BEST PRACTICES
IN SW TESTING

Petr NEUGEBAUER
QA EVANGELIST

INTRODUCTION

Education

Brno Business School, Brno University of Technology (MBA '12, Strategic management)

Faculty of Informatics, Masaryk Universityzita in Brno (MSc. '99, Informatics)

Experience

Y Soft Corporation (2008 – 2015) | Brno (CZ) – Printing solutions

Quality Manager | R&D Manager | PMO

Siemens (2001 – 2008) | Brno (CZ), Vienna (AT), Munich (GER) – Telecommunications, ITS

PM | Quality Manager | QA | SW developer

Professional

Czech and Slovak Testing Board (2007 – 2015)

ISTQB – International Software Qualification Testing Board (2011 – 2015)

[pro]TEST! MORAVA (2015)

INFLUENCERS

Gojko ADZIC

James BACH

Janet GREGORY

Tom GILB

Mary POPPENDIECK
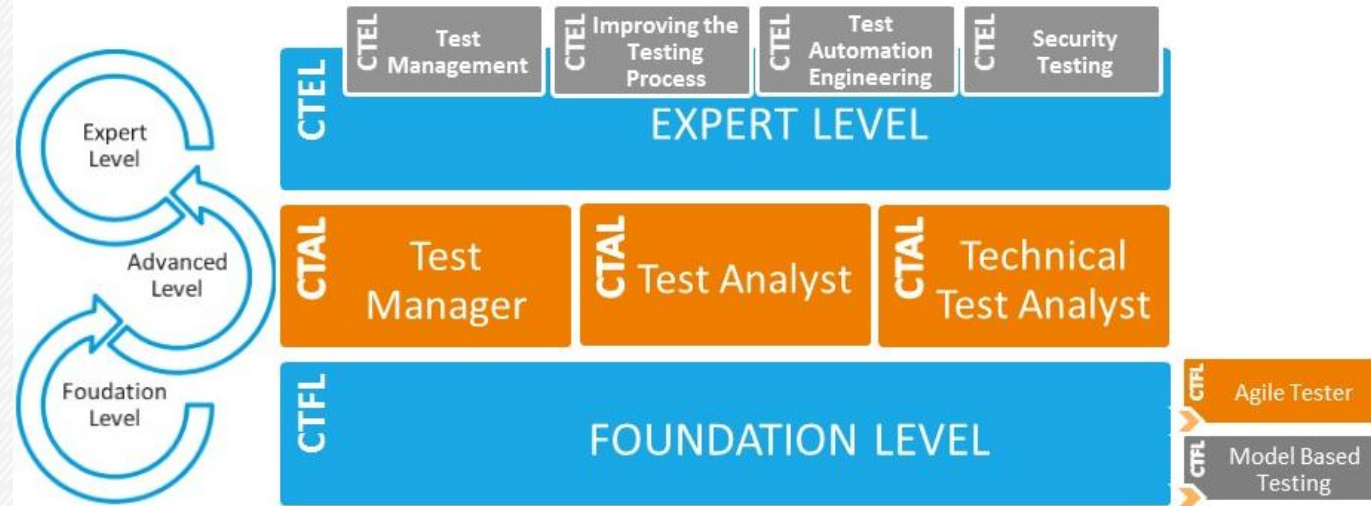
ISTQB
CZECH AND SLOVAK TESTING BOARD

