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Causing E&P problems with Digitalisation

Presented at DEJ “Solving E&P problems with Digitalisation”

Duncan Irving, Oil and Gas Practice Partner

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Reminder: What is digitalisation

Mechanisation → Electrification → Automation → Digitalisation

Quality

Measure → Manage

Scalability

"It is wrong to suppose that if you can't measure it, you can't manage it – a costly myth."

W Edwards Deming

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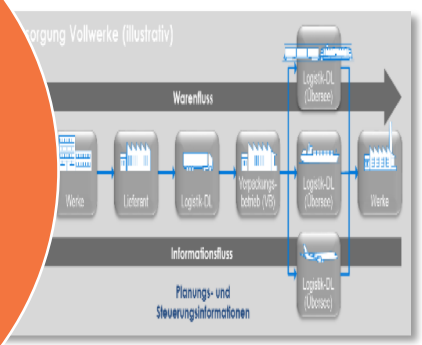
So why is the oil industry going so slowly with digitalisation?

(oh, let me count the ways…)

With the benefit of hindsight:

- **Wrong Culture**
- **Wrong Skillsets**
- **Wrong Platforms**
- **Wrong economic drivers**

For most other industries, the availability and monetisation of data was the disruptor



In asset-based industries , the data already existed; the business environment changed and big data technologies were the catalyst

But oil and gas has been on the back foot for many reasons, not least the price crash. But digitalisation was crucial in unconventionals

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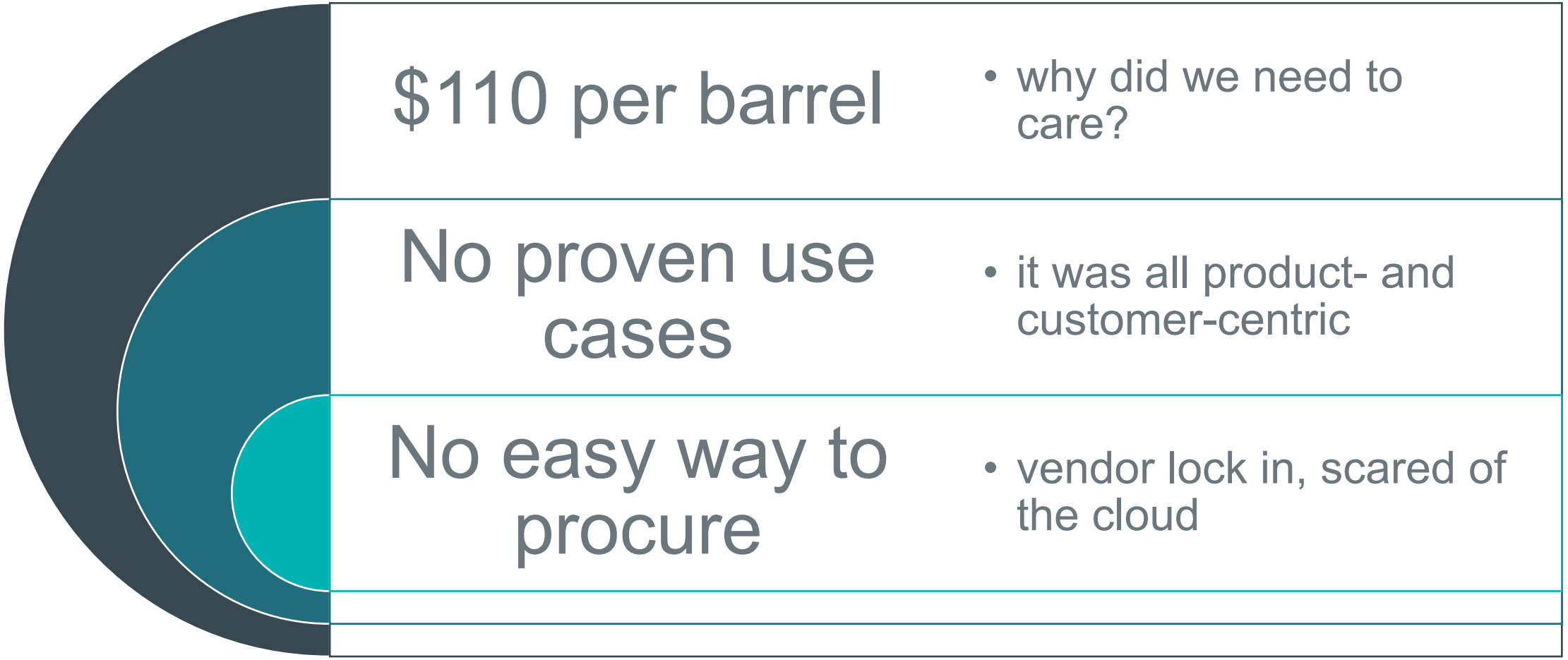
And there were other reasons…



