Changing role of Process & Quality Functions in the context of Agile & DevOps movement

BSPIN
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Introduction

- About 30 years in IT Industry
- Worked in IISc, ADA, Motorola, Mindtree
  - R&D, Military Avionics, Hardware, Software Engineering, Project Management, Delivery Management, Quality Management, Business Excellence
  - Sr VP and global Head of Business Excellence at Mindtree
- Now part of PM Power consulting
  - Consulting & Coaching on Enterprise Agile/DevOps transformation, Project Management competency development, Leadership coaching
Changing role of Process & Quality Functions

- Traditional role of Process & Quality Functions
- Why should P&QF should change?
- Technology trends driving change in the industry
- How Agile & DevOps are enabling/leveraging the Technology changes?
- What is Agile & DevOps?
- Rationale behind Agile - Knowledge era paradigms
- What should be the new role of P&QF?
- What should be the characteristics of new P&Q Professionals?
Traditional role of Process & Quality Functions

- Defining Processes
- Defining Metrics
- Collecting Metrics
- Auditing process compliance
- Doing Assessments
- Driven by standards & models like ISO, CMMI
Why should P&QF should change?

- Businesses & Technologies are rapidly changing
- Engineering & Project Management practices need to change to adapt to the needs of such changing Businesses & Technologies
- Quality is achieved through good Engineering & Project Management practices
  - But because P&QF are driven by Standards & Models, they have become over-focused on process
- Quality Function is a Change Agent/Catalyst Function
  - They should be leading the change
  - But on the contrary they have the highest resistance to change because they are driven by the goal of compliance – which is maintaining status quo
- In order to be more value-adding Function, P&QF should change
Gartner predictions for 2015

1. Computing everywhere
2. IoT
3. 3D printing
4. Advanced, pervasive and invisible analytics
5. Context-rich systems
6. Smart machines
7. Cloud / client computing
8. Software defined apps / infra
9. Web scale IT
10. Risk based security and self protection
Forrester: Emerging technologies to watch – now through 2020

1. Customer analytics
2. Managing customer life cycle
3. Co-created solutions
4. IoT
5. New digital end-points
6. Wearable technologies
7. Natural UI
8. Advanced analytics
9. Digital identity management
10. Software acceleration platforms
11. Advanced devices
12. Software defined infrastructure
13. Cloud integration tools
14. Big data management
Overall Technology Trend

Digital Business

S M A C I
Implications of these trends

- Faster time to market – and increased agility
  - Being very dynamic to change and faster to bring out products
- Simplified business / adaptive business models
- Faster and adaptive processes
- Context awareness (about industry, customers, customer insights and so on)

- Expectations in terms of improved productivity of teams and organizations
- Solutions requirements becoming more complex
- Need to outpace competition, every day
- Development cycles shrinking
- Deployment speeds to match development
Enterprise Agility – How?

Agile methods

DevOps
### Why are Businesses adopting Agile?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Accelerate product delivery</td>
<td>59%</td>
</tr>
<tr>
<td>Enhance ability to manage changing priorities</td>
<td>56%</td>
</tr>
<tr>
<td>Increase productivity</td>
<td>53%</td>
</tr>
<tr>
<td>Enhance software quality</td>
<td>46%</td>
</tr>
<tr>
<td>Enhance delivery predictability</td>
<td>44%</td>
</tr>
<tr>
<td>Improve business/IT alignment</td>
<td>40%</td>
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<tr>
<td>Improve project visibility</td>
<td>40%</td>
</tr>
<tr>
<td>Reduce project risk</td>
<td>38%</td>
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<tr>
<td>Improve team morale</td>
<td>26%</td>
</tr>
<tr>
<td>Improve engineering discipline</td>
<td>25%</td>
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<tr>
<td>Reduce project cost</td>
<td>23%</td>
</tr>
<tr>
<td>Increase software maintainability</td>
<td>22%</td>
</tr>
<tr>
<td>Better manage distributed teams</td>
<td>20%</td>
</tr>
</tbody>
</table>

Source: VersionOne survey 2015
Top Benefits of Agile adoption

<table>
<thead>
<tr>
<th>Benefit</th>
<th>% Got Better</th>
<th>% No Change</th>
<th>% Don't Know</th>
<th>% Got Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to manage changing priorities</td>
<td>87</td>
<td>2</td>
<td>10</td>
<td>&lt;1</td>
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<tr>
<td>Increased team productivity</td>
<td>84</td>
<td>3</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Improved project visibility</td>
<td>82</td>
<td>4</td>
<td>13</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Increased team morale/motivation</td>
<td>79</td>
<td>6</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Better delivery predictability</td>
<td>79</td>
<td>6</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Enhanced software quality</td>
<td>78</td>
<td>6</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Faster time to market</td>
<td>77</td>
<td>7</td>
<td>15</td>
<td>1</td>
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<tr>
<td>Reduced project risk</td>
<td>76</td>
<td>6</td>
<td>17</td>
<td>&lt;1</td>
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<tr>
<td>Improved business/IT alignment</td>
<td>75</td>
<td>6</td>
<td>18</td>
<td>1</td>
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<tr>
<td>Improved engineering discipline</td>
<td>72</td>
<td>7</td>
<td>20</td>
<td>2</td>
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<tr>
<td>Enhanced software maintainability</td>
<td>68</td>
<td>9</td>
<td>21</td>
<td>2</td>
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<tr>
<td>Better manage distributed teams</td>
<td>59</td>
<td>12</td>
<td>27</td>
<td>2</td>
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</tbody>
</table>

