Agile in Product Development

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***Note**: Class notes/presentation prepared with due credit to all the references.*

Educator Background …Prof. Prakash Attili

Global IT Delivery (USA for 6 years) (11 years)

- ✓ Developer, Technology Lead, Manager, Senior Manager

Leadership Roles (5 years)

- ✓ Agile Coach and Strategist
- ✓ Head, Learning Partner for Cyber Security practice @Infosys
- ✓ Head, Learning Partner for Chennai Development Center @Infosys

Industry-Academic

- ✓ Researcher & Adjunct Faculty, DoMS, IIT Madras
- ✓ Board of Studies - VIT, SRM etc.,
- ✓ Key note talks - CII, ISACA, DSCI, EFY, and SPIN

Global Consulting (2 years)

- ✓ Principal Consultant - Large Strategic Deal

Academic-Industry *(2 years)*

- ✓ Full time Faculty, IIM Lucknow

Education Background

- ✓ Bachelor from Andhra University (Mechanical Engineering – Gold Medalist, 1996-2000)
- ✓ Masters from IIT Bombay (Industrial Engineering & Operations Research, 2000-2002)
- ✓ Ph.D. from IIT Madras (Information Systems – Best Doctoral Student Award from AIS, USA, 2012-2017)

Research and Development

Strategy alignment is the key for research

Innovation *vs* R&D Spend

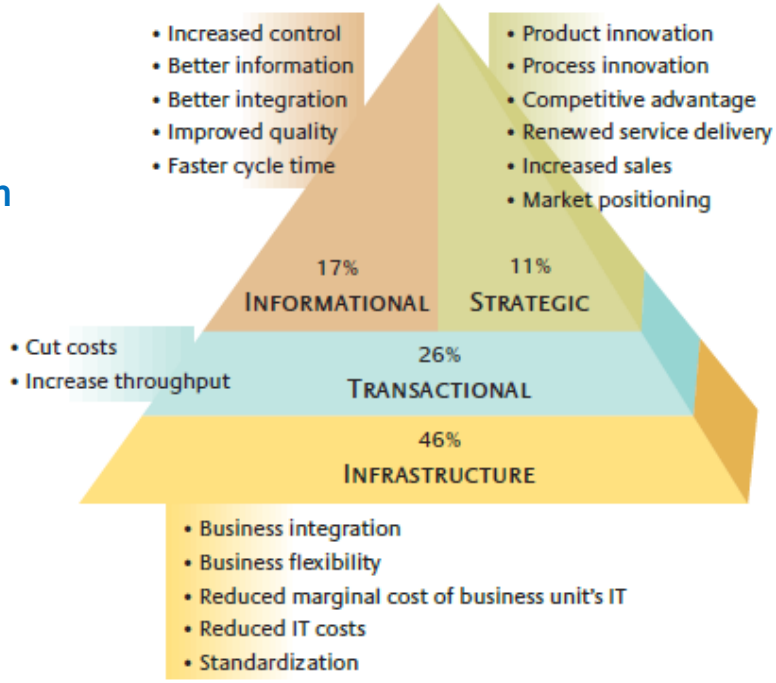
The 10 Most Innovative Companies 2014			*The Top 10 R&D Spenders 2014*		
Company	**Industry**	**2014 R&D Spending (USD billion)**	**Company**	**Industry**	**2014 R&D Spending (USD billion)**
Apple	Computing and electronics	4.5	Volkswagen	Auto	13.5
Google	Software and Internet	8.0	Samsung	Computing and electronics	13.4
↑ Amazon	Software and electronics	13.4	↑ Intel	Computing and electronics	10.6
↓ Samsung	Computing and electronics	13.4	↑ Microsoft	Software and Internet	10.4
↑ Tesla	Auto	0.2	↓ Roche	Healthcare	10.0
↓ 3M	Industrials	1.7	↑ Novartis	Healthcare	9.9
↓ General Electric	Industrials	4.8	↓ Toyota	Auto	9.1
↓ Microsoft	Software and Internet	10.4	↑ Johnson & Johnson	Healthcare	8.2
↓ IBM	Computing and electronics	6.2	↑ Google	Software and Internet	8.0
NEW Procter & Gamble	Consumer	2.0	↓ Merchk & Co	Healthcare	7.5