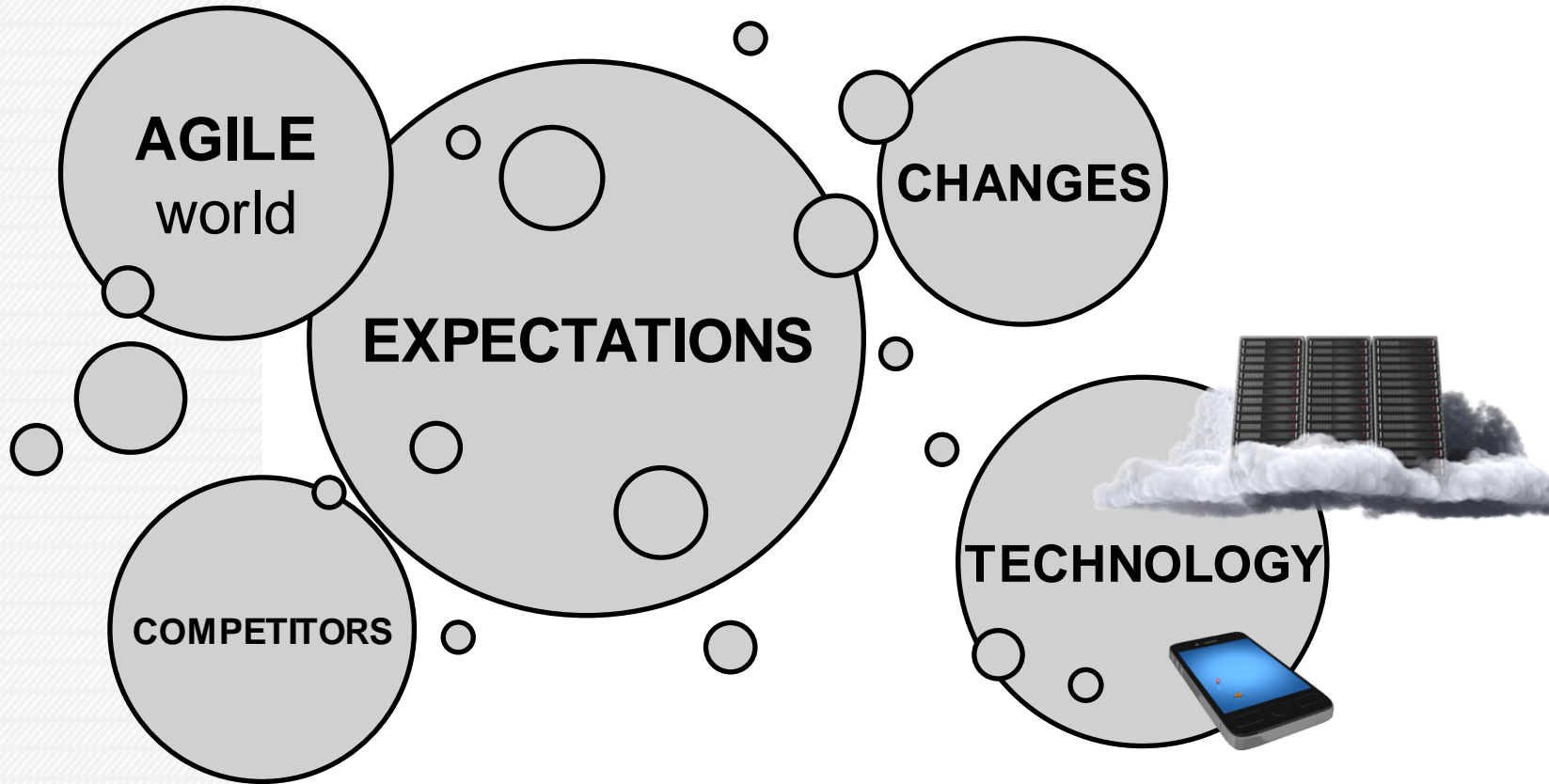**TESTING PROFESSIONALS**

350.000+ ISTQB certified professionals

COVERAGE

49 Member boards in 72 countries

International Software Qualification Testing Board

CHALLENGES NOWADAYS
DELIVER RESULTS

AGILE
world

EXPECTATIONS

CHANGES

COMPETITORS

TECHNOLOGY

TESTING

… IS AN EXTREMELY EXPENSIVE ACTIVITY

… IS DOESN'T CONTRIBUTE TO BETTER QUALITY

… DIFFERS FROM QUALITY ASSURANCE

… UNREWARDED JOB

STANDARDS AND FRAMEWORKS

- ISO/IEC 25010:2011 Software engineering – Systems and software Quality Requirements and Evaluation (SQuaRE)
  - ISO/IEC 9126 (Standard describing typical risks)
- IEEE 829 – Standard for Software and System Test Documentation
- IEEE 1044 – Standard classification for Software Anomalies
- ISO 29119 – Software and systems engineering — Software testing

- ISTQB Framework

DEVELOPMENT PROCESS
EVOLUTION

60's: WATERFALL

- (+) Simple and easy to manage
- (+) Applicable for small SW
- (-) Big design up front
- (-) Defect detected at late phases
- (-) High amounts of risk and uncertain

70's: V-MODEL

- (+) Early testing involvement
- (+) Clear relationship between test phases and development phases
- (-) Still poses limitation of sequential model
- (-) Require high amount of documentation
- (-) Duplication of testing effort

80's: RUP

- (+) Risk and uncertain are managed
- (+) Testing activities and process are managed
- (-) Heavy documentation
- (-) Late customer involvement – only UAT

00's: AGILE

- (+) Adaptable to changes
- (+) Early feedback
- (+) Avoid spending time on useless activities
- (-) Require high-capable people
- (-) Need representative from client
- (-) Problem scaling up the architecture

