



Digital Transformation

August 2019



WHAT IS DIGITAL TRANSFORMATION?

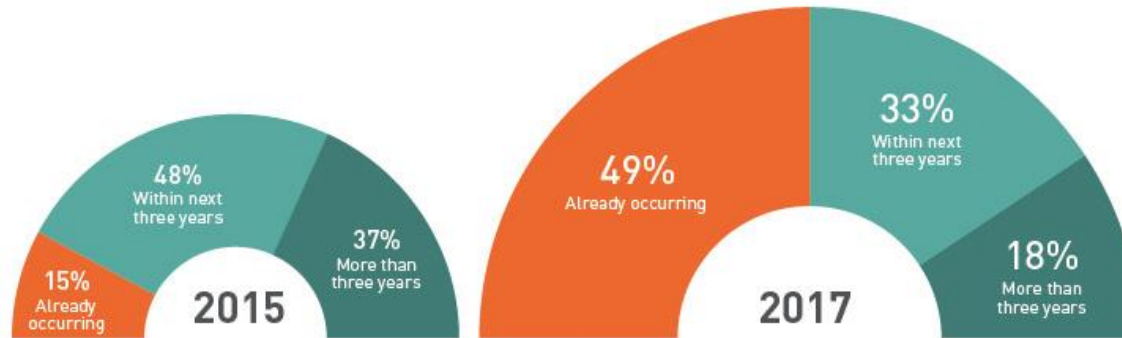
- 88% of companies surveyed said they were undergoing digital transformation
 - Yet... only 25% had an understanding of what it is
- The challenge is not the investment in technology, but rather the realignment of business models to reflect the transformation
- Digital transformation is not just a technology trend, but rather a core business approach at the center of enterprise strategies across all industry segments and markets



Source: Global Center for Digital Business Transformation, 2015; Image copyright Tagxedo.com

A PERSPECTIVE ON SPEED OF CHANGE

Across All Industries



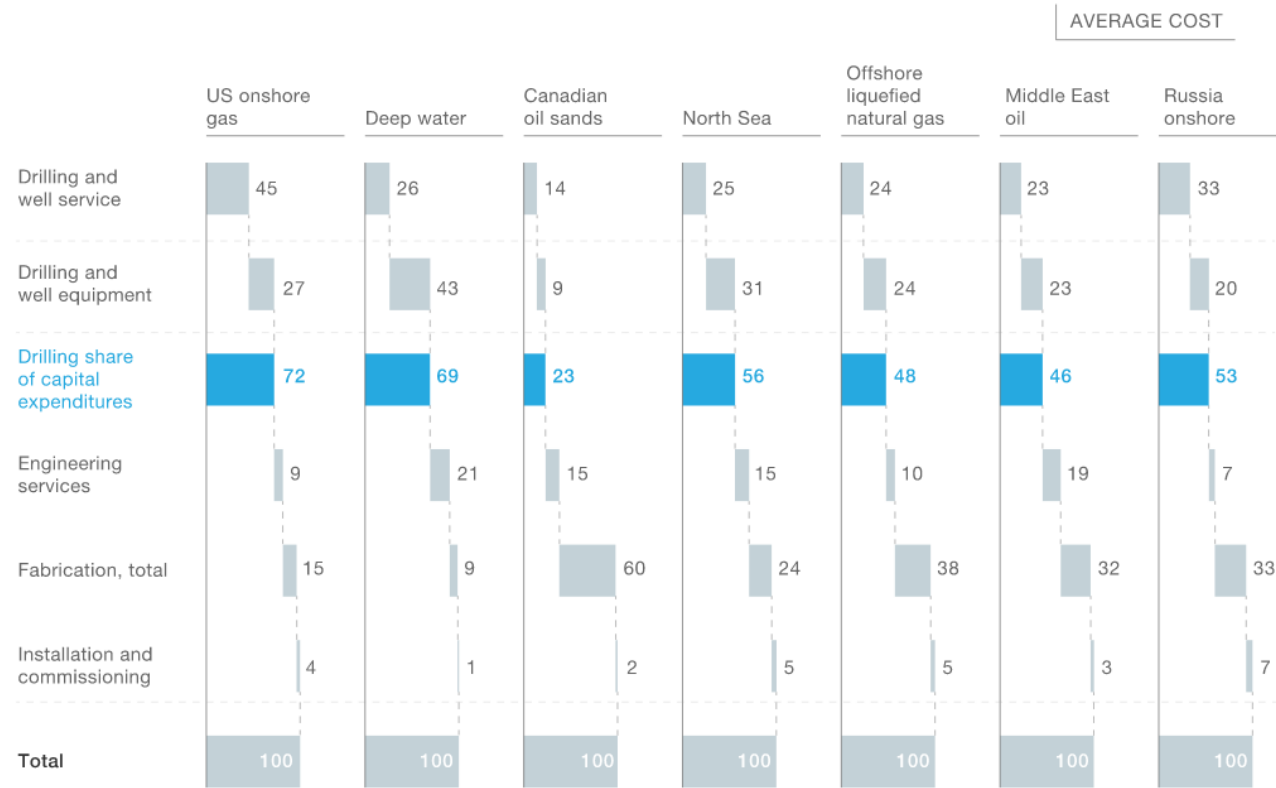
Source: Global Center for Digital Business Transformation, 2017

