Parallel Roundtable 3: Energy Sector Digitalization; Benefits and Challenges
Introduction

Market Context

- Industries are going through digital revolution and it has started to reshape each and every one of it
- Though digital is at a nascent stage in O&G industry but players are developing sophisticated initiatives in digital space
- Digital is significant in India and will go beyond 3Ms - males, millennials and metro

Session Objectives

- What technologies today constitute digital?
- To observe themes driving digital investments across O&G industry and how some of the majors are deploying and benefitting from it
- To understand the key challenges in the deployment of digital in Oil and Gas

Key Question: How is digitalization making oil, gas and power sectors more efficient and resilient? What is the role of inventory data, will stocks become more transparent in the digital age?
Digital is a “tremendous rate of change” with an ubiquitous front end

By 2030, the cloud will have more raw computing power than all human brains together

2X growth in connected devices per household—25 (2017) to 50 (2020)

1 internet minute means

- 0.9Mn logins
- 156Mn emails
- $0.7Mn spent

4 billion of the world’s internet users, will spend a staggering 1 billion years online in 2018

Source: BCG Analysis, 2018 Global Digital Suite of Reports (We are social)
Digitization has started to re-shape the complete industrial world

**Industrial Internet**
- Tracking (location & temperature) of refrigerated shipping container

**Mobile & social**
- Advanced mobile service assistance

**Augmented reality**
- AR-based assistance in warehousing

**Cyber security**
- Industrial cyber security for process industries

**Additive manufacturing**
- 3D-printed fuel nozzles in the combustion system

**Big Data & Analytics**
- Gene sequencing for agricultural production

**Cloud**
- SaaS based process engineering tools

**Simulation**
- 3D real-time factory simulation for design and monitoring

**Horizontal & vertical integration**
- Plant engineering integrated with process control system

**Autonomous robots**
- Human collaborative robots working side-by-side with workers
Digital in India is already significant and will continue to grow

India today has the 2\textsuperscript{nd} largest base of internet users in the world

Internet users to further increase, driven by the rise in smartphone use

- **650 Mn** > Internet users in India in 2020
- **80%** > Users to access internet from phones v/s 70% today
- **13%** > Growth in Indian smartphone market vis-à-vis 3% globally

<table>
<thead>
<tr>
<th>Country</th>
<th>#internet users (Mn)</th>
<th>Internet penetration xx%</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>731</td>
<td>53%</td>
</tr>
<tr>
<td>India</td>
<td>462</td>
<td>35%</td>
</tr>
<tr>
<td>USA</td>
<td>286</td>
<td>89%</td>
</tr>
<tr>
<td>Brazil</td>
<td>139</td>
<td>66%</td>
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<tr>
<td>Japan</td>
<td>115</td>
<td>91%</td>
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</tbody>
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Source: BCG Analysis, Ethinos Digital India snapshot 2017

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### Digital to go beyond 3M’s—males, millennials, metro

<table>
<thead>
<tr>
<th>Segment</th>
<th>2016 (Mn)</th>
<th>2020 (Mn)</th>
<th>Δ</th>
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<tbody>
<tr>
<td>Millenials (&lt;34 Yrs)</td>
<td>244</td>
<td>436</td>
<td>1.8</td>
</tr>
<tr>
<td>Male</td>
<td>231</td>
<td>390</td>
<td>1.7</td>
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<tr>
<td>Metro/T1</td>
<td>96</td>
<td>150</td>
<td>1.6</td>
</tr>
<tr>
<td>Not So Young (35+ Yrs)</td>
<td>86</td>
<td>214</td>
<td>2.5</td>
</tr>
<tr>
<td>Female</td>
<td>99</td>
<td>260</td>
<td>2.6</td>
</tr>
<tr>
<td>Non-metro</td>
<td>234</td>
<td>500</td>
<td>2.2</td>
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</table>
Digital is still nascent in Oil and Gas but could cause significant disruption

<table>
<thead>
<tr>
<th>Impact of digitalization</th>
<th>Transformations</th>
<th>Attackers</th>
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<tbody>
<tr>
<td>Impact of digitalization is growing in all industries</td>
<td>Media</td>
<td>Netflix</td>
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<td>Logistics and mobility</td>
<td>Logistics and mobility</td>
<td>MAERSK</td>
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<td>Retail</td>
<td>Retail</td>
<td>TESCO</td>
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<td>Consumer</td>
<td>Consumer</td>
<td>P&amp;G</td>
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<td>Banking</td>
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<td>Telecommunication</td>
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<td>Agriculture</td>
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<td>JOHN DEERE</td>
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<td>Healthcare</td>
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<td>Bayer</td>
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<tr>
<td>Energy</td>
<td>Energy</td>
<td>Total</td>
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<tr>
<td>Mining</td>
<td>Mining</td>
<td>GLENCORE</td>
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<tr>
<td>Construction/Building materials</td>
<td>Construction/Building materials</td>
<td>HILTI</td>
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</tbody>
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Digital dominates value chain
Digital attacks value chain
Additive digital value

Source: BCG analysis
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“Digital” in O&G: 11 themes are driving innovation in leading global companies

- **Cybersecurity**: Protecting system integrity is a “must-have”
- **Robots & automation**: Intelligent robots take on complex assignments
- **Sensors**: Low cost, low power, connected sensors capturing spatial and environment information
- **Unmanned aerial vehicles**: Autonomous, low-cost vehicles able to perform complex tasks and remove human presence
- **3D scanning**: Analyses of real-world object or environment to collect data on its shape/appearance
- **Collaborative technology platforms**: Employee engagement and collaboration enabled by digital platforms and communities
- **Big data & analytics**: Instant analysis of large data sets to identify new patterns
- **Cloud computing/storage**: Highly scalable, variable-cost storage & processing on demand
- **Virtual reality**: Interact more naturally with digital devices and services
- **Real-time communication and tracking**: Every asset, equipment, employee always connected
- **Mobile connectivity & augmented reality**: Virtual tele-presence to remove the need for on-site humans and omnipresent mobile devices

Source: BCG analysis
Oil & Gas players are already developing sophisticated initiatives in the digital space

Digital oilfields controlled from a unique Real-Time Drilling Optimization Center
UAV for pipeline inspections

Analytics driven predictive maintenance
Digital initiatives in retail (customer segmentation and loyalty)

Submersible robot for Ocean exploration
Immersive 3D training simulation

Real time production optimization through big data and machine learning
However, companies are hindered in their “digitalization” by internal roadblocks

Digital talent crunch
72% of CEOs struggle to source the right digital talent

Dated processes
74% high digital decision-makers do not fully agree that their operational process is ready to execute their digital strategy

Cultural obstacles
“The biggest challenge is cultural change”

Inadequate investment in digital infrastructure
Only select cos are investing in state of the art digital infrastructure

Key Questions

1. What are some of the most practical areas where digital can help an O&G company in the short term (1 to 3 years)?

2. How can one insure smooth infusion of technology into traditional O&G business/companies without disrupting it?

3. What is the role of inventory data, will stocks become more transparent in the digital age?
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Background Paper