↓↑ Increase or decrease within top 10 ranking compared to 2013

Source: Bloomberg data; Capital IQ data; Strategy & 2014 Global Innovation 1000 survey data and analysis

IT Assets - Investments Classification

Combination of short term and long term gains



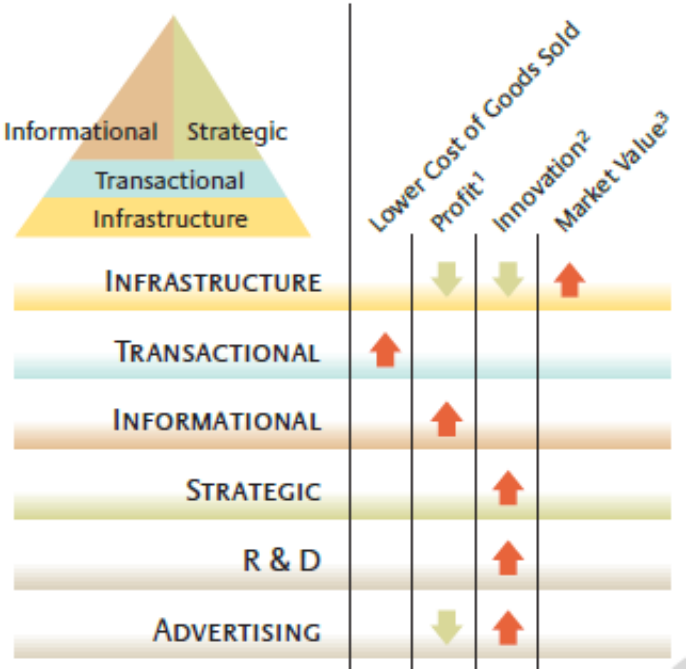
Source: Framework from P. Weill and M. Broadbent "Leveraging the New Infrastructure: How Market Leaders Capitalize on IT," Harvard Business School Press, 1998.

Data: Percentages are from an MIT CISR study of 2005 total IT investments from 640 enterprises.

Investment in single project can spread across one Or more asset classes

IT Assets – Delivery of Value

Statistically significant relations showed.
- As per MIT research



Top performers in Financial Services spend 10% less on IT Than average IT spend

Challenges – Approach

- Fast Paced change in Business Environment
  - Change in preferences
  - More range of products
  - Known needs
  - Unknown needs

Company growth in a highly competitive world hinges on superior R&D performance

- Innovation
  - Incremental Innovation (Re-New)
  - Breakthrough innovation (New)

Challenges – Approach

- R&D performance is boiled down to a few simple universal practices.
  - Repeated restructuring
  - Oscillations between centralized to decentralized models
  - Endless process re-engineering

There is no one best model for R&D that is universally superior. There is no "magic bullet."

- R&D Output depends on interaction of many different decisions and choices
  - Size and location of R&D facilities
  - The division of labor between various groups,
  - The choice of technologies used inside the R&D organization,
  - The selection of personnel
  - The allocation of resources
  - The design of processes for managing projects etc.,

