

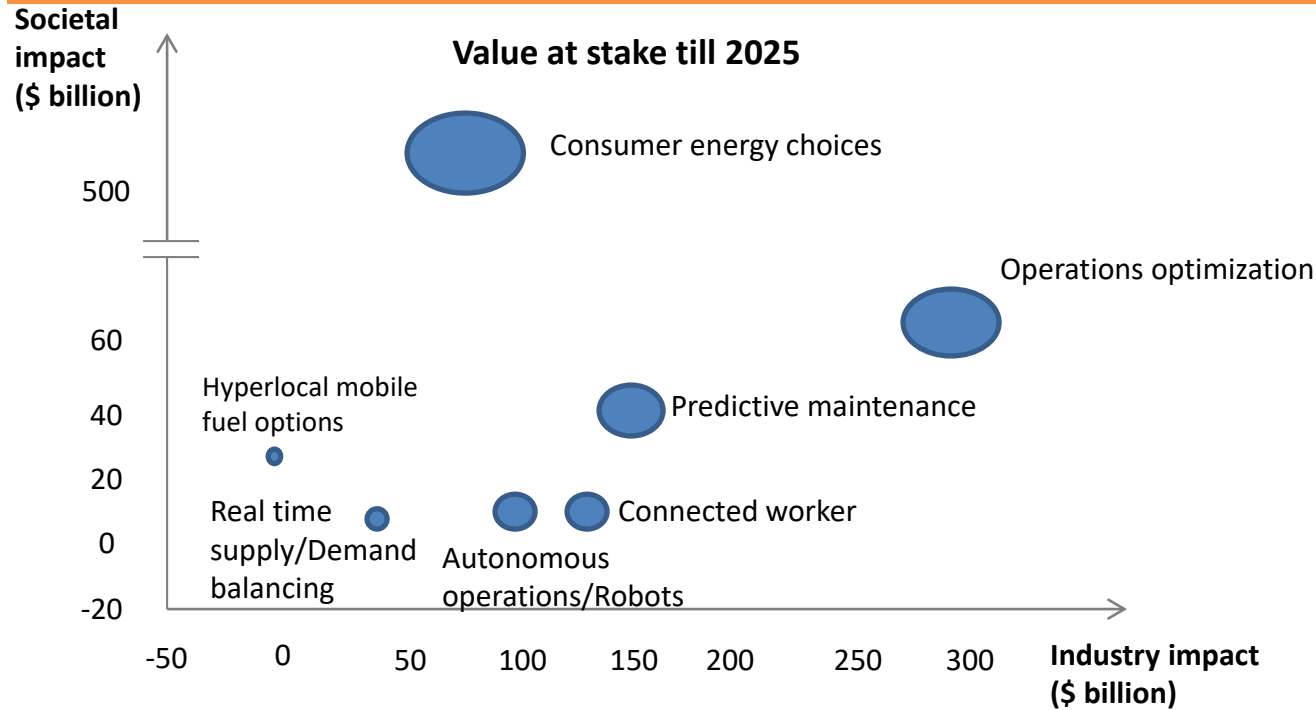
IEF 16, Parallel roundtable 3

Digitalization in Oil & Gas - Benefits and Challenges

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Potential value of digital initiatives in O&G



Bubble size represents the total impact in 2025; Societal impact includes the economic impact of emissions, reduction in water usage and oil spills, time savings, and reduction in costs to customers.

Source: World Economic Forum, Accenture analysis

Investments in digital technologies

- **Global spending on IIoT across all industries was around USD 20 billion in 2012 and analysts forecast that this number would reach close to USD 514 billion by 2020.**
- **Global IIoT in Oil & Gas market is expected to grow to over USD 30 billion by 2026.**
- **IIoT in Oil & Gas sector to be mainly driven to improve performance efficiency of infrastructure and operational efficiency.**
- **Simultaneously, we can safeguard employee health & safety.**

Benefits of digital technologies in Oil & Gas Sector

- According to a Deloitte report, shut down cost in global process industries accounts for 5% of the production, equivalent to USD 20 billion per year.
- Ineffective maintenance practices, unscheduled down time and accidents cost global refiners an additional 60 billion dollars per year.
- Japanese Bank, Nomura says that with IIOT, oil & gas companies could be more profitable with oil prices at 70 dollar per barrel than they were at 100 dollars per barrel.
- A McKinsey report adds that digital technologies in oil & gas sector could reduce capital expenditure by up to 20% and operating costs in upstream by 3-5%.

