

Evaluating economic impact of digitization on upstream project during the period between 2008 and 2017- Shell Plc as a case study

- Can upstream projects be profitable at any oil price?
- Can digital technologies extend economic life of fossil fuel?
- How can digitization impact E&P asset value?

Agenda

- Rationale behind choosing this topic.
- Digital technologies that I looked into.
- Case study.
- Research results.
- My conclusion and recommendation.

Why this topic?

london.spe.org/London/

SPE London Section

SPE London Evening Programme meeting 28th November 2017

From SPE London Section



International Petroleum Week
20 – 22 February 2018
InterContinental Park Lane, London



Hosted by



Automated rig drilling digitization

courtesy of Rockwell automation and Nabors



Big Data and Analytics

courtesy of QUINTIQ

Optimizing for industry KPIs

Priorities of the oil & gas industry



Safety



Sustainability



Return on capital investment

Exploration

- Improved planning and scheduling of resources can reduce the risk and cost of exploration.
- Ensuring the right people are in the right place at the right time helps to reduce risk.
- Improved planning reduces the risk of polluting marine environments and waterways.

Production

- Having complete information when making decisions optimizes production to minimize the risk of market volatility.
- Scheduled maintenance across the value chain reduces risks posed by machine malfunctions, and cuts the potential costs of delays (snowball effect).
- Improved planning helps reduce air emissions and water pollution.

Transportation

- Improved planning of oil and gas transportation can significantly reduce safety stocks.
- Minimizing the amount of material and the distance it is transported reduces risk.
- Optimizing transportation reduces associated emissions.

Processing

- Optimizing across the entire value chain increases throughput.
- Risk is reduced through better maintenance planning.
- Balancing production, processing and shipping reduces flaring.

Refining

- Costs are saved by processing a higher percentage of low-cost crude to satisfy product demand.
- All equipment constraints are taken into account.
- Energy consumption, and therefore, emissions are reduced.

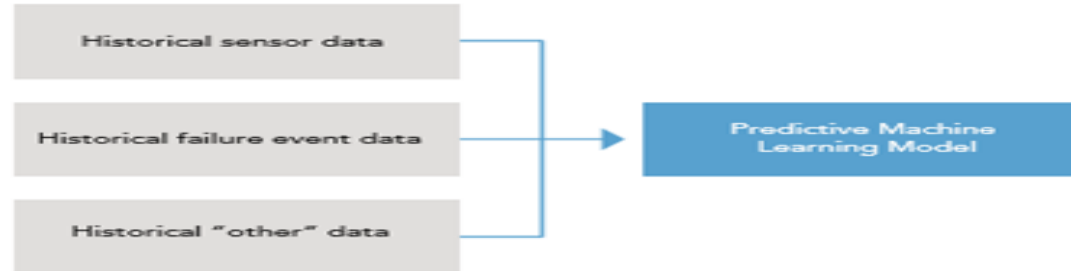
Distribution

- Costs are saved when opportunities for product exchange become visible and routes are optimized.
- There is improved customer satisfaction and less of a chance of losing customers due to late or non-delivery (ATP, CTP, PTP functionalities).
- Emissions are lowered when opportunities for product exchanges become visible, when routes are optimized, etc.