COSTS OF DEFECT FIXING
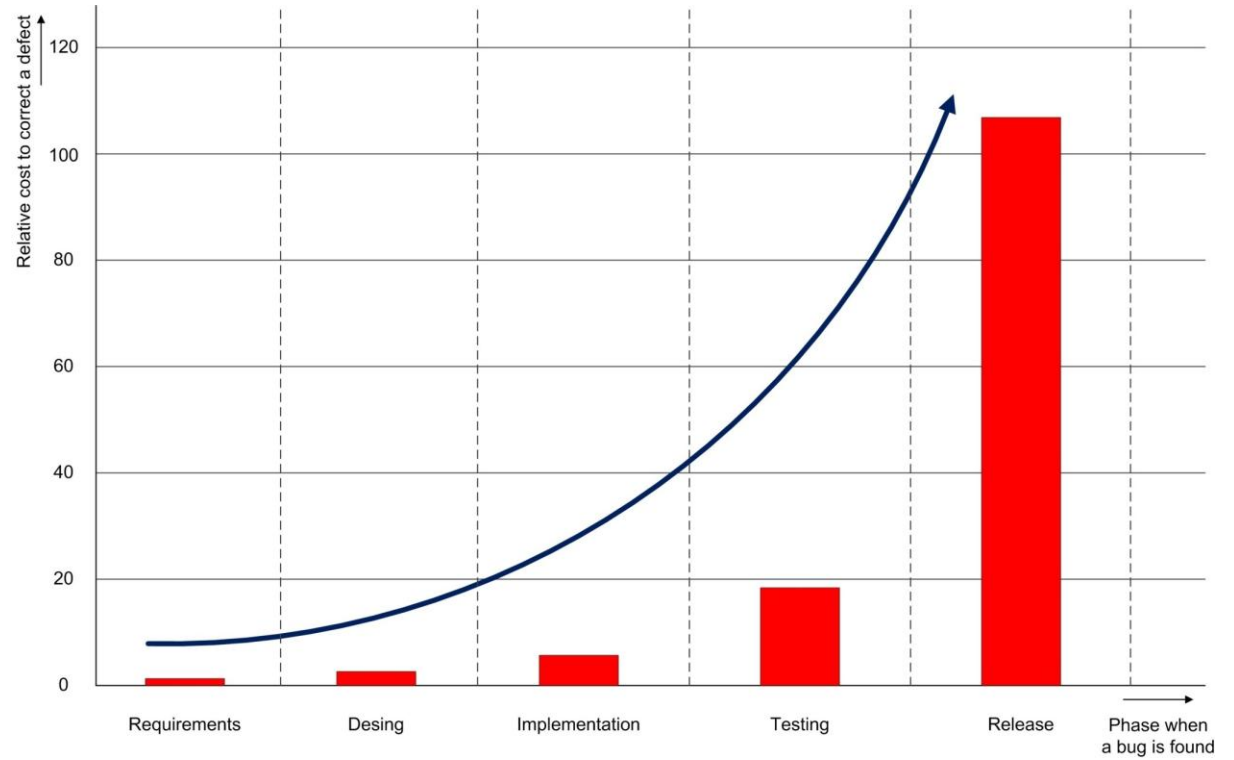
MAIN OBJECTIVES

➔ **ENSURE CUSTOMER NEEDS AND EXPECTATIONS**

➔ **ENSURE PROJECTS ARE DELIVERED ON TIME WITH HIGH QUALITY**

Participates in all phases of the Product life cycle, suggests APPROVAL/REJECTION of the outputs of these phases in terms of quality.

Responsible analysis, design and measuring requirements, and managing necessary test cases to meet quality standards defined in the company.

Ensuring the highest quality by using manual functional testing, automated test suites, regression, endurance, performance and scale testing, while learning and applying testing best practices.

MANAGING QUALITY
TESTING VS QUALITY ASSURANCE

Quality Control (Testing)

- Focus on finding bugs

- Does not guarantee quality

Quality Assurance

- Focus on prevention

Quality Analysis

TESTER VS QA ENGINEER

TESTER

Executes manual tests

Performs test scenarios review

Uses test tool and simulators

Analysis customer issues

Provide summary test reports

Participates in defect management

QA ENGINEER

Participates in technical analysis and review

Interprets business requirements

Designs and implements tests scenarios

Focus on manual/automated tests

Performs functional, regression, exploratory testing

Cooperates with development team

Focus on non-functional requirements

Participates in Test Process Improvement

AREAS OF EXPERTISE

QUALITY CONTROL

Tool support

Test management process

Functional testing

Integration testing

Regression testing

QUALITY ANALYSIS

Business analysis

Formal review

High level analysis

Risks

Non-functional REQs

TEST PROCESS IMPROVEMENT

Test Automation

Standardization

Professional development

Academia cooperation

RELEASE MANAGEMENT

Planning

Monitoring

Verification

TEST ENVIRONMENT

Configuration Management

Virtualization

Performance

INTERNAL SUPPORT

Onboarding / trainings

Knowledge sharing

Remote support

Consultations

Documentation

WHAT IS QUALITY?

failblog.org

QUALITY
CHARACTERISTICS

FUNCTIONALITY
SUITABILITY
ACCURACY
INTEROPERABILITY
SECURITY
RELIABILITY
MATURITY
FAULT TOLERANCE
RECOVERABILITY
USABILITY
UNDERSTANDABILITY
LEARNABILITY
OPERABILITY
ATTRACTIVENESS
EFFICIENCY
TIME BEHAVIOR
RESOURCE UTILIZATION
EFFICIENCY COMPLIANCE
MAINTAINABILITY
ANALYZABILITY
CHANGEABILITY
STABILITY
TESTABILITY
PORTABILITY
ADAPTABILITY
INSTALLABILITY
CO-EXISTENCE
REPLACEABILITY

STAKEHOLDERS

QUALITY IS …

… THE LEVEL OF CONFORMANCE OF THE FINAL DELIVERABLE(S) TO THE **REQUIREMENTS**.
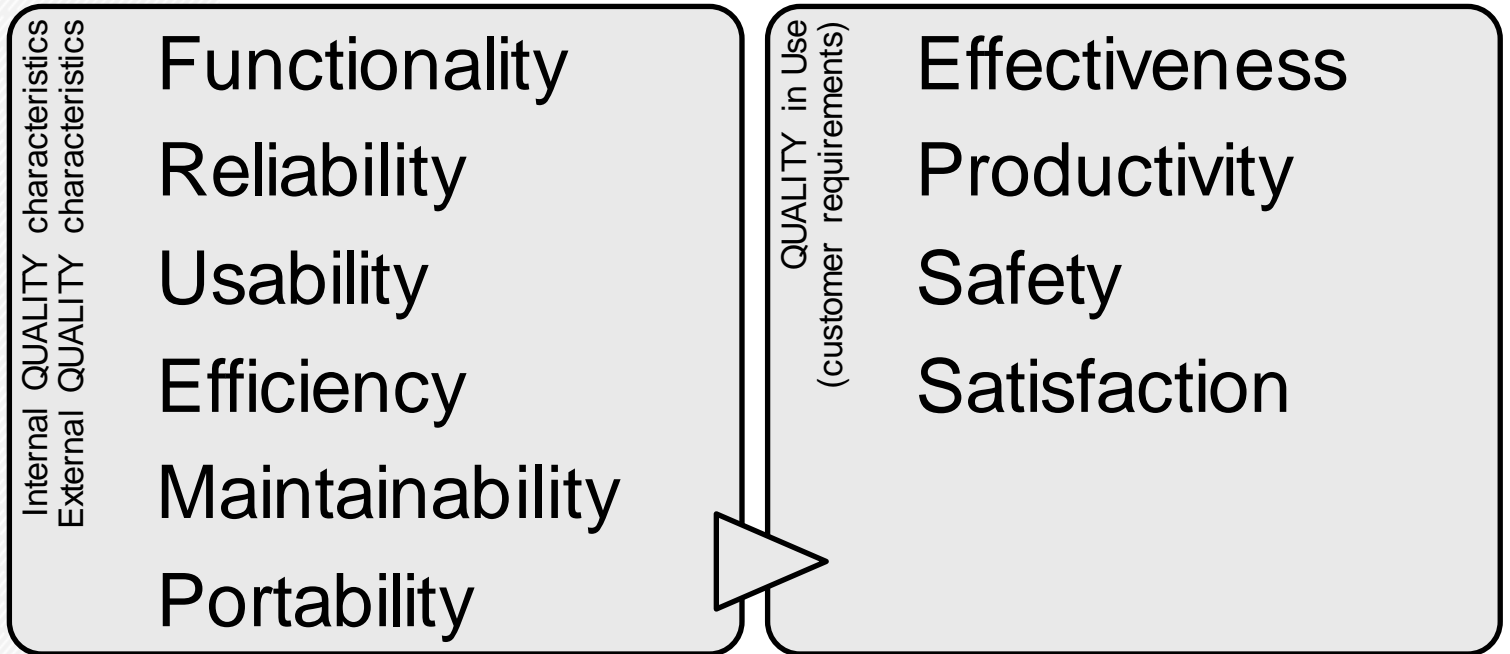
REQUIREMENTS ARE DEFINED BY ALL **STAKEHOLDERS**!

