



Independent Intelligent Energy Advisors

**stepchange
global**

Introduction to Stepchange Global

Tony Edwards



Our Company

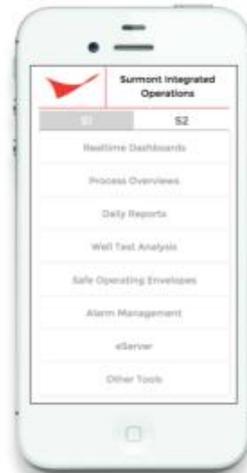
StepChange Global is an independent integrated operations and digital oilfield advisory company

- working in IO internationally since 2008
- industry recognised experts
- currently working internationally in North and South America, Europe, the Middle East, South East Asia and Australasia
- working with leading companies in Integrated Operations in Oil and Gas and Mining

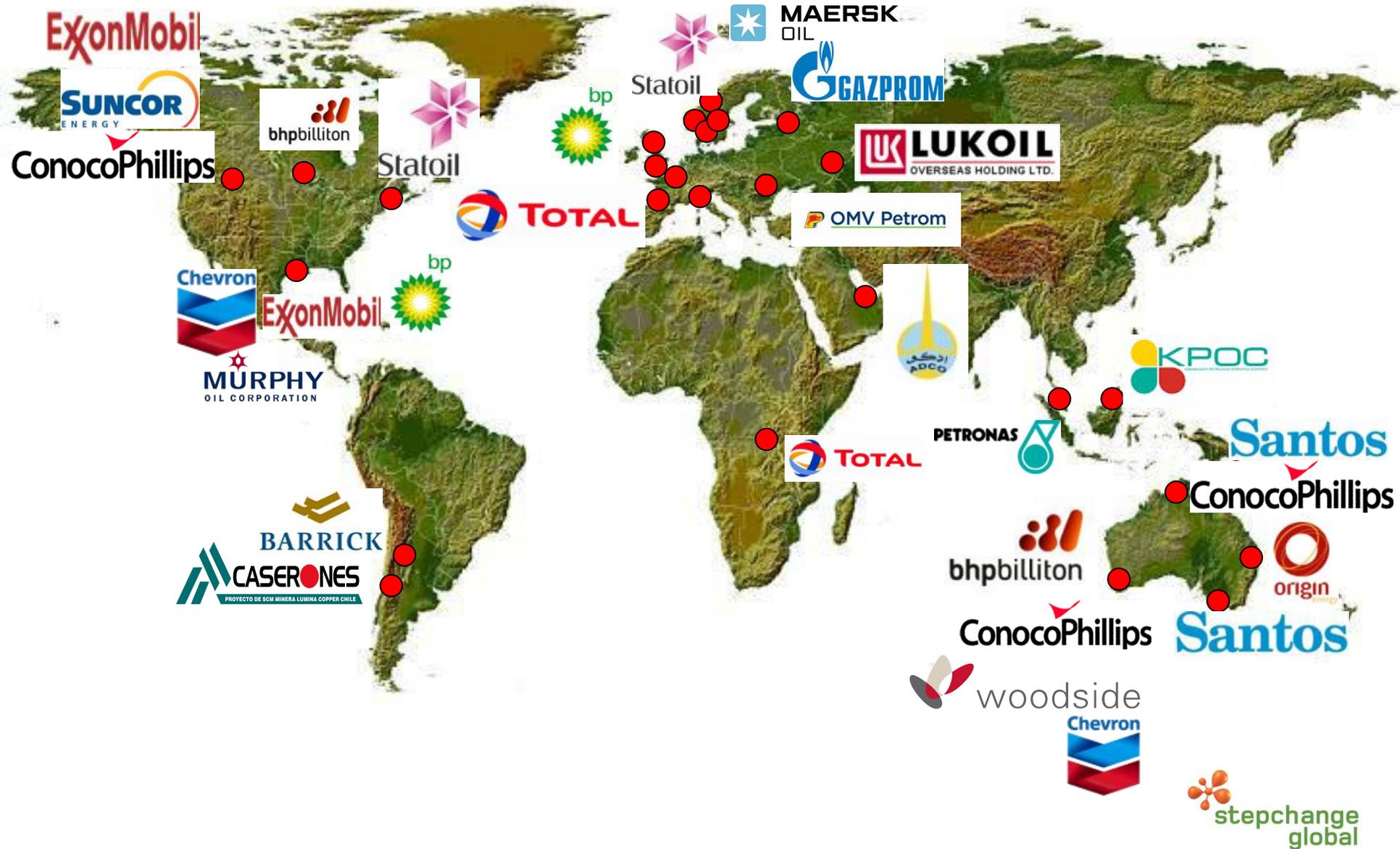
Our Main Capabilities



- Development & Deployment of Integrated Operations strategies & programmes & pilots for Oil & Gas and Mining
- IO and Digital Oilfield Technology strategy and advice
- Integrated Operations Centre design and implementation
- People, Process and Organisational change for IO
- Collaborative real-time working, IOC Health Check
- New operational models enabled by IO
- IO enabled and next generation operations excellence
- Major Projects and minimum manning enabled by IO



IO and Operations Centre Experience



The Team

- Highly experienced team that have applied IO globally
- IO Experience from within operators
 - BP, BG Group, Conocophillips, Shell, ADMA, Saudi Aramco
- Corporate IO Programme services for
 - Statoil, Petronas, ExxonMobil, SANTOS, Suncor, Origin, Total and GAZPROM
- Regional and Asset Implementation experience from
 - Statoil, BP, ConocoPhillips, ExxonMobil, Total, Chevron, Suncor, SANTOS, BHP Billiton, KPOC, Origin
- Minimum Manning and New Operational Model Studies
 - ExxonMobil, Chevron, SANTOS, OMV, Total, Statoil, ConocoPhillips

What have we learned from the first fifteen years of Digital Oilfield and What is next? Qingdao October 2017

Dr Tony Edwards – CEO

Stepchange Global



5TH DOSFIAC

The Fifth Digital Oilfield Summit Forum & International
Academic Conference



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



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

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 FotF
- 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?

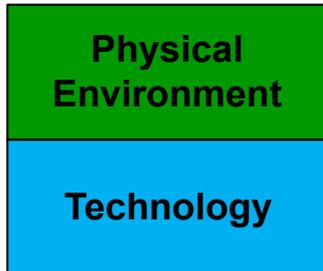
Pipeline Engineer:

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?