Data Analytics- Modelling

Courtesy of Dobson and Misra

Step A: Build and train a model



Step B: Test and validate model



Step C: Deploy and use the model

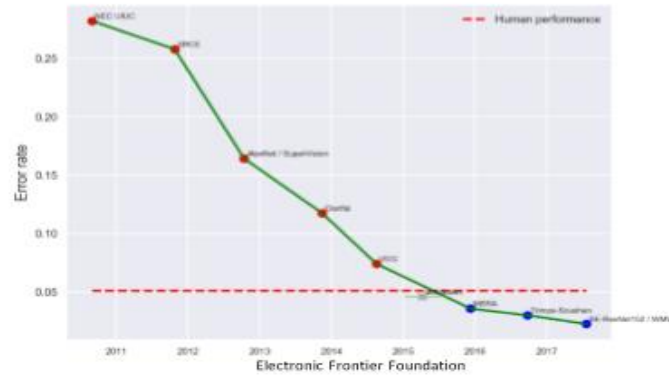


Big Data-Artificial Intelligence

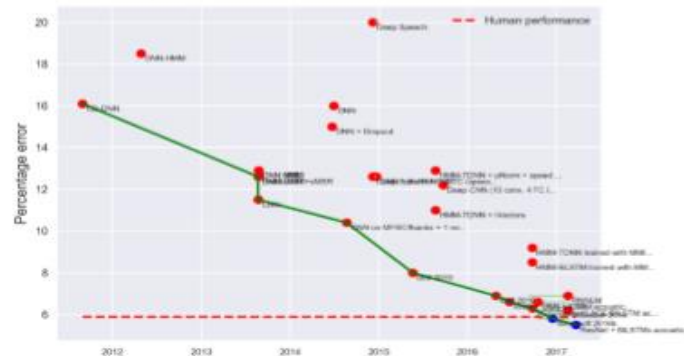
Courtesy of VORTEXA

BETTER ALGOS

IMAGE RECOGNITION

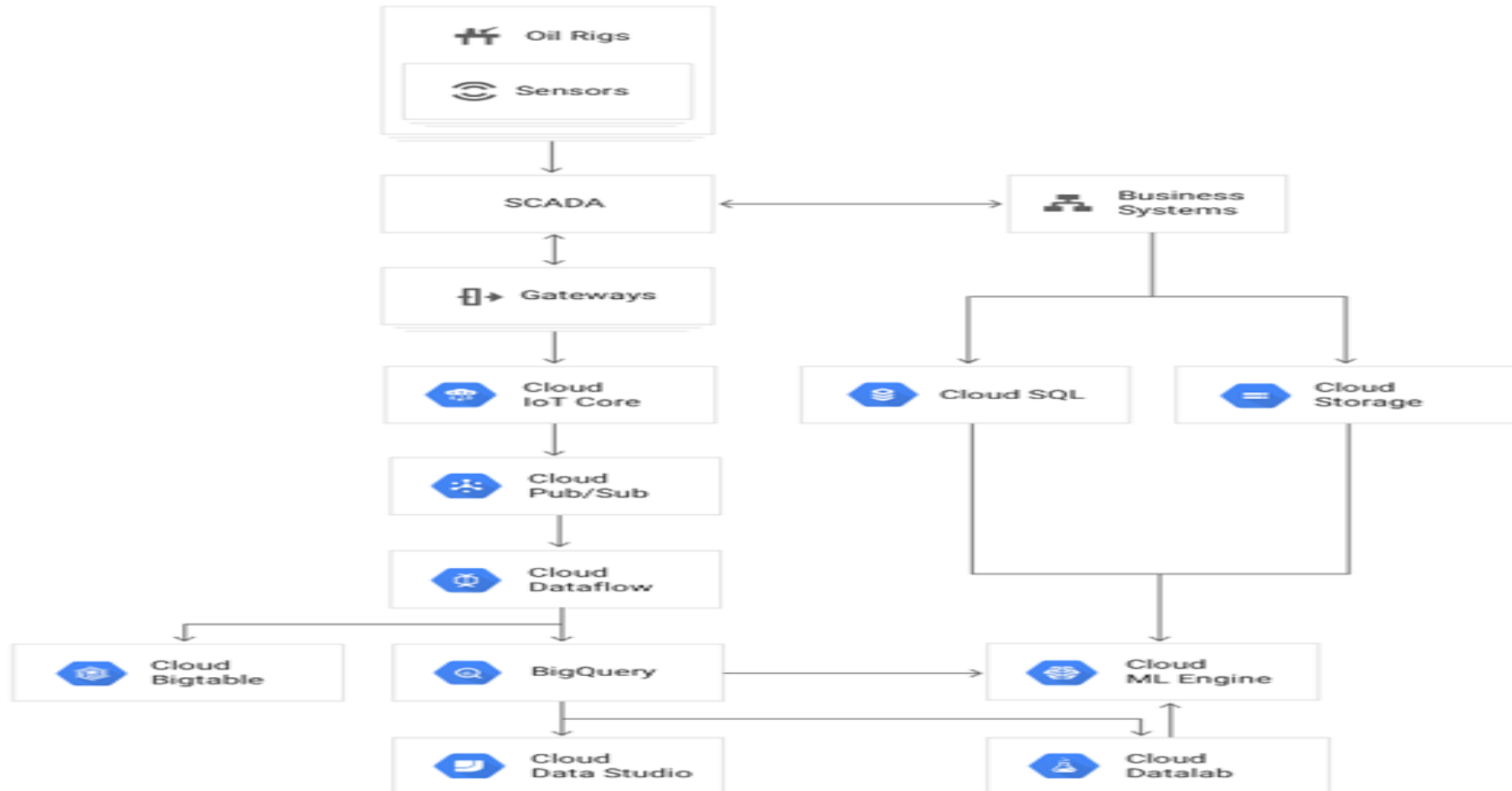


SPEECH RECOGNITION



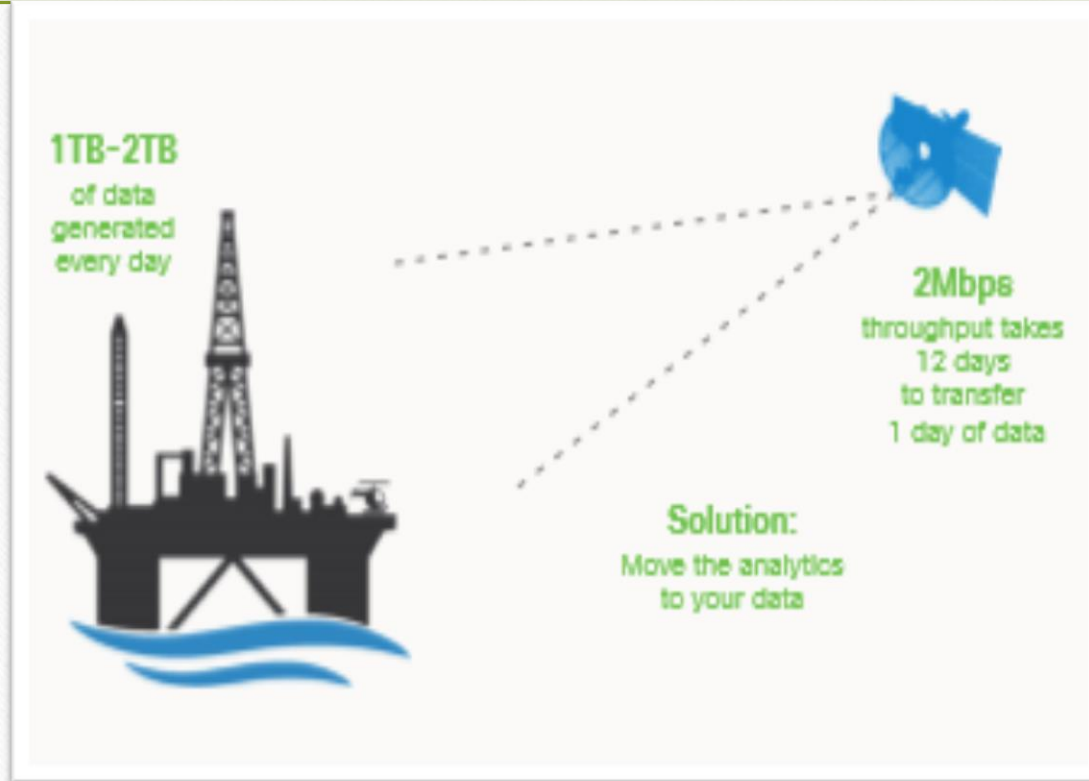
Big Data-Cloud

Courtesy of Google Cloud



Connection and latency