STANDARDS COMPLIANT

EASY TO USE

SEXINESS

COMPETITIVE

SCALABILITY

GOOD DESIGN

DURABLE

GOOD AFTER SALES SERVICE

VALUE FOR MONEY

REQUIREMENTS

No stakeholder ➔ No Requirements

No Requirements ➔ Nothing to do

No Requirements ➔ Nothing to test

ISO/IEC 25000:2005

External QUALITY characteristics

Functionality

Reliability

Usability

Efficiency

Maintainability

Portability

QUALITY in Use
(customer requirements)

Effectiveness

Productivity

Safety

Satisfaction

Functionality
Suitability

Accuracy

Interoperability

Security

Compliance

Reliability
Maturity

Fault tolerance

Recoverability

Compliance

Usability
Understandability

Learnability

Operability

Attractiveness

Compliance

Efficiency
Time behavior

Resource utilization

Compliance

Maintainability
Analyzability

Changeability

Stability

Testability

Compliance

Portability
Adaptability

Instability

Co-existence

Replaceability

Compliance

MANAGING EXPECTATIONS

MANAGE EXPECTATIONS

    NEEDS vs REQUIREMENTS

DESIGN MUST MEET THE BUSINESS NEEDS

    No unintentional design in the requirements

CUSTOMER vs STAKEHOLDER

    Identify stakeholders

QUALITY

    Expectations of ALL stakeholders

AUTOMATION

… WHY / WHEN / WHAT

TEST AUTOMATION
INTRODUCTION

Why:

Reduce amount of manual testing activities (motivation)

