BEYOND TRADITIONAL DIGITAL TRANSFORMATION – A PORTFOLIO APPROACH

Presentation by Steve Wright and Manas Satapathy
We have been collecting cost/headcount data with our General & Administrative (G&A) Diagnostic since 2015

• The PwC Lower 48 G&A Diagnostic has emerged as the industry-leading source of truly comparable, consistently defined peer-based G&A costs and headcount. Data are collected and vetted by component – for both Technical (e.g., Operations, HSE, Land) and Support G&A (e.g., IT, HR, Legal, Finance and Accounting) areas.

• To enhance comparability, we focus on “Adjusted Gross G&A” costs and normalize cost and headcount data on a variety of bases – barrel of oil equivalents (boe), oil and gas revenue, capex, wells, total G&A headcount, rigs, etc.

• Since 2015, the 85+ participating entities have collectively accounted for more than three quarters of all companies in the IHS global integrated, regional integrated, large and mid-sized E&P US peer groups (ihsmarkit.com).

• There is no cost to participate, and all submitted data are kept confidential.

About the G&A Diagnostic

Participant profile (based on most recent study)

<table>
<thead>
<tr>
<th>Production and other statistics</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net production (boe/day)</td>
<td>282,831</td>
</tr>
<tr>
<td>Gross operated production (boe/day)</td>
<td>363,305</td>
</tr>
<tr>
<td>Gross operated producing wells</td>
<td>3,031</td>
</tr>
<tr>
<td>Total gross producing wells</td>
<td>3,700</td>
</tr>
<tr>
<td>Gross operated wells drilled</td>
<td>51</td>
</tr>
<tr>
<td>Average operated rig count</td>
<td>5.8</td>
</tr>
<tr>
<td>Oil and gas revenue ($MM)</td>
<td>$1,785</td>
</tr>
<tr>
<td>G&amp;A FTE per net MMBOE</td>
<td>6.7</td>
</tr>
<tr>
<td>Gross operated boe/well/day</td>
<td>76.1</td>
</tr>
<tr>
<td>Oil/Liquids percentage (based on gross operated production)</td>
<td>60.1%</td>
</tr>
<tr>
<td>Total capital spend ($MM)</td>
<td>$484</td>
</tr>
<tr>
<td>Exploration &amp; Development capital spend ($MM)</td>
<td>$393</td>
</tr>
</tbody>
</table>
Understanding the extent of cost declines/efficiency gains, 2015-2022

G&A cost and exploration and development capital have been cut roughly in half on a BOE basis. G&A headcount (FTE) is about 1/3 of its 2015 level, as is G&A cost as a percentage of oil and gas revenue.

With such declines over the past eight years, where will additional efficiencies come from?

Source: PwC L48 Upstream G&A Diagnostic
The oil and gas sector is entering unchartered waters with several headwinds...

**Global & Macro Trends**
- Russia supply disruption
- High global inflation
- Rising interest rates/USD strength
- Global recessionary concerns

**Industry & Sector Trends**
- L-T O&G demand reduction
- Renewables in energy mix
- No real alternatives to O&G found
- Supply shock/underinvestment
- Long-term cost of supply pressure

**Global & Macro Trends**
- Regulatory pressure
- Investor pressure
- Public capital exited the sector
- Unclear and ever-changing remit
- No clear path forward

**Workforce**
- Aging workforce
- Great resignation
- Tainted reputation
- Critical skills shortage
- Reskilling/retraining

**Technology**
- Migration to cloud
- OT and IT sophistication
- Value unlock from data
- Increased automation
- Cyber resiliency
... and stakeholder expectations and the value drivers are shifting

**Digitalization plays a key role in helping the industry transition and manage complexity**

<table>
<thead>
<tr>
<th>Stakeholders now looking for</th>
<th>Changing the value drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlocking growth and value in low-carbon future</td>
<td>From</td>
</tr>
<tr>
<td>Increased efficiency and targeted production</td>
<td>To</td>
</tr>
<tr>
<td>Free cash flow even at low oil price conditions</td>
<td>Focus on NPV</td>
</tr>
<tr>
<td>Better balance sheet</td>
<td>Focus on cash flow</td>
</tr>
<tr>
<td>Delivering net-zero pledges</td>
<td>Reserve-replacement ratio</td>
</tr>
<tr>
<td>Offering higher dividend yields</td>
<td>Carbon intensity</td>
</tr>
<tr>
<td></td>
<td>Long-term major capital project delivery</td>
</tr>
<tr>
<td></td>
<td>Short-cycle development</td>
</tr>
<tr>
<td></td>
<td>Concentrated portfolio</td>
</tr>
<tr>
<td></td>
<td>Diversified portfolio</td>
</tr>
<tr>
<td></td>
<td>Autonomous/siloed businesses</td>
</tr>
<tr>
<td></td>
<td>Integrated structures</td>
</tr>
<tr>
<td></td>
<td>Proprietary &amp; tailored tools/processes</td>
</tr>
<tr>
<td></td>
<td>Standard &amp; open-source tools/processes</td>
</tr>
<tr>
<td></td>
<td>Energy-friendly policies</td>
</tr>
<tr>
<td></td>
<td>Sustainable products</td>
</tr>
<tr>
<td></td>
<td>Supply chain optimization</td>
</tr>
<tr>
<td></td>
<td>Supply chain resilience</td>
</tr>
</tbody>
</table>