The History of DOF has shown the following trend of Value gained over Time

Value

- The Technologies are all available?
- Technology is the enabler
- The design of the Physical Environment can be done

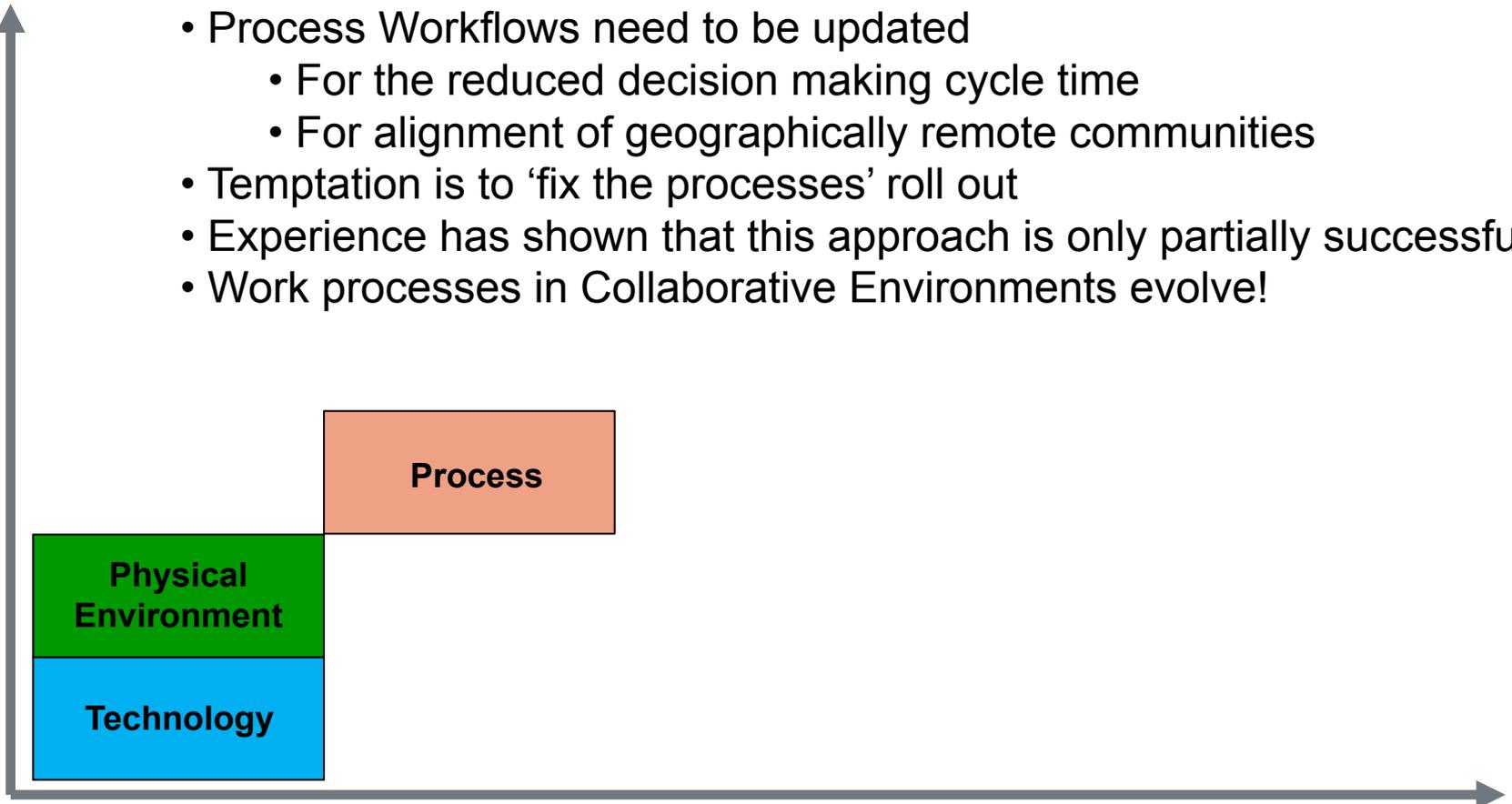


Time

The History of DOF has shown the following trend of Value gained over Time

Value

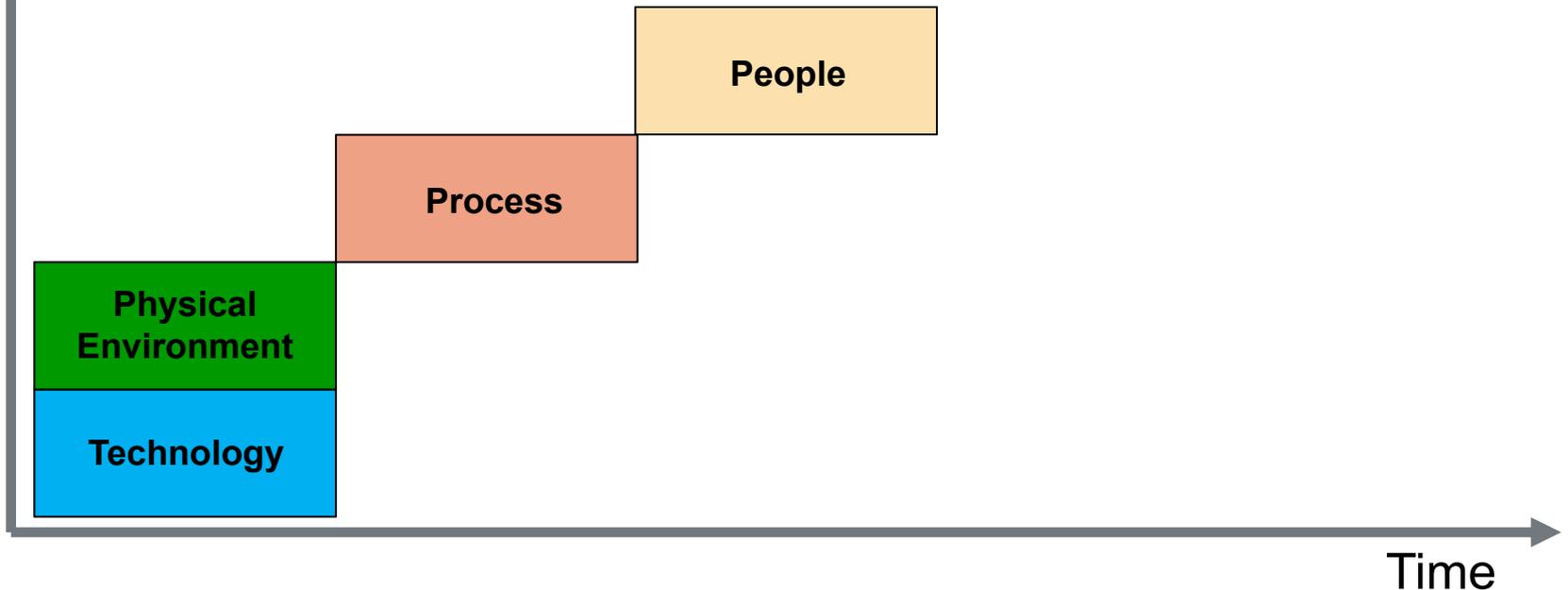
- Process Workflows need to be updated
 - For the reduced decision making cycle time
 - For alignment of geographically remote communities
- Temptation is to 'fix the processes' roll out
- Experience has shown that this approach is only partially successful
- Work processes in Collaborative Environments evolve!