Early feedback

Sanity tests

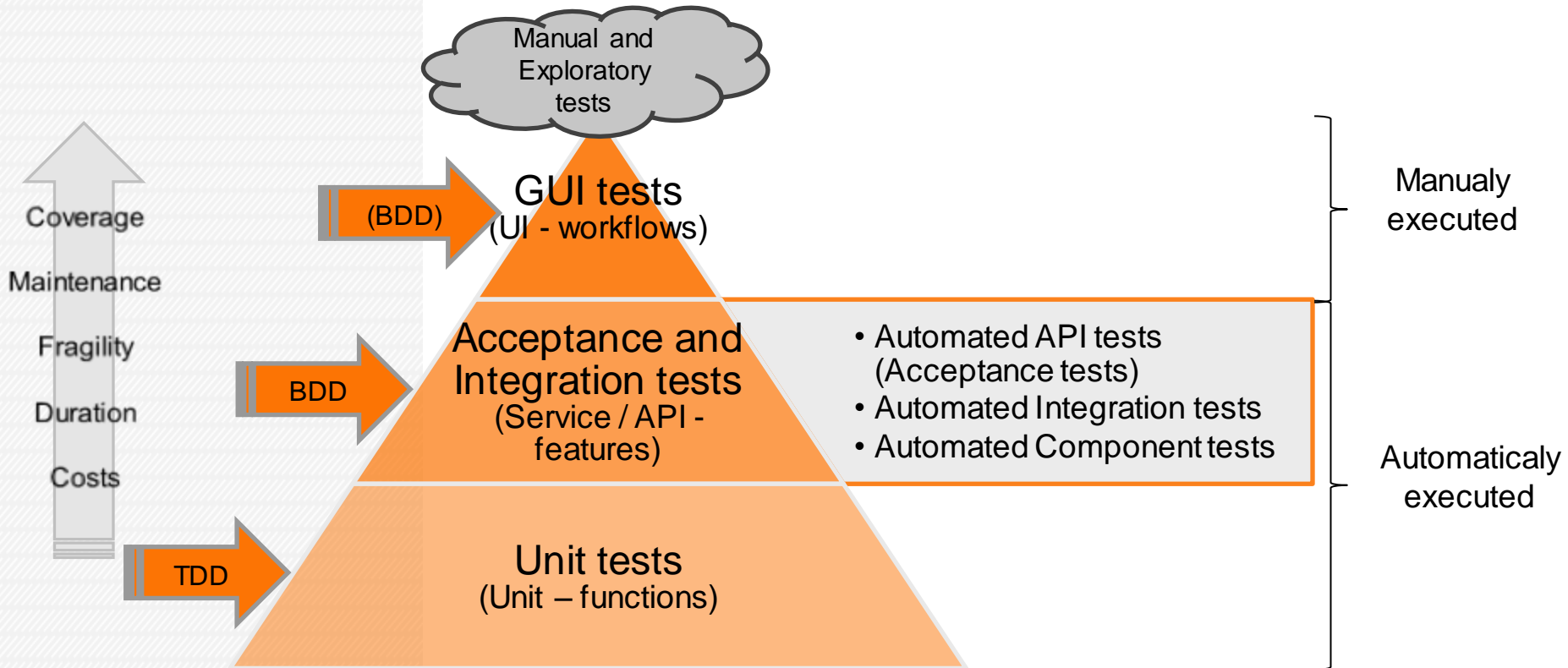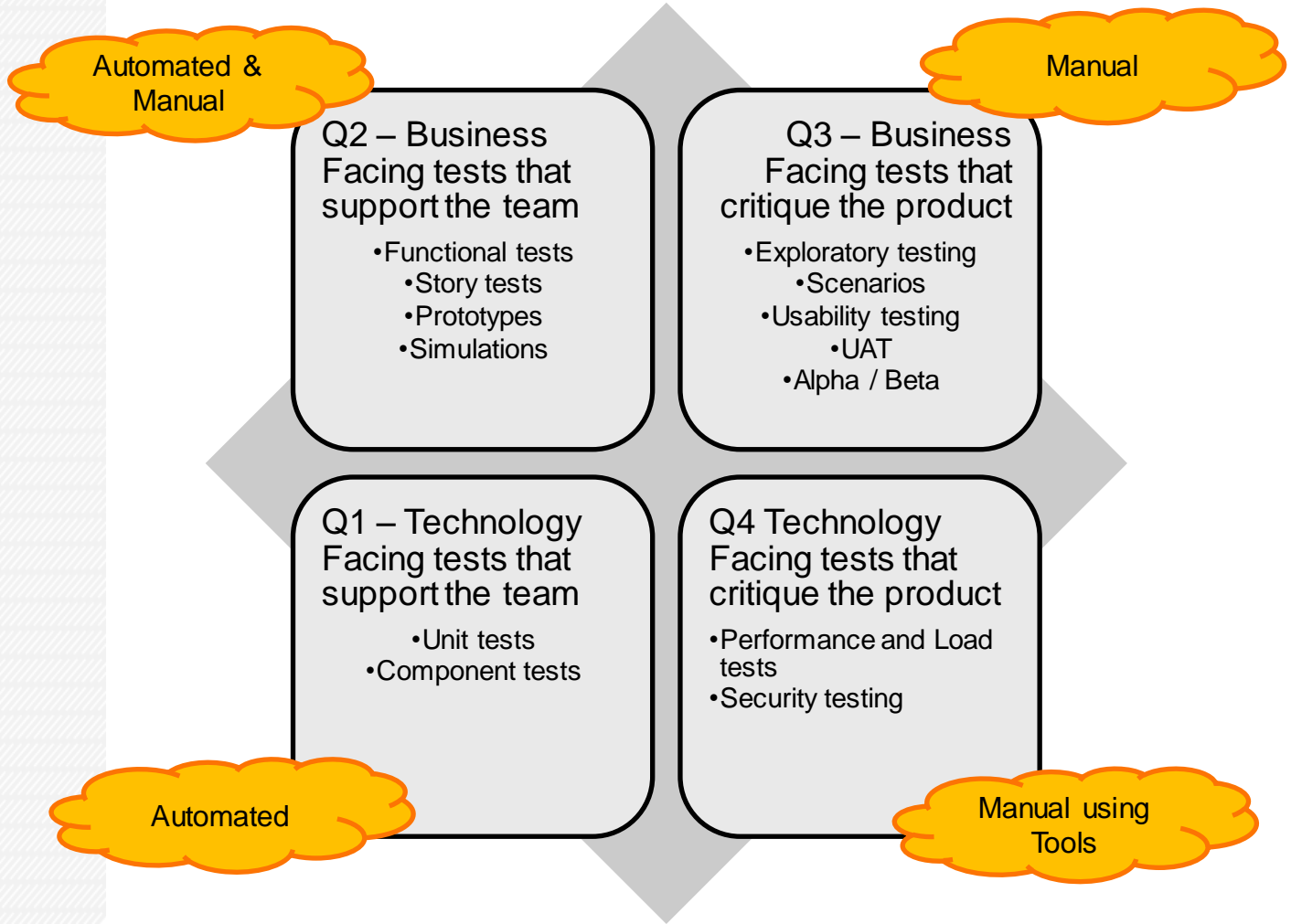Limitations:

Automation does not detect bugs

Agile approach:

Test Driven Development (TDD)

Behavioral Driven Development (BDD)

Acceptance Test Driven Development (ATTD)

TEST AUTOMATION PYRAMID

TESTING QUADRANTS

BEHAVIOR DRIVEN DEVELOPMENT
BDD

Scenario X: Account is in credit+

Given *the account is in credit*

And *the card is valid*

And *the dispenser contains cash*

When *the customer requests cash*

Then *check that the account is debited*

And *ensure cash is dispensed*

And *check that the card is returned.*

BEHAVIOR DRIVEN DEVELOPMENT
BDD

Scenario X: Account is in credit+

<u>**Given**</u> *the account is in credit*

And *the card is valid*

And *the dispenser contains cash*

<u>**When**</u> *the customer requests cash*

<u>**Then**</u> ***check that*** *the account is debited*

And ***check that*** *cash is dispensed*

And ***check that*** *the card is returned*

And ***check that nothing happens that shouldn't happen and everything else happens that should happen for all variations of this scenario and all possible states of the ATM and all possible states of the customer's account and all possible states of the rest of the database and all possible states of the system as a whole, and anything happening in the cloud that should not matter but might matter.***

COFFEE BREAK
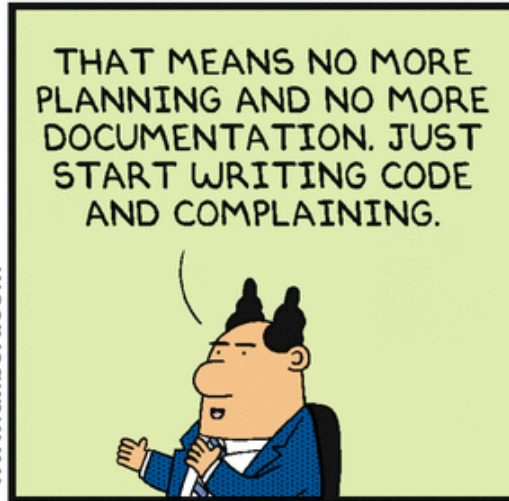
BUILDING QA TEAM

MOTIVATION

People are the most important in an organization

People are not predicable

MOTIVATION

Motivation

- From the Latin word 'movere' – move to action.