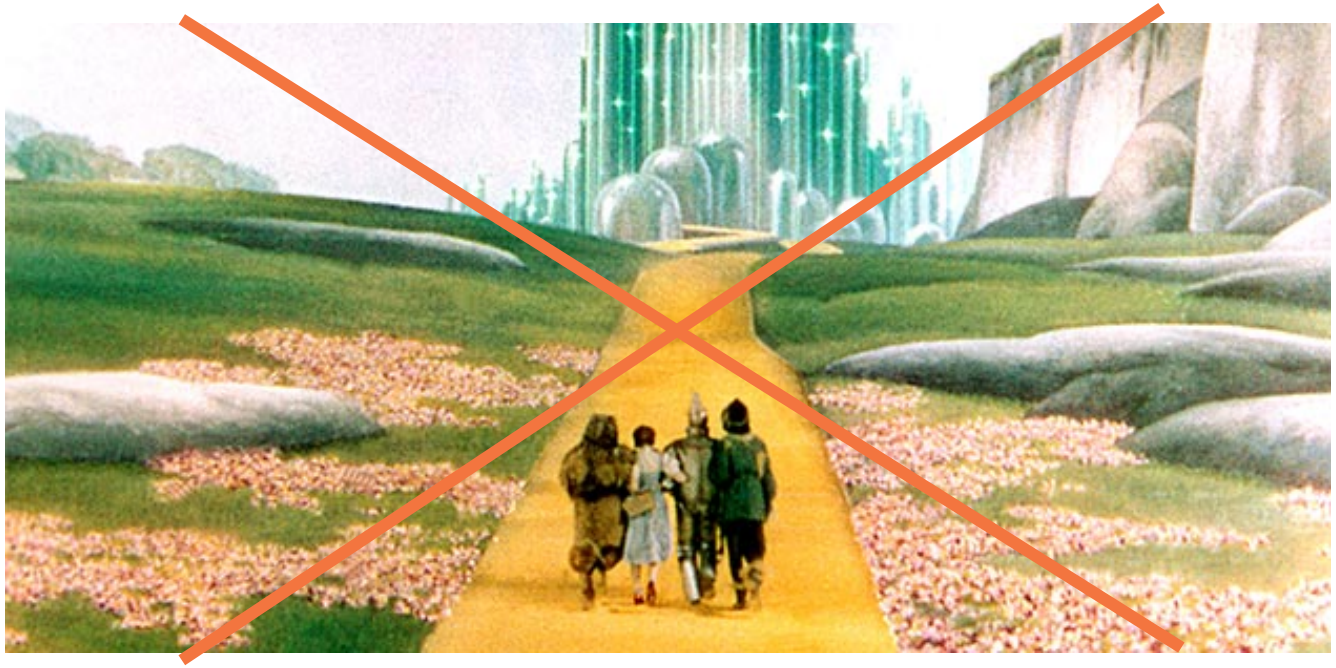
So how do we get digitalised?

(Actually, let’s look at how we shouldn’t be doing it)

“We want to be like that”

(…or a reminder of where an E&P company shouldn’t be going)

- We’re not Uber, AirBnB or Google
- We’re not “monetizing data”
- We’re not transforming or disrupting the way our **product** is sold (because we don’t have a product, we sell a commodity)



“We want to be like that”

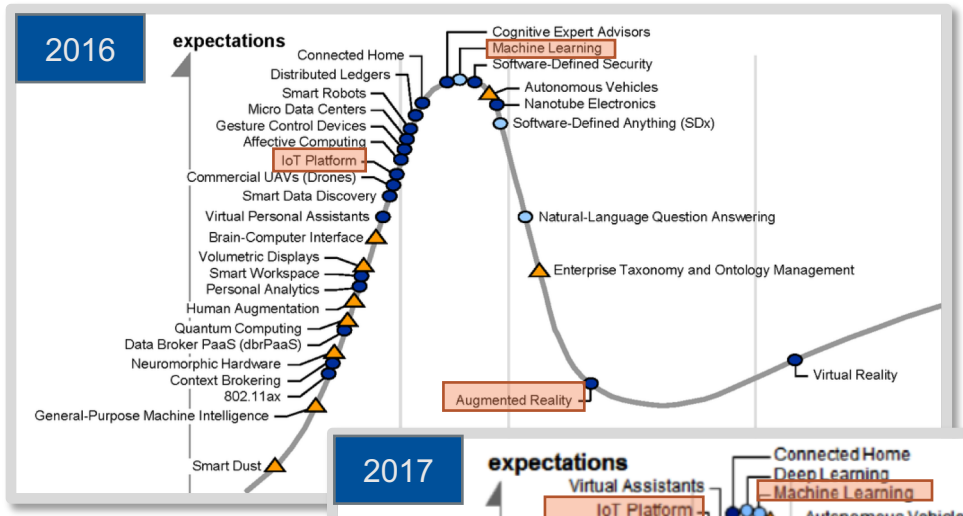
How we understand and interact with each other