The History of Integrated Operations has shown the following trend of Value gained over Time

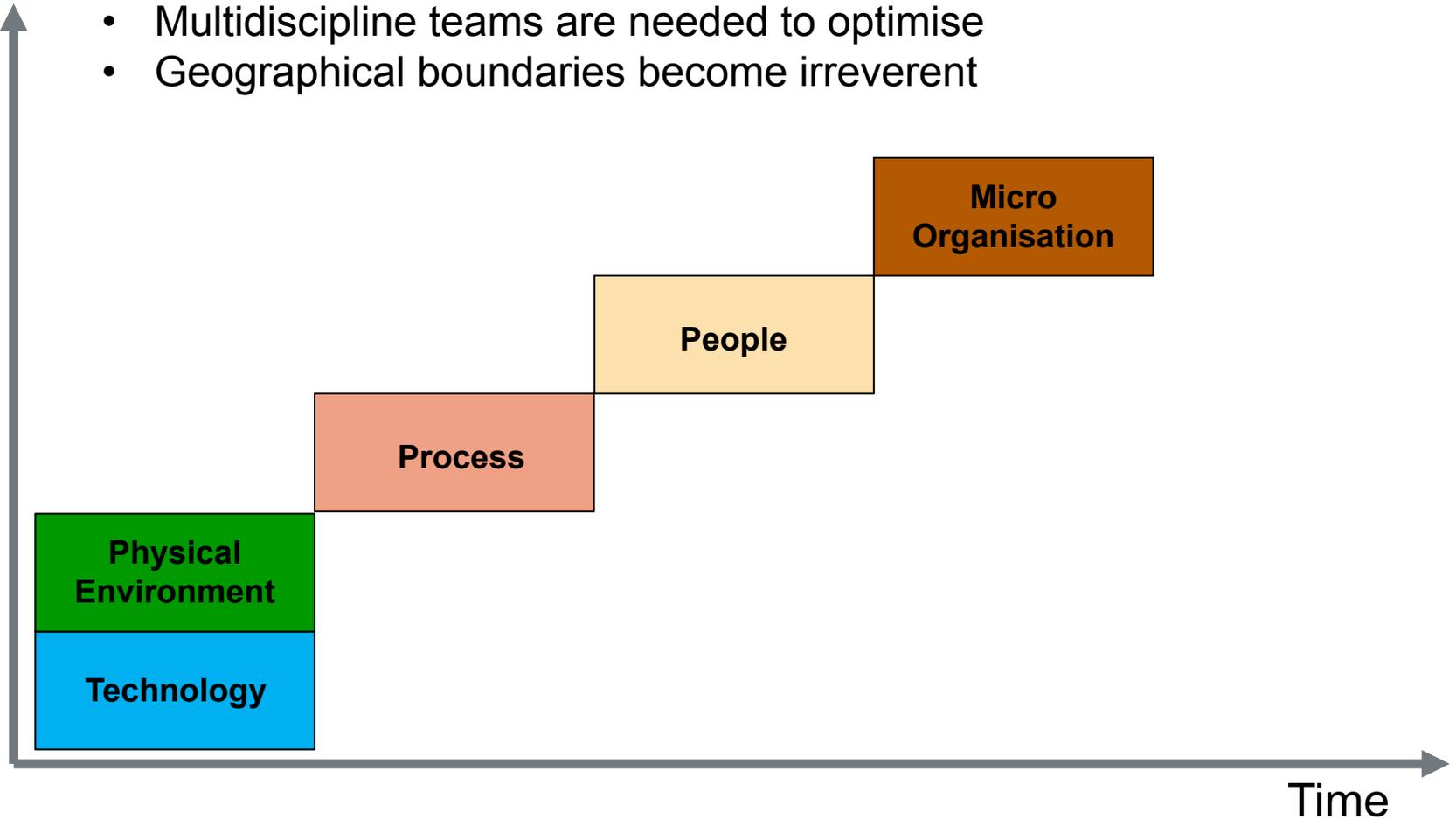
Value

- A people approach to MOC is the key to success
 - A “process only” approach to MOC will not work!
- If your people are not aligned with your management vision it will not be a success, top to bottom
- Need to work with all levels in an organisation