Energy and Utilities

2019	RANKING	2017
Media & Entertainment	← 1	Media & Entertainment
Technology Products & Services	← 2	Technology Products & Services
Telecommunications	↘ ⁺² 3	Retail
Retail	↘ ⁻¹ 4	Financial Services
Financial Services	↘ ⁻¹ 5	Telecommunications
Hospitality & Tourism	↘ ⁺³ 6	Consumer Packaging Goods
Transportation & Logistics	↘ ⁺⁴ 7	Education
Education	↘ ⁻¹ 8	Professional Services
Professional Services	↘ ⁻¹ 9	Hospitality & Tourism
Consumer Packaging Goods	↘ ⁻⁴ 10	Manufacturing
Healthcare & Pharmaceuticals	↘ ⁺² 11	Transportation & Logistics
Manufacturing	↘ ⁻² 12	Real Estate
Energy & Utilities	↘ ⁺¹ 13	Healthcare & Pharmaceuticals
Real Estate & Construction	↘ ⁻² 14	Energy & Utilities

OPERATORS ARE FOCUSED ON CAPITAL DISCIPLINE

Proportion of project cost, %, indexed

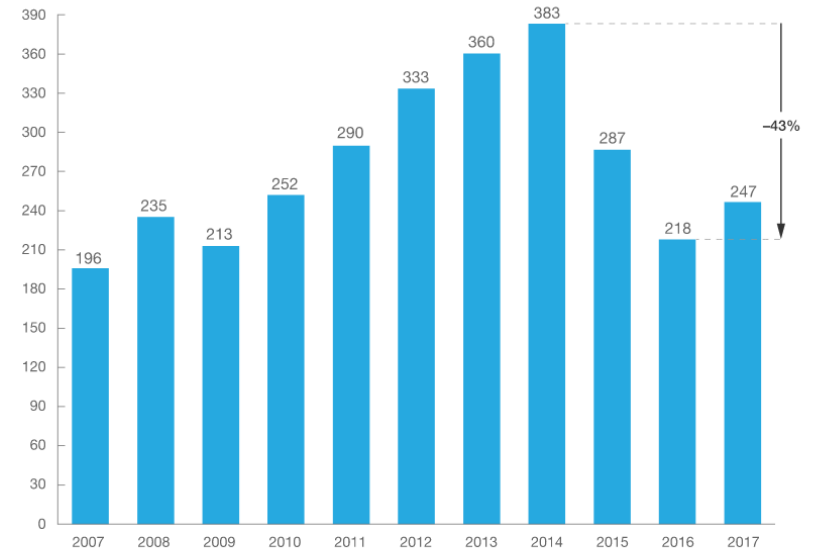


Note: Figures may not sum to 100%, because of rounding.

McKinsey&Company | Source: IHS Markit; Wood Mackenzie; McKinsey analysis

Oil and gas companies reduced capital spending on wells by approximately 40 percent in 2016.