How we interact with technology and services

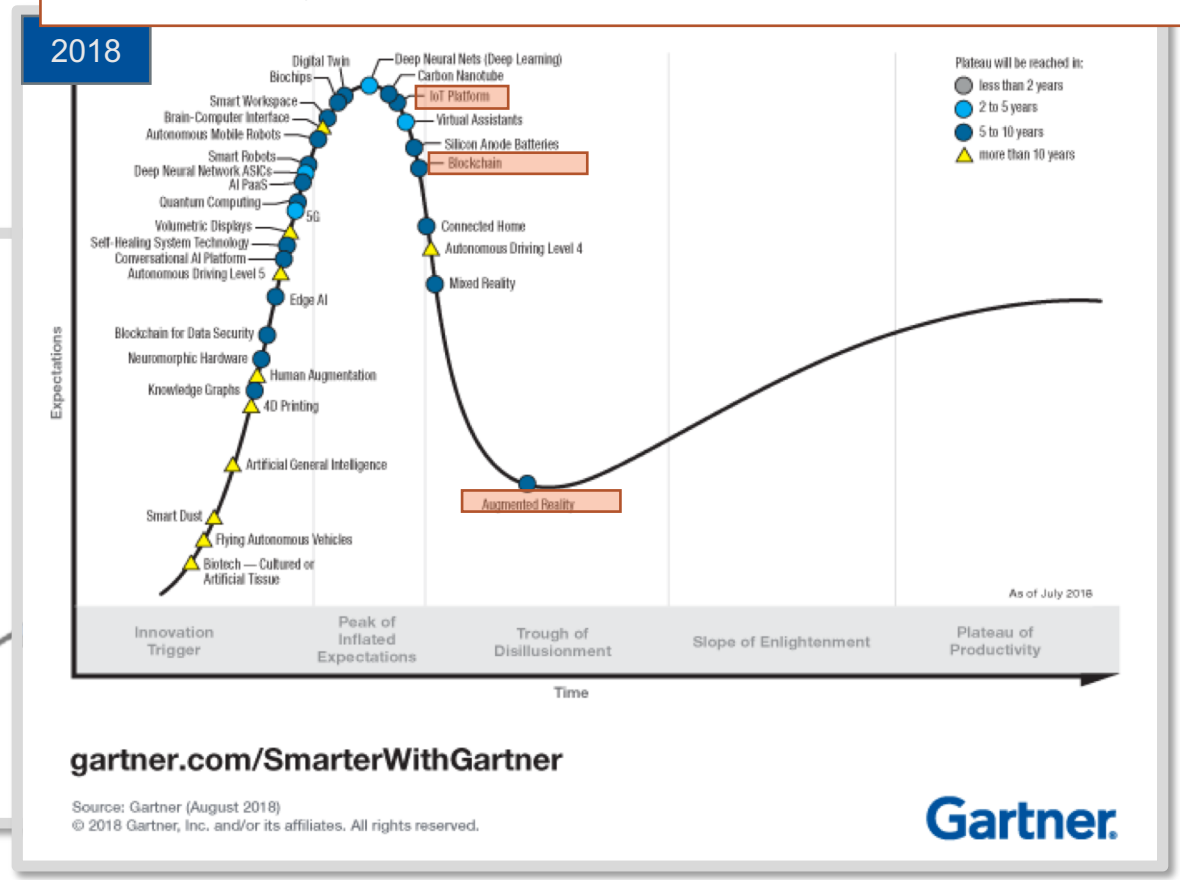
How organisations understand and interact with us

How we exploit knowledge…
at scale and pace

“We’ll buy one of those new things”



This focus on hyped technology has a detrimental effect – it distracts from building a solid foundation for digitalisation. Many E&P data prep activities are **disposable**.



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“We’ll buy the same old things with extra digitalised widgets”