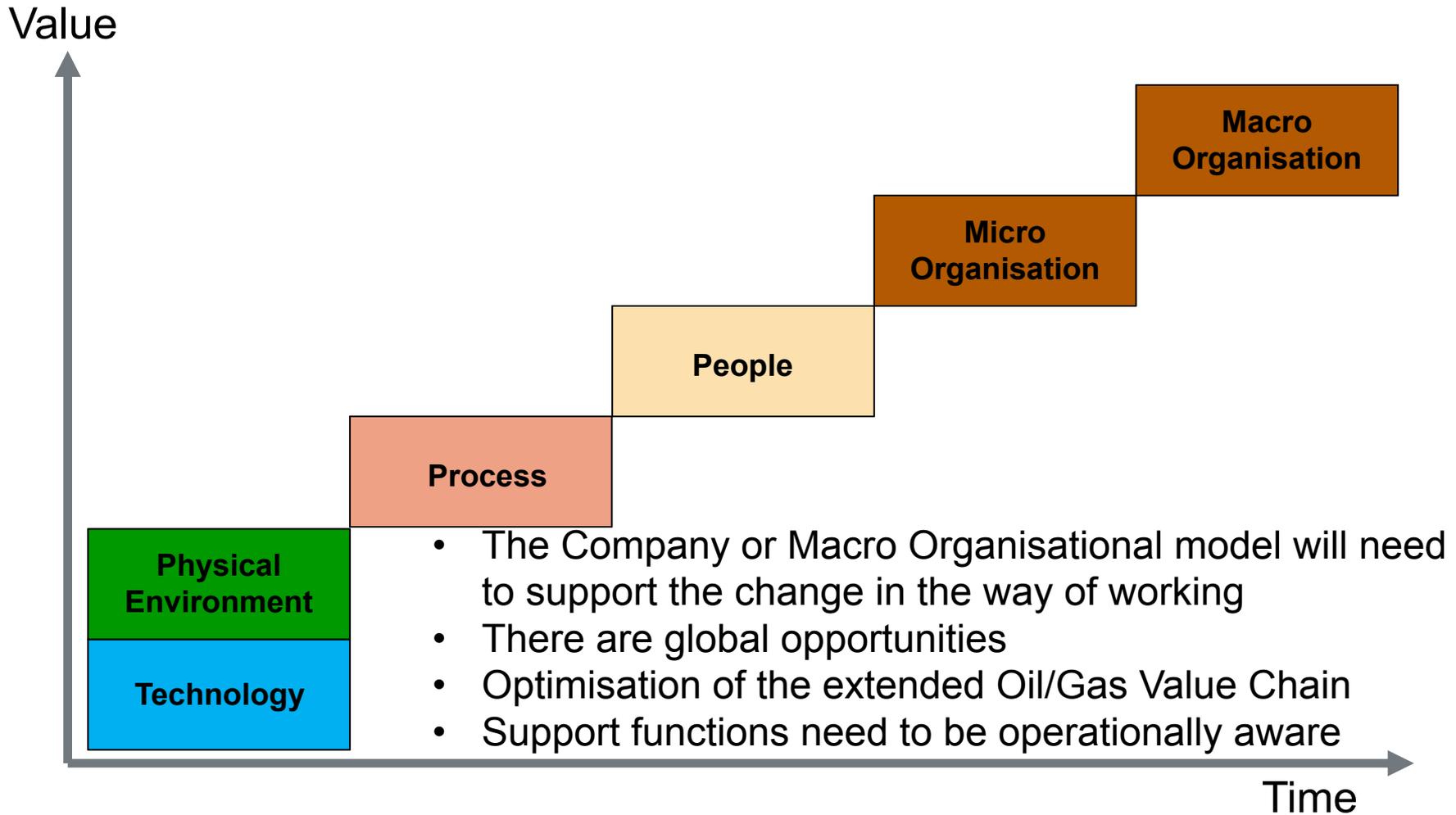


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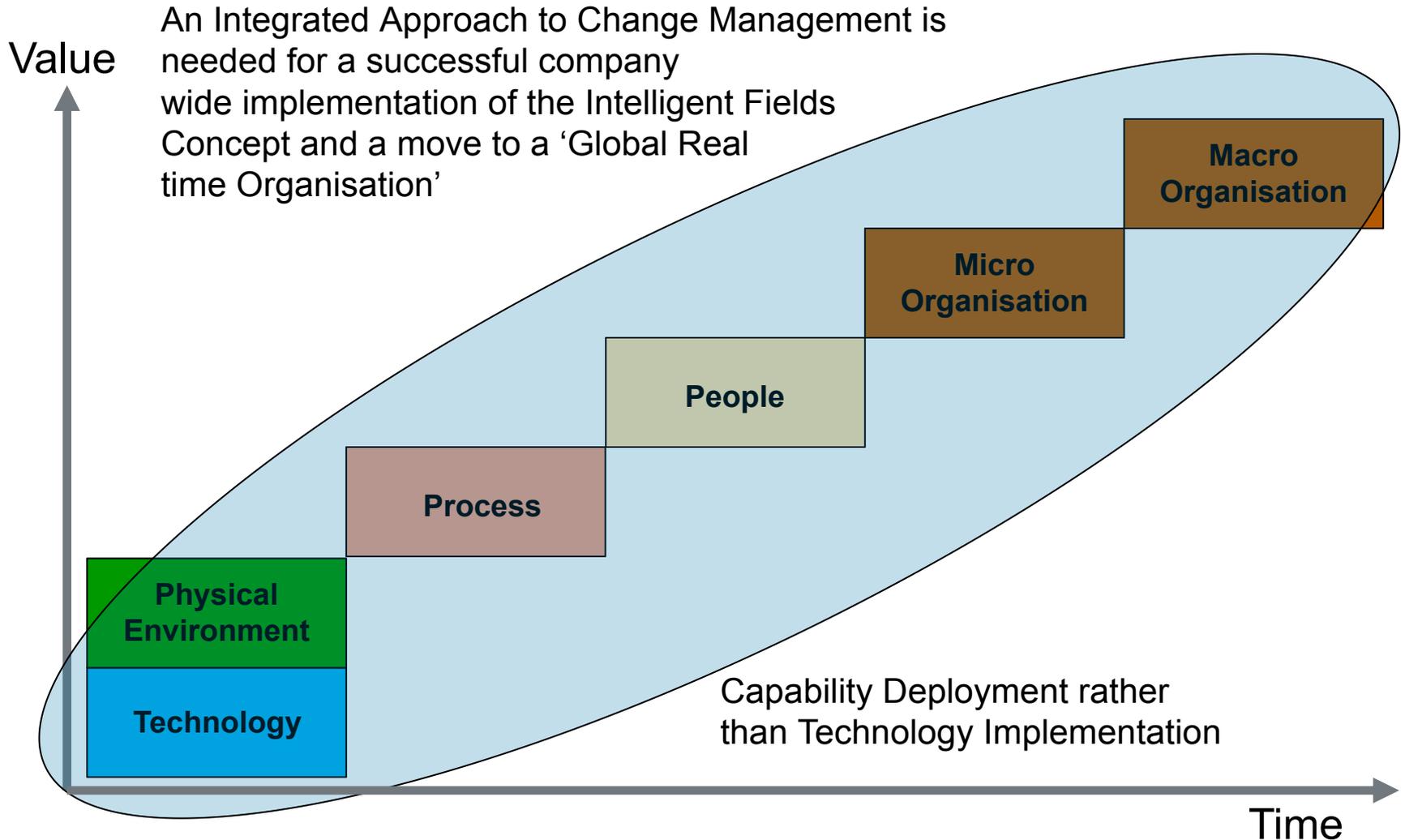
- Value
- The micro-organisational structure needs to follow the value opportunity
 - Multidiscipline teams are needed to optimise
 - Geographical boundaries become irreverent



