Future of Knowledge Work: 
Developing Your Next Generation Experts

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Agenda

• Future of Knowledge Work
• Trends in Human Capital
• Next Generation Experts and Thought Leaders
• How to Think Like Your Best Experts
• Visualizing Tacit Knowledge Domains
• Designing Smarter Networks
• Creating Extraordinary Business Value
The (Near) Future of Knowledge Work

- Competitive advantage relies on highly skilled people for decision-making, problem-solving, product development and service delivery

- Shortage of skilled Gen Y knowledge workers (~40 MM by 2020)
  - **GAPS**: critical thinking, problem-solving, team behaviors, communication

- Focus on best use of human capital
  - Identify off-loadable tasks; use automated/smart systems/*Big Data*
  - Find better ways to **accelerate skill development** (strategic differentiator)
  - Fewer full-time “Employees”, **Contract skills** as needed
  - Dynamic and agile teams become the norm
  - Improve KM processes to **retain internal and add external expertise**
  - **Crowdsourcing** (for tasks), **Open Innovation** (for new ideas)

Factors Correlating with Human Capital

- Work experience (years)
- Education (degrees)
- Salary
- Seniority
- Job tenure (company or position)
- Leadership positions and rank
- Employee engagement
- Network effects (collaboration)

Human Capital Management Institute, 2013
Knowledge Loss – Millennial Crew Change

![Graph showing the number of employees by age for Year 2009, 2012, and 2019.](image)

<table>
<thead>
<tr>
<th>Human Capital Factor</th>
<th>2009</th>
<th>2012</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>281</td>
<td>264</td>
<td>229</td>
</tr>
</tbody>
</table>

Large Manufacturer
Retaining Millennials – Generational Mindsets

Source: BCG analysis.
How to Think Like an Expert

**Mental Model**

- PROFITABILITY
  - CAPEX
    - driven by: Age, Bottlenecks
  - OPEX
    - driven by: Variable Costs, Fixed Costs
- FACILITY
  - Operations
- INCREMENTAL RECOVERY
  - measured by: BOPD
- RESERVOIR
  - Properties
- INJECTORS
  - # and Location of Injectors
  - Injectivity
  - Target Injection Rate
  - Faults

**Expert Knowledge**

- The big picture
- What is most important
- Managing to constraints
- Common situations
- Achieving quality results
- What can go wrong
- Handling problems
- Who to contact for help
Designing Smarter Networks
Learning and Performance Support

- Operating Parameters
- Functional Knowledge
- Expertise Location
- Q&A
- Mental Model
- Operational Know-How
- Experiences
- Knowledge Assets
- Expertise Location
- Q&A
- Mentoring
- Peer Assist
- Master Class
- AAR
- Team Learning
Impact of Accelerated Competency

Point of Autonomy

Years

0 4 8 12 16

Learning Philosophy

Conventional

Innovative

6 years

Capability:

Execute assigned tasks
Select among several standard tasks
Make non-standard, original technical decision
Make personnel decisions (hire, transfer...)

Source: Schlumberger, SPC 2006 Benchmark Survey, 20 companies
Smarter Network - Drilling

Drilling Mental Model

Rig Components

Geology
Drilling operations are expensive with rig costs of $100-500K/day. Reducing days per well provides high value.
## Smarter Networks and Knowledge Recovery

<table>
<thead>
<tr>
<th>Internal Expertise</th>
<th>At-Risk Expertise</th>
<th>External Expertise</th>
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</thead>
<tbody>
<tr>
<td>SMEs/Workforce</td>
<td>Near Retirement</td>
<td>Retirees</td>
</tr>
<tr>
<td>Smart Systems</td>
<td>Changing Jobs</td>
<td>Qualified Vendors</td>
</tr>
<tr>
<td>Knowledge Bases</td>
<td>Leaving</td>
<td>Consultants</td>
</tr>
</tbody>
</table>

![Network Diagram](image-url)
Smarter Networks – Business Value

- **Cost Reduction**
  - Operating Cost ($2 billion/year)
  - Energy Savings (>1 billion)
  - Global Refining Operations ($100 million)

- **Oil & Gas Exploration and Production**
  - E&P Knowledge Networks ($50-250 million/year)
  - Drilling Process (cut time by 50%)

- **Safety**
  - World-class safety performance

- **Expertise Development**
  - Reduce time to competency (by 50%)
Q&A: Measuring Activity and Value

> $100 Million Savings

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Available by</th>
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</thead>
<tbody>
<tr>
<td>Total # of Questions Asked</td>
<td>Individual</td>
</tr>
<tr>
<td># of Questions Resolved</td>
<td>Team</td>
</tr>
<tr>
<td># of Questions Unanswered</td>
<td>Location</td>
</tr>
<tr>
<td># of Questions Escalated</td>
<td>Month/Year</td>
</tr>
<tr>
<td>Total # of Answers Provided</td>
<td></td>
</tr>
<tr>
<td>Total # of FYIs</td>
<td></td>
</tr>
<tr>
<td>Skills and Categories</td>
<td></td>
</tr>
<tr>
<td>Cost and Time Savings</td>
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Global Refining Knowledge Management System

Welcome to the GR KM System

The Global Refining Knowledge Management System enables users to share technical information effectively, securely and globally by improving the speed and quality of communication.

GRKM Quick Links
- GRKM Training Material
- GRKM Quick Ref. Card
- Provide Feedback

Q&A/FYI Metrics

<table>
<thead>
<tr>
<th>Month</th>
<th>Questions</th>
<th>Answers</th>
<th>FYIs</th>
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</thead>
<tbody>
<tr>
<td>January</td>
<td>18</td>
<td>65</td>
<td>3</td>
</tr>
<tr>
<td>December</td>
<td>22</td>
<td>85</td>
<td>7</td>
</tr>
<tr>
<td>November</td>
<td>35</td>
<td>110</td>
<td>7</td>
</tr>
</tbody>
</table>

Global Refining Knowledge Management

Q&A/FYI

Have a question or an FYI?
You can...
- Search Q&A/FYI
- Browse Q&A/FYI
- Ask a Question
- Submit FYI
- My Questions/FYIs
Summary

- Human capital trends indicate needs to **quickly develop next generation experts** and connect external expertise
- **Engage and retain Millennials**: understand generational mindsets
- Knowledge Networks tap the collective expertise of your organization, sharing ideas, practices and lessons that **deliver extraordinary value**:
  - Reduce costs
  - Solve tough problems
  - Stimulate innovation
  - Accelerate competency
- **Smarter Networks** can reach beyond departmental and organizational boundaries, to include retired experts and trusted vendors
- **Visualizing knowledge** is a proven method for enabling better cognitive processing of complex work domains
Questions? Key Takeaways?