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II STRATEGIC CONGRESS 2017

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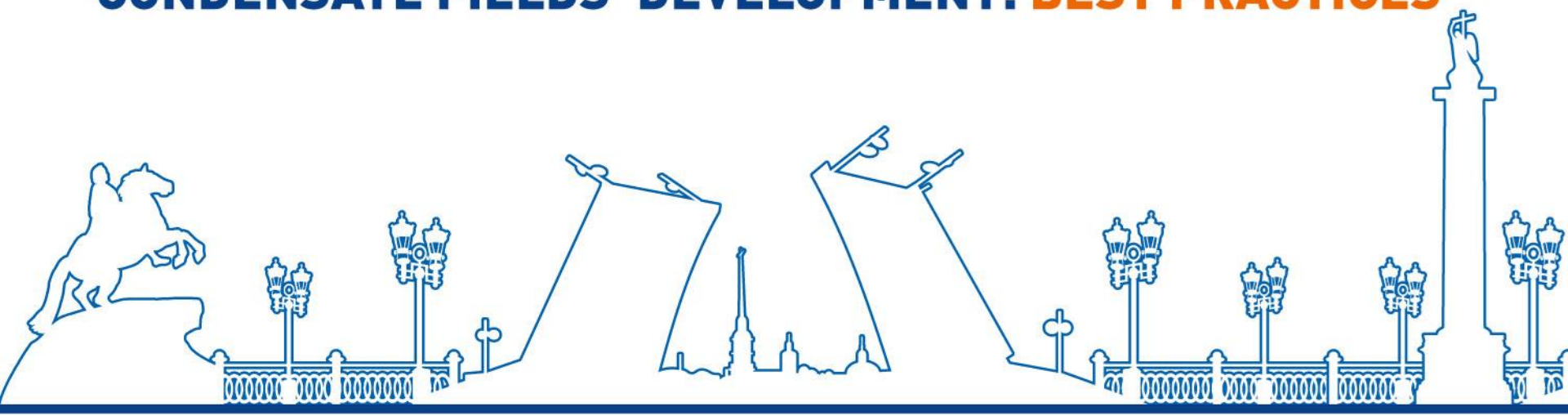
INTEGRATED MANAGEMENT OF OIL AND GAS CONDENSATE FIELDS' DEVELOPMENT: BEST PRACTICES



Industries digitalization: hype or consistency

Michael Wirth; IBM CTO em; BDE

SEPTEMBER 26, 2017, ST. PETERSBURG, HOTEL ASTORIA

Why digitalization?

Because Oil & Gas companies own revolutionary growing big data

Need risk management

Need cost competitiveness

Need workforce management

Need to protect know how

Need to innovate

E&P

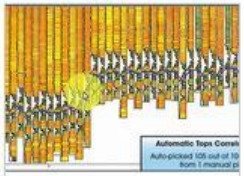
http://www.epmag.com/

Embracing The Digital Revolution

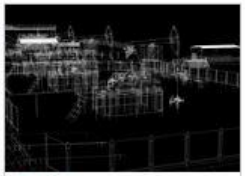
Rhonda Duey Executive Editor, E&P Hart Energy
Wednesday, May 10, 2017

Digital Era Revolutionizes Oil, Gas Industry

Brunno Braga Friday, September 8, 2017



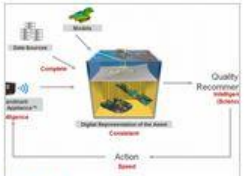
DIGITAL
Shale Solutions: Quantifying That Gut Feeling