Annual well capital expenditures, \$ billion, nominal term

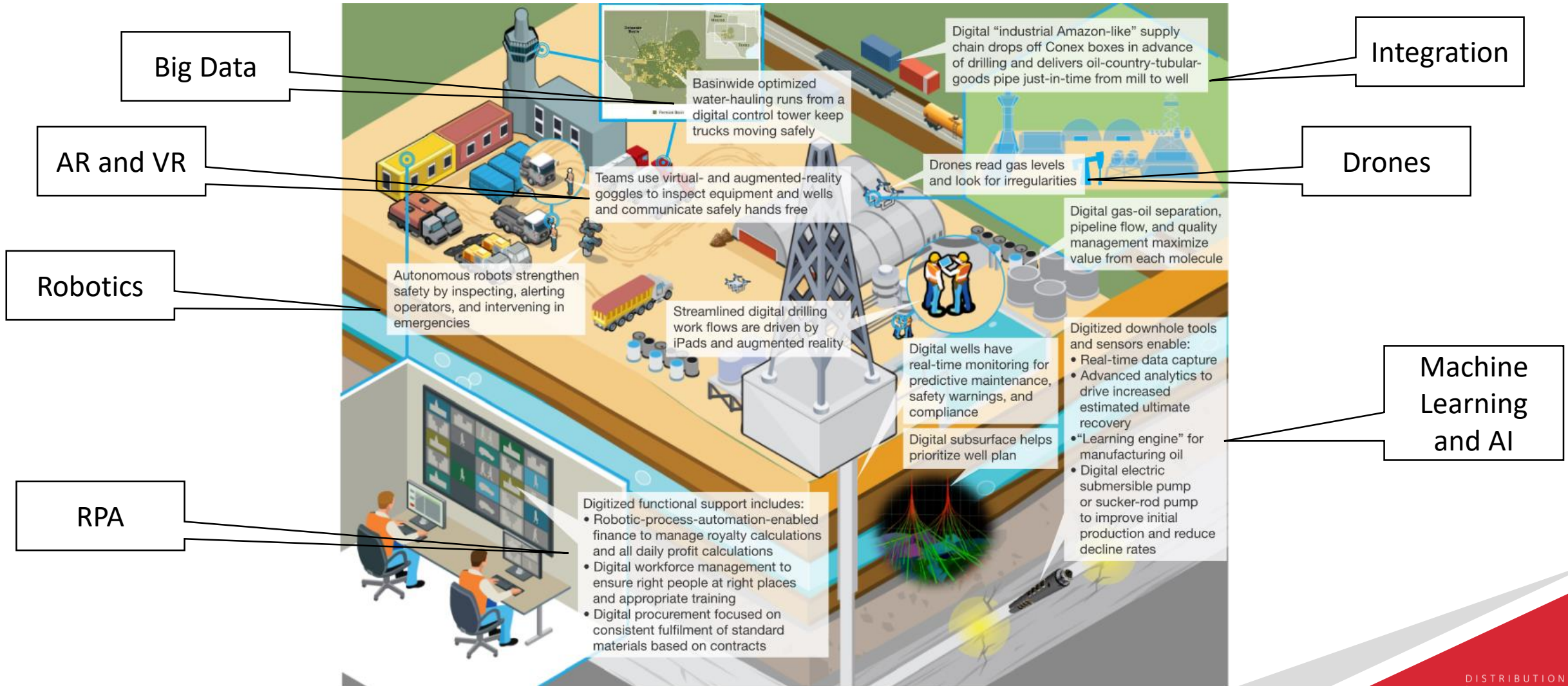


McKinsey&Company | Source: Rystad Dcube June 2018

APPLICATIONS FOR OPERATORS

- Performance forecasting
- Production forecasts across thousands of wells
- Enhanced oil recovery
- Analytics across unconventional assets
- Analytics have been shown to help exploration companies extract 3-5% more oil
- Predictive maintenance
- Automation of work
- Transferring work onshore from offshore facilities
- Integration of Wi-Fi and location-based technologies to allow for remote monitoring of potential incidents, tracking and tracing not only people in potentially dangerous situations, but also equipment utilization
- Enhanced asset security
- The increase of hydrocarbon shrinkage through theft and leakage is a problem that can be identified and tracked through logistics analytics
- Smart Rigs that communicate with one another based on success and obstacles encountered

ONE VISION INTO AN OPERATOR'S FUTURE



INFRASTRUCTURE CHALLENGES

- The installed base of IoT endpoints will grow to more than 30 billion by the end of the decade from just less than 13 billion units in 2015.
- As a consequence, machine-generated data will comprise an increasing share of stored data: by 2020, 10 percent of the 44 zettabyte digital universe will originate from IoT devices.
- In five years, there will be seven times more IoT data than there is today.
- Cyber security is more real than ever
 - Careful consideration will need to be applied as enterprises undergo the digital transformation

Consider a typical offshore oil platform that generates between 1TB and 2TB of data daily. Most of this data is time-sensitive, relating to platform production and safety issues. Using a satellite connection (i.e., the most common communications link for offshore oil platforms), it would typically take 12 days to move one day's worth of oil platform data to a central repository. But with edge processing, companies can assess this data locally to determine whether it needs to be moved to the cloud or datacenter—or analyzed where it is, at the edge of the network.⁴



SIMPLIFIED AND AUTOMATED CORE WORK PROCESSES

- Automation can take on 80 percent, or even more, of the tasks executed today
- An example currently in testing is parametric cost estimation of the well prospect fueled by a digital-twin-design tool that comes close to eradicating the need for manual costing completely.
- The same effects are potentially possible on other activities, such as logistics planning and design simulation
- The potential for greater speed and accuracy is tantalizing
- Leading operators are already using predictive tools and data-driven approaches for key activities, such as well placement, downhole “geosteering,” and setting operational parameters, such as rate of penetration and mud and chemical usage
- Ultimately, automation and robotics will challenge the current status quo of the work performed and its management.

THE SHIFT IN HUMAN CAPITAL AND MINIMUM SUPPLIER REQUIREMENTS

- With current labor-intensive tasks being automated, new capabilities in addition to the traditional disciplines are necessary
- Future organizations will build capabilities in areas such as:
 - Agile coaching
 - Data science
 - Advanced-tech stack planning
 - Cyber security
 - Analytics
- Changing interfaces with suppliers will be more complex
- Cyber Security will become a selection criteria for trusted suppliers
- It will be extremely costly for organizations to maintain hundreds of vendors

A VIEW FROM AN ENERGY SERVICES COMPANY

- We cannot afford to wait until a digital transformation is forced upon our industry
- Clarity around terms and education regarding solutions is key
- The larger operators and utility providers are accelerating their journey
- Service companies must evaluate their current offerings and processes to:
 - Identify new competitive differentiators
 - Adopt new technologies
 - Undergo enterprise wide operational changes
 - Embrace the challenges of Change Management
 - Proactively be prepared for when the digital transformation is no longer an option

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