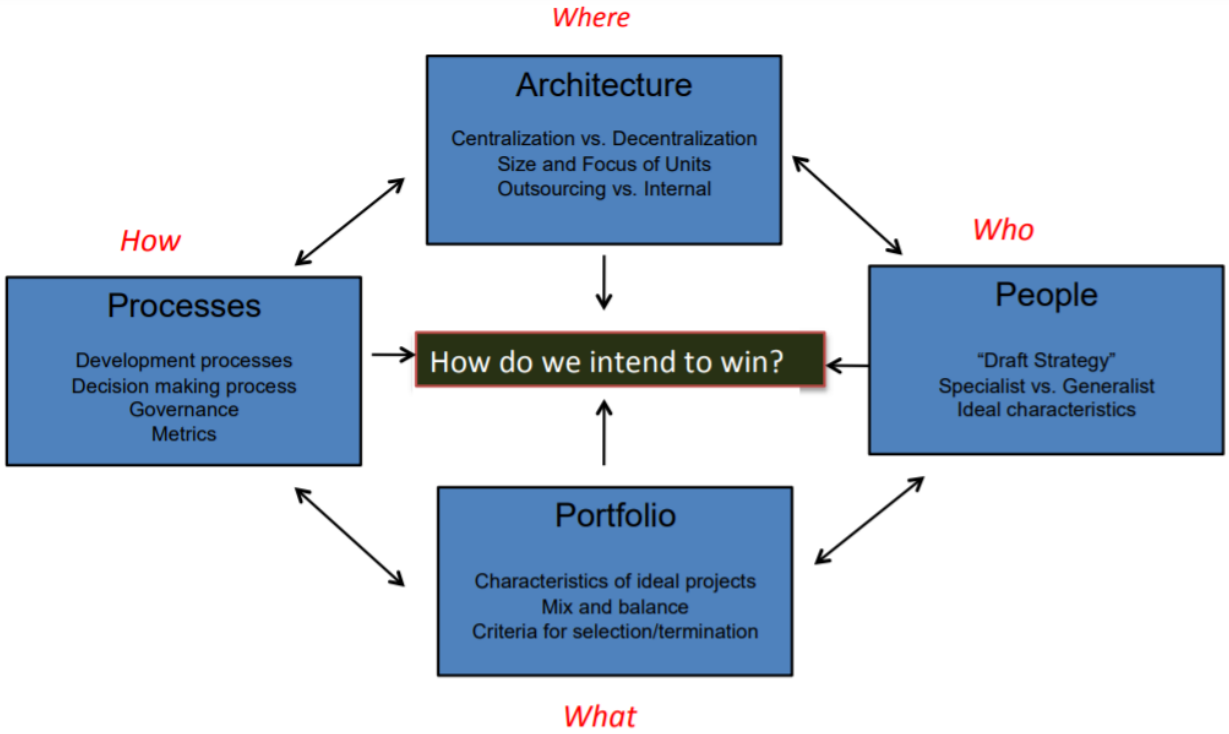
Creating an R&D Strategy

- **Apple's** strategy, for instance, is to develop easy-to-use, aesthetically-pleasing products that integrate seamlessly with a broader system of devices in the consumer's digital world.
- This strategy provides a guiding orientation for a broad range of Apple's business decisions such as the selection of new R&D projects, the design of products, the composition of project teams, the choice of suppliers, the focus of marketing campaigns, the layout of Apple's retail stores, and even hiring of people.
- The strategy implies a pattern of behavior with respect to all of these decisions.

- Consistency : Cumulative outcome - decisions, actions, and behaviors over time.
- Coherence : Ensure these tactical decisions are coherent.
- Alignment : R&D organization strategy to align with the broader business strategy