**Shift towards customer centricity** can be key to unlocking sustainable and long-term value in oil & gas sector.
Digital transformations can generate more value as we move from pure-play cost cutting to efficiency-driven growth.
There are 7 core areas for digital transformation in O&G value chain

<table>
<thead>
<tr>
<th>Portfolio Areas Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assess &amp; Acquire</strong></td>
</tr>
<tr>
<td>Acquisitions</td>
</tr>
<tr>
<td>Exploration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Portfolio Areas</th>
<th>Value Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Projects</td>
<td>Assess &amp; Acquire</td>
</tr>
<tr>
<td></td>
<td>Develop &amp; Operate</td>
</tr>
<tr>
<td></td>
<td>Commercialize &amp; Distribute</td>
</tr>
</tbody>
</table>

1. Capital Projects
   - Modular/automated engineering
   - Integrated capital project tracking & management
   - Cost/schedule benchmarking & tracking
   - Personnel & inventory tracking and safety
   - Contract & invoice management

2. Production Operations & Facility Management
   - Dynamic planning & monitoring
   - Operations-focused facility upgrades/workovers
   - Repair and maintenance optimization
   - Inventory optimization
   - Logistics & personnel planning & tracking
   - Netback maximization

3. Midstream & Liquefied Natural Gas (LNG)
   - Pipeline & terminal operations
   - Fleet management & route optimization
   - Commercial excellence

4. Fuels & Lubricants
   - Dynamic planning and monitoring
   - Manufacturing
   - Distribution & channel selection
   - Customer

5. Sub Surface & Reservoir Management
   - Seismic acquisition and processing
   - Sub-surface analysis and modeling
   - Integrated field development planning
   - Field & well-level production optimization
   - Brown field re-developments & optimization
   - Reserves reporting and management

6. Drilling & Completions
   - Efficient permitting and operations reporting
   - Pad planning and scheduling
   - Well drilling & completions design optimization
   - Operations optimization and monitoring
   - Personnel & inventory planning, tracking and safety

7. Decarbonization
   - Carbon trading and offset value maximization
   - Operations decarbonization management
   - Integrated supply chain monitoring
   - Carbon management

Identification of high impact portfolio areas for clients can be key to help achieve fast and sustainable results.
As an example, production operations can be digitally transformed to generate 30-40% more value

Net Income Improvement Potential (for 100MBPD1) Facility, $MM

Use cases (Total 100+)

1) Thousand barrels per day

A typical E&P company could have 10-20 such facilities

Assumptions: Revenue per barrel $60, Cost $20, Tax $20; 10% production increase, 2% downtime reduction, $2 per barrel cost reduction from Lifting optimization; $1 for Gathering & Transportation, $1 for Chemical/Treating.
There can be 100+ use cases in production operations alone

### Use Cases

<table>
<thead>
<tr>
<th>Value Chain</th>
<th>Assess &amp; Acquire</th>
<th>Develop &amp; Operate</th>
<th>Commercialize &amp; Distribute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acquisitions</td>
<td>Concept Design</td>
<td>Transportation &amp; Storage</td>
</tr>
<tr>
<td></td>
<td>Exploration</td>
<td>Construction</td>
<td>Commercialization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Production</td>
<td>Sales</td>
</tr>
</tbody>
</table>

#### Dynamic planning and monitoring

- Optimized planning system helps update production plans dynamically based on current well performance, facility bottlenecks and other constraints to deliver at or near nameplate capacity.
- Optimize the day-to-day production by considering multiple inputs – facility bottlenecks, supply chain constraints, macro-economics.
- Help drive well-by-well profitability by optimizing the operations of each well in alignment with economics.