Source: VersionOne survey 2015
Agile Adoption trend

Agile Methods and Practices

AGILE METHODOLOGY USED

Source: VersionOne Survey 2015
Agile Family

Scrum:
‘Project Management’ Practices

XP:
‘Engineering’ Practices

Other Agile methods:
- Lean
- Kanban
- DSDM
- FDD
- Adaptive Software Development
- …
### DevOps impact

Comparison of IT performance metrics between high¹ and low performers

<table>
<thead>
<tr>
<th></th>
<th>2015 (Super High vs. Low)</th>
<th>2014 (High vs. Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment Frequency</td>
<td>30x</td>
<td>30x</td>
</tr>
<tr>
<td>Deployment Lead Time</td>
<td>200x</td>
<td>200x</td>
</tr>
<tr>
<td>Mean Time to Recover (MTTR)</td>
<td>168x</td>
<td>48x</td>
</tr>
<tr>
<td>Change Success Rate</td>
<td>60x</td>
<td>3x</td>
</tr>
</tbody>
</table>

Source: Puppet Labs survey 2015
DevOps Impact

Number of deployments per day per developer

Deploy/Day/Dev

Deployment Frequency (log of freq): Higher is more frequent; 1 = daily

Number of Developers

Low Performers
Med Performers
High Performers
WHAT IS AGILE, DEVOPS?
Agile Analogy: Laying pipes, building roads – Bangalore model

Month 1: “Dumping” department dumps pipes by the side of the road for several kms

Month 2: “Digging” department digs the road for several kms

Month 3: “Fixing” department fixes pipes for several kms

Month 4: “Gravel” department pours gravel for several kms

Month 5: “Asphalt” department puts asphalt for several kms

- Customers agonize for several months with road blocks & traffic jams
Agile Analogy: Laying pipes, building roads – Singapore model


- Customers get uninterrupted business value
Waterfall vs Agile

**Waterfall**

Waterfall lifecycle has all phases in a linear fashion. Delay in one phase can cause delay in entire release.

**Agile Scrum**

Agile Scrum has all phases in each iteration (called a sprint) and teams have mix of skills.
Agile Vs Waterfall: deviation from the objectives with waterfall approach
Agile: how it deals with changing objectives

By delivering working software frequently

Short sprints = short feedback cycle = more frequent deliveries = more frequent customer feedback = less time spent running in the wrong direction = learn and improve faster …
Agile Benefits

Business value

Risk

Visibility

Cost of change

Traditional development
Agile development
The DevOps cycle

Continuous value without barriers

Define
- Requirements toolbox
- User and stakeholder engagement

Develop
- Continuous testing
- Continuous feedback
- Acceptance test driven development
- End-to-end traceability with PMO integration

Operate
- Continuously validate acceptance criteria
- Automated test lab management
- Integrating incident systems
- Actionable diagnostics

DevOps: Horizontal Integration

- Organizations are designed vertically, but work flows horizontally.
- Customers experience the organization horizontally.
- QF is best positioned and empowered to facilitate the integration.
Rationale for Agile
Brief history of civilization

Agricultural Era
- Labour intensive
- Local
- Mass production / distribution

Industrial Era
- Mechanization, Mass production
- Globalization, Manufacturing driven economy
- Product Design, innovation

Knowledge Era
- Extreme Globalization, Anytime-Anywhere (e.g. Internet)
- Knowledge driven Industries, Economies
- Thinking, Collective-wisdom

“Everything in this world is done twice – once in the Mind and then in the outside world” – Stephen Covey

Challenge in knowledge era is the first part – accuracy & speed of thinking, collective thinking
Current Management, Leadership, Quality Management philosophies in Software industry (e.g. CMM, Six Sigma, PMI) are influenced by the Industrial Era experiences:

- Improper application of mass production principles to design/creation principles
- Knowledge Era products need a different approach on Quality, Management, Engineering – Human centric & Knowledge centric
The Paradigm Shift in Knowledge Era

- What is the raw material for software?
  - It’s Knowledge/ Idea

- Where does the transformation from raw material to finished product happen?
  - It’s in the Minds of people
  - Computer is only a tool to capture & facilitate the thoughts

- How do we know then, how the transformation is happening?
  - Break the transformation into smaller steps
  - Bring visibility (e.g. pictures, documents, models, prototypes...)

- What is the measuring equipment to verify whether transformation is happening correctly or not? (the calipers?)
  - Another knowledge body (e.g. peers, customers, experts...)
  - Collective wisdom (Peer Reviews, Brainstorming...)

