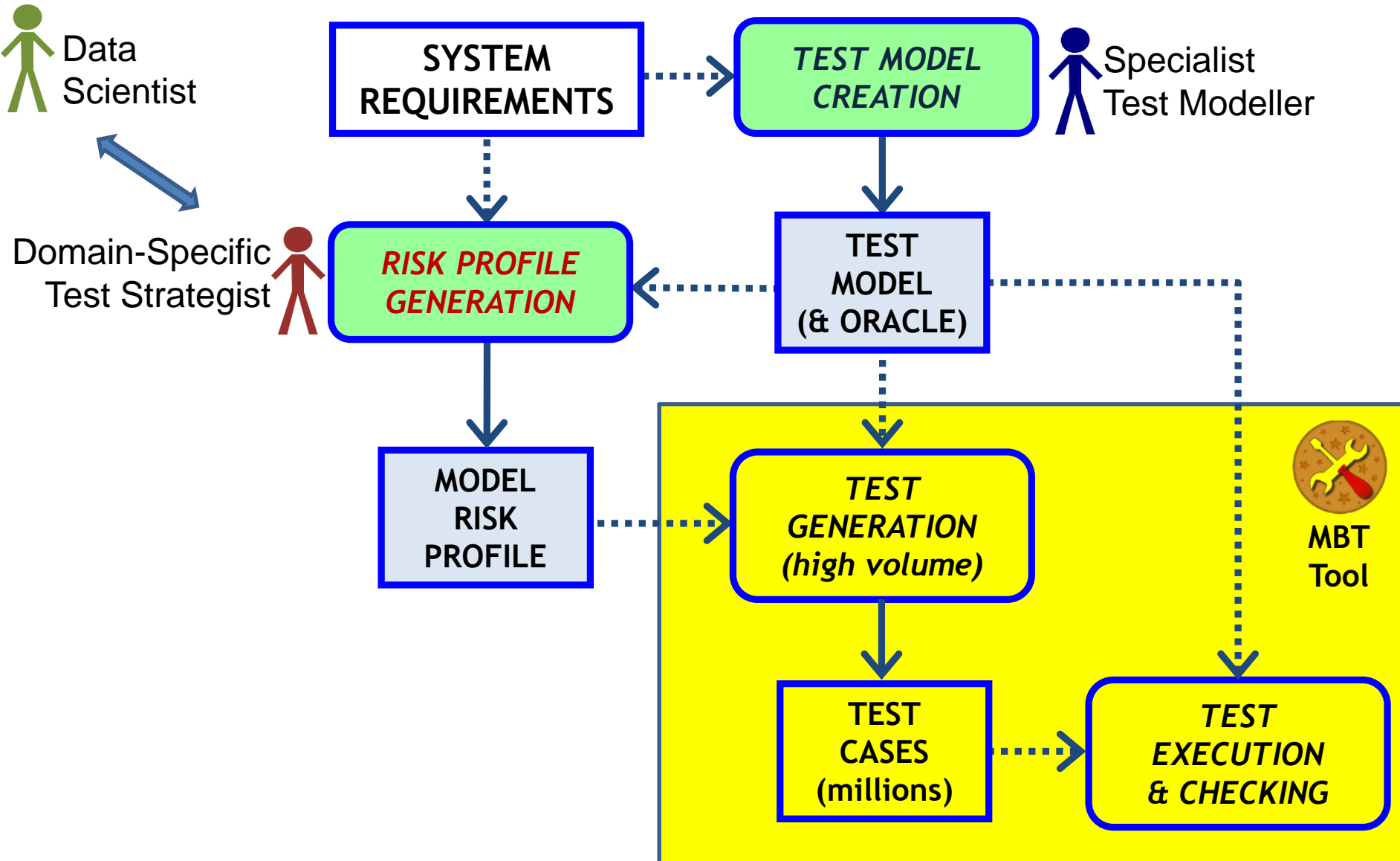


```
graph TD; A[Data] --> B['Magic']; B --> C[Assets]
```

'Magic'

Assets

Model-Based Testing for Data Analytics



Cloud



Why Cloud?