DIGITAL
Big Data IoT Transforming The Industry

DIGITAL
Redefining Through Disruption

DIGITAL
Machine Learning Goes Viral In Oil Patch

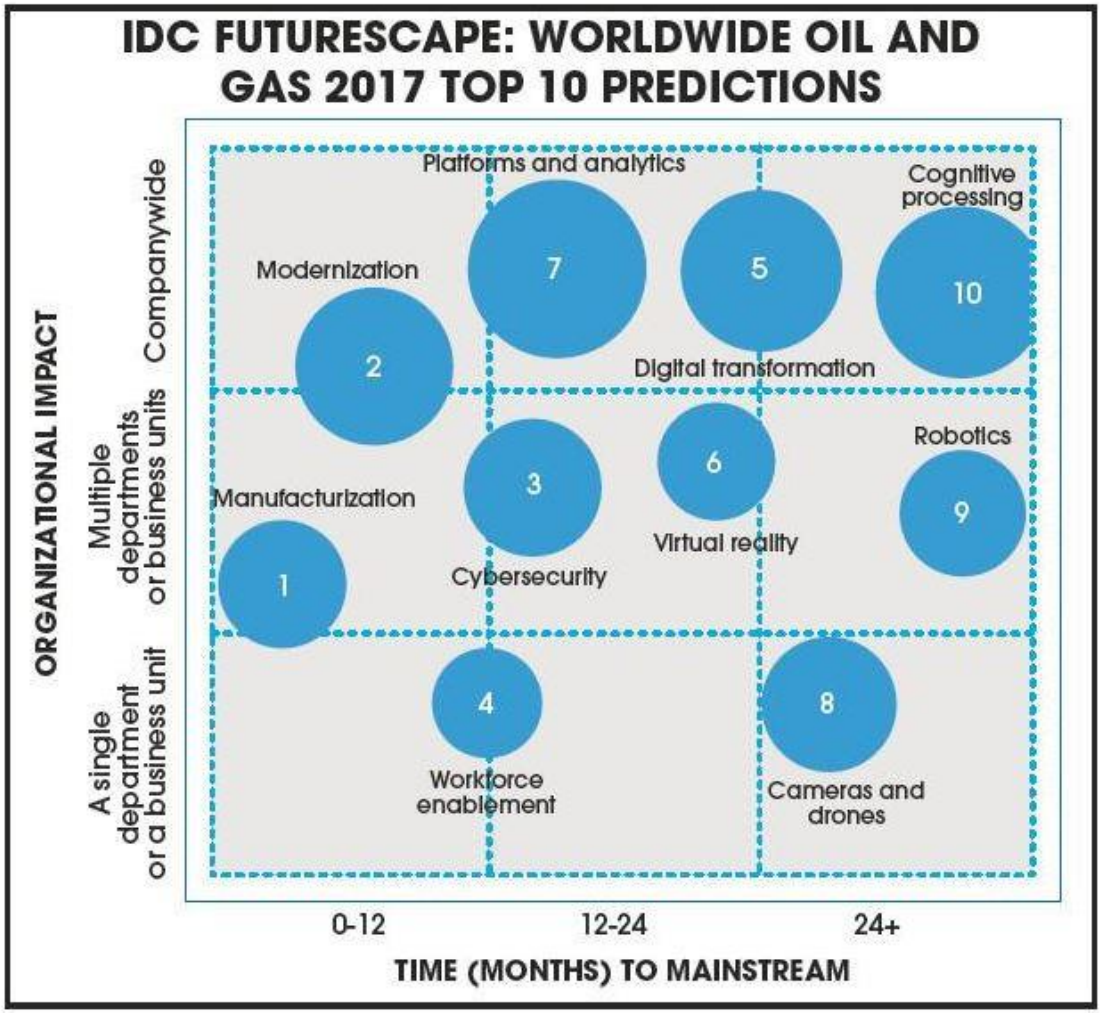


DIGITAL
Advancing Digital Field Operations

DIGITAL
Whitepaper: Driving Operational Efficiencies with Digital Technologies

DIGITAL
Industry Moves Closer To Automated Real-time Production Optimization

DIGITAL
Big Oil Taps Silicon Valley Expertise On Journey To Advanced Technologies



5. **Digital Transformation**: By 2019, oil and gas companies that executed digital transformation plans in 2016 will have reduced costs and increased efficiencies (10-50%) by evolving IT to 3rd platform technologies