Internal factors (motive) vs external factor (stimulus)

- 3 dimension
- Direction (choice) | Intensity (effort) | Persistence (duration)

Stimulus – easier to be introduced

Motives – stronger and far more effective
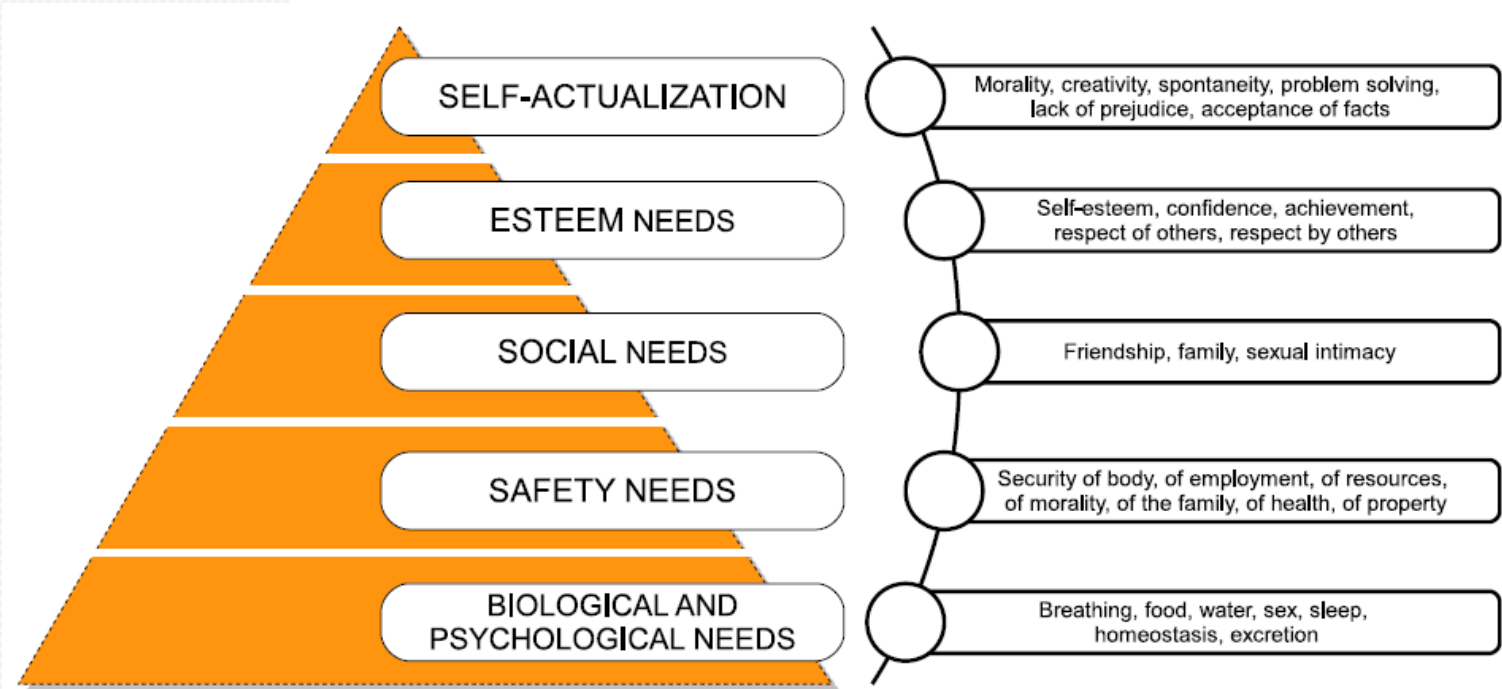
MOTIVATION – THE MANAGERIAL POINT OF VIEW