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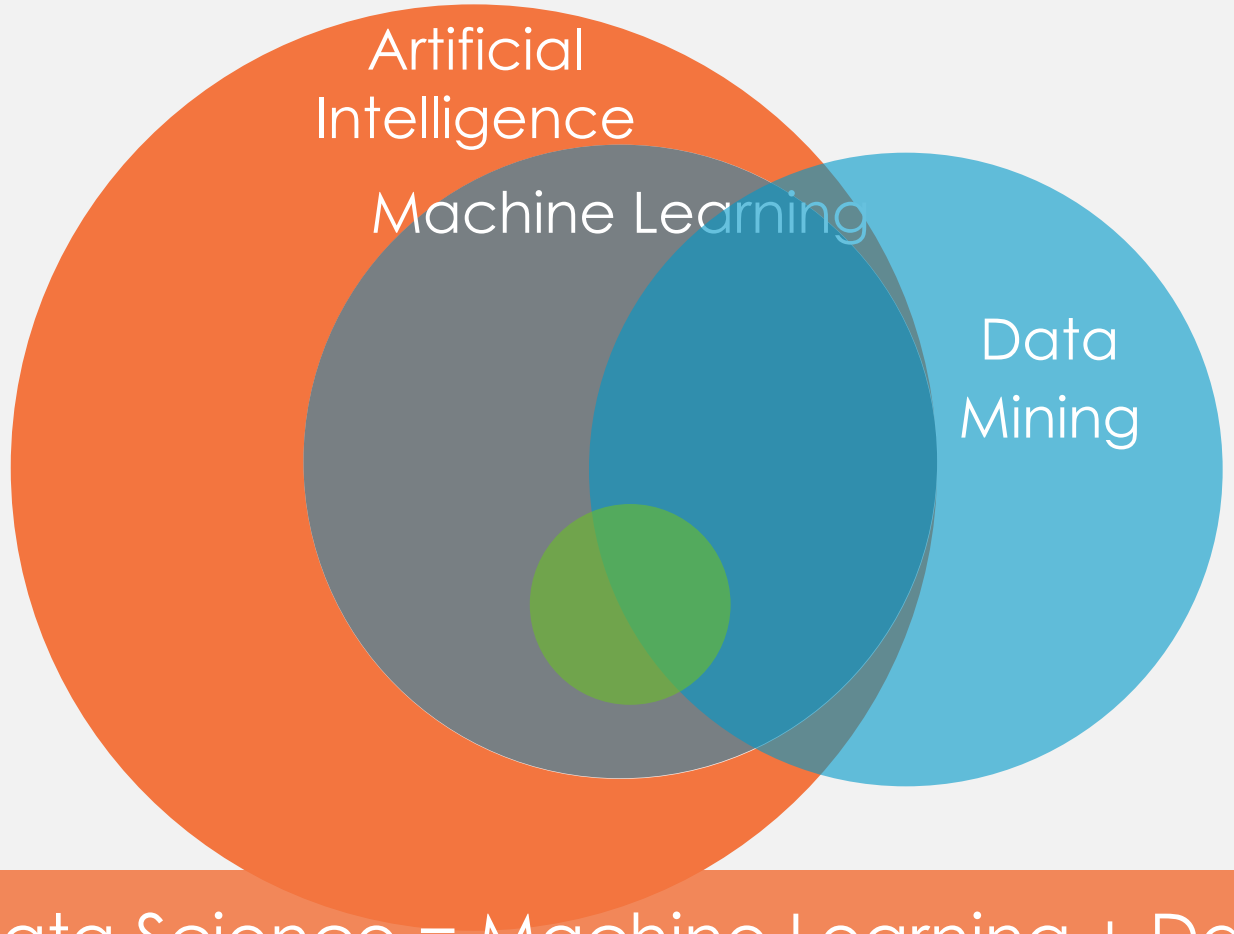
“We’ll hire someone with that cool stuff on their CV”

Data Science	≠	Domain Expertise
Data Science	≠	Data Engineer or Data Manager
Maths for Data Science	≠	Maths for describing streams of sensor data
Data Engineer	≠	IT architecture
CDO	≠	Expertise on Digitalisation

“We’ll (data) science the hell out of it”



To improve itself, a machine must be capable of learning;

First Data Mining workshop took place at an AI conference in 1989;

Many commentators now associate AI with Machine Learning / **Deep Learning**.

Data Science = Machine Learning + Data Mining + Experimental Method

Let’s dig a bit deeper

Those were the symptoms - what are the underlying causes?

Cutting through the hype

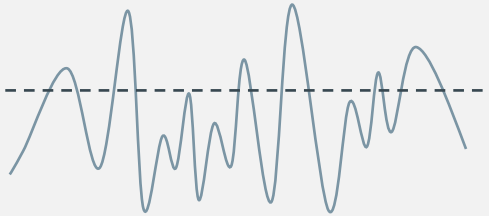
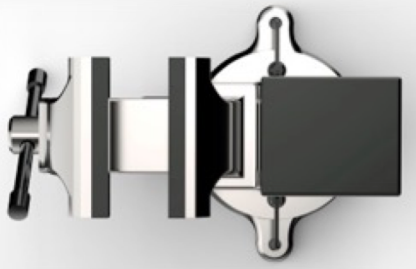
Old Skool Machine Learning techniques still dominate, often "good enough"

Code for "funky new stuff like Deep Learning"

Old Skool Machine Learning technique

Analytics often involves using data for purposes that were not foreseen when the data were collected

Old skool: predicting train-set failure using sensor data

1	2	3	4	5
Manage raw sensor data…	*…combine with Engineering reports & Ops data…*	*…feature engineering…*	*…dimension reduction…*	*…and then create and evaluate a predictive model.*
				
Interpolation of missing values, "virtual sensor" correction for drift, re-calibration, etc., etc…	**…topic extraction and sentiment analysis; labelling of sensor data…**	**…Path, Graph, Time-Series Analytics to identify, for example, changes of state…**	**…identification of most predictive variables…**	**Naive Bayes, Random Forest, kMeans, Hidden Markov Models, Neural Net, etc., etc.**