- Knowledge Era Product Engineering
  - From raw material to finished product, the object is not physical in nature. There are no Laws of Physics governing the engineering principles, like in Mechanical or Civil engineering
# Knowledge Era vs Industrial Era Production Systems

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Industrial Era</th>
<th>Knowledge Era</th>
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</thead>
<tbody>
<tr>
<td>Raw Material</td>
<td>Physical in nature</td>
<td>Intangible in nature: knowledge, Idea…</td>
</tr>
<tr>
<td>Transformation Engines</td>
<td>Machines: Stereotype, Repetitive</td>
<td>People: Idiosyncratic, changing</td>
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<tr>
<td>Productivity</td>
<td>‘Touch time’ of Tools</td>
<td>‘Touch time’ of Minds</td>
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<td>Interaction</td>
<td>People work around the machines</td>
<td>People work with people (including Customers) – High collaboration, communication</td>
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<td>[Diagram: Input - Man - Machine - Material - Output]</td>
<td>[Diagram: Capable People - Collaborating with Common Protocols]</td>
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</table>

The equation

**Industrial Era**: Man-Machine-Material

**Knowledge Era**: Capable People-Collaborating-with Common Protocols
“Repeatable process to Contextual process”

PARADIGM SHIFT 1
What is ‘Process’?

Think of a phrase or sentence to describe ‘Process’.

Typical responses:
- Set of steps to perform to get output from input
- Sequence of operations to be performed
- Standard way of doing things
- Repeatable tasks to be performed
- Clearly documented instructions to do a job
- .....
## Game with Mathematics

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</tbody>
</table>

Is this possible? What Operations do you perform to get this **Consistent output**?
Repeatable Process ??

\[
\begin{align*}
(1 + 1 + 1)! &= 6 \\
2 + 2 + 2 &= 6 \\
3 \times 3 - 3 &= 6 \\
\sqrt{4} + \sqrt{4} + \sqrt{4} &= 6 \\
5 + 5 \div 5 &= 6 \\
6 + 6 - 6 &= 6 \\
-7 \div 7 + 7 &= 6 \\
\sqrt[3]{8} + \sqrt[3]{8} + \sqrt[3]{8} &= 6 \\
\sqrt{9} \times \sqrt{9} - \sqrt{9} &= 6
\end{align*}
\]

In a Function \( f(x) = y \)

if ‘y’ needs to be consistent while ‘x’ is varying, can \( f() \) be constant?
Repeatable Process or Consistent Outcome?

- ‘Repeatable Process leads to Consistent Outcome’ is an Industrial Era paradigm
  - Because Input is fairly homogeneous
- In Knowledge Era scenario like Software, Input has high variability – people, technology, project contexts...
  - In order to maintain Output consistent, Process should change
- Focus should be on Contextual Process (not Repeatable Process) and Consistent Outcome
“Measuring to Sensing”

PARADIGM SHIFT 5
What Moves the Iceberg?

- Wind
- Current

10% Visible part
90% Invisible part
What makes Projects successful?

**Effort**
- Schedule
- Cost
- Defects

**Soft aspects**
- Shared vision
- Motivation
- Communication
- Collaboration

**Leading Indicators**
- Customer engagement
- Team engagement

**Lagging Indicators**
- Lagging indicators

**Hard aspects**
Measurement Considerations

Because of idiosyncratic human beings as the transformation engines and dealing with intangibles like knowledge, idea…etc., measurement is a challenge

- What we CAN measure are perhaps not very significant
  - E.g.: Defect Removal Efficiency, Effort/Schedule variance, … - Mostly Lagging Indicators
- Those which are significant, are not so visible/measurable
  - People experience, Motivation, Collaboration, level of engagement of people (‘touch time’ of mind)

- Sensing & Sense-making is more important than hard measurements
  - ‘If you can't measure, you can't manage’ is an Industrial Era paradigm

- Focus on Visual Management in Agile
WHAT IS THE NEW ROLE FOR P&QF?
Customer engagement not just at the end (CSat), but upfront engagement
New role of QF

- QF as Integrating Function
- True change Agent role – Lead the change than resist the change
QF as Change Agent/Catalyst

**Educate:**
- Train, Coach teams on Agile practices, principles

**Enable:**
- The teams work in Agile way by organizational ecosystem enablement

**Empower:**
- Self-organizing team
- Cross-functional collaboration
- High-performing team

**Ensure:**
- Agile practices by knowledge sharing, creating visibility
What should Quality Professionals focus on?

- Understand new business & technology aspects
- Be experts in new approaches of project management & engineering practices like Scrum, XP, DevOps
- Become coaches to teams
  - Should have played the game & should know the game
  - Develop good Facilitation & Communication skills
  - Develop Leadership qualities – Emotional Intelligence (EQ), people management dimensions
- Continuously Learn & Adapt
Quality 2.0

Quality 1.0
Standards
Models
Certifications
driven

Quality 2.0
Business driven
Technology lead
People aligned

1990 2000 2010 2020

Wish the Process & Quality Functions & Professionals will lead the IT industry to the next S curve
Thank You

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