

Challenges & Success of Digital Oilfield Implementation

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Emmanuel Udofia is a seasoned Petroleum Engineering Consultant with over 21 years diversified experience in the oil and gas industry with specialty in: Operation Integration (Digital Oilfield Implementation), Collaborative Work Environment Sustainability, Production Metering / Allocation / Planning / Well Testing / Facility Maintenance, Petroleum Production Engineering Consultancy & Oil/Gas Field Operations, Asset and Project Management.

He is Technical Director with Suneses Energy, currently supports oil and gas operators as Petroleum Engineering Consultant and formulation of new technology road map in implementation of DOF following previous work experiences with Geoservices, ConocoPhillips, Addax Petroleum and Shell. During these years, he has lectured part-time at University level and has a sound track record in digital oilfield (DOF) implementation as well as successfully implemented and embedded Smart Fields and Collaborative Work Environment projects across assets in Shell.

He has facilitated workshops, published, authored and presented several technical papers including SPE technical papers in major oil and gas conferences in many countries with great focus on DOF. Besides his engineering qualifications (Masters & Bachelors degree in Petroleum Engineering from University of Port Harcourt - Nigeria), he holds Masters degree in Business Administration (from University of Leicester- United Kingdom).




+ Presentation Outline

- **Introduction**
 - ✓ What is Digital Oilfield & Objective?
 - ✓ Digital Oilfield Value Loop
- **Key Benefits of Digital Oilfield Implementation**
- **A Case Study**
- **Challenges of Digital Oilfield Benefits Realisation**
 - ✓ Data / Technology Challenges
 - ✓ Project Management Challenges
 - ✓ Organisational / People Challenges
- **Success Factors for Digital Oilfield Benefits Sustainability**
- **Conclusion**
- **Questions**

+ Objectives

- **At the end of this presentation we should be able to:**

- ✓ Better understand the concept of Digital Oilfield
- ✓ Know the common challenges of Digital Oilfield implementation
- ✓ Provide mitigations on identified DOF Implementation challenges
- ✓ Map sustainability model in DOF embedment process
- ✓ Manage World-Class DOF projects

+ Poll Question

What geographic region are you from?

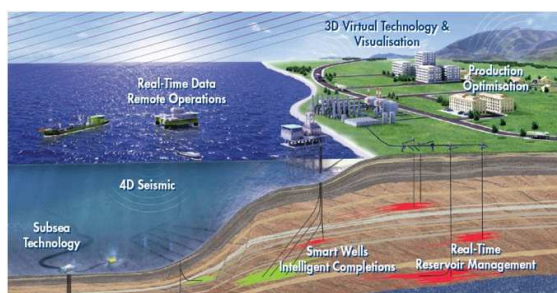
+ What is World-Class Digital Oilfield?

World-Class Digital oilfield refers to a 'top-notch' concept in real-time operation that aims for continuous production optimisation of an asset or group of assets through the integration of people, tools, processes & facility. World-Class Digital Oilfield solutions provide an operating field the capabilities to optimise operation in the short term and maximize lifecycle value of an asset in the long term.

- Excerpts from Paper OTC 24078

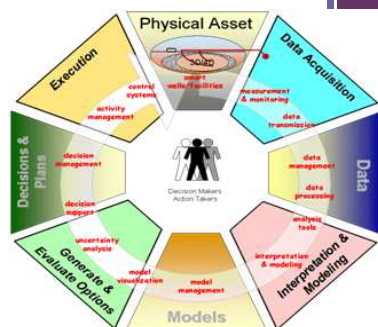
+ Elements of Digital Oilfield?

- Concept of Continuous Optimisation of Asset(s)
- Integrates People, Tools, Processes & Facility.



+ Digital Oilfield Value Loop

- Gather data and define the problem
- Generate ideas and various solutions to the problem
- Make appropriate decision
- Communicate and execute the agreed decision (s)

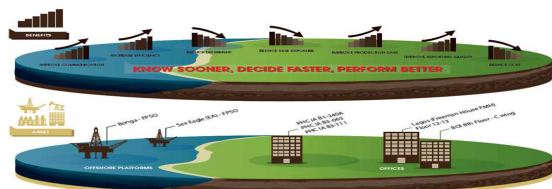


+ Poll Question

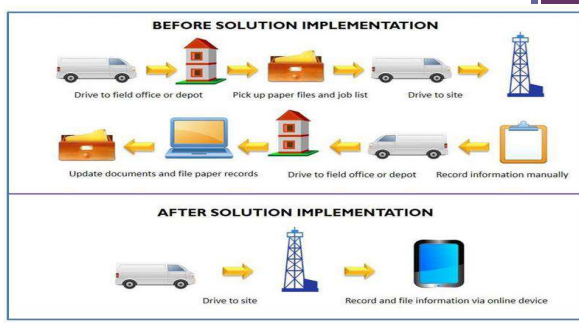
How many years of experience do you have?