Application of digital technologies in Upstream operations



Data management	Seismic inversion and basin modeling	Production optimization
Operational analytics	Reservoir characterization and simulation	Reservoir/field Management and Flow/composition analysis
Field surveillance	Real time network and asset security utilizing drones and wearable technology	
Operations automation	Automated drilling	Minimally manned platforms, self diagnostic equipment
Integrated field Planning and delivery	Logistics, planning execution and resource scheduling	
Asset optimization technology	Reliability, predictive condition based monitoring and machine to machine communication	

Application of digital technologies in Midstream & Downstream operations



Digital Asset Management: SCADA systems to detect leakages in pipelines, sensors to monitor machines in real time



Dynamic inventory management: Supports logistical decisions, optimizes sourcing based on availability and lead time



Integrated control rooms: Technicians receive alerts and perform diagnostics, issues are isolated and maintenance schedule is planned



Analytics and simulation: AI uses surveillance and flow data to perform work simulations and impact analysis for planning and scheduling



Biometric monitoring/GIS: Wearable devices monitor field worker's location, safety and job status



Smart trucks: Products delivered via digital GPS enable trucks and e-locks to ensure real time tracking



Drones/PIGs: Drones and/or Pipeline Inspection Gauges share real time data and video to detect for leaks



Tablets/smart glasses: Utilize workflow on tablets to perform activities in remote locations while collaborating with control room

Challenges to digitalization in Oil & Gas



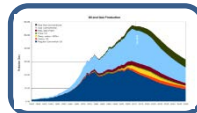
- **Timing:** O&G projects are capital intensive and take long time to develop, once a project is sanctioned focus is on design execution rather than design changes



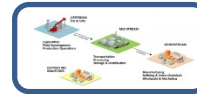
- **Age of infrastructure:** O&G installations may be old and may not support new digital technologies



- **IT support infrastructure:** While many digital technologies are available, many operators are not well placed to exploit them, as their use requires a well trained workforce.



- **Future production trends:** While most reservoirs can benefit from digital applications, it may not always make sense economically to do so due to their stage in production cycle

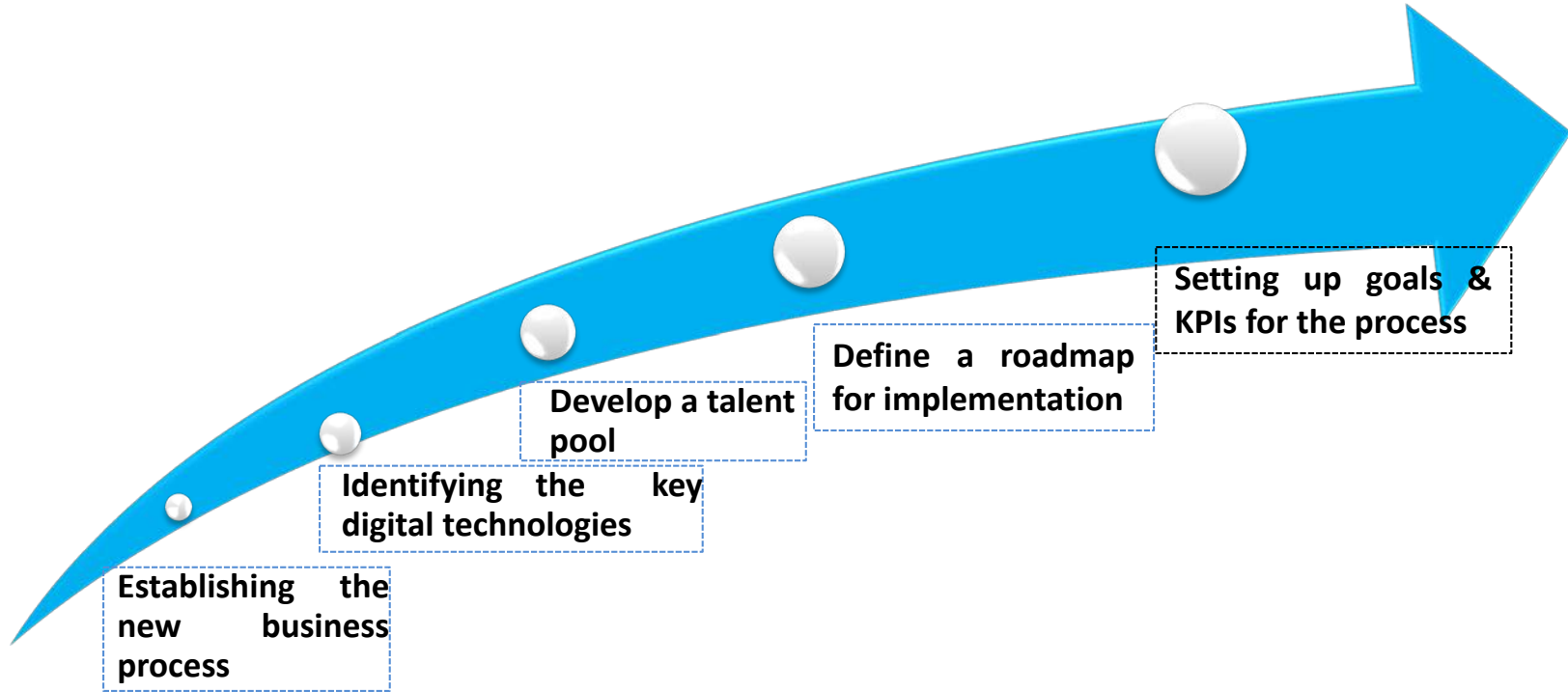


- **Lack of supply chain integration:** Due to only a few companies being fully vertically integrated, Digitalization remains largely tailored to the needs of individual subsectors.



- **Conservative management culture:** Oil and gas companies may look to service companies to develop digital technologies rather than bear the risks and cost

Steps to Digitalization without Disruption



Thank you