Intrinsic motivation

- responsibility, status, recognition, personal and professional development, opportunities, and other similar factors
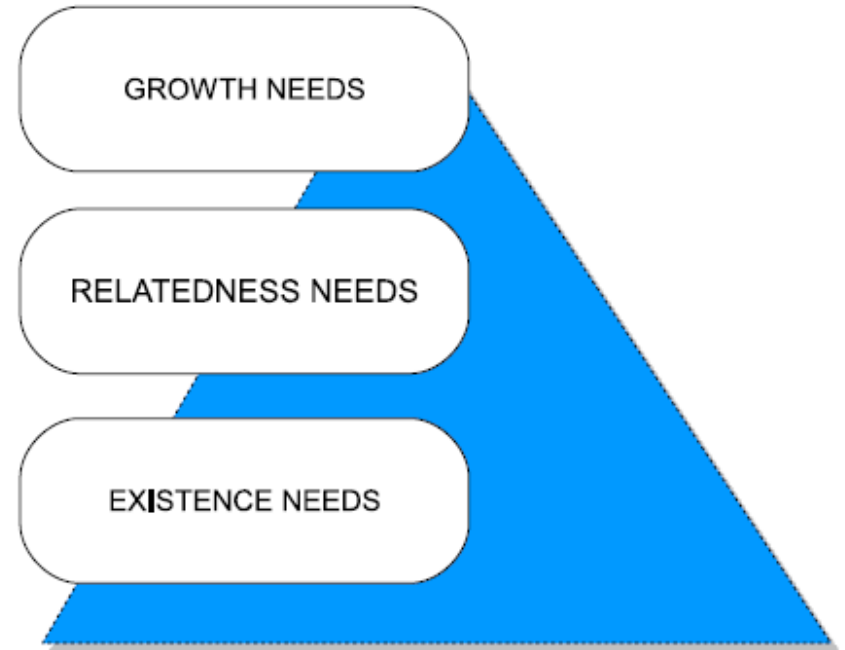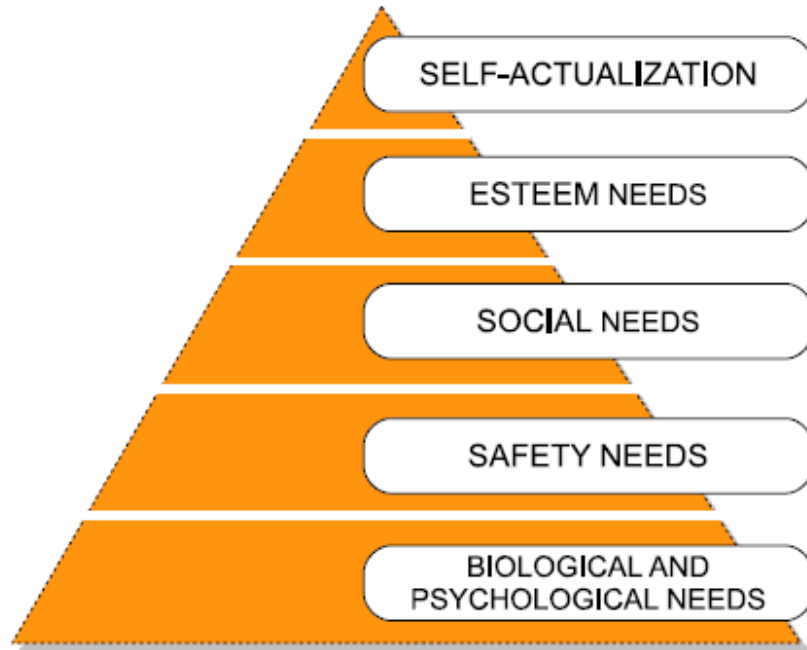
Extrinsic motivation

- salary, wages, benefits and bonuses, work condition, fringe, security, promotion, contract of service, the work environment and conditions of work
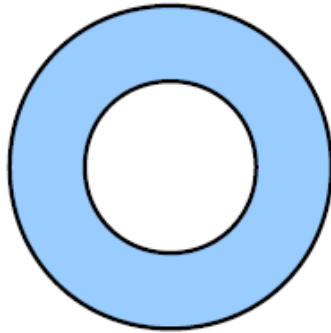
MASLOW'S HIERARCHY OF NEEDS

SELF-ACTUALIZATION — Morality, creativity, spontaneity, problem solving, lack of prejudice, acceptance of facts

ESTEEM NEEDS — Self-esteem, confidence, achievement, respect of others, respect by others

SOCIAL NEEDS — Friendship, family, sexual intimacy

SAFETY NEEDS — Security of body, of employment, of resources, of morality, of the family, of health, of property

BIOLOGICAL AND PSYCHOLOGICAL NEEDS — Breathing, food, water, sex, sleep, homeostasis, excretion

ALDERFER'S ERG THEORY

SELF-ACTUALIZATION	GROWTH NEEDS
ESTEEM NEEDS	RELATEDNESS NEEDS
SOCIAL NEEDS	EXISTENCE NEEDS
SAFETY NEEDS	
BIOLOGICAL AND PSYCHOLOGICAL NEEDS	

HERZBERG'S TWO FACTORS THEORY
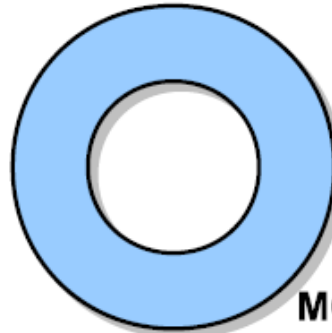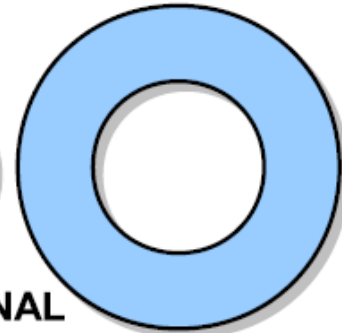
SATISFACTION <-> NO SATISFACTION
DISSATISFACTION <-> NO DISSATISFACTION

MANAGEMENT 3.0 – 10 INTRINSIC DESIRES

|	
Curiosity	The need to think
Honor	Being loyal to a group
Acceptance	The need for approval
Mastery / Competence	The need to feel capable
Power	The need for influence of will
Freedom / Independence / Autonomy	Being an individual
Relatedness / Social Contact	The need for friends
Order	Or Stable environments
Goal / Idealism / Purpose	The need for purpose
Status	The need for social standing