+ Key Benefits of Digital Oilfield

- Production Optimisation / Availability 0.5 – 5%
- Remote support resulting in reduction of field crew - 25%
- Reduced NPT through concurrent planning operation optimisation 5 – 15%
- Reduction in risk exposure (HSES) / Travels
- Field life extension through effective field management
- Increased team operational integration / situational awareness



+ Before & After DOF Solution Implementation



+ Poll Question

What is your job title?

The Case Study

OTC Paper No. 24078

Smart Fields Management in Deepwater Field: Experience & Perspectives

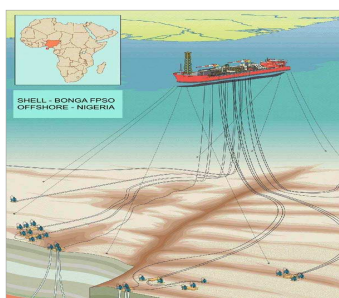
Emmanuel Udofia, Olatunbosun Oni, Abdul Samad Chaker & Ogbole
Oghedegbe.

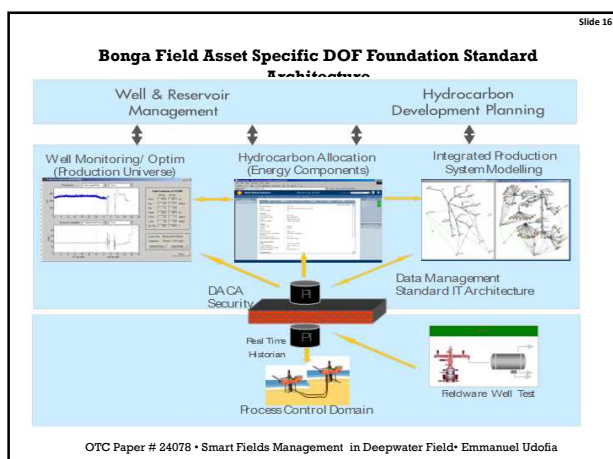
Shell Nigeria Exploration & Production Company

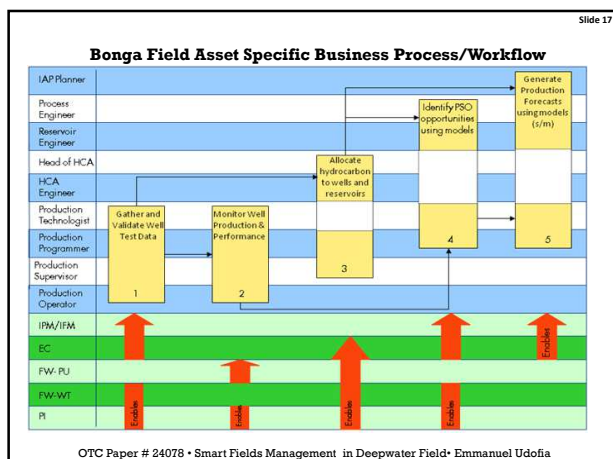


+ Case History of Bonga Field DOF Implementation (OTC Paper 24078)

- First Deepwater Field in Nigeria
- Located 120km South West of Warri, Nigeria
- Water Depth of 1000m covering 60 square KM
- Developed with Eighteen Producers & Fourteen Injectors
- Produced Over 500MMstb & Injected Over 700MMBbls of water from Nov-05
- Operational Dynamics Based on Pressure Maintenance by Water-Injection
- First Implementation of DOF in Sub-Sahara Africa









Slide 19

The Case Study: Business Process Review

- Gather & Validate Well Test Data
- Production Monitoring and Optimisation
- Enhanced Production Allocation Process
- Integrated System Optimisation & Forecasting
- Embedment Process

Paper # 24078 • Smart Fields Management in Deepwater Field• Emmanuel Udofia

Slide 20

Outcome of Bonga Field DOF Post Implementation Review

- Achieved Reduction in Manual Data Entry
- Provides common source of data for collaboration & in real time
- Smart Fields Solution extended to CWE Deployment
- Work process define reducing cycle of work activity
- Smart Field business objectives aligned with asset business needs
- Staff Succession planning and training needs to be sustained

Bonga Smart Field KPI's

Business Objectives	Performance Highlight	Rating (%)	Weaknesses	Strengths	Comments
Eliminating Manual Data Entry		75%	IFM	PI, PU, FWWT & EC	
Production System Optimisation		75%	Monthly PSO Meeting	Daily Prod Surv. Meeting	
Production Allocation		97%	FWWT/IFM	PU	
Production Forecasting		50%	Forecasting W/O IFM	Forecasting Using IPM	
Well & Reservoir Management		80%	Forecasting W/O IFM	Good IPSM	RP=BP
Cyber Security		95%	Needs Updates	Constant Monitoring	
Collaborative Work Environment		85%	Lack Virtual WE	Daily Prod Surv. Meeting	

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+ Poll Question

Who is your employer?