Source: HBS Article by Gary P. Pisano

Elements of the R&D Strategy



Source: HBS Article by Gary P. Pisano

Role of Data in Strategy

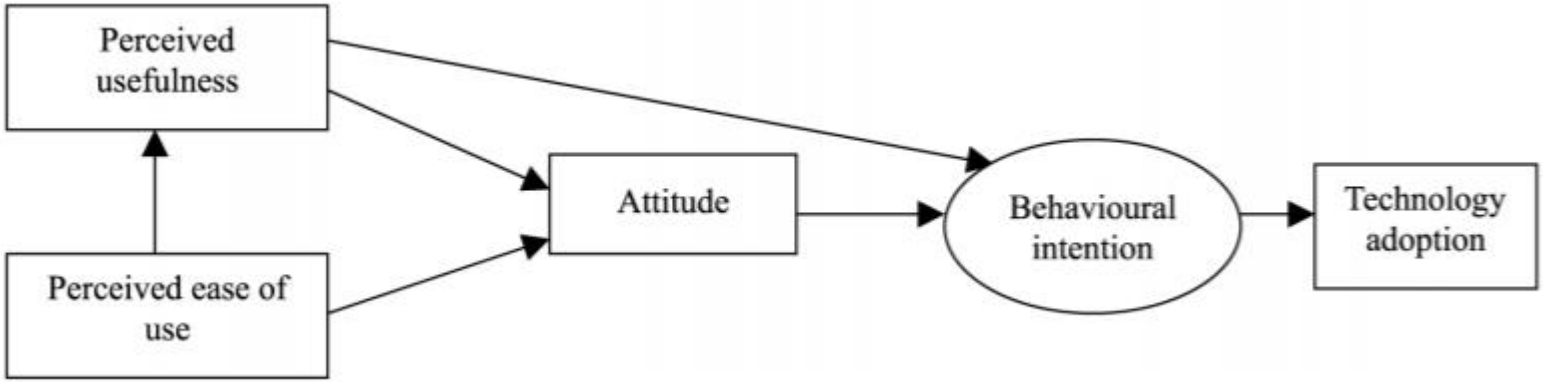
- Your Bet is your hypothesis Or proposition
- Experience executing a strategy provides "data" that may cause you to revise your core hypotheses

Finally, because a strategy is a "hypothesis", we need to evaluate our R&D strategy against performance data and recognize when the time has come to reject our initial hypothesis, and change strategies.

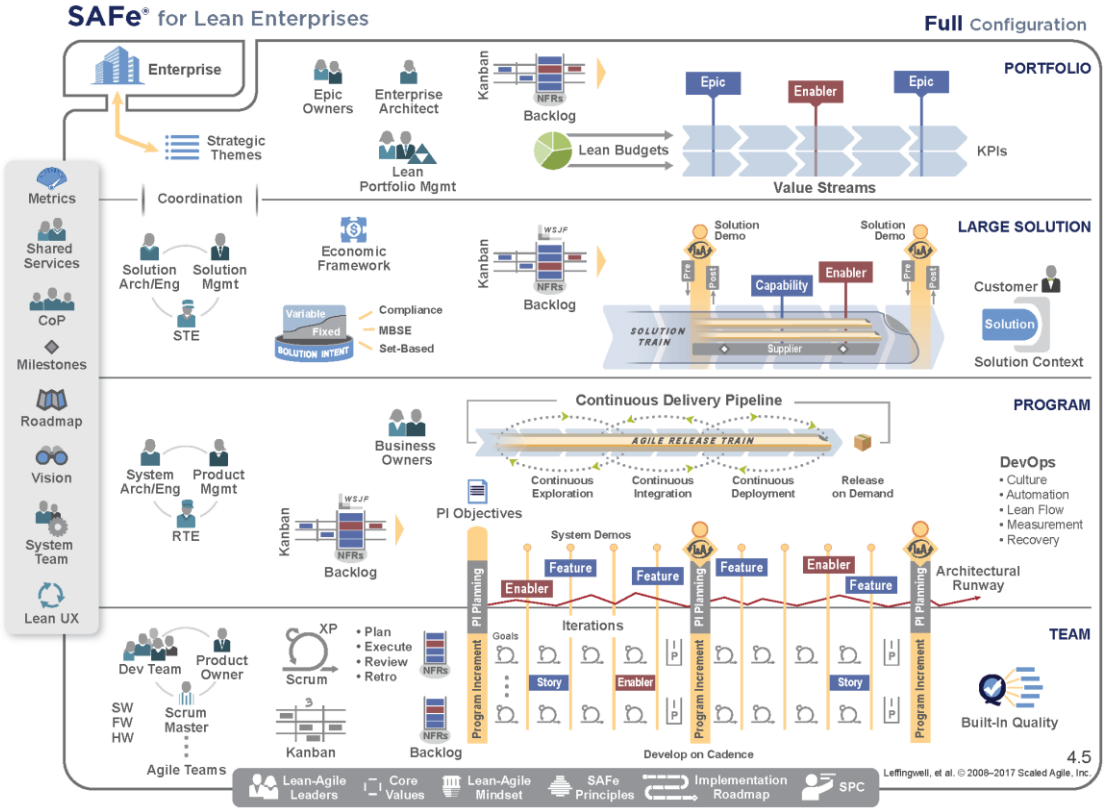
- Qualitative Data – Themes
- Quantitative Data – Statistical significance, to accept Or reject hypothesis