Pros

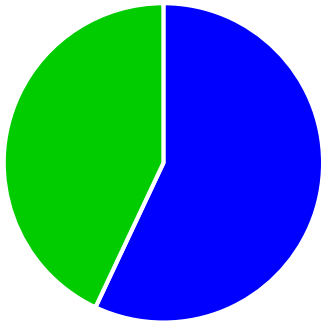
- Power
- Elasticity / Scalability
- Affordability
 - Pay per Use Model
- Low Maintenance
- Reliability
 - but not as good as many believe

Cons

- Security Fears
 - not as bad as many believe
- Lack of Control
- Costs

Cloud Adoption

Global Cloud Services Market
predicted at \$555 Billion by 2020
(from \$210 Billion in 2014)



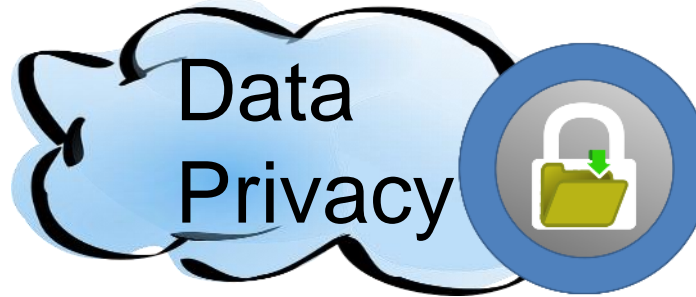
57% of organizations are already using
or are planning to use the cloud in 2015
(84% in the UK)

Most Important Cloud Issues

82%



81%



78%



Cloud Testing

- **Testing using the Cloud**
 - Testing as a Service
 - Test tools (fewer licenses sitting idle)
 - Testing from the Cloud (e.g. generating virtual users, anywhere)
- **Testing of Cloud-based Apps**
 - Test Environments same as Production
 - 20-30% Cost Reductions
 - Performance/Load Testing
 - due to varied hardware architectures
 - Hybrid Cloud Testing
 - Security Testing
 - encryption/decryption
 - Chaos Monkeys...

Chaos Monkeys

- **Open Source tools for testing Cloud-based systems**
- **Chaos Monkeys randomly disable (in work hours) instances to test whether the system can survive failures in the cloud infrastructure**
- **Simian Army**
 - Security Monkey, Janitor Monkey, etc.
 - Chaos Kong kills whole AWS regions
- **Netflix survived Amazon rebooting 10% of EC2 servers in Sept 2014 with no downtime**