80% Data Management, Preparation & Feature Engineering

20% Modelling

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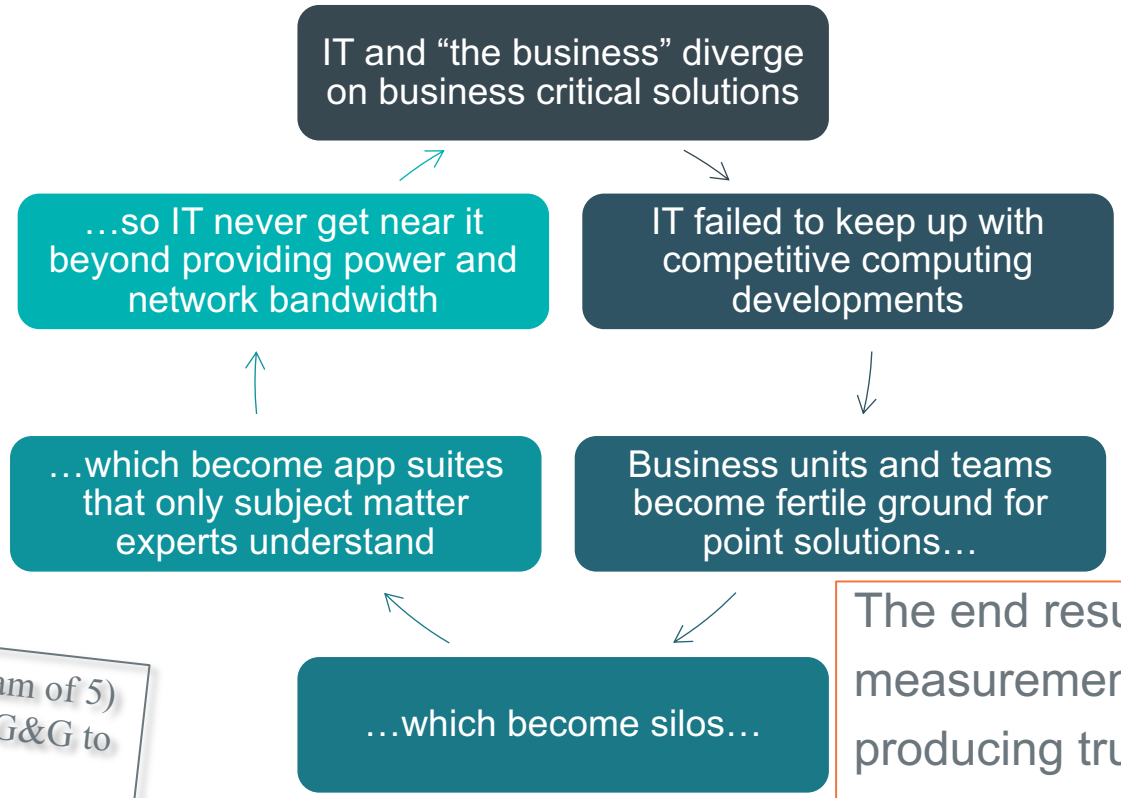
But crucially, upstream digitalisation is ham-strung because of the relationship between “business” and IT

and it’s the data that has suffered

4 months for a well planning team on a NCS asset to standardise competing well plans to give a «barely good enough» ranked set of completion options for one slot and six targets



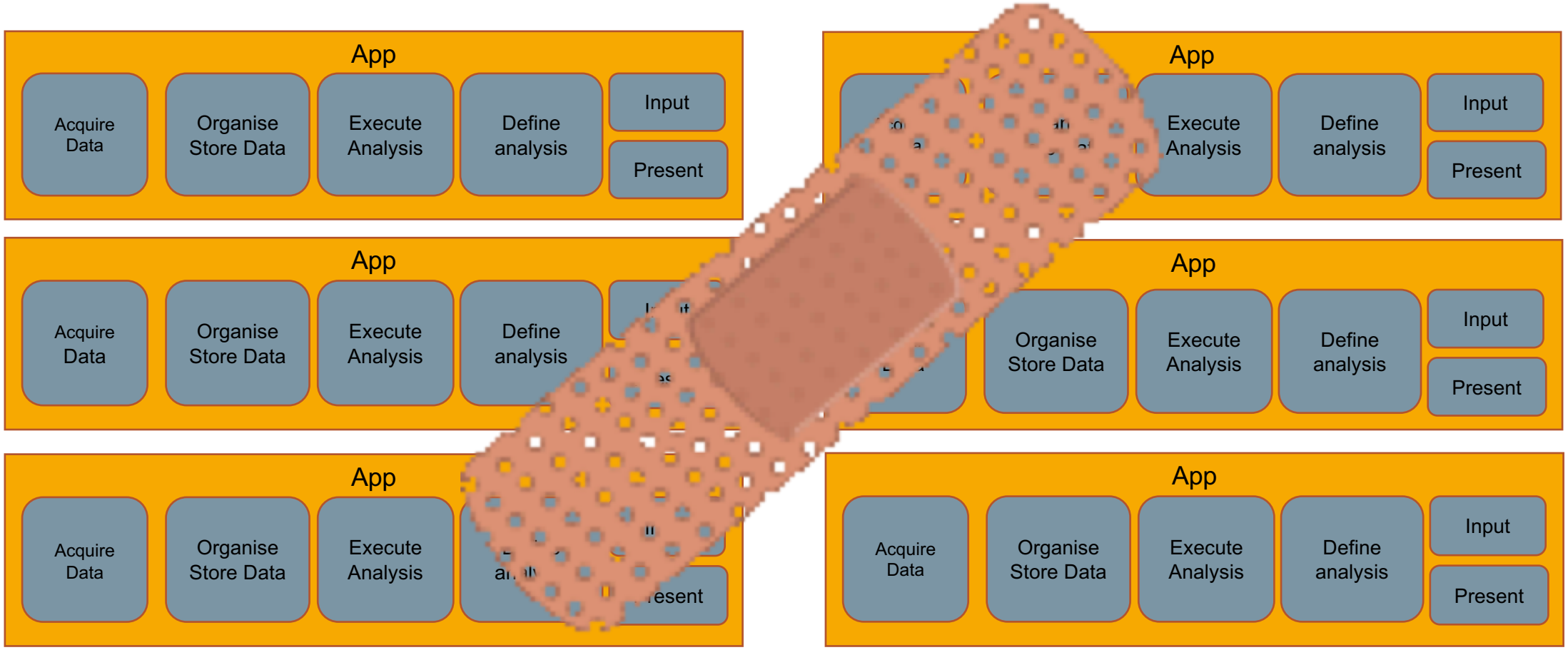
2 months for a G&G team in EXP to integrate data across new acreage – 3 days to calculate sweet spots