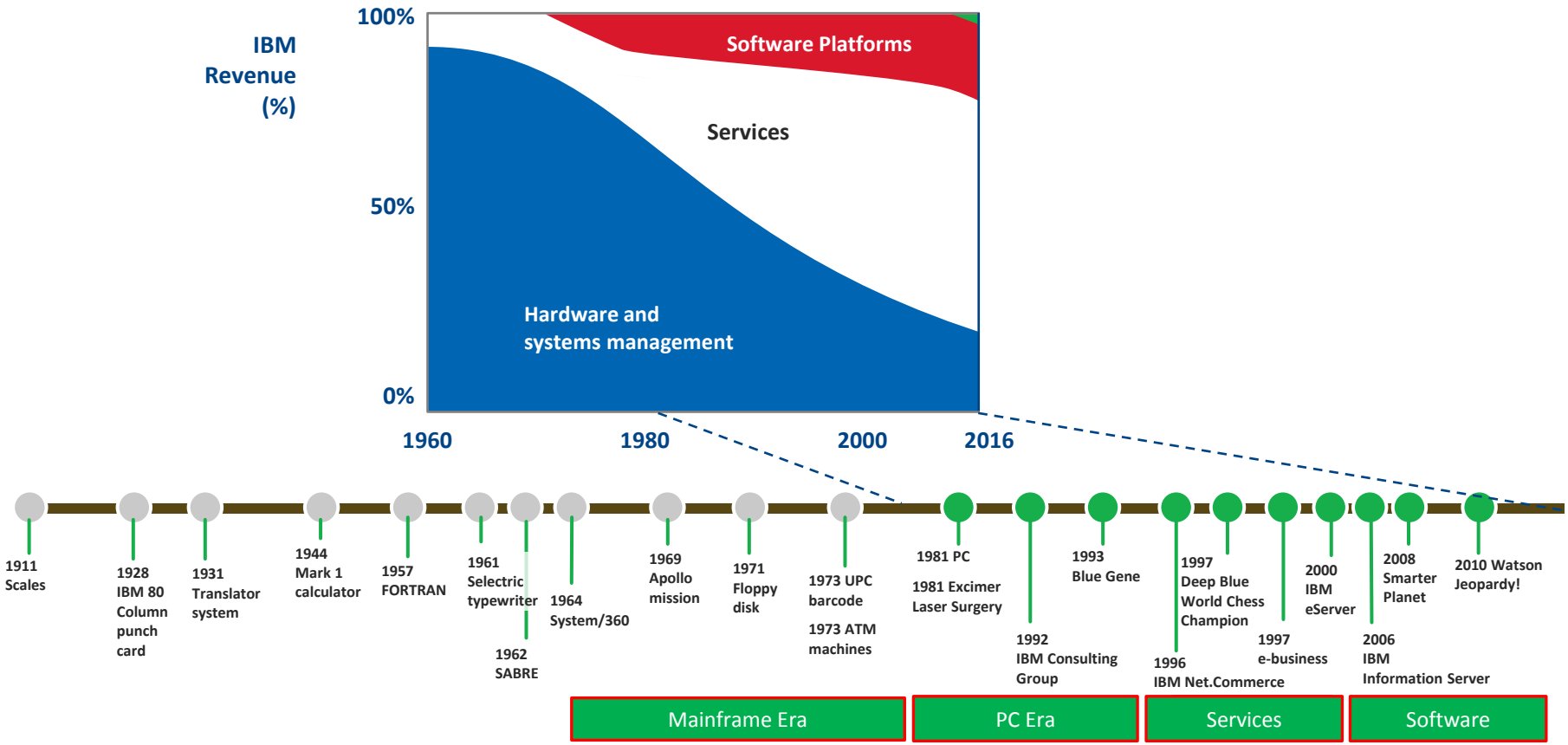
7. **Platforms and Analytics**: By 2019, 40% of all oil and gas companies will have basic platforms for managing data, and generating analytics and cognitive/AI solutions for performance-related insight

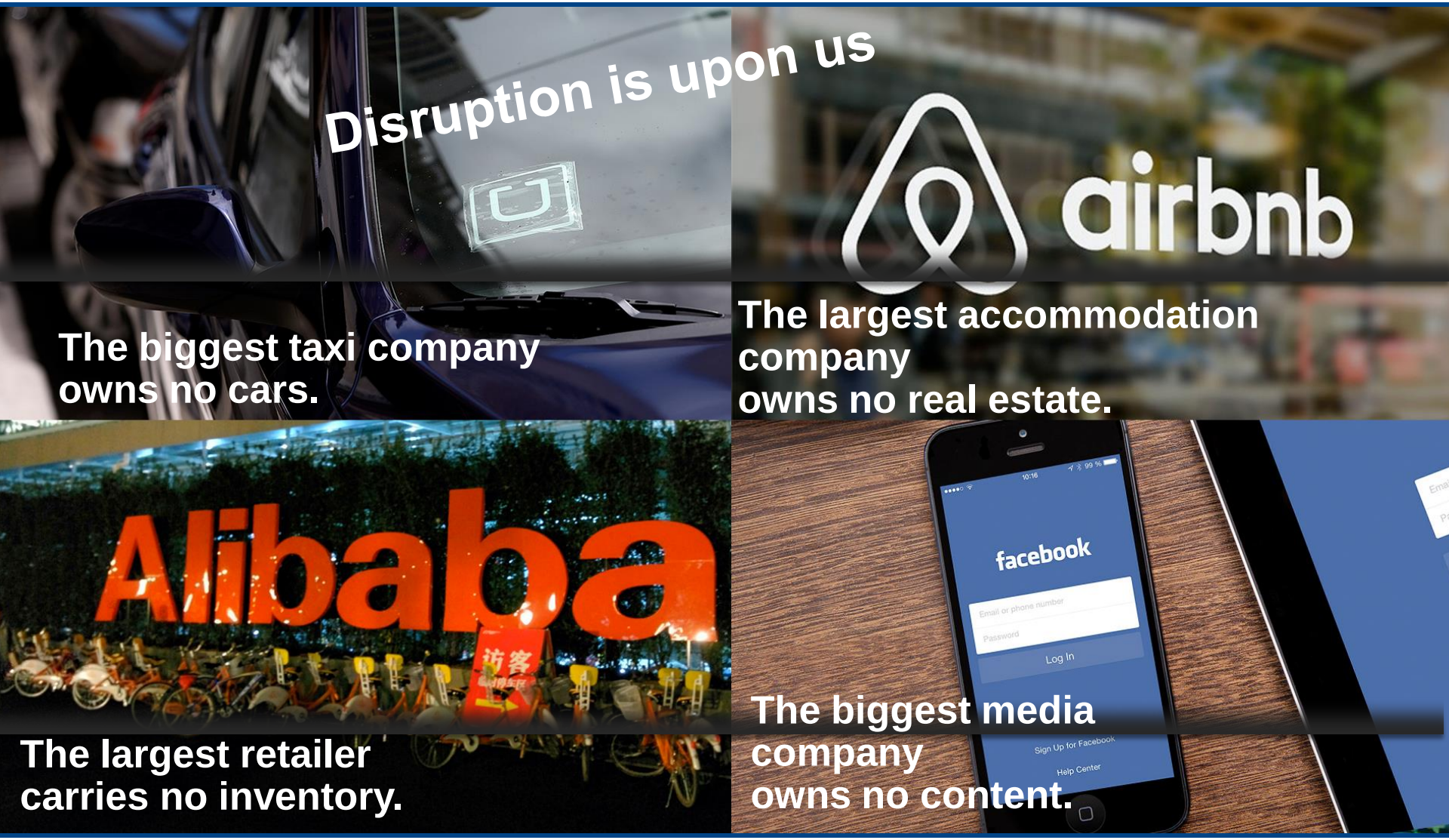
10. **Cognitive/AI Processing (CNLP)**: By 2020, 80% of large oil and gas companies will run their business with help from a Cognitive/AI Agent capable of learning, reasoning and solving complex problems