Courtesy of Cisco





Case Study

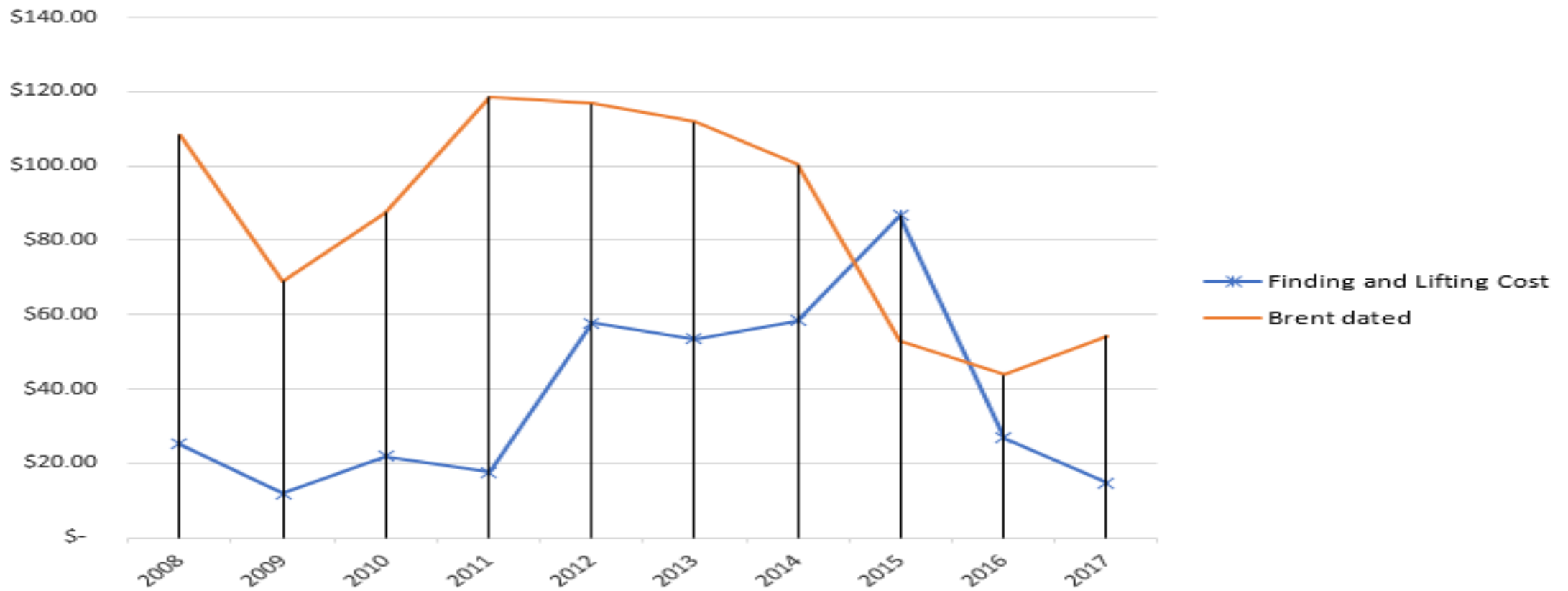
- Sensabot and Petrobot
- PI System For getting insight
- Wellsense for Corrosion assessment
- GeoSign for Seismic data interpretation
- Collaborative Working Environment