8 months for a data science project (team of 5) to integrate data from drilling ops and G&G to build a predicitive capability that is trustworthy to < 1 m

The end result is that when you acquire new measurements, there is such a long road to producing trustworthy, contextualised data, that there is no time or enthsiasm for the value-creation

But it's not really business v. IT

To digitalise our industry we must evolve from capability-centric to data-centric



"buy" vs "build" caused the problem

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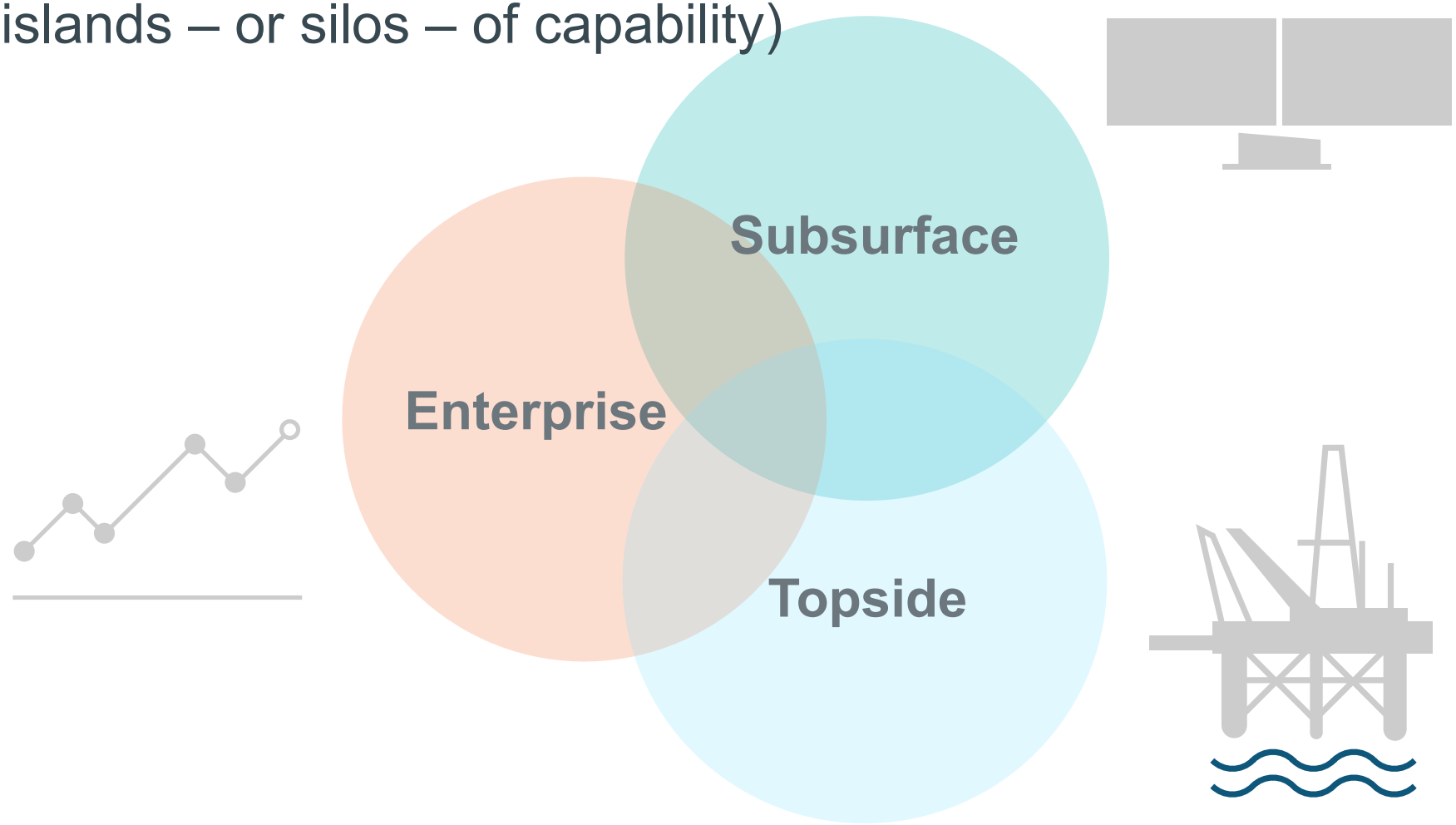
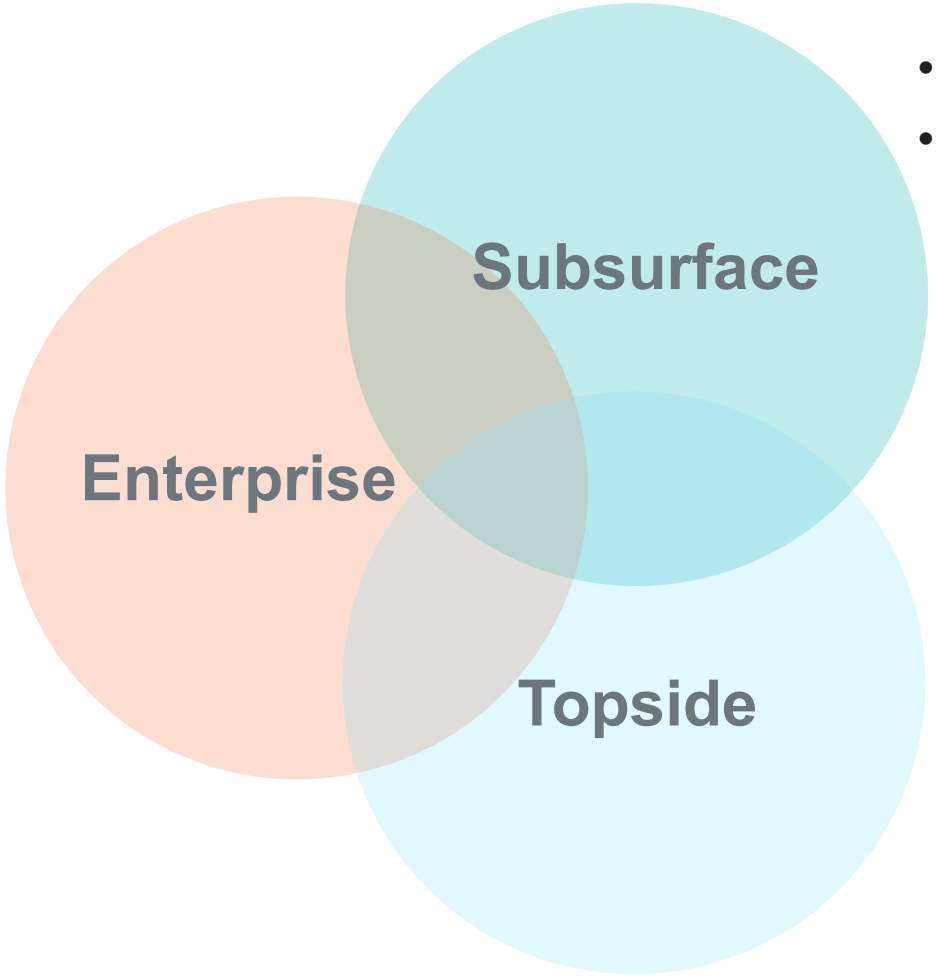
Historically, we've managed different data separately

(many islands – or silos – of capability)