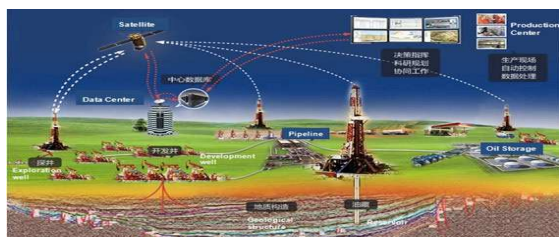
+ Challenges of DOF Benefits Realisation

- Data Challenges
- Technology / Infrastructure Challenges
- Project Implementation Challenges
- Organisational Structure Challenges
- People Challenges
- Results in value erosion overtime



+ DOF Data Challenges

- Getting the right quality data (data accuracy)
- No common source or storage of data. Integrated models is encouraged
- Frozen data caused by system or instrumentation issues or scalability 'nodes'
- Poor decision resulting from weak quality data

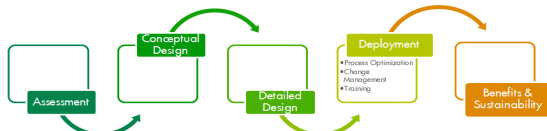


+ DOF Technology/Infrastructure Challenges

- Getting the right applications to support the DOF business process need
- Poor user interface for collaboration / Technology changes or innovation
- Real time system (Plant Information) outage resulting from application issues. We require 100% system uptime.
- Cyber threat against DOF critical infrastructure

+ DOF Project Implementation Challenges

- Poor project definition/framing poses threat to successful delivery. Benefit must be visible to all and aligns with asset specific business objective.
- Weak corporate structure support for DOF project delivery. Asset based structure as against functional based structure advised.
- Absence of Business Opportunity champion within the business with strong passion for DOF solutions delivery & sustainability.
- Misconception that DOF is an IT project. From project inception, the business must take ownership, sponsorship and drive the solutions.



+ DOF Project Implementation Challenges

- Poor turn-around time for fixing issues. Should have right level of support with agreed SLA to fix DOF issues promptly
- Delayed MOC process. Start MOC at early stage of the project
- Inadequate experience in similar project management. Learn from others and use appropriate DOF delivery model (stage-gate or iterative execution process)
- Lack of feedback loop. Ensure sustained engagement (throughout the project phase) among the project team, the business & management
- No Post Implementation Review

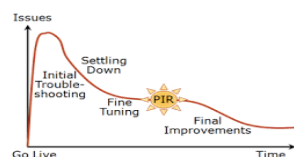


+ DOF Post Implementation Review

- Determine level of DOF solutions embedment in the asset
- Review competence level of domain experts and other support staff for DOF project
- Assess awareness level of DOF solutions within the asset
- Identify areas of improvement & ensure improved sustainability
- Capture lessons for future DOF Implementation

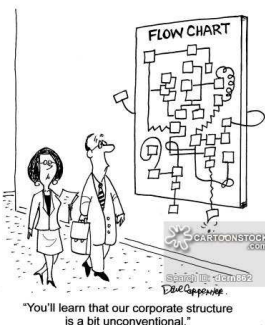


"Well, now we know what not to do."



+ DOF Organizational Structure Challenges

- Complex organisational structure that do not align with the DOF business driver
- Lack of visible corporate Management Support
- No cross-functional team collaboration. Organisational structure must support cross-functional team collaboration.
- Using Organisational Structure that do not ensure domain experts team co-location
- Organisationally, deliverables from DOF should form part staff KPI



+ Digital Oilfield People Challenges

- Resistance to change. Inadequate engagement (with bottom-up approach) showing benefit of DOF solutions. Project are easily accepted with Intrinsic team motivation
- Lack of staff training & retraining.
- No defined training plan for DOF processes in company training structure
- Staff attrition.
- No clear succession planning
- Lack of team passion or intrinsic motivation. Process ownership is key
- Result in poor motivated team



+ Digital Oilfield People Challenges

- Situational Awareness is insight into what is happening to enable you define appropriate solution.
- Generate individual situation awareness
- Build shared mental model from the individual situational awareness consciousness
- Develop business process for the team shared situational awareness
- Result in truly integrated cross-functional team



+ Success Factors for Digital Oilfield Benefit Realisation & Sustainability

- Continuous improvement of existing defined business process helps upscale the benefits overtime
- Benefits realisation is possible when all the DOF components are in sync with asset specific business benefits through clarity of thought and actions.
- We cannot completely eliminate all challenges but we can upscale our area of strength and better manage the identified challenges
- The DOF solutions need to agree with asset-specific business driver
- Keep focus & control on business value and ensure all stakeholders are aligned
- Top management, domain experts & corporate structure support remains key success factor

+ Conclusion

With cited case study, the following conclusions were reached;

- Identified DOF challenges provides opportunity for process improvement
- Sustainability comes with alignment of business objective and process ownership should sit with the asset.
- Significant business benefits are achieved in DOF implementation

+ Questions?



+ Advice for Contacting me:

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