UKCS
Data & Digital
Maturity Survey

SURVEY REPORT 2020

Understanding attitudes, progress and challenges in Digital Transformation for the UK oil and gas industry

OGUK technology leadership board ONE OPPORTUNITY NORTH EAST The Oil & Gas Technology Centre Your Innovation Partner Deloitte.

EXECUTIVE SUMMARY

'Digital' is not a new concept for the oil & gas industry, however, it is only in the last few years that organisations have begun to understand the full potential of digitalisation. Oil price fluctuations and reducing margins have been a significant driver, with the falling costs of technology and increased focus on digital 'foundations' combining to further enhance the business case for investment.

Organisations need to have digitalisation in mind, not digitisation

Organisations have been introducing 'digitisation' initiatives for many years - using data & technology to enhance existing business processes. However, true 'digital-isation' offers a far more significant opportunity, and represents a fundamental change to how an organisation operates. Offshore teams using tablets to provide quicker access to maintenance schematics represents digitisation of an existing business process, whereas using a digital twin to predict failures of equipment and greatly optimise maintenance schedules across many assets would be an example of digitalisation. Whilst digitisation is a pre-requisite of digitalisation, it should not be viewed as an end goal, otherwise many of the benefits will be missed.

True digitalisation will require a significant shift in mindset. Henry Ford's famous quote highlights the risk that many organisations are facing - "*If you always do what you've always done, you'll always get what you've always got*".

Digital transformation is in its early stages

For the ~60% of organisations that had a digital transformation programme in place, the overwhelming majority of these programmes are less than three years old, showing that the transformation journey is only recently underway for most. Although many organisations have many years' experience in deploying digital technology, full digital transformation requires a holistic approach that also encompasses data, innovation, people and culture.

As to be expected in the early stages of transformation, there are still many people that have not yet been positively impacted by digital. The industry is in an investment intensive stage of the transformation process, and many foundational initiatives (e.g. data governance and connectivity) do not provide value on their own, but still require significant effort. Equally, digital initiatives only provide their full value when rolled out at scale across organisations – most initiatives are not at this point.

Operators have a responsibility to drive change in the right way

Operators have a significant influence on digital transformation, with the supply chain largely being incentivised to change based on understanding what their customers want. With regards to data, operators often hold the power to determine how data is transferred, accessed, formatted and shared. However, capability and maturity is generally lower among operators than the supply chain - they are less likely to have digital strategies, capability programmes and innovation mechanisms in place. Operators have the responsibility to ensure they are driving transformation in the right way, as their influence on the whole industry will set the direction for digital.

Data is the foundation for digital

Whilst organisations should be wary of viewing digitisation as the end goal, they should also be careful of focussing on technology before data. Organisations have largely understood that data is the foundation of digital, and are investing effort in data governance and data quality issues, as well as ensuring data is easily accessible.

These initiatives are unlikely to provide the case studies for any keynote speeches, but will provide the foundations for success in digital transformation by preparing for the future and enabling an agile, connected organisation.

A recognised business model for collaboration has not yet emerged

The complex nature of the oil & gas supply chain means that collaborative digitalisation is the critical next stage in the industry's journey. Organisations attempting to transform on their own will suffer from slow progress and wasted effort. Attitudes towards collaboration between organisations are positive, yet examples of genuine collaboration (outside of contracting arrangements) are rare. The industry is yet to find the business model for collaboration, where multiple organisations have a shared benefit and acceptance of risk, whilst still putting the end users first.

Data sharing has its part to play – organisations should focus on data models and APIs rather than locking data into a specific application or tool. An open attitude to data sharing is likely to be one of the signals that indicates a willingness to collaborate, and provides a foundation for more conversations around the value of the data, which can be explored further through hackathons, joint innovation projects etc.

The most effective collaboration comes as a by-product of a business model where all parties involved are set to benefit. For this to work, trust between organisations and an element of risk acceptance is required.

Innovation, culture & capability are intricately linked

At its most basic level, innovation is the process by which digital ideas are identified, developed and scaled into value-adding initiatives. However, experiences of truly innovative organisations outside of oil & gas indicate that innovation has the ability to transcend these process boundaries to influence the wider culture of an organisation – 'the way we do things around here'.