..because the data was quite different

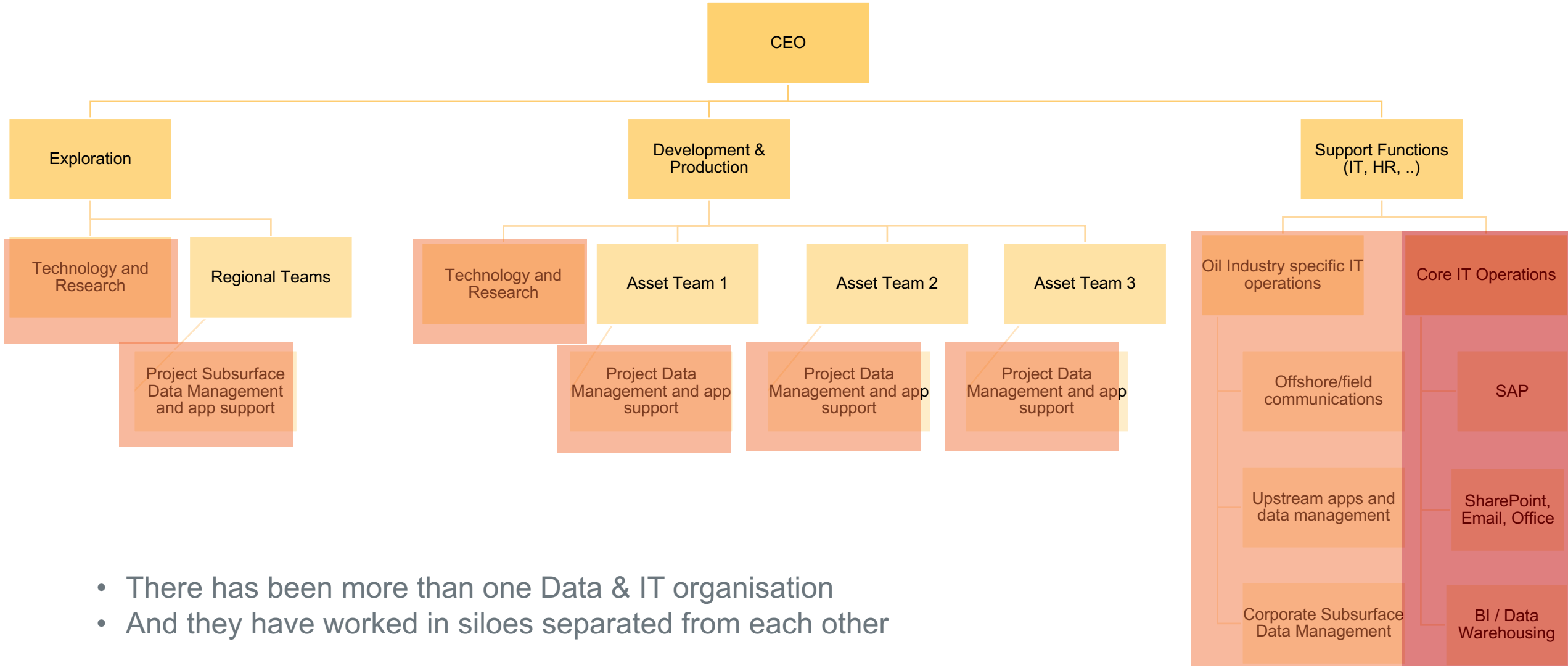
- Measurement data (in all the Units)
- Accurate geospatial data
- Physics based simulations



- “Normal data” - this part is what other companies do – so it’s reasonably well understood and supported by tools
- ERP, BI, EDW

- industrial automation and control systems
- massive one-off CapEx projects
- CAD drawings

The data management organisation hasn't helped



- There has been more than one Data & IT organisation
- And they have worked in siloes separated from each other

“We want to be like that”

(…or a reminder of where an E&P company shouldn’t be going)

- We’re not Uber, AirBnB or Google
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- But they **do** bring new approaches
- But there are value opportunities in our data
- But then again, we have a lot of knowledge products e.g. well plans, reservoir models that ***should*** follow well-described processes

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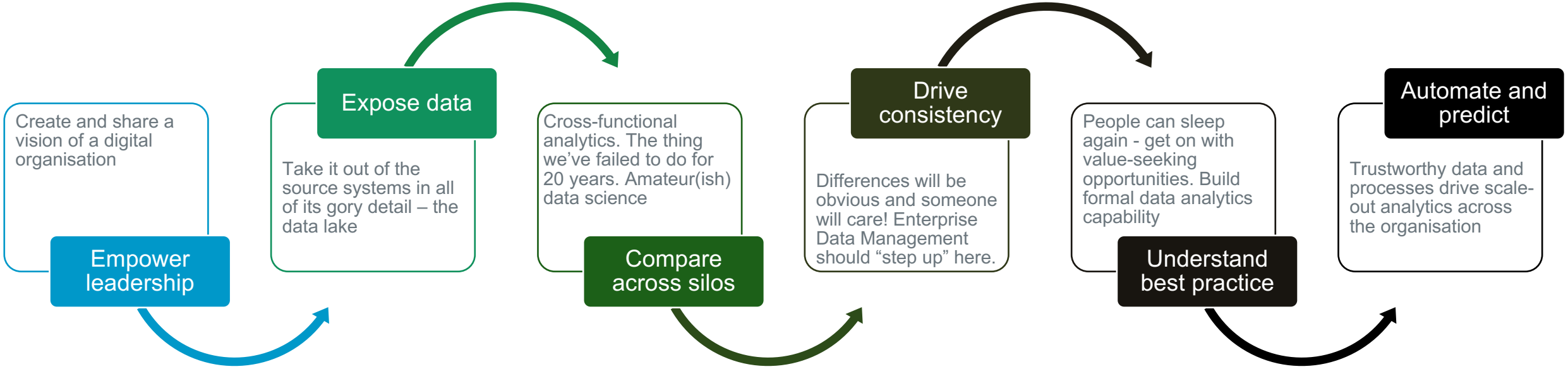
So how do you do it?

A simple journey



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And how do I use all the new stuff?

Start small, think big

- Use commodity, open source tools to build out good-enough infrastructure but make sure that you have strong design leadership in your Enterprise Architecture and Data Management

Get with the new beat

- Use data science and data engineering but do it with an eye to the future – overlap them in teams with domain experts and IT specialists

Understand what you should value

- Take ownership of your data and insights. Only you will ever care as much as you should about the quality of your data, but there are many 3rd parties who would like to care about value that can be extracted from it.