Social Media

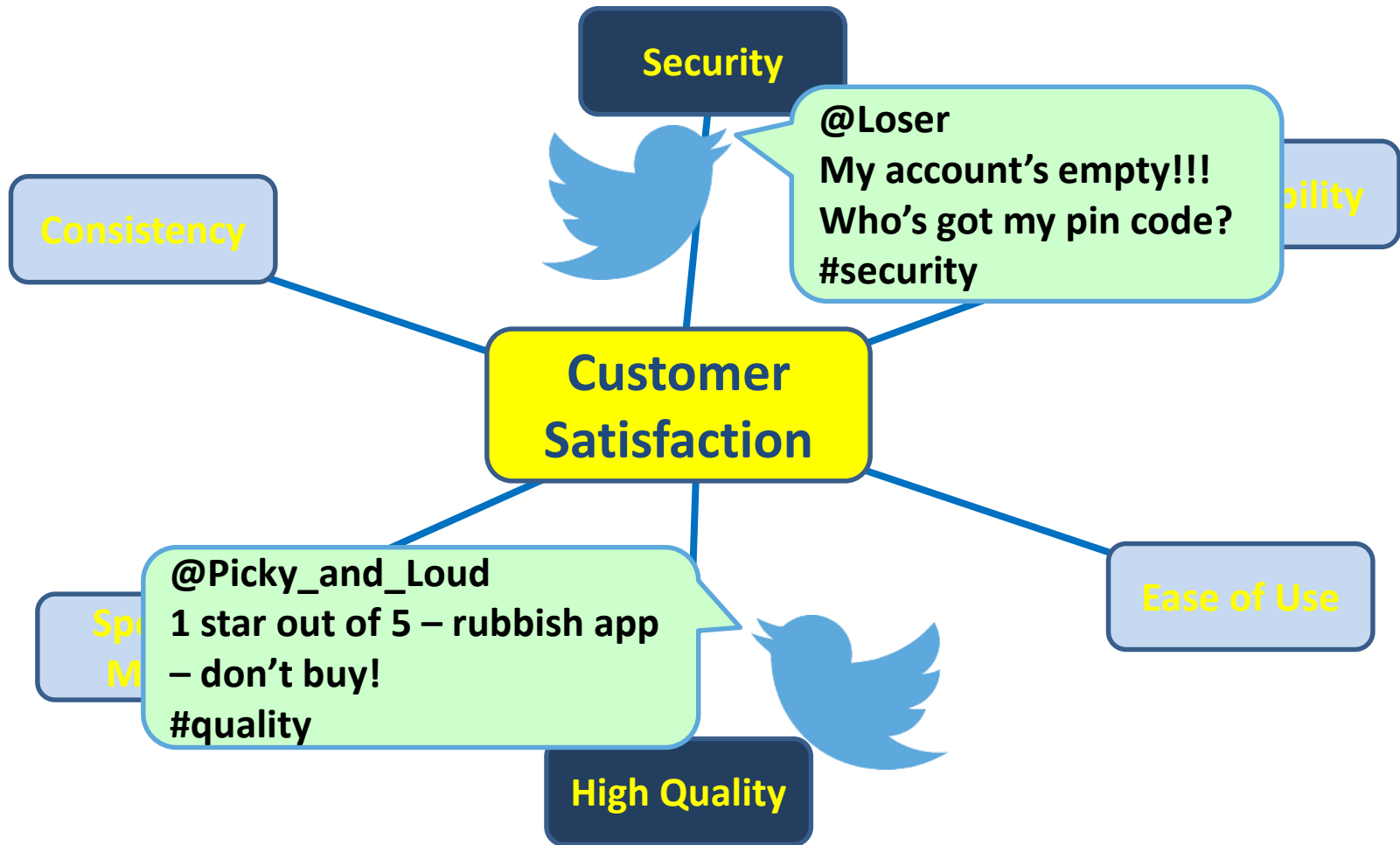


OPEN
24 HRS

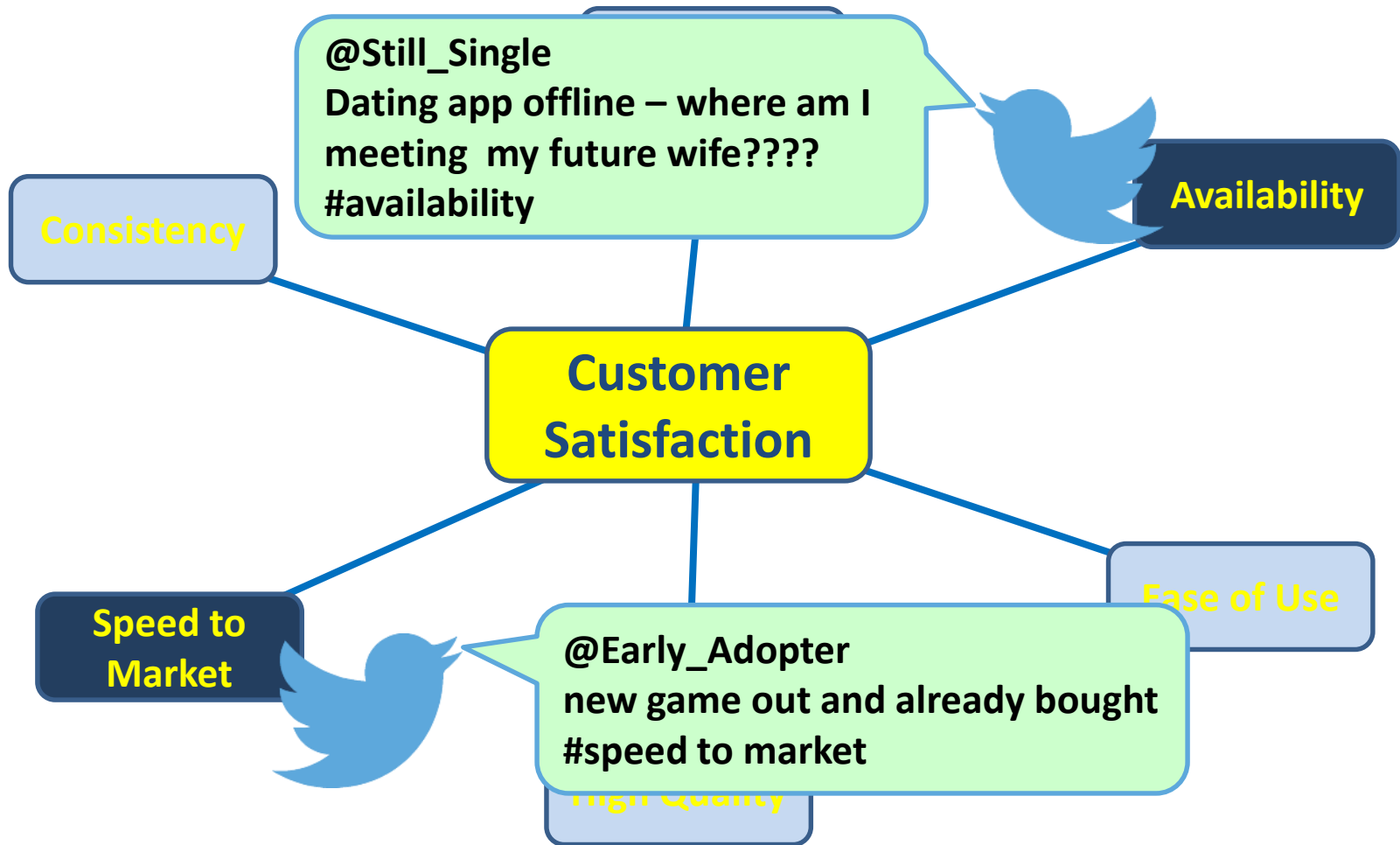
Customer Expectation → Satisfaction



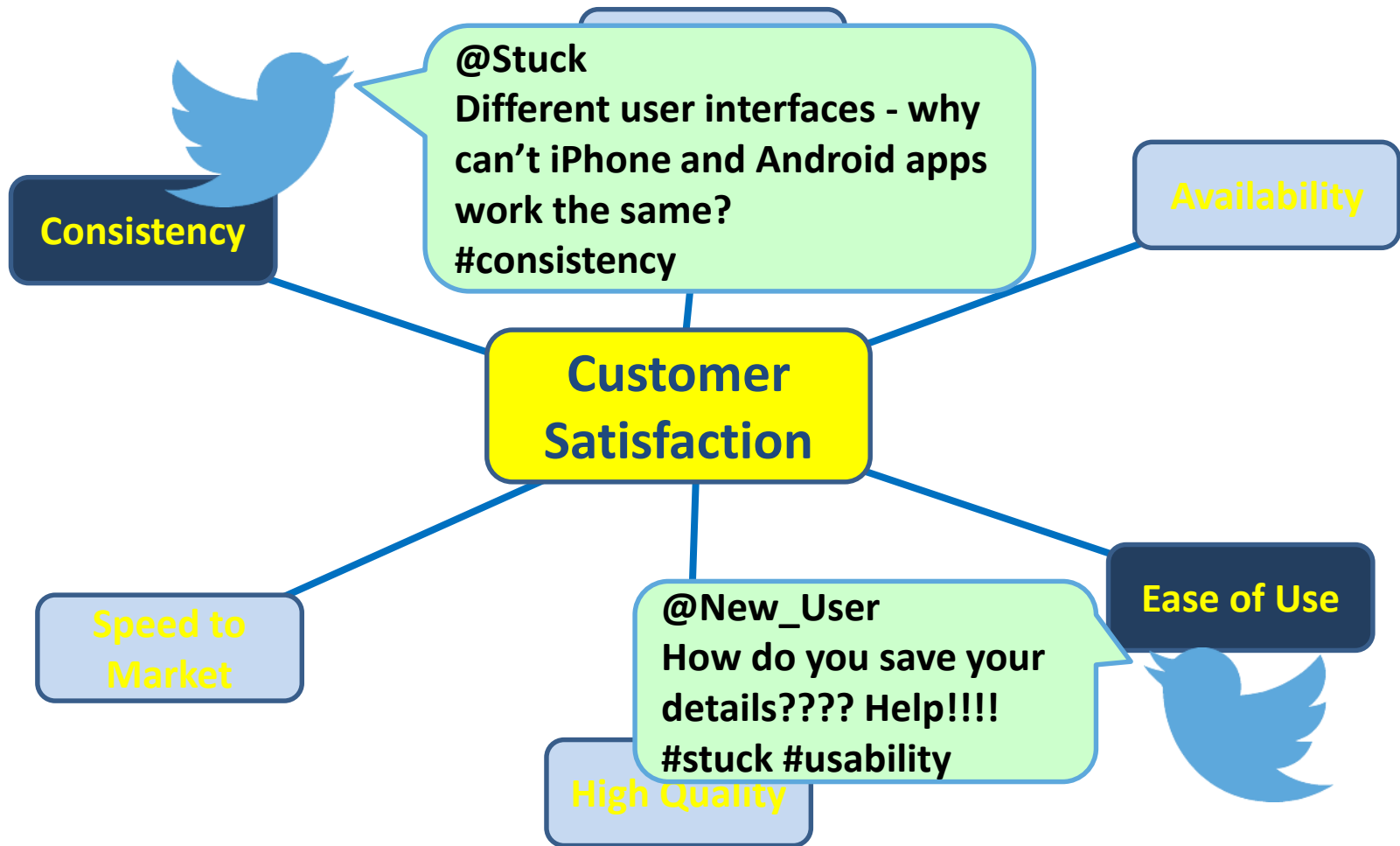
Social Media & Customer Satisfaction



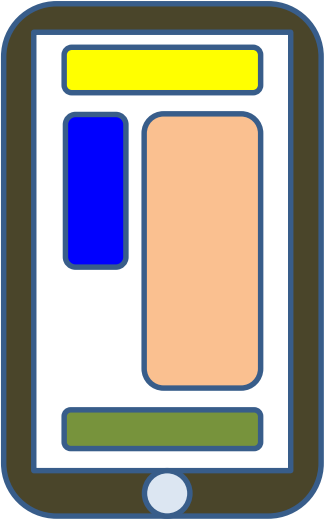