Capability related digital initiatives have been mostly overlooked – where programmes do exist, they have generally focussed on ensuring teams have the tools and training to operate digital tools within their current roles, not on helping teams understand how digital can help enhance their roles.

Technology should be the final piece in the transformation puzzle

With an organisation that has a coherent digital strategy supported by leadership, robust and accessible data and a workforce that fosters innovation and collaboration, the foundations for technology to provide its full value are in place.

With a vast array of technology available and tested, implementations are most likely to fail due to the approach taken, rather than the technology itself. The foundations mentioned above are the most significant indicators of success.

SURVEY ORGANISATIONS

The survey has been developed in collaboration between five organisations, with the aim of understanding attitudes, strategies and progress in digital, encompassing data, innovation, technology, capability & culture.

This report presents a number of insights from the 70+ organisations that participated in the survey.

OGUK's aim is to strengthen the long-term health of the offshore oil and gas industry in the United Kingdom by working closely with companies across the sector.

The Technology Leadership Board (TLB) works with the industry, government and other stakeholders to define priorities to adopt and develop oil and gas technologies, securing investments, and strengthen UK oil and gas industry competitiveness.

Opportunity North East (ONE) is a catalyst driving transformational change in north east Scotland's economy. They develop and deliver projects to accelerate regional economic growth and diversification.

The Oil & Gas Technology Centre's goal is to unlock the full potential of the UK North Sea, anchor the supply chain in North East Scotland and inspire a culture of innovation and transformation.
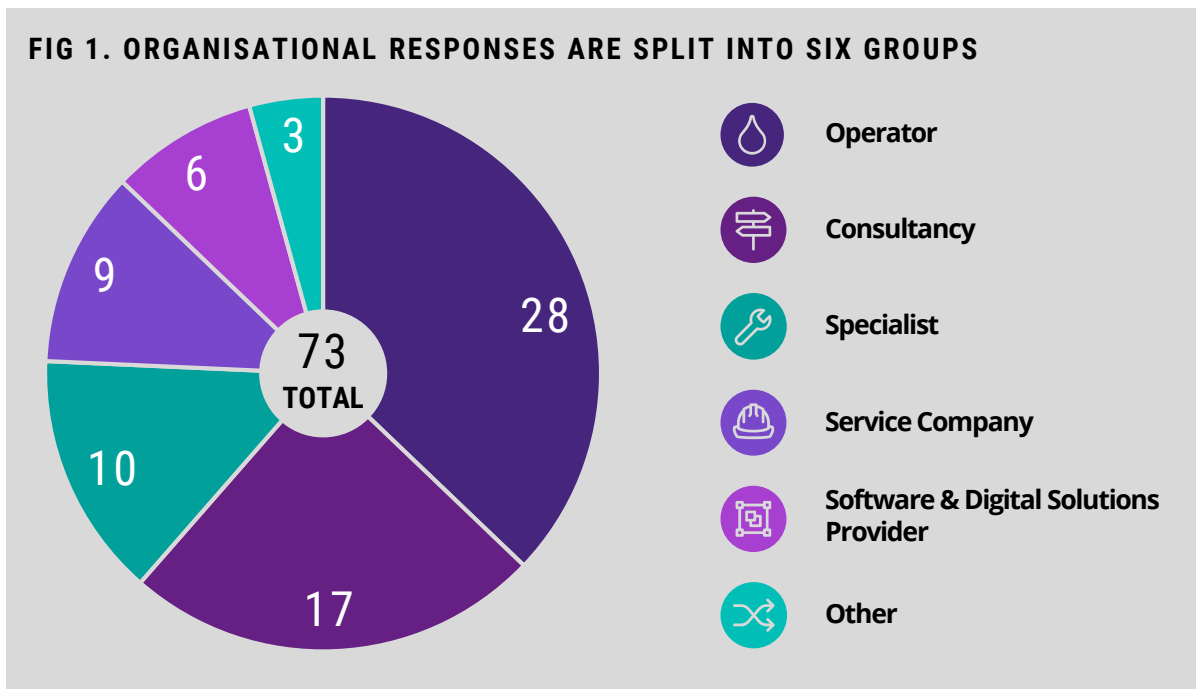
Deloitte's UK Digital Capital Projects team supports oil and gas organisations in driving digital transformation through delivery of data/digital strategies, innovation processes, technology implementations and business change programmes.