The History of DOF has shown the following trend of Value gained over Time



An Integrated Approach



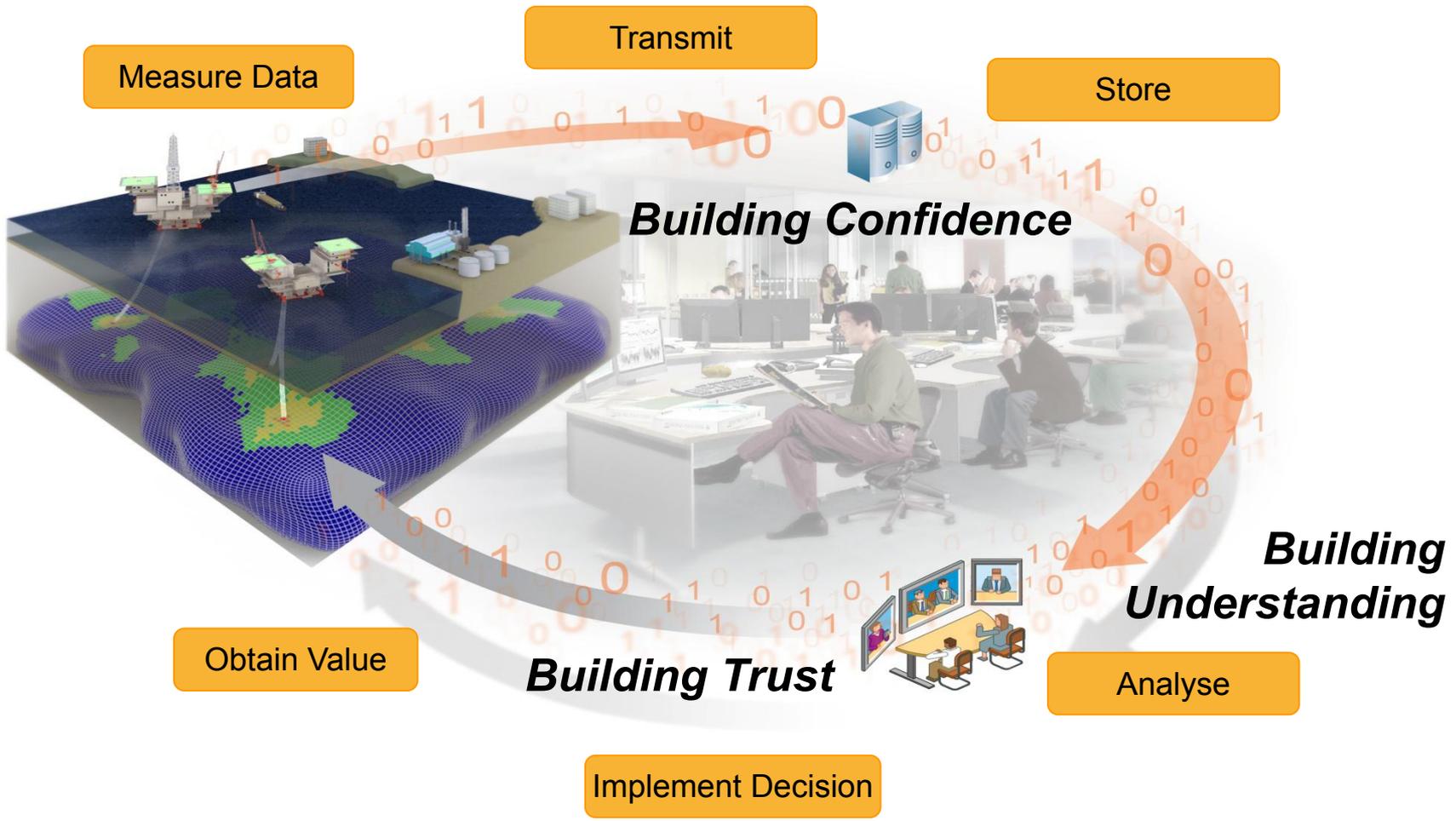
DOF - A Capability Approach

*‘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

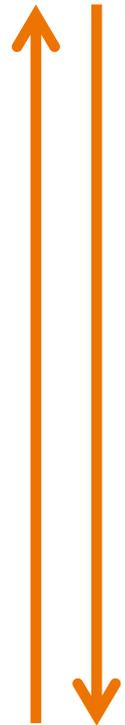
Collaboration is key to delivering the Measurement to Decision Lifecycle