Results

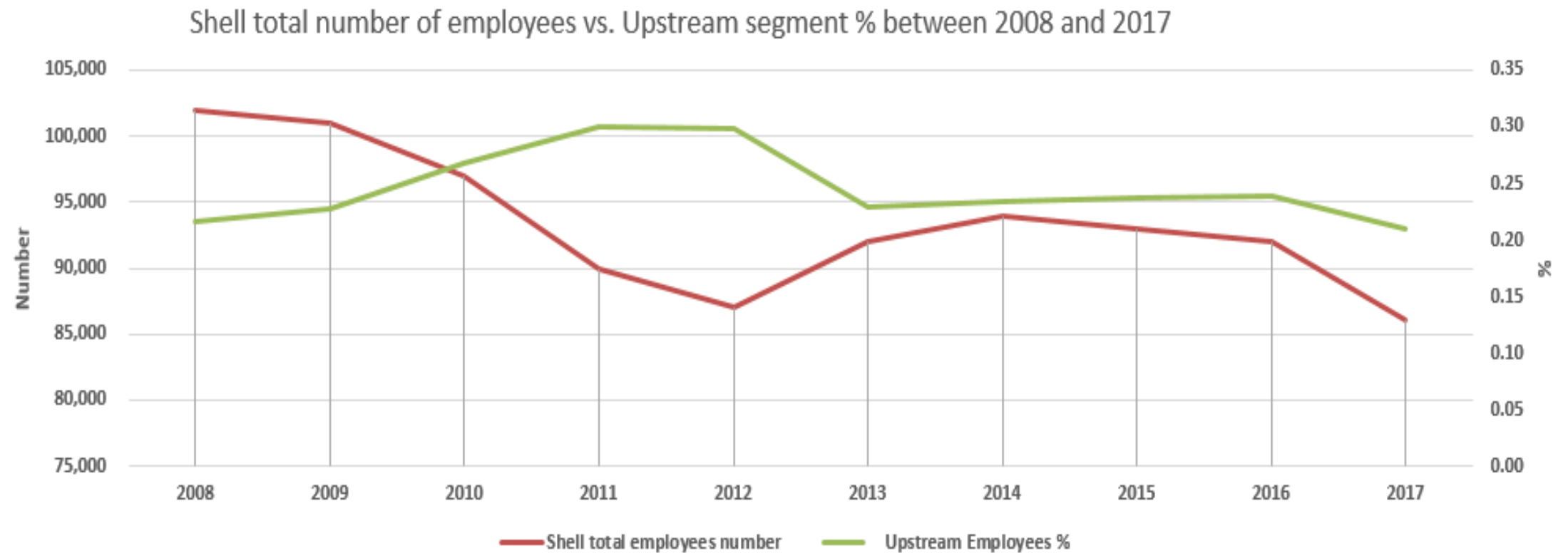


How fast Shell reacted to crude price downturn?

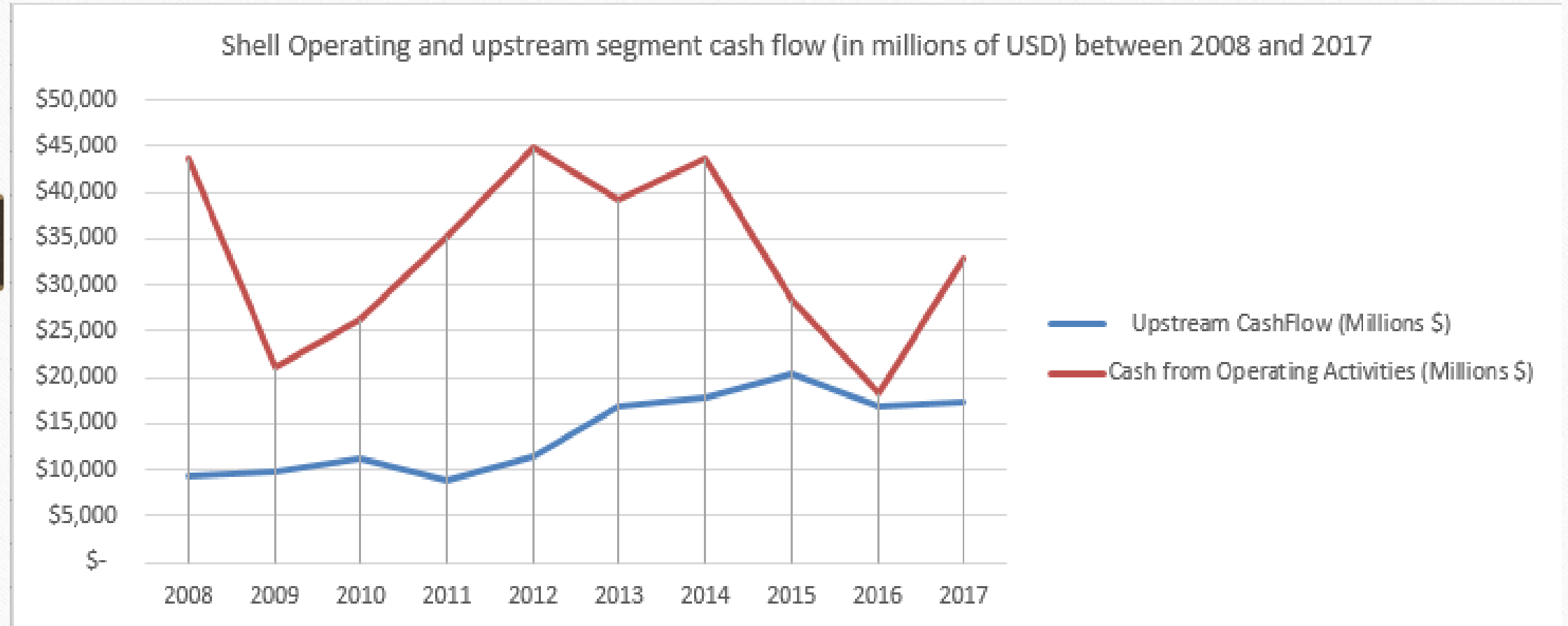
Shell finding and lifting cost (\$/bbl) Vs. Brent dated Crude Price between 2008 and 2017