SURVEY RESPONDENTS

The survey targeted two types of respondents – organisational responses from a single nominated individual involved in digital, and public responses encompassing others who responded to the open link to the survey. Generally, there was close alignment between the organisational responses and the public responses.

Following the survey completion, a cross section of organisations took part in follow-up interviews to provide additional insights, commentary and validation of the emerging hypotheses.

FIG 1. ORGANISATIONAL RESPONSES ARE SPLIT INTO SIX GROUPS

73 TOTAL

- 28 — Operator
- 17 — Consultancy
- 10 — Specialist
- 9 — Service Company
- 6 — Software & Digital Solutions Provider
- 3 — Other

Responses from operators spanned vertically integrated supermajors and E&P companies, including those who are private equity backed. Consultancies and specialists covered a wide range of capabilities, including logistics, subsea, asset management, instrumentation & controls, data & information management, decommissioning, and other bespoke equipment providers.

In addition to the above organisation responses, 38 individual responses were used to add further commentary to the insights and results provided.

The survey was designed to provide an overall picture of the state of digital across the industry, not to assess individual organisations on their maturity against others. However, the survey does pick out a few responses which are general indicators of digital maturity – related to the presence of digital, data and capabilities strategies, a self-assessment of where an organisation is on the digital journey, the existence of innovation mechanisms, and an organisation's focus on data as a foundation for digital. In some cases, these questions have been used as a benchmark for responses to other questions.

HOW DIGITALLY MATURE IS OIL & GAS?

- **Oil & Gas is still relatively immature in its digital transformation journey based on the age of digital transformation programmes and position of most processes on the digital journey.**

Oil & Gas organisations have been investing in systems & technology for decades, with initiatives to better understand reservoirs and improve production having been seen as early as the 1980s. However, an industry with a long term investment history in these areas does not equate to one which is digitally mature.

Given the diverse starting points and an array of choices, O&G companies could benefit from a coherent framework that helps them achieve their near-term business objectives, measures their digital progression through stages of evolution and, above all, gives them a pathway to ultimately transform the core of their operations, the real assets and the business model itself. Deloitte's Digital Operations Transformation (DOT) model provides this roadmap, and helps to understand the maturity of the industry compared to others.
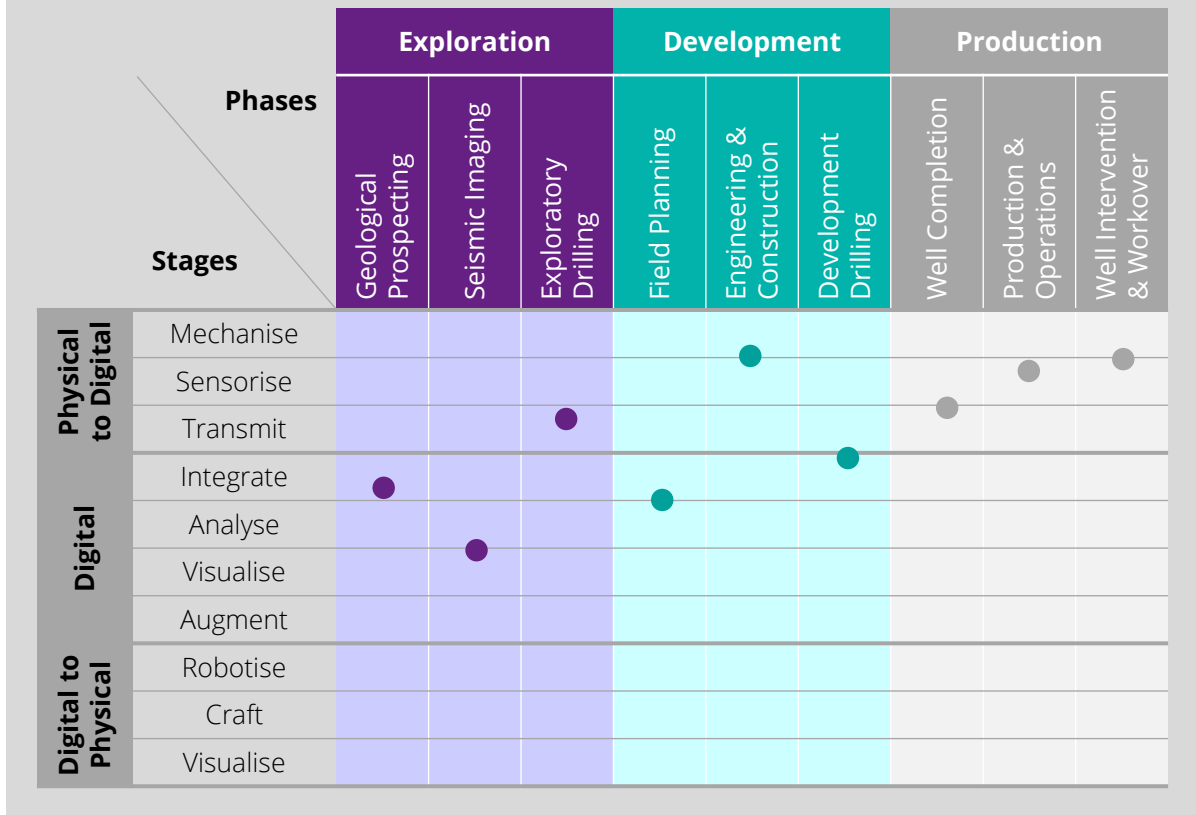
DIGITAL OPERATIONS TRANSFORMATION (DOT) MODEL