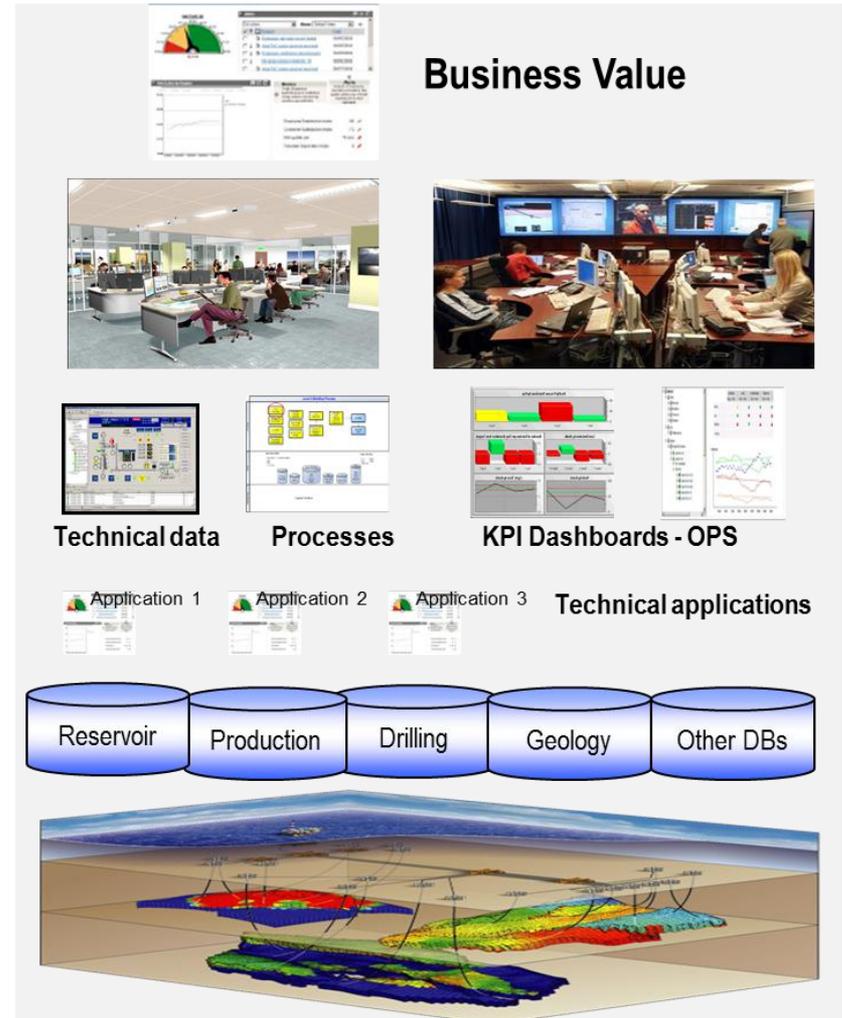
Improving Operational Excellence

DOF Elements for Success – Stack Model

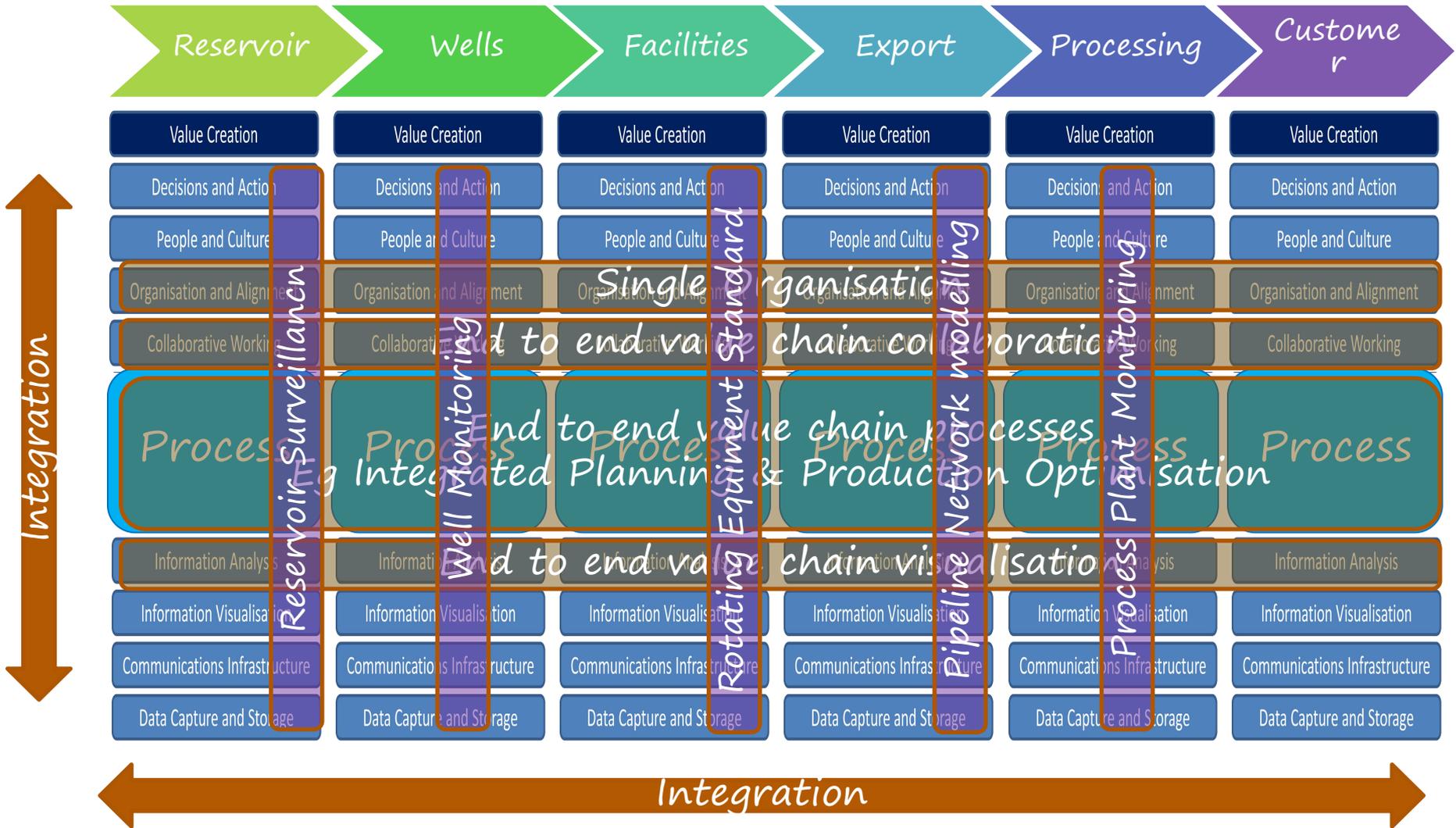
Highest Value



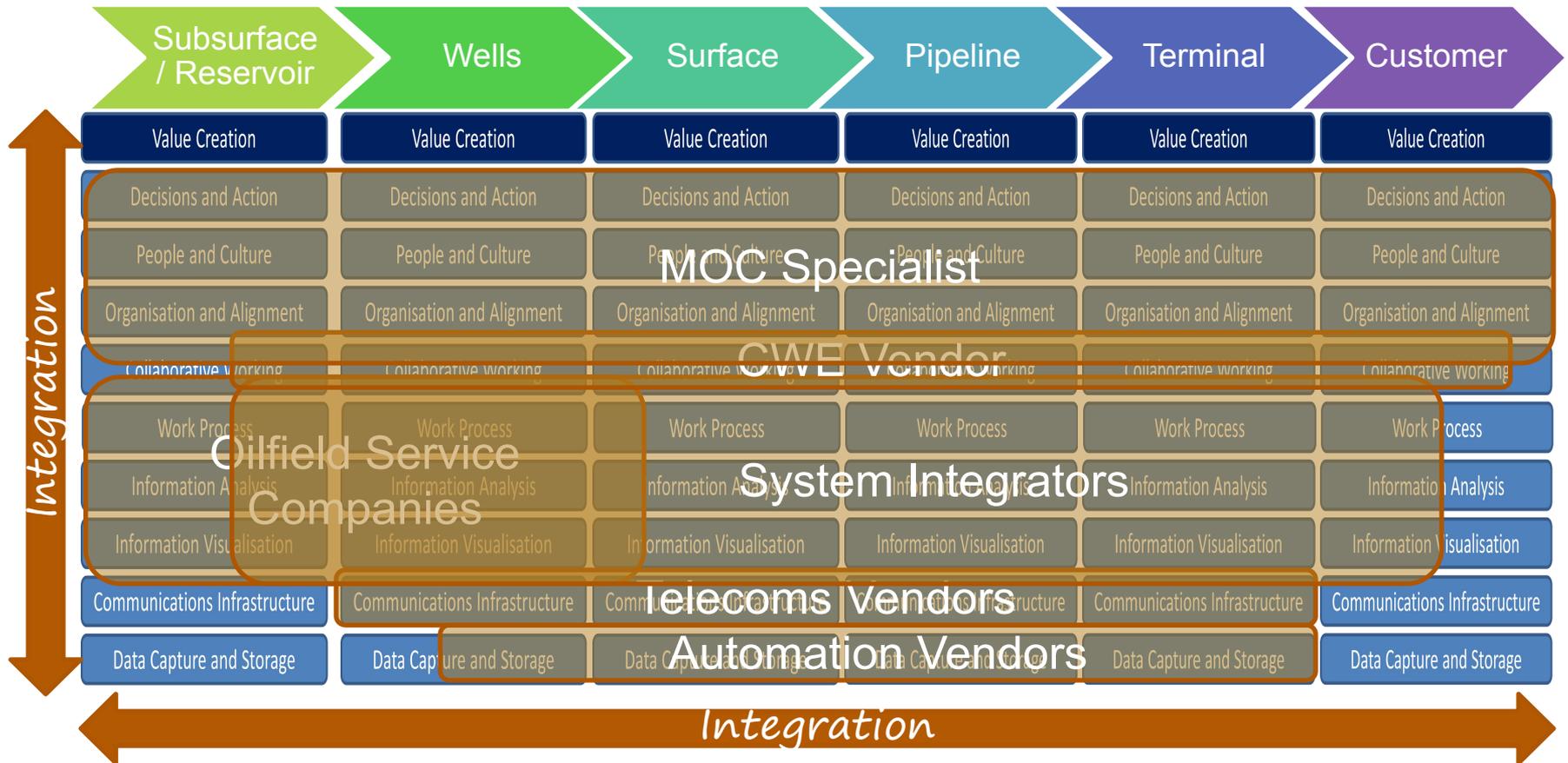
Highest Cost



DOF Value chain integration



No single vendor can deliver all of IO



New DOF Technology Trends



Mobile Worker

- People Tracking
- Tablet Devices
- Helmet Camera Technology



Equipment and Logistics Tracking



Data Driven Analytics

- Machinery data
- Well Performance data
- Cross discipline data
- Video Analytics