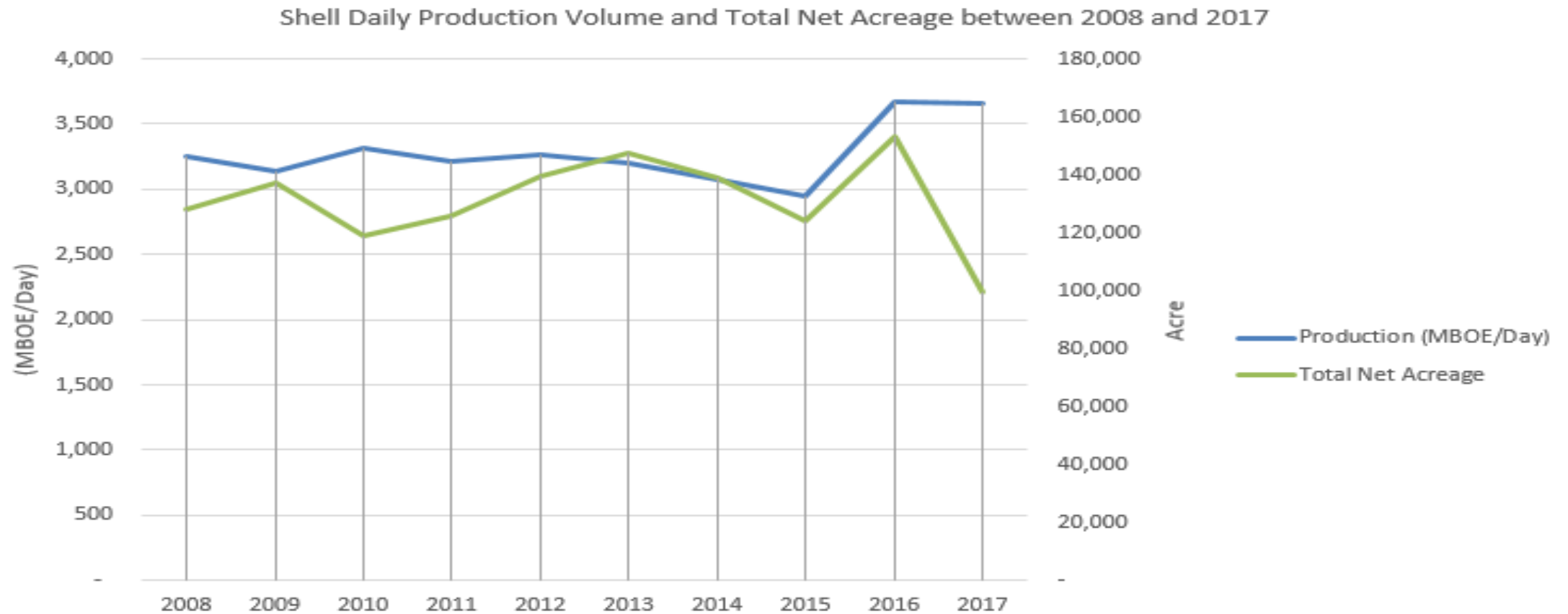
What was the impact of digitization on the company Upstream employee numbers?