IDC FutureScape: Worldwide Oil and Gas 2017 Predictions

IBM's History of transformation from technological perspective

Mainframes → the PC era → a new industry in services → enterprise software




Disruption is upon us
airbnb
The biggest taxi company
owns no cars.
The largest accommodation
company
owns no real estate.
Alibaba
The largest retailer
carries no inventory.
facebook
Email or phone number
Password
Log In
Sign Up for Facebook
Help Center
The biggest media
company
owns no content.

Current Trends in IT Technology

→ Cognitive

Based on data analytics:

A cognitive System provides helpful information for the 'human" decision maker

An AI System will tell the 'human' what actions to do

'Whoever leads in AI will rule the world': Putin to Russian children on Knowledge Day

Published time: 1 Sep, 2017 14:08
Edited time: 1 Sep, 2017 14:40

Get short URL

Russian President Vladimir Putin © Alexei Druzhinin / Sputnik

"Artificial intelligence is the future, not only for Russia, but for all humankind. It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world," Russian President Vladimir Putin said.

However, the president said he would not like to see anyone "*monopolize*" the field. "*If we become leaders in this area, we will share this know-how with entire world, the same way we share our nuclear technologies today,*" he told students from across Russia via satellite link-up, speaking from the Yaroslavl region.

Trend: Value in IT Industry is Shifting

Automating the World

Processor Focus

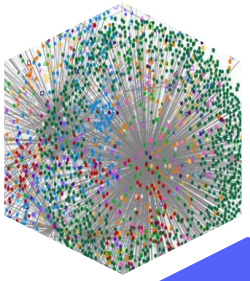
Moore's Law

CPU's

Silicon Chips

Neurosynaptic Chips

Quantum Computing

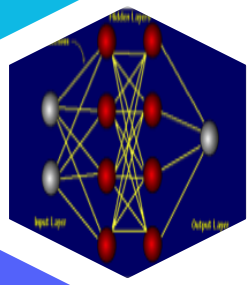


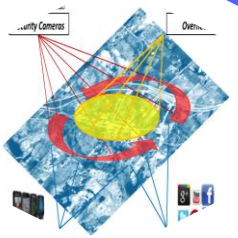
Graph Analytics

Social Networks
Security

Internet of Things

Machine Learning





Video, Speech Analytics

Object recognition
Complex video analytics
Multi-model analytics

Understanding the World

IBM Watson

@ Confidence

Content Analytics

Data insights as a Service !