Drones and AUV's

- Fixed wing
- Rotor Wing



Robotics



Automated report writing

Closed Loop Optimization

- Artificial lift optimisation
- Advanced Control
- Integrated Asset Model



Major Projects

- Collaboration for the project process
- Radical Minimum Manning
- Remote Commissioning



New Operational Models

- Remote Operations and Remote control
- Cross Asset support centres
- Expert and Regional Support centres
- Value Chain integration



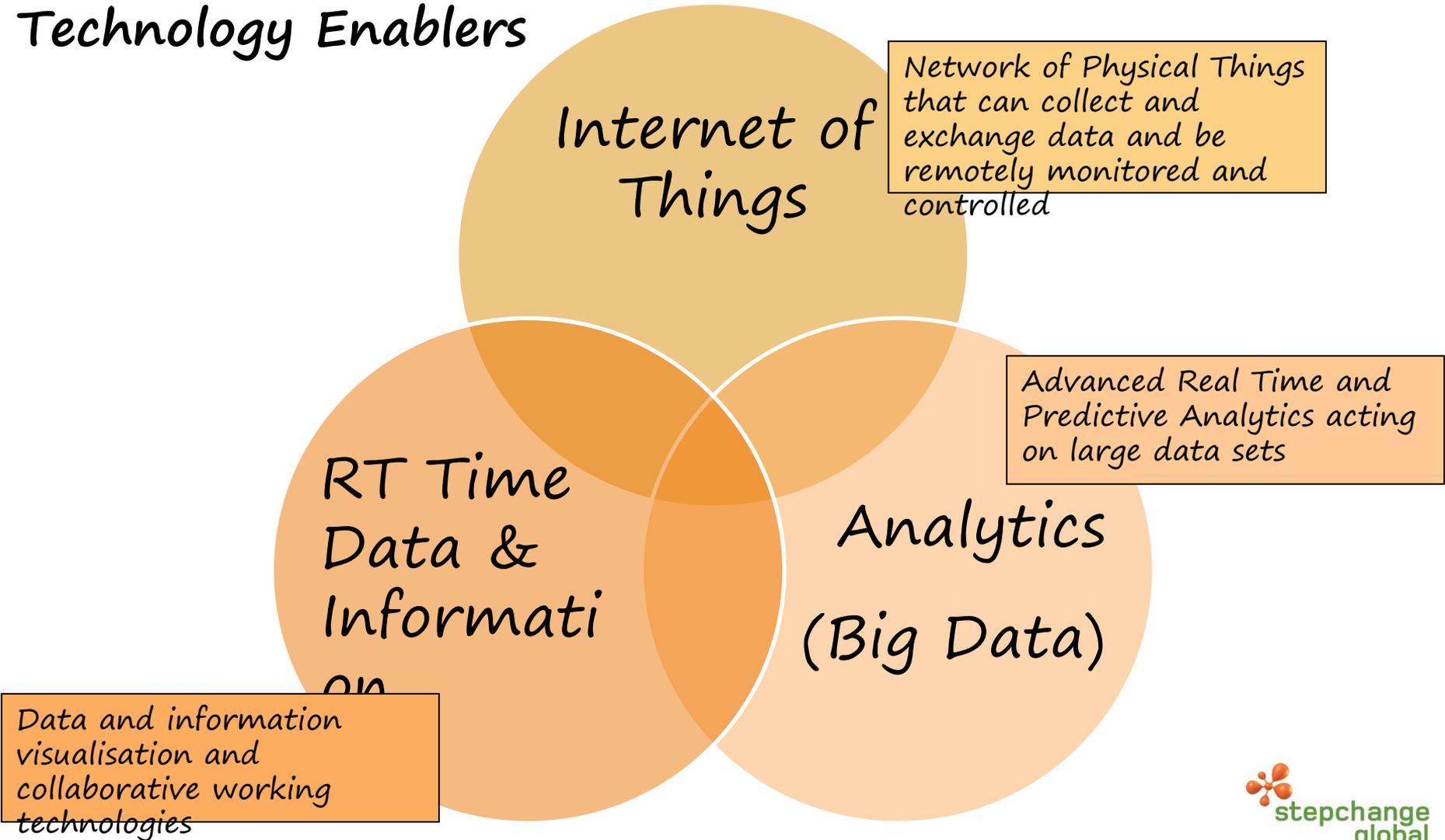
Internet of Things



3D Virtual environments

Analytics, Internet of Things & DOF

Technology Enablers



Analytics, Internet of Things & DOF

Operational Capability
Delivery

Internet of
Things

Network of Physical Things that can collect and exchange data and be remotely monitored and controlled

Integration of the Data and Information Technologies with People, Process and Organisational change to change the way work gets done
- Real Time Multi-location

Integrated
Operations
People,
Process

Advanced Real Time and Predictive Analytics acting on large data sets

Collaborative working

Real Time Organisation

Data &
Information

Analytics
(Big Data)