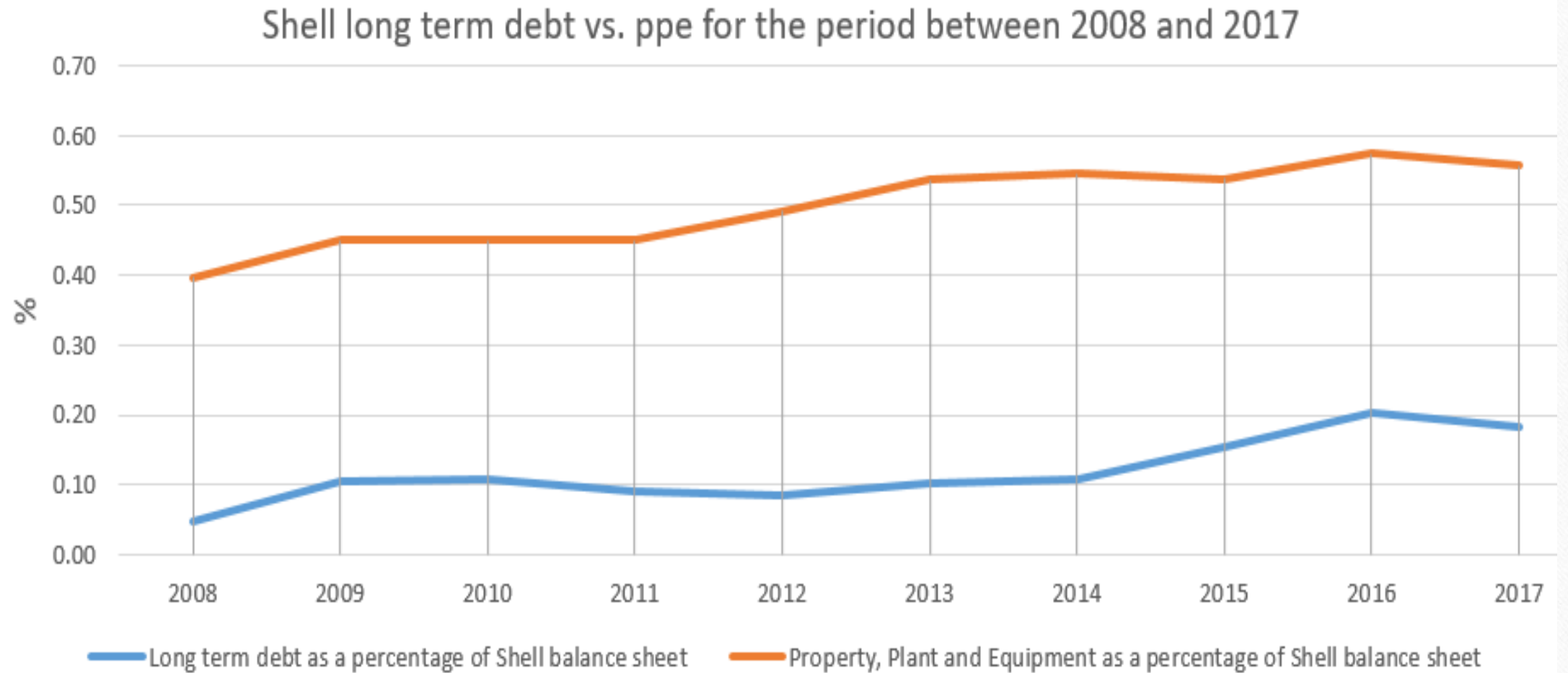
Contrasting overall company and Upstream segment cash flows.



Production vs. Total net acreage



How long before capital markets factor digitization credentials of upstream projects when considering funding applications?



Thank you