Leading in the next era of computing

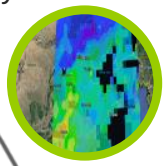
Symbiotic Cognitive Platforms

Advanced Dialogue & Reasoning

Neurosynaptic Brain-inspired Computing

Hybrid Cloud

Physical Analytics

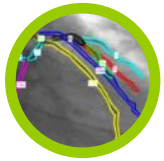


Exascale Data-centric Systems

"Ad Hoc" Systems

Personality Analytics

Curation at Scale



Advanced Image Recognition

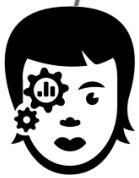
Quantum Computing

Personalized Learning

0-18 months | **18 months - 3 years** | **3-10+ years**

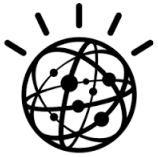
Brute force computing

Natural Scientists



Data Scientist

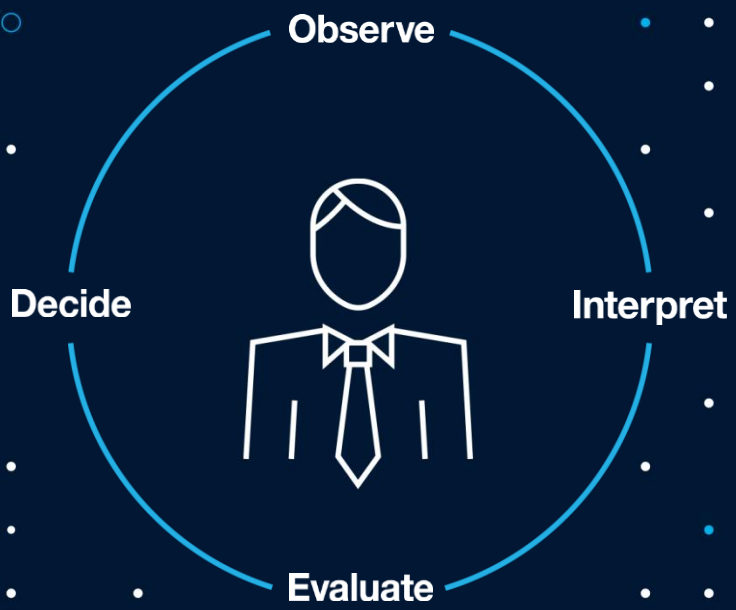
Big Data Analytics



Cognitive Computing / AI

AI interaction

The making of an expert.