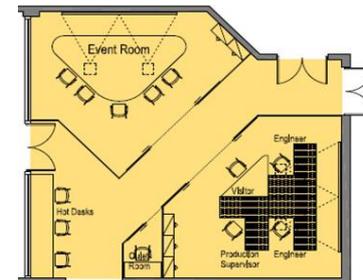
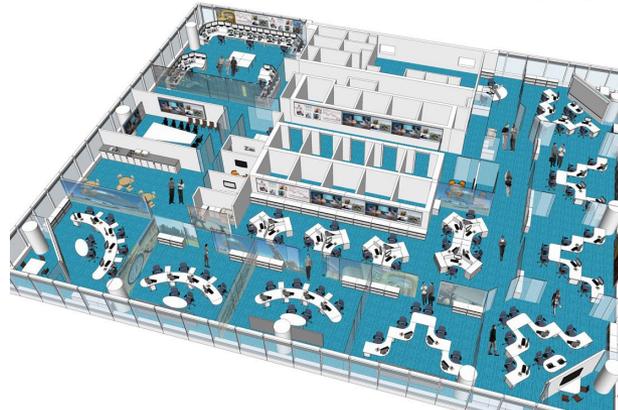
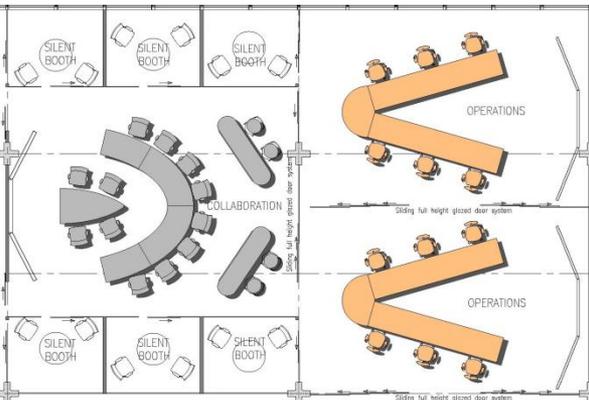
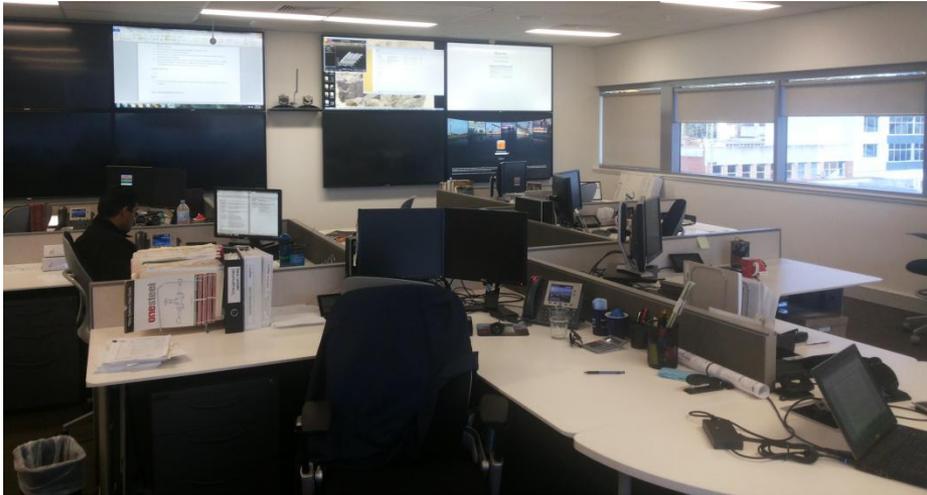
Data and information visualisation and collaborative working technologies

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



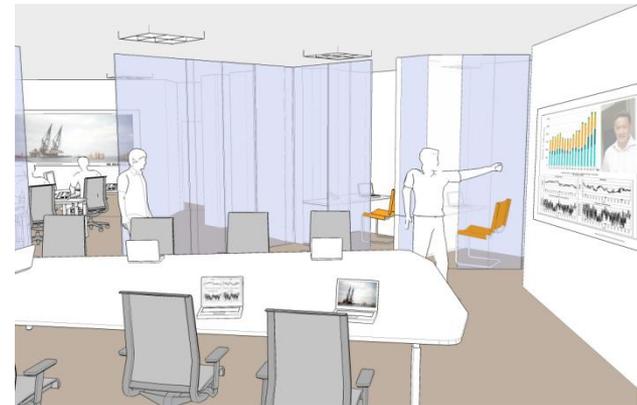
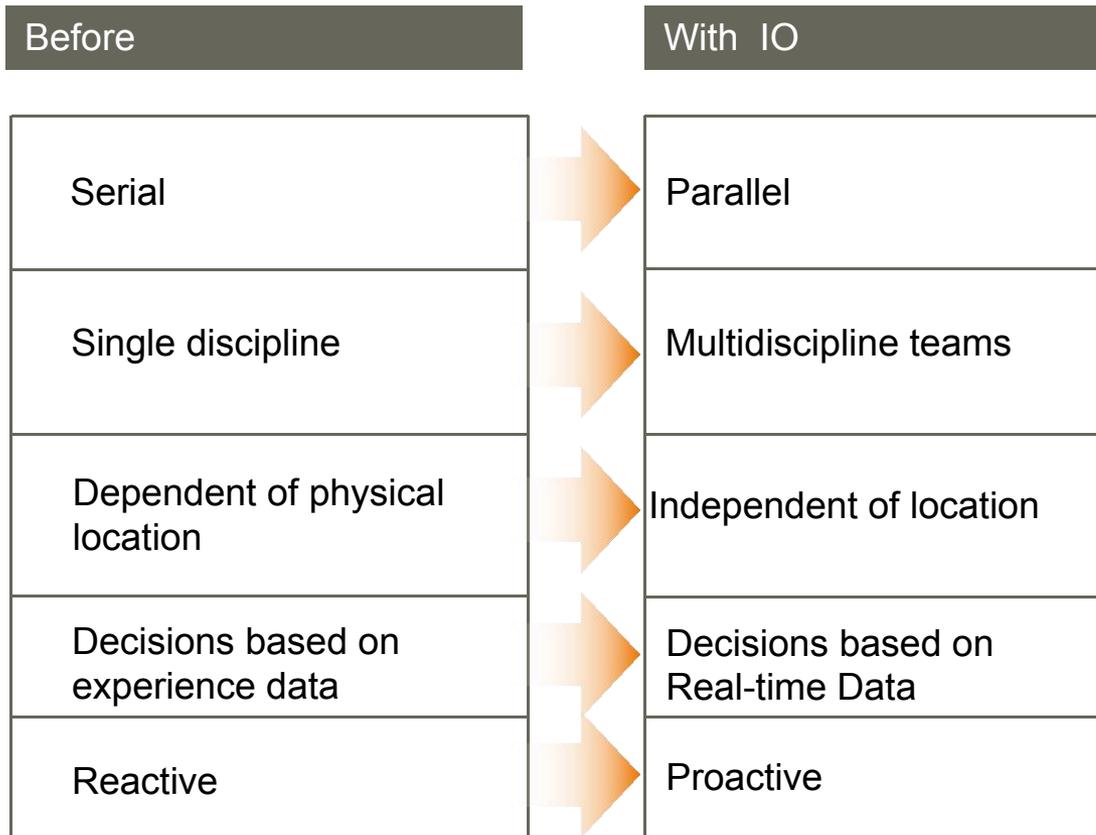
Collaborative Environments



Collaboration is at the heart of DOF



Changes enabled by Digital Oilfield



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
- It is about changing the way we work and how we will run our companies in the future
- DOF is very organisationally and culturally dependent

Questions & Reflections

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