Total Use Cases Identified: 10+

#### Operations-focused facility upgrades and workovers

- Enhanced well-pad functionality to stimulate further production.
- Example Use Cases:
  - Optimize artificial lift performance (gas lift flow rate, ESP RPM, etc.)
  - Optimize chemical dosing strategy by customizing injection rate per well/pad.
- Total Use Cases: 10+

#### Repair & Maintenance Optimization

- Increased uptime through equipment monitoring and condition-based maintenance.

  **Use cases include:**
  1. Integration of key equipment health and trends on single dashboard
  2. Predictive analytics of critical equipment (e.g., heat exchangers)
  3. Rod pump/ESP failure analysis

- Total Use Cases: 30+

#### Logistics & Personnel Planning & Tracking

- Tailored resource and route planning to increase productivity, HSE compliance and confirm accurate invoicing.

  **Use cases include:**
  1. Route/logistics optimization
  2. People tracking and invoicing
  3. Production virtual control tower

- Total Use Cases: 20+

#### Inventory Optimization

- Tracked and centrally managed parts and inventory to drive insights.

  **Use cases include:**
  1. Material & equipment reqs are forecasted and aggregated across all operations
  2. Inventory is tracked using sensors, and operations teams can quickly identify and request required material

- Total Use Cases: 20+

#### Maximize Net Back

- Understand end market requirements and options to optimize the entire value chain and maximize net-back.

  **Use cases include:**
  1. Optimize value chain and shipping routes based on real-time pricing to leverage price arbitrage
  2. Optimize long-term vs. spot contracts to maximize value

- Total Use Cases: 10+
Sustainable digital value creation requires a holistic approach based on integrated IT platforms and supported by change management.

**Overview**

**Create Value**
- Focus on portfolio areas and KPIs that really matter
- Drive immediate value via integrated use cases

**Embed Change Management**
- Design with end-users in mind (who is making the decisions)
- Work with the business to embed solutions in the functional workflow

**Build an Enabling Platform**
- Prioritize for value creation potential and ease of implementation
- Take a modular approach -- do not wait to light-up all functional areas
Business portfolio value creation focuses on progressively complex and integrated use cases to unlock exponential impact

**Approach**

**Identify**
- Perform initial lighthouse project to demonstrate value creation potential
- Select high impact use cases based on hypotheses for value creation
- Leverage initial insights for prioritization of use cases

**Integrate**
- Understand relationship between use cases
- Combine and integrate use cases to create synergies
- Ramp up multiple teams and parallelize efforts to accelerate approach

**Scale**
- Roll-out full-scale solutions to high impact portfolio areas
- Deploy digital platforms to enable scaling and facilitate repeatability
- Support transformation via larger cultural change program

---

**Immediate Business Impact**

**Synergistic Value Optimization**

**Sustainable Value Creation**
Enabling digital platforms span IT layers and break silos between legacy systems

In the past many digital initiatives focused on the data layer only causing outcomes to fall short of expectations.
Enabling digital platforms span IT layers and break silos between legacy systems

In the past, many digital initiatives focused on the data layer only, causing outcomes to fall short of expectations.
Scaling of digitalization will likely require a modular platform build-up based on a microservices architecture.

**Digital Platforms**

- **Decision Layer**
  Automate decision making whenever possible

- **Visualization Layer**
  Create optimization engines to strike the right trade-offs

- **Analysis Layer**
  Develop analytical models for each functional domain

- **Data Layer**
  Lay pipelines to different data source systems and stitch data together

**To help manage use cases effectively:**

- Start with clear business objectives and value levers for each domain to be digitalized
- Delineate the family of use cases and create metrics and dashboards to measure and monitor progress of the whole domain
- Use the right D&A stack (OT/IT) to stitch the family of use cases and manage them as a system
To sustain the value created and embed digital transformations, cultural change management is likely essential.

Cultural Change

1. Establish Cultural Priorities
   - Define target elements **based on culture priorities**
   - Align to **strategic aspirations** and base them on the **existing culture**

2. Drive Critical Behaviors
   - Behaviors are an **enduring way of acting** that is considered regular or expected
   - Involve management to **specify relevant behaviors**
   - **Katzenbach Center** is a recognized leader in organization, change and leadership

3. Embed in Daily Work
   - Define **formal and informal interventions** to help implement the behaviors in **day-to-day work**
   - Management to **lead by example**

4. Sustain Cultural Change
   - Establish **behavior reviews** with managers and employees
   - Regularly track progress and **celebrate success**

1) **Key publication from PwC Katzenbach Center**: *A practical guide for leaders at all levels on leveraging culture to accelerate and sustain transformation*
Questions?