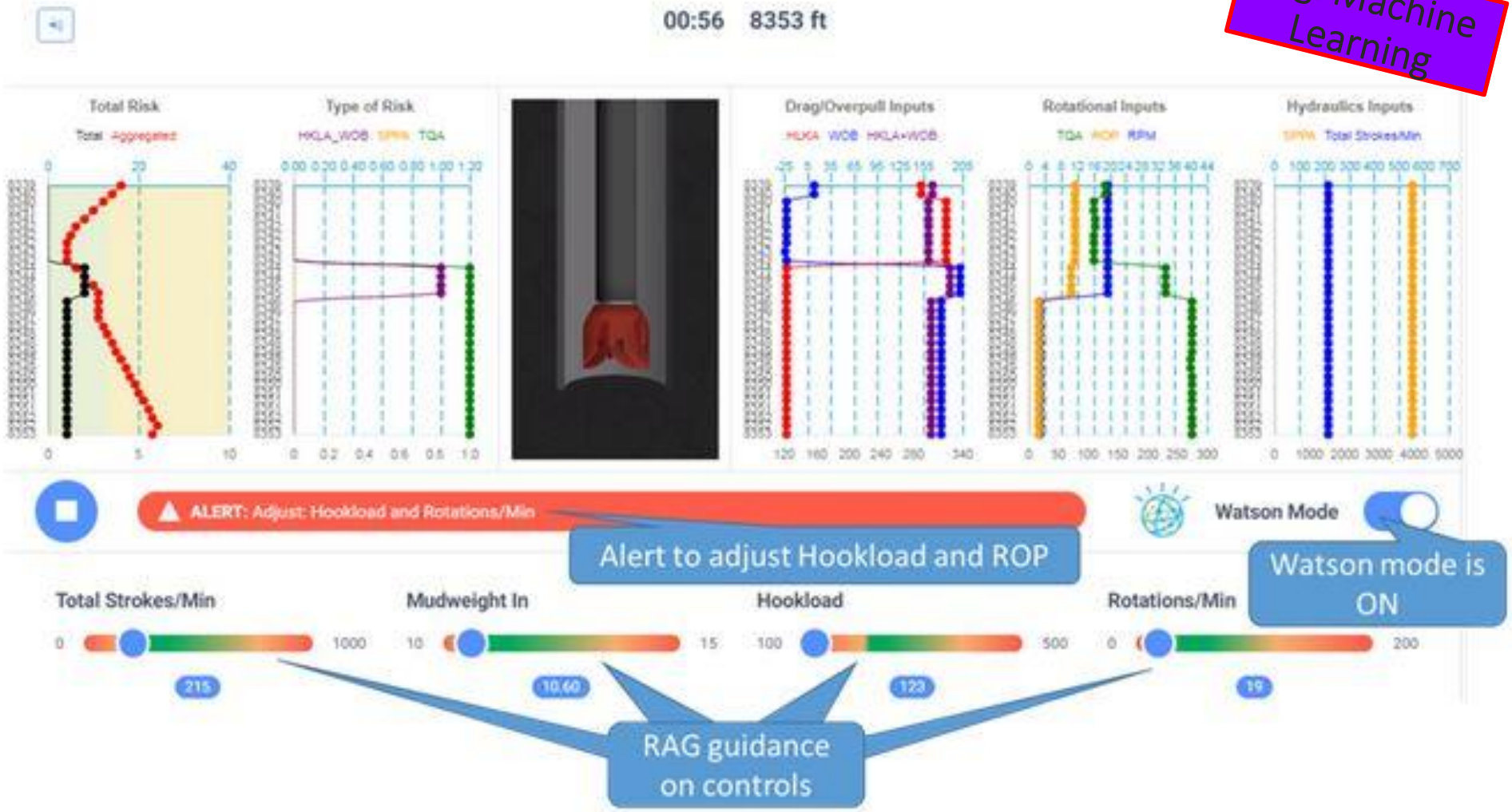


- http://www.research.ibm.com/software/IBMResearch/multimedia/Computing_Cognition_WhitePaper.pdf

Example AI

I can read 800M pages per second and I can sing !

e.g. Machine Learning



http://hybriddrillinganalytics.mybluemix.net/

The new AI innovation equation

Thought leaders and scientists largely agree on the confluence of forces that have advanced artificial intelligence:

- The rise of big data
- The emergence of powerful GPUs for complex computations
- Deep / Machine learning

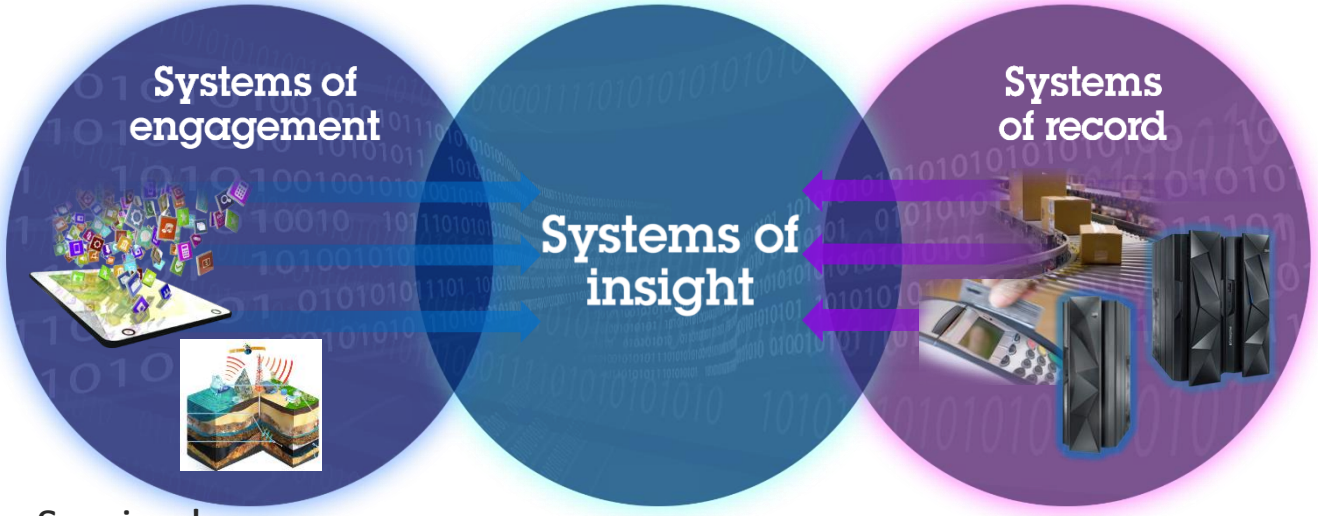
- Access to know how
- IOT

https://www.ibm.com/watson/advantage-reports/future-of-artificial-intelligence.html