MOTIVATION
SUMMARY

What motivates one demotivates others

Motivating people is NOT the same as NOT demotivating people

TEAM ROLES (PERSONALITY TYPOLOGY)
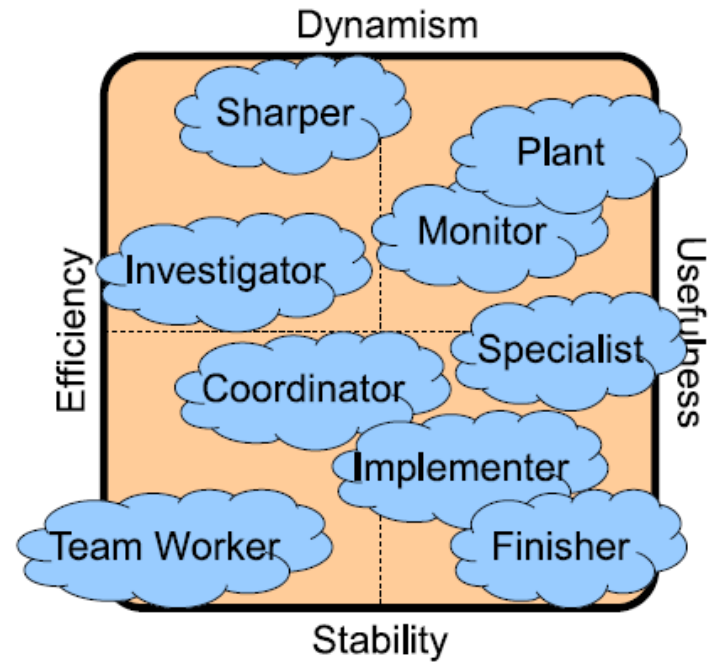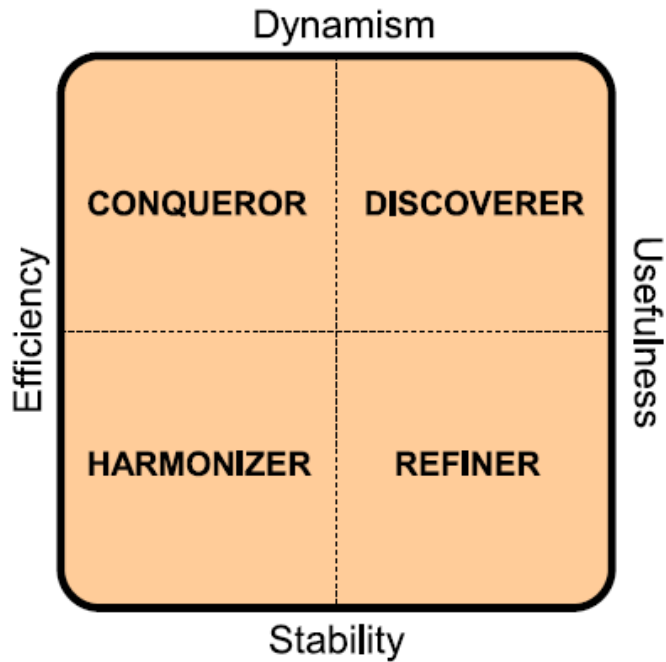
Comparison of Jiri Plaminek's typology and Belbin team roles

IMPROVING PROCESSES

CONTINUOUS IMPROVEMENT

PROCESS IMPROVEMENT

It means success

Requires commitment from management

Involves monitoring and measurement

People do not like changes

    (people like changes, they do not like uncertainty)

It is about processes, not people

CMMI

Level 1: Initial

Level 2: Managed

Requirement Management, Project Planning, Process and Product QA, Configuration Management, …

Level 3: Defined

Requirements development, Validation and Verification, Organizational Processes, Risk Management, …

Level 4: Managed

Organizational Process Performance, Quantitative Project Management

Level 5: Optimizing

Organizational Innovation and Deployment, Causal Analysis and Resolution

TEST PROCESS IMPROVEMENT
STANDARD MODELS

Staged model

    TMMi (based on CMMi)

Continuous models

    TPI Next (Test Maturity Matrix)

    CTP (Critical Testing Processes)

        Project Driven Improvement

    STEP (Systematic Test and Evaluation Process)

        Very agile

TMMI MATURITY LEVELS

Level 1: Initial
- Chaos
- Ad-hoc methods

Level 2: Managed
- Test Policy and Strategy
- Test Planning
- Test Monitoring and Control
- Test Design and Execution
- Test Environment

Level 3: Defined
- Test Organization
- Test Training Program
- Test Lifecycle and Integration
- Non-functional Testing
- Peer Reviews

Level 4: Measured
- Test Measurement
- SW Quality Evaluation
- Advanced Peer Reviews

Level 5: Optimized
- Defect Prevention
- Test Process Optimization
- Quality Control

TPI NEXT

16 Key areas

4 Maturity levels

157 Checkpoints

13 Clusters

AGILE ADOPTION

THE ULTIMATE TEST OF AGILITY IS WHETHER YOU CAN KEEP ALL YOUR STAKEHOLDERS HAPPY.

WHOLE-TEAM APPROACH

Enhancing communication and collaboration within the team

Enabling the various skill sets within the team to be leveraged to the benefit of the project

Making quality everyone's responsibility

Early and Frequent Feedback

ROLE OF TESTERS
IN AN AGILE TEAM

Combination is the science

    Reviews

    Exploratory testing

    Risk Based testing

    Test Automation

    Measuring quality

Team Role

CHALLENGES

ADOPTION vs ADAPTION

CULTURE

    Punishment vs Taking risks

MATURITY

    Responsibility

INTERACTIONS

RESISTANCE TO CHANGE

MANAGEMENT

    LEADERSHIP IS ACTION, NOT POSITION

    "Boss" is a job; "Leader" is a career.

PEOPLE QUIT THEIR BOSS, NOT THEIR JOB

TESTING MYTHODOLOGY

Myth 1: Testing is a boring job

FACT: Testing is NOT boring: It's been said that "Testing is like sex. If it's not fun, then you're doing it wrong."

Myth 2: Testing and debugging improves quality

FACT: Testing is a measure of quality. The number of defects you find indicates the quality of the product. "Testing to improve quality is like standing on a scale to lose weight".

Myth 3: Automated testing eliminates the need for manual testing

FACT: 100% test automation cannot be achieved. Manual Testing, to some level, is always necessary. Automation is a useful tool that should be taken into consideration, but it should not be the first thing to be considered when testing software. It is much useful while designing a method for testing, as the design outcome helps to decide whether automation is actually required or not. Moreover, Test Automation can never be used if requirements keep changing.

Myth 4: When a defect slips, it is the fault of the Testers

FACT: Quality is the responsibility of all members/stakeholders, including developers, of a project.

Myth 5: If the software is tested then it must be bug free

FACT: No one can say with absolute certainty that a software application is 100% bug free even if a tester with superb testing skills has tested the application

THANKS!

Petr NEUGEBAUER

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QA Evangelist | ISTQB® Agile Extension Certified Professional