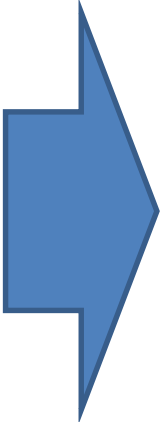
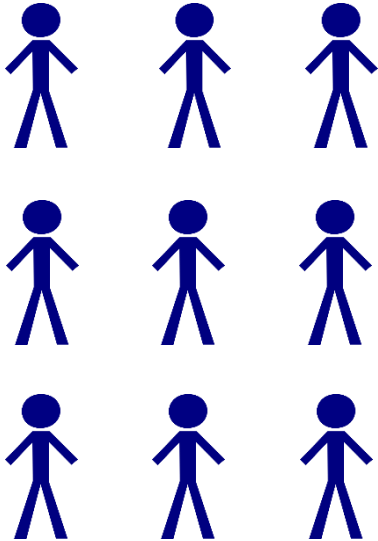
Social Media & Customer Satisfaction



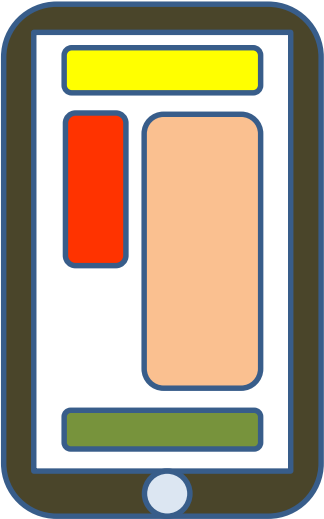
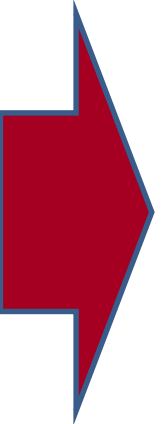
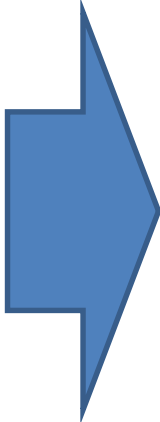
Social Media & Customer Satisfaction



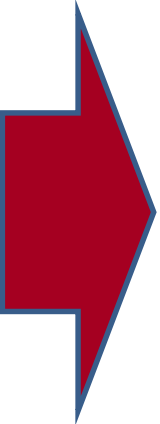
A/B Testing



**ORIGINAL
BENCHMARK**



**MORE SALES?
HIGHER PRODUCTIVITY?
HAPPIER USERS?**



Conclusions

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Thank you for listening 😊

Any Questions?

Credits/References

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