Oil Companies will give highest focus to Data analytics for new business

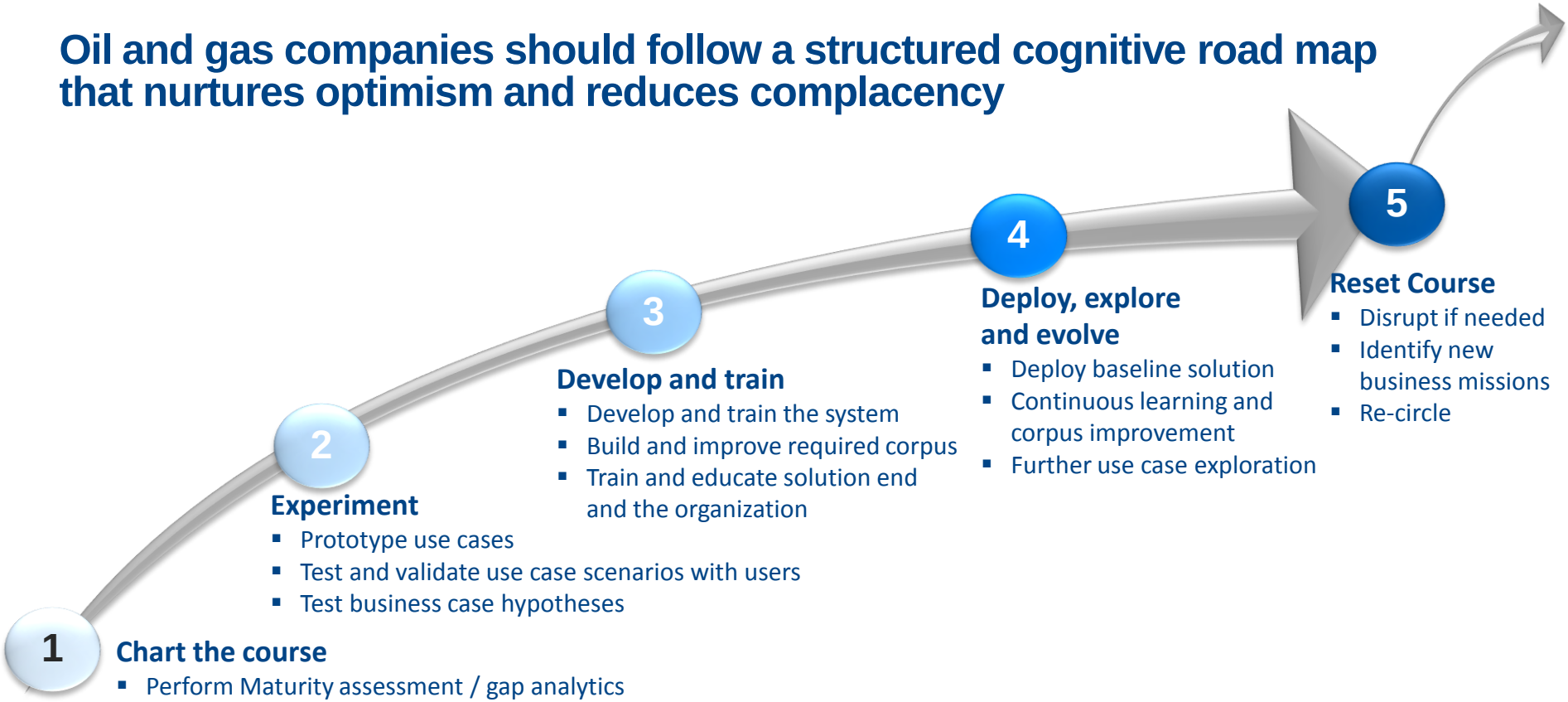
No new or more oil without deep data analytics and intelligent risk management

- → Holistic Data management will allow to predict risk and reduce uncertainties
- → If chance of success for new oil to be >50%, understanding of all factors must be at highest confidence >>90%
- → Big Data will grow exponentially and needs System support
- → IOT & Enhances seismic data shall be recorded as raw data → Corporate Data lake
- → Data handling needs corporate Data Scientists with domain know how



Data insights as a mandatory Service !

Oil and gas companies should follow a structured cognitive road map that nurtures optimism and reduces complacency



Thank you!

Example AI

https://www.youtube.com/watch?v=tuWV6mK_5s8

News room › News releases ›

Woodside, Australia's Largest Independent Oil and Gas Company, Uses IBM Watson to Enhance Decision Making and Increase Efficiencies

NEW YORK CITY & MELBOURNE, AUSTRALIA - 27 May 2015: IBM (NYSE: IBM) and Woodside today announced they will use IBM Watson as part of the oil and gas company's next steps in data science.

The cognitive computing system will be trained by Woodside engineers, enabling users to surface evidence-weighted insights from large volumes of unstructured and historical data contained in project reports in seconds.

Watson is part of Woodside's strategy to use predictive data science to leverage more than 30 years of collective knowledge and experience as a leading liquefied natural gas operator, to maintain a strong competitive advantage.

Allowing a broad population of employees to leverage this knowledge will enhance Woodside's collective expertise in designing, fabricating and constructing major oil and gas facilities as well as managing major turnarounds.

Delivered via the cloud, the cognitive advisory service - 'Lesson Learned' – scales the knowledge of engineers making insights and information quickly accessible to a wide group, with the potential to lead to faster resolutions, improved process flow and operational outcomes. Lesson Learned will enable Woodside's engineering teams to ask complex questions in natural language.