A digital journey of ten milestones which mark an organisations (or asset's) maturity in digital.

| Digital Realm	Stage
Physical-digital	**Mechanise:** Automate workflows through electricals, hydraulics, pneumatics, etc. **Sensorise**: Detect events or changes in the environment and send the information to other devices, usually using computer processing **Transmit:** Transmit digital or analogue data over a communication medium to various networks, systems, and devices.
Digital-physical	**Integrate**: Standardize, aggregate, and integrate technology and data Analyse: Process and examine big data sets to draw insights and conclusions about operations **Visualise**: Provide advanced display of information for better interpretation and usability, and thereby improve the mobility of employees **Augment**: Automate decision-making by using intelligent insights to predict and prescribe the best operational strategies
Digital-physical	**Robotise**: Interact autonomously with the physical world using smart equipment and intelligent robots **Craft**: Use 3D data models for layer-upon-layer printing or equipment manufacturing to drive rapid prototyping and advanced custom manufacturing **Virtualise**: Digitally replicate physical assets, processes, and systems

Plotting some key process areas against the DOT model provides a view of the most and least digitally mature processes.

FIG 2. EXPLORATION IS MORE MATURE THAN OTHER LIFECYCLE STAGES

Phases		Exploration			Development			Production		
Stages		Geological Prospecting	Seismic Imaging	Exploratory Drilling	Field Planning	Engineering & Construction	Development Drilling	Well Completion	Production & Operations	Well Intervention & Workover
Physical to Digital	Mechanise					●				
	Sensorise								●	●
	Transmit			●				●		
Digital	Integrate	●			●					
	Analyse						●			
	Visualise		●							
	Augment									
Digital to Physical	Robotise									
	Craft									
	Visualise									

According to a recent WEF report, despite organisations having the highest average revenue of any industry in the list below, investment in digital has led to the one of the smallest returns.

FIG 3. OIL & GAS DIGITAL MATURITY IS LOW

Industry Maturity based on *Deloitte's Digital Maturity Index*

Source: Deloitte Digital Maturity Index
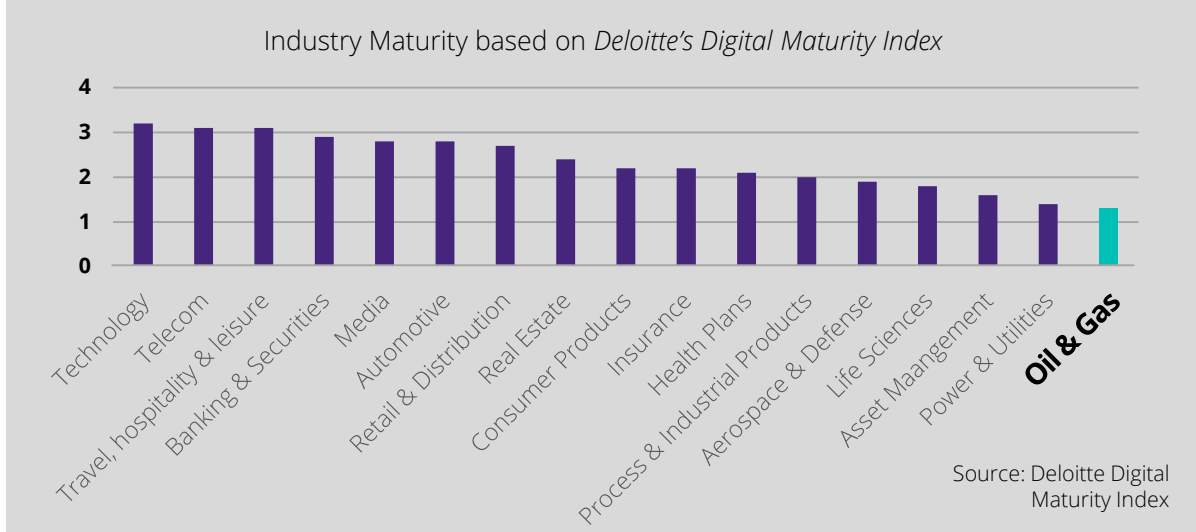
WHAT IS 'DIGITAL'?

The term 'digital' is everywhere, and has a wide variety of meanings across organisations, teams and individuals. For some, it's about implementing technology to help solve a specific problem, and for others, it's about leveraging the power of information. However, true digitalisation can provide a fundamentally different way for the industry to operate.

For the purposes of this report, it represents the use of data & technology to gain additional insight, support better decision making, reduce risk, improve efficiency, and ultimately drive improvement in business performance.

The survey focussed on four areas of digital: Data, People, Innovation and Technology

"*Digitalisation involves the use of data & technology to gain additional insight, support better decision making, reduce risk and improve efficiency across the organisation. Supported by an agile culture and a focus on innovation, it represents a fundamentally different way of working.*"

- DEFINITION OF DIGITALISATION

FIG 4. THE SURVEY FOCUSSED ON FOUR AREAS OF DIGITAL

Data is the foundation of digital. Governed, accessible and connected datasets provide the basis for digital to add value.

Without digital capability and culture through the organisation, the impact that digital can make is limited.

An innovation process ensures that a pipeline of "ideas" is driving transformation, with the support mechanism to invest, pilot and scale.

Technology transforms data into tangible value, but must be focussed on solving the right problems, and properly deployed.
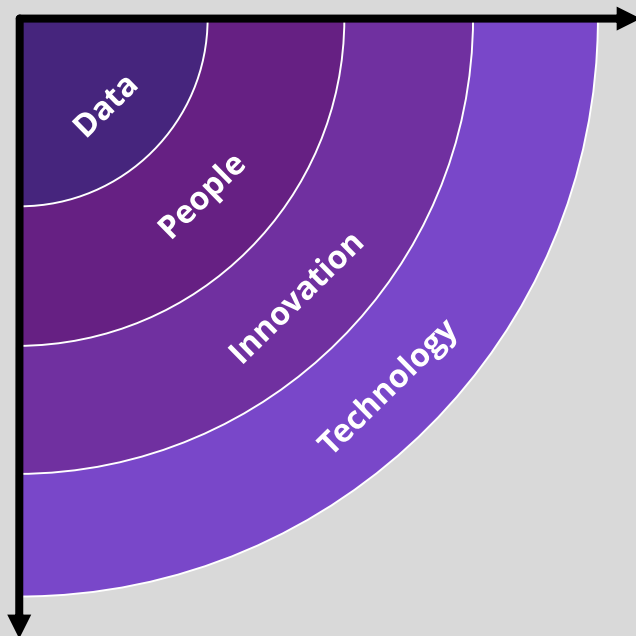