



Independent Intelligent Energy Advisors
stepchange
global

What have we learned from the first fifteen years of Digital Oilfield
SPE Webinar Series – 14/09/2017

Dr Tony Edwards – CEO
Stepchange Global





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Tony has extensive experience in the oil and gas exploration and production industry worldwide. Tony has a BA degree from Keele University in Geology and Chemistry, and a Doctorate in Petrology from the University of Manchester. He had a 17 year career with BP that spanned R&D through to front line operations and project management. He was a founder member of BP's Integrated Operations Program, Field of the Future, and was subsequently the global director for the Advanced Collaborative Environment Program. In 2006 he moved to BG-Group to launch its digital oilfield program. In January 2009 he founded Stepchange Global, a dedicated digital oilfield advisory company, and has since advised Statoil, BP, PETRONAS, ConocoPhillips, Total, Santos, Origin Energy, BHP Billiton, GAZPROM and ExxonMobil on their Integrated Operations strategies.

Over the last four years Tony has combined to his operational experience in running unmanned platforms with Digital Oilfield to advise on radically minimum manned operational and project concepts that are lower in CAPEX and OPEX whilst delivering improved safety and reliability.





Tony Edwards, PhD
CEO, Stepchange
Global





What is Digital Oilfield (DOF)?

'The vision for the Digital Oil Field is one where operators, partners, and service companies seek to take advantage of improved data and knowledge management, enhanced analytical tools, real-time systems, and more efficient business processes'

IHS CERA: Digital Oil Field of the Future

What is enabled by an IO?

- Moving to a real time or near real time way of working
- Connection of one or more remote sites or teams to work together
- Moving to more multidiscipline way or working
- Value chain integration and optimisation

'How we run our companies in the future'

Digital Oilfield, i-Field, Smart Fields, Integrated Operations ..what does it all mean?

Drivers and Enablers for Digital Oilfield



Drivers

- Discoveries in increasingly remote locations
- Key skill shortages
- Increasing technical nature of new discoveries
- Performance Improvement
 - Production efficiency
 - Reservoir recovery
 - Operational cost base
- High or Low Commodity Price?
- Risk reduction both HSE and Production.
- Value chain integration

Enablers

- High bandwidth communication
- Large storage capacity
- Quality video conferencing
- New sensor technologies
- New Analytical Methods
- New Modelling Methods
- Internet of Things
- Mobile Worker Technology
- **New Supply Chain Models**
- **New Operational Models**
- **New Organisational Models**



Industry View of Value Realization from DOF





Smart Fields *



Field of The Future ®



Digital Field

IO Benefits – Industry View

- Accelerate Production (2-8%)
- Improve Recoverable Rate (0.5-5%)
- Reduce Operation Cost (5-25%)
- Reduce Drilling Cost (5-15%)
- Improve HSE



Integrated Operations (IO)



Integrated Operations (IO)



i-Field ®

Oil majors have used their own brand names, industry generic term is Integrated Operations (IO) and Digital Oilfield (DO)

- Shell has reported \$5 billion of benefits attributed to Smartfield Program
- BP has gained 85 mboed of excess production due to FoF
- Statoil has moved to a new operational model - 20-25% less offshore staff



"IO is a quiet revolution reshaping our industry" – Helge Lund, CEO Statoil

DOF Answers day to day Operational Questions



Operator:

Are all the Wells running?
Is the compressor fouling? What are the choke and valve setting?
What are the injection rates?
Are the gauges calibrated?
How much can I flare?
Is the storage tank approaching capacity?

Reservoir Engineer:

What are the limits on production?
How do I avoid sanding?
What are my water injection problems?
What wells should we test?
What is the production forecast?

Asset Manager:

How does my production compare to plan?
Where are my losses?
Am I on target against emission and flaring quotas?



Process Engineer:

Are the separators running efficiently?
Where are the operating envelopes for the compressors?
Do we need hydrate or waxing inhibition?
What's the export specification?

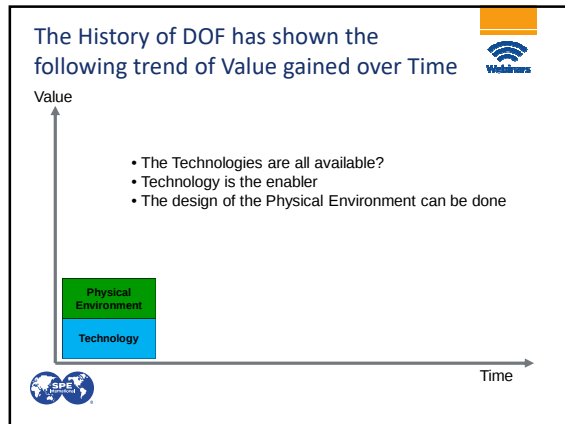
Production Engineer:

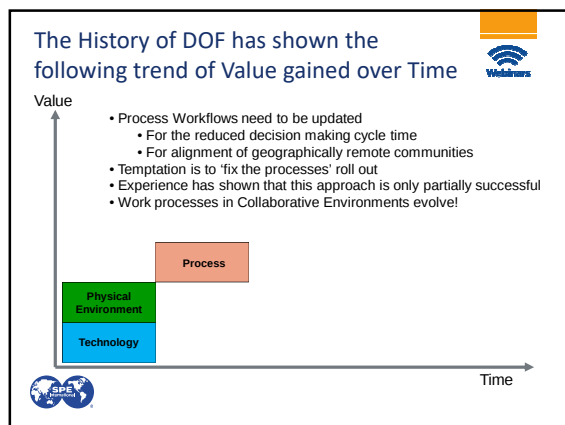
How do I meet my delivery target today?
What are my problem wells?
Where are my maintenance crews?
What is my production potential, how do I achieve this?

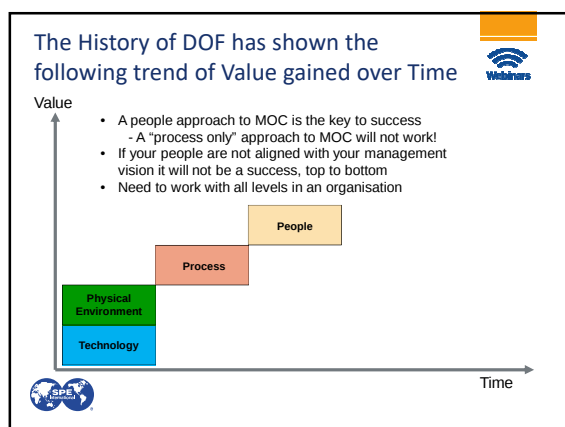
Pipeline Engineer:

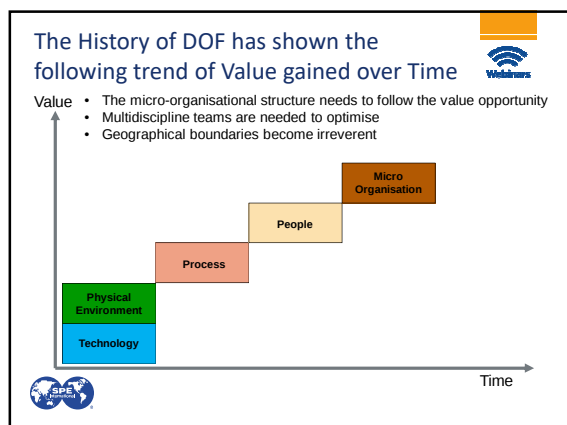
How can I avoid slugging problems?
What do I need to inject for corrosion, hydrates, etc?
Where are my bottlenecks?
Which pipelines can we pig?

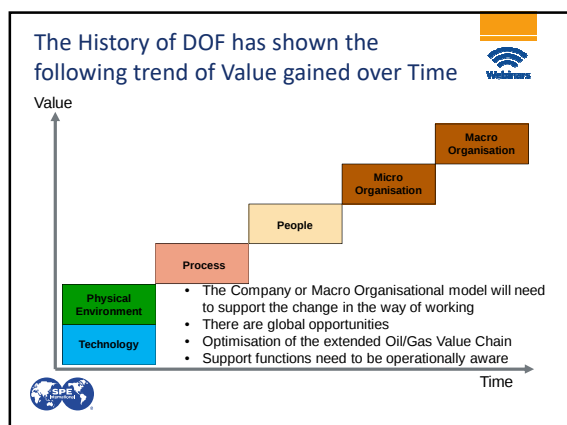


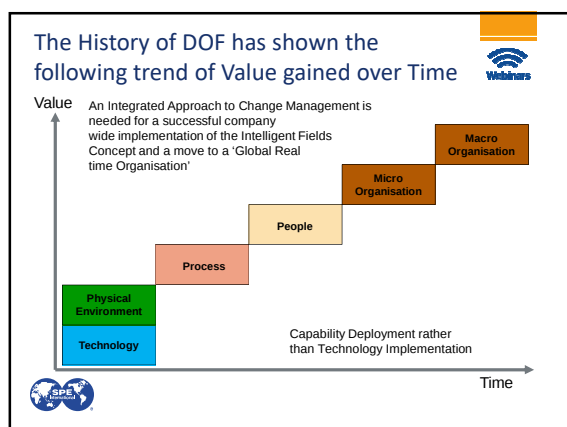












DOF - A Capability Approach

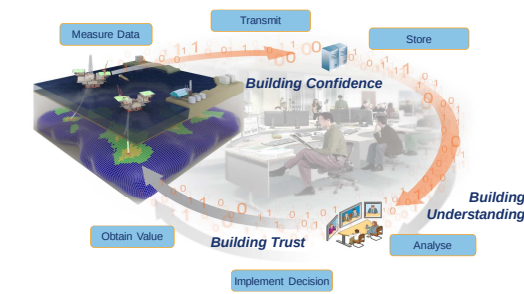
*'By a capability we mean the combined capacity and ability to plan and execute in accordance with our business objectives through a designed combination of human skills, work processes, organisational change and technology'**

A Capability is a performance improvement methodology that is value driven, measurable and action oriented. To have the 'Capability' to improve business value you must all of four key elements in place:

- **Process** – What is the core value process and underlying processes that is to be improved and updated
- **Technology** – What technologies are needed to improve the process
- **People/Resource** – What skills, competencies and behaviours are needed to execute the process and use the supporting technologies
- **Organisation/Governance** – What organisational structures, incentives and relationships are needed to execute the process

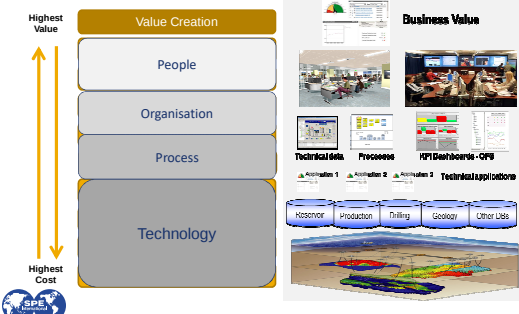
 * Henderson and Kulatilaka 2008 – Boston University School of Management

Collaboration is key to delivering the Measurement to Decision Lifecycle



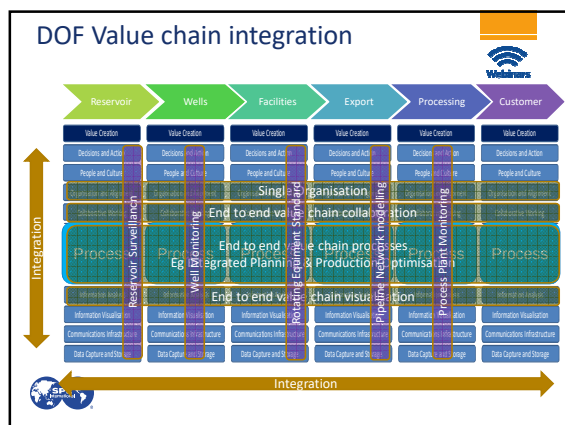
Improving Operational Excellence

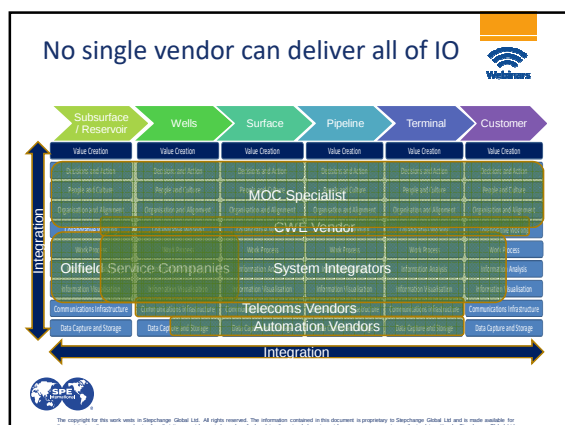
DOF Elements for Success – Stack Model

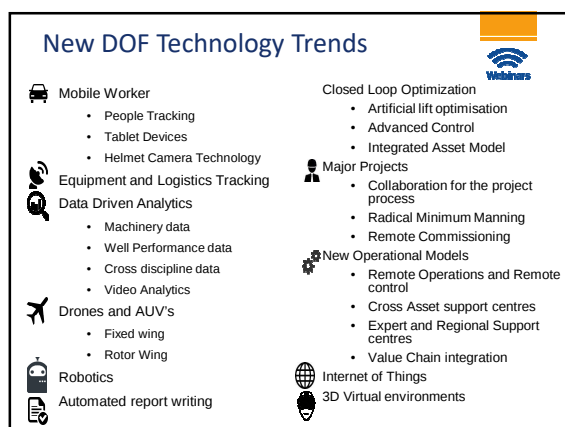


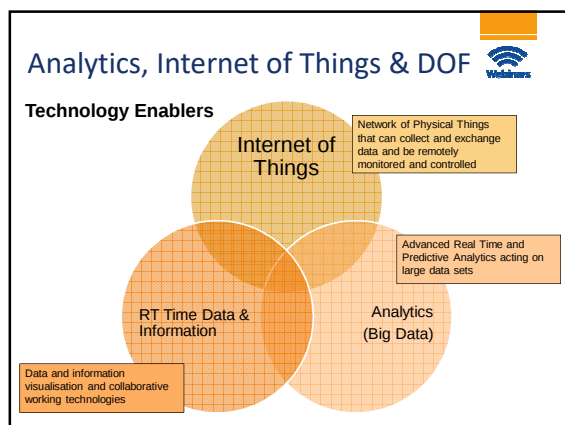
Highest Value

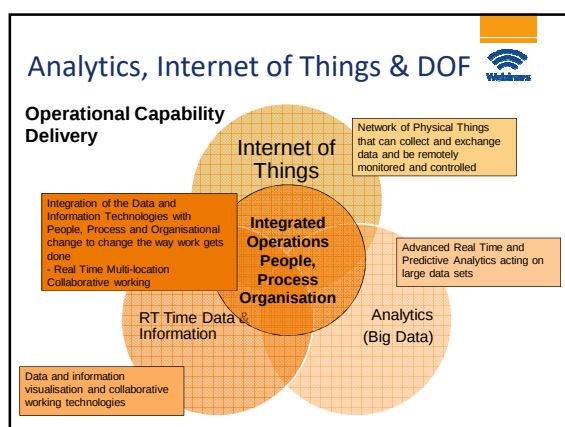
Highest Cost

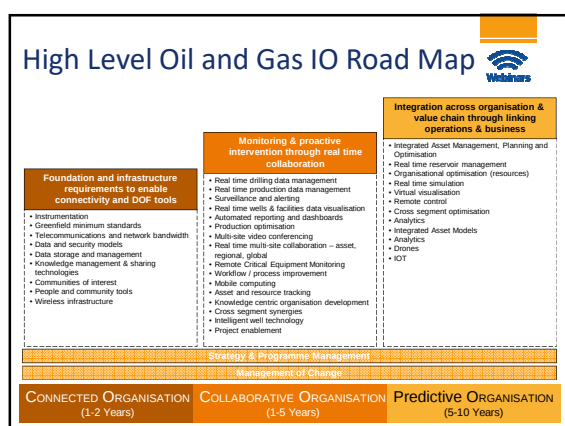












Collaborative Environments



- A new way to organize an operation
- Collaboration between people, across disciplines, companies and places
- Truly integrated Multi-discipline teams
- Distribution of internal & external information and knowledge
- Better use of scarce resources
- A dynamic organization
- Distributed real time working
- Has reduced decision time and improved decision making
- Is the way you add value from Integrated Operations



Collaborative Environments



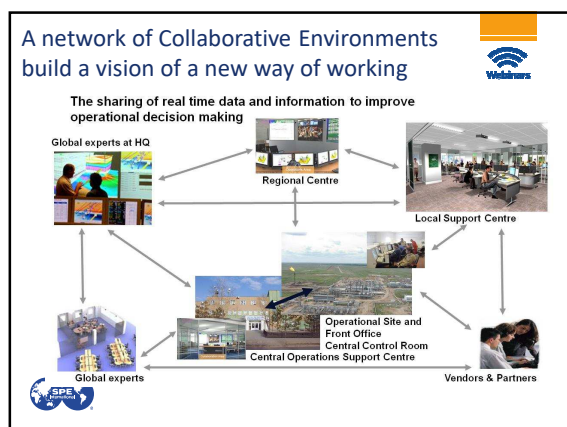
Current Status of Collaborative Environments

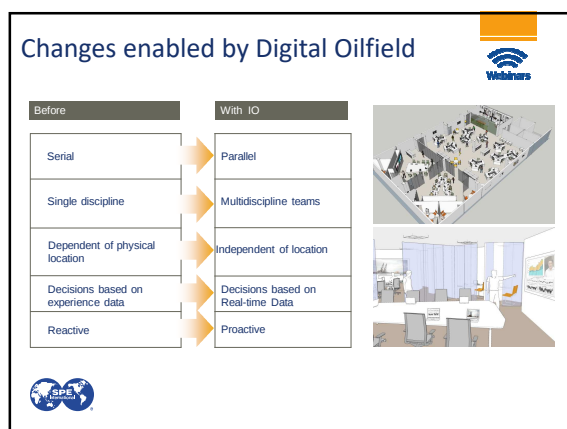


- 1st Generation CE's – Connecting Office to Operational Site
 - Single asset support environments
- 2nd Generation CE's – Co-location of a number of single asset support environments
 - Synergy across assets
- 3rd Generation CE's – Multi-Asset support environments
 - Value chain optimisation
 - Sharing of resources between assets or along the value chain
 - Micro-Organisational impact
- Regional CE's – Supporting a group of Business units and many assets
 - Can be 'Expert' or Operational depending on scale of company
- Global CE's – More defined scope with Global reach
 - Mostly provide expert support
- External Support Environments
 - Package /Technology/Vendor Specific
 - General Engineering, Technology Support
- Remote centralised Control Rooms are being incorporated into CE's
 - Value chain optimisation for LNG and Mining









DOF in Oil & Gas Summary

- DOF is a major change in the way we run Oil and Gas operations.
- The leaders in DOF regard it as a ‘transformation programme’ and not a technology or IT project
 - Real Time data and information is the enabler
- People, Process and Organisational change is key to success – Enabled by Technology (PPTO)
- Collaboration is core to DOF as it is where you make your decisions between the office and the field
- DOF is very organisationally and culturally dependent
- It is about changing the way we work and how we will run our companies in the future






Questions & Reflections

Tony Edwards
Stepchange Global

Contact:
Email: tony.edwards@stepchange-global.com
Mobile: +44 7777 681207
Office: +44 2083989000
Web: <http://www.stepchange-global.com>