Woodside Senior vice president strategy, science and technology Shaun Gregory said data science is the essential next chapter in knowledge management, enabling the company to unlock collective intelligence.

"We are bringing a new toolkit to the company in the form of evidence based predictive data science that will bring down costs and increase efficiencies across our organization," Gregory said.

IBM Watson will help scale the knowledge of Woodside engineers working in control rooms offshore. (Credit: Woodside)

News room › News releases ›

IBM and Repsol Launch World's First Cognitive Technologies Collaboration for Oil Industry Applications

YORKTOWN HEIGHTS, N.Y. and MADRID, - 30 Oct 2014: Scientists at IBM (NYSE: IBM) and leading global energy company Repsol S.A.(REP.US) announced today the world's first research collaboration to leverage cognitive technologies that will help transform the oil and gas industry. IBM and Repsol are jointly developing two prototype cognitive applications specifically designed to augment Repsol's strategic decision making in the optimization of oil reservoir production and in the acquisition of new oil fields.

Oil and gas company in the U.S.

This company is a leading oil and natural gas producer, gasoline and natural gas marketer, and petrochemical manufacturer in the U.S.

Machine learning algorithms decrypt outage warning signs with a new level of accuracy

>95% increase in outage event detection accuracy

Reduced production outage through more accurate analysis of equipment sensor data

Improved productivity through actionable insights

Business challenge

For oil and gas companies, powerful and complex equipment such as compressors are the heartbeat of production. Keeping them running is a top priority. This company used sophisticated asset surveillance systems to look for the signs of impending outages. Still, those systems were missing a significant share of outage events because the mix of warning indicators was too complex to discern from the flood of noisy data generated by sensors.

Cognitive transformation

The company embraced a new way of monitoring the health of its oil production assets. It's using machine learning algorithms to automatically build complex, multivariate and far more flexible rules that define which changes in vibration patterns, pressure and the like are true anomalies. And because these machine learning algorithms are self-correcting, they grow more accurate over time. The result: a quantum leap in outage detection accuracy.

Oil and gas company in Europe

This company is one of the world's leading integrated oil and gas companies and is present along the entire energy value chain, including exploration, production, refining, marketing and new energy R&D.

Improving exploration through cognitive computing

Maximizing access to better exploration areas, increasing the productivity of maturing oil fields and their value and mitigating environmental risks.

The two prototype applications to **reduce the risk** and **uncertainty** of **future oil field acquisitions** and **maximize** the **yield** of **existing oil fields**

Business challenge

As demand for oil and gas increases and oil plays mature, operators are faced with the challenge of having to look deeper and further offshore. To search for new oilfields, geoscientists have been tasked with mostly manually reading and extracting information from enormous amounts of data retrieved from their exploration and production activities, including journal papers and baseline reports and seismic imaging data and reservoir models, wells and facilities.

Cognitive transformation

Cognitive technologies can analyze subsurface data on geology and crude reserves and help make better informed decisions based on that data. The infrastructure has been designed specifically to extract all the relevant information from complex databases and interact with people across various devices and physical spaces. Scientists will also be able to experiment with a combination of traditional and new interfaces based upon gestures, robotics and advanced visualization and navigation techniques. Researchers can leverage sophisticated models of human characteristics, preferences and biases that may be present in the decision-making process.

Energy company in Australia

This oil and gas explorer, developer, producer and supplier produces liquefied natural gas (LNG) in Northwest Australia. Its exploration portfolio includes emerging and frontier provinces in Australia and the Asia-Pacific region, the Atlantic margins, Latin America and Sub-Saharan Africa.

Using cognitive analysis of an ocean of data to make smarter decisions

An energy company uses cognitive computing to bring its technical data discovery capabilities to a new level of depth and efficiency.

USD 7.5 million reduction in in employee expenses due to faster access to and more intuitive analysis of engineering records

75% reduction in the time spent by the geoscience team reading and searching through data sources

Increases overall productivity by empowering a larger range of employees to interrogate the cognitive system

Business challenge

Large oil and gas operations involve a constantly unfolding, interlocking chain of technical and engineering decisions, and the stakes of making the right decision can be enormous. Despite the virtues of making informed, data-driven decisions, the practice can be severely hampered when critical knowledge—contained in maintenance records, project documents and test results—is buried in unstructured form.

Cognitive transformation

This company is using the powers of cognitive computing to dissect, map out and navigate 30 years' worth of dense and complex engineering knowledge. Content analytics algorithms identify and score logical connections between and across unstructured documents of all kinds, enabling employees of all stripes—not just subject matter experts—to submit plain-English queries that drill down quickly and accurately to the most relevant and valuable insights.