Adaption Model

- Technology Adaption Model



Scaled Agile

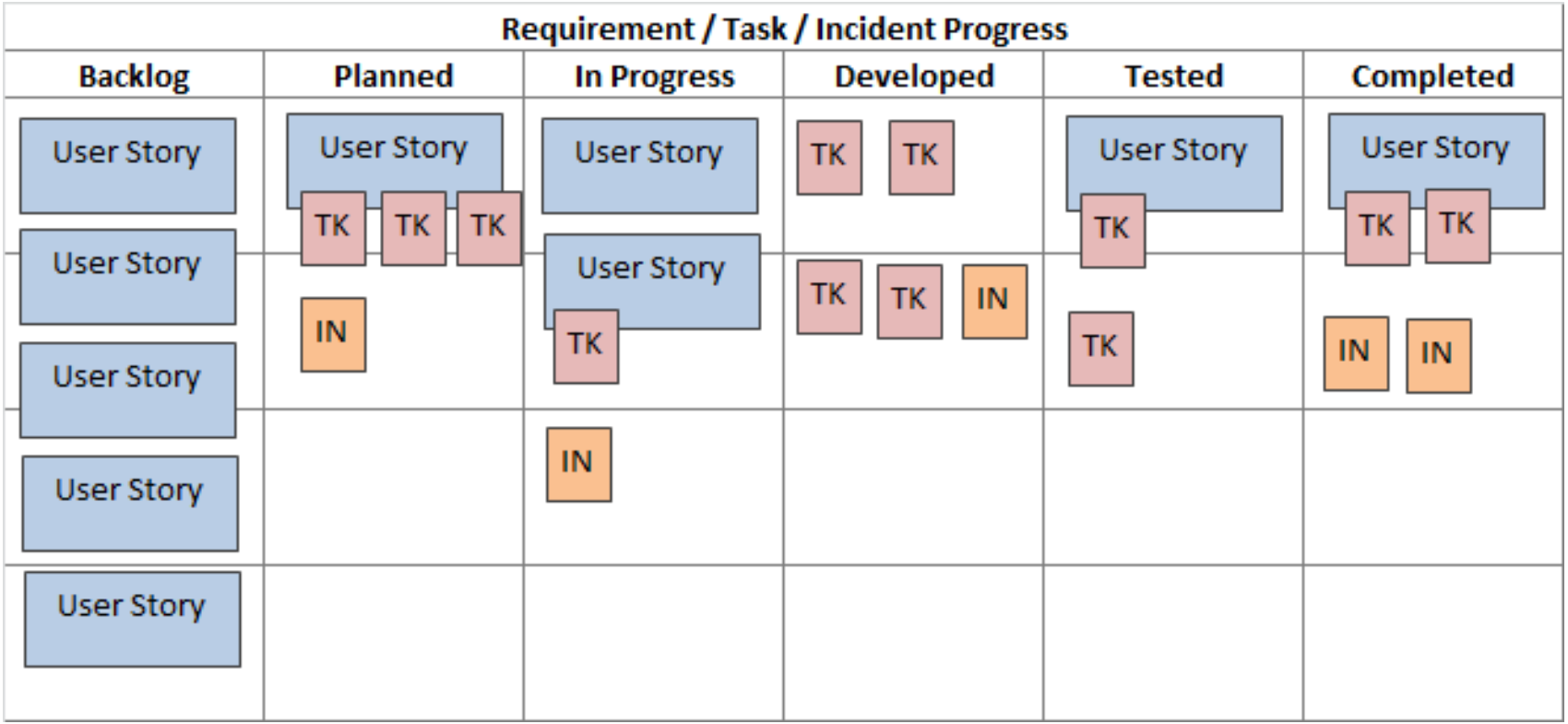


Compare and Contrast Agile Approaches

Agile methodology	Characteristics	Phases of development life cycle supported	Usage constraints
ASD	Promotes adaptive paradigm, derives principles from radical software development	Requirements, design, code, unit test, integration test, system test, acceptance test	It is more about concepts and culture rather than in-practice
AM	Agile modelling – agility and rapid development in producing sufficiently advanced models to support acute design.	None	It does not work independently but work within other methods as supplement
Crystal	Family of methods to be chosen suitable for the business needs with rules of thumb for tailoring. Flexible and configurable process	Design, coding, unit test, integration test, system test	Lack of support for mission-critical systems, distributed teams, scalability, insistence on only collocation.
DSDM	Provides control framework for rapid application development. Keeps time and resources as constant and adjust the functionality to be developed	Project inception, requirements, design, code, unit test, integration test, system test, acceptance test, system in use	Availability issue to wider audience
XP	Customer focused and close customer participation, short iterations and short release, continuous re-factoring.	Requirements, design, code, unit test, integration test, system test	Lack of attention on management practises
FDD	More emphasis on quality, frequent and tangible deliveries and accurate monitoring of project progress. Very short iterations	Requirements, design, code, unit test, integration test, system test	Focused mainly on design and implementation
ASP	The Agile Software Process model focusses on accelerated development with flexibility to include volatile requirements	Requirements, design, code, unit test, integration test, system test, acceptance test	Unable to predict effort upfront and threat of loss of focus due to changing requirements,
PP	Pragmatic programming – more of pragmatic perspective with a set of best practises	None	Does not define any concrete methodology to develop a system
SCRUM	Focusses on flexibility, adaptability, productivity, through small, self- motivated teams. Integrated project management process to overcome deficiencies in the development process	Requirements specification, integration test	Coding and all testing process not defined completely.

***Source**: Abrahamsson et al., 2010*

Kanban



Technical Practices

- ✓Simple Design
- ✓Test Driven Development
- ✓Refactoring
- ✓Pair Programming
- ✓Continuous Integration

XP = Technical Practices + Scrum Style Project Management

OR

Effective development teams = Scrum + Technical Practices from XP

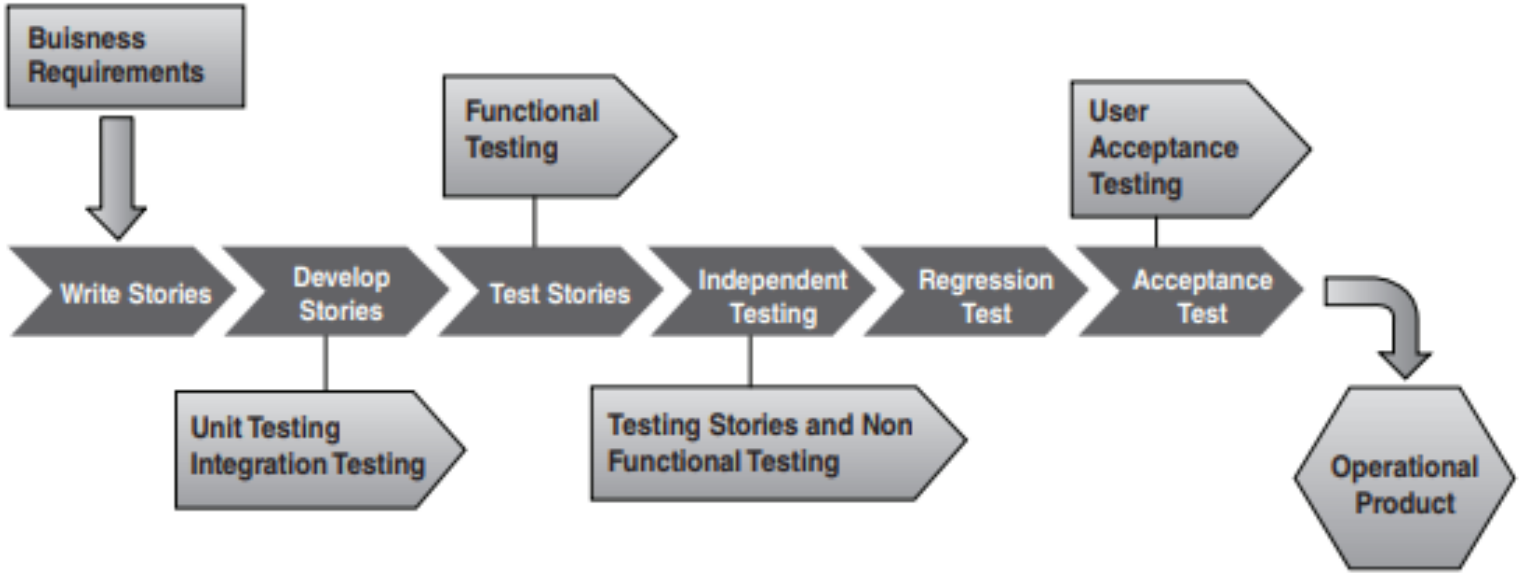
Focus on Testing

A 'passing' test doesn't mean 'no problem.' It means no problem 'observed'. This time. With these inputs. So far. On my machine.
—Michael Bolton

Be a yardstick of quality. Some people aren't used to an environment where excellence is expected.
—Steve Jobs

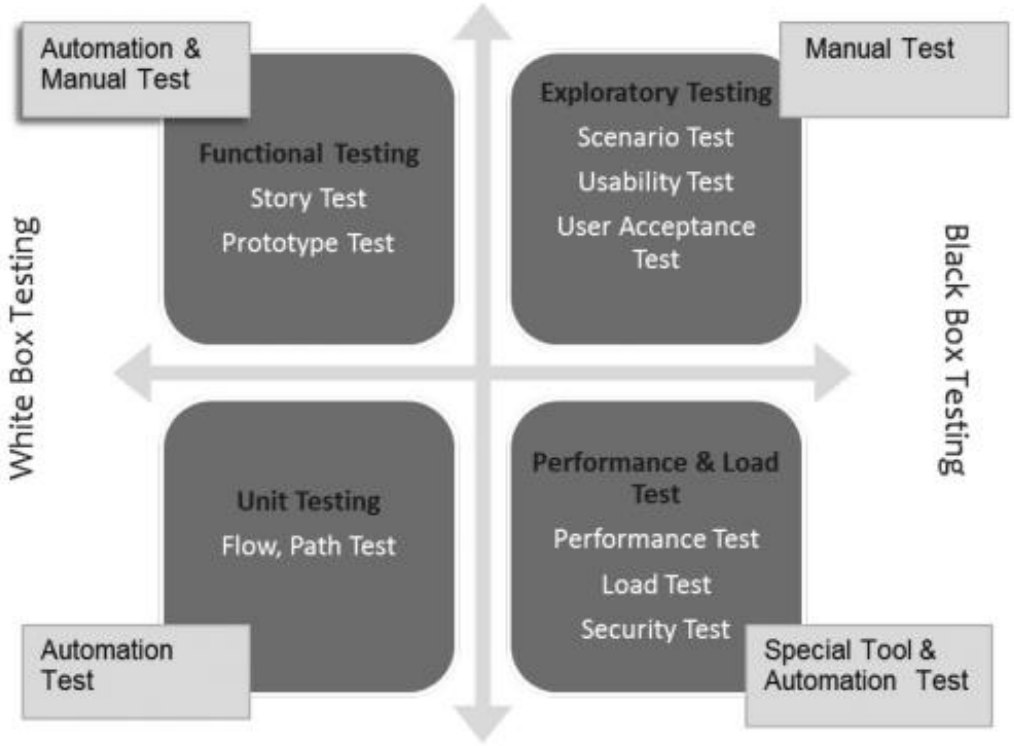
- ✓**Verification**
  - Does program coded / works correctly
- ✓**Validation**
  - Does it meet user requirement
- ✓Focus Areas
  - Developer / SIT / UAT /Third party tools / Security / Non-functional etc.,
  - White box / Black box

Agile Testing Focus



Testing Activities in Agile Projects

Agile Testing Focus



The agile test methodologies

Product Support

✓Strategic Importance of Product Support
- Enhanced product adoption and loyalty
- Ability to innovate by listening to the customer base
- Better align product capabilities to market segment needs
- Generate repeat business and larger wallet share of customers
- Improve customer satisfaction
- Reduce customer churn
- Increase overall product and services revenue
- Sustain market leadership

✓Support Processes
- Customer service request
- Support ticket handling
- Creation of knowledge repository
- Incident and escalation management
- Problem and incidents data analysis and root cause analysis

Distributed Scrum

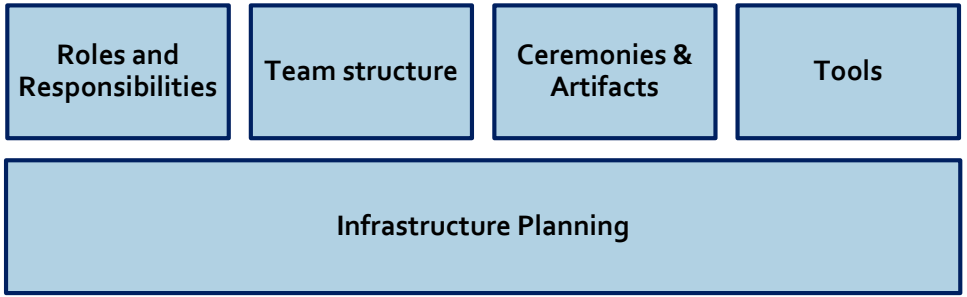
✓Features

- Applicable where GDM is practiced
- Practices of Scrum remain the same
- Need to make the scrum practices work in a distributed fashion

✓Challenges

- Product owner not collocated
- Stark difference in time zones
- Communication gaps
- Late response to questions asked
- Unfamiliar accents and culture

Can be addressed by using the practices mentioned under the following categories



Few Best Practices

Sprint planning meeting	• May be done in the middle of the week instead of a Monday or on a Friday of earlier sprint • Involve Offshore team members also • Ensure availability of Product owner to answer queries
Daily standup	• Done at a mutually convenient time for the distributed team • Practice time rotation for stand up meetings • If no time overlap , separate stand up meetings and sync between Scrum masters
Product Backlog grooming	• Done at a mutually convenient time between customer and Development teams
Sprint Review & retrospective	• Entire team to participate in the review (Invite the World) • Done at a mutually convenient time between customer and Development teams • Use video conference if possible

Few Best Practices - Roles & Responsibilities

- ✓Team to align to spirit of the three global scrum roles
- ✓Daily interaction of product owner with sprint teams
- ✓If most of the team is co-located at offshore –
  - Invite customers at least for first few sprints for co-location at offshore
- ✓Addition of –
  - BA(business analyst) as proxy product owner at onsite or offshore for faster clarification of requirements
  - Technical experts/deployment managers can be proposed at onsite
  - Functional expert at offshore proxy product owner) can give decisions in absence of actual product owner

Few Best Practices - Team structure

- ✓Limited to 5-9 members
- ✓Possible combinations in the decreasing order of consideration
  - Complete co-location at onsite or offshore with customer travelling to meet the team
  - Key members at onsite along with product owner
- ✓Have first few sprints completely co-located at onsite or at offshore with customer travelling to the location
- ✓Start off with 2-week sprints
- ✓Scrum master with each local team
  - An experienced team member can double up as a scrum master

References

- ✓Agile Project Management with Azure DevOps - Concepts, Templates, and Metrics by Joachim Rossberg, Apress Publishing.
- ✓Agile Product Management with Scrum - Creating Products that customers love by Roman Pichler, Pearson Publishing.
- ✓ A Guide to the SCRUM BODY OF KNOWLEDGE (SBOK™ GUIDE), Third Edition
- ✓THE SCRUM PRIMER, A Lightweight Guide to the Theory and Practice of Scrum , Ver 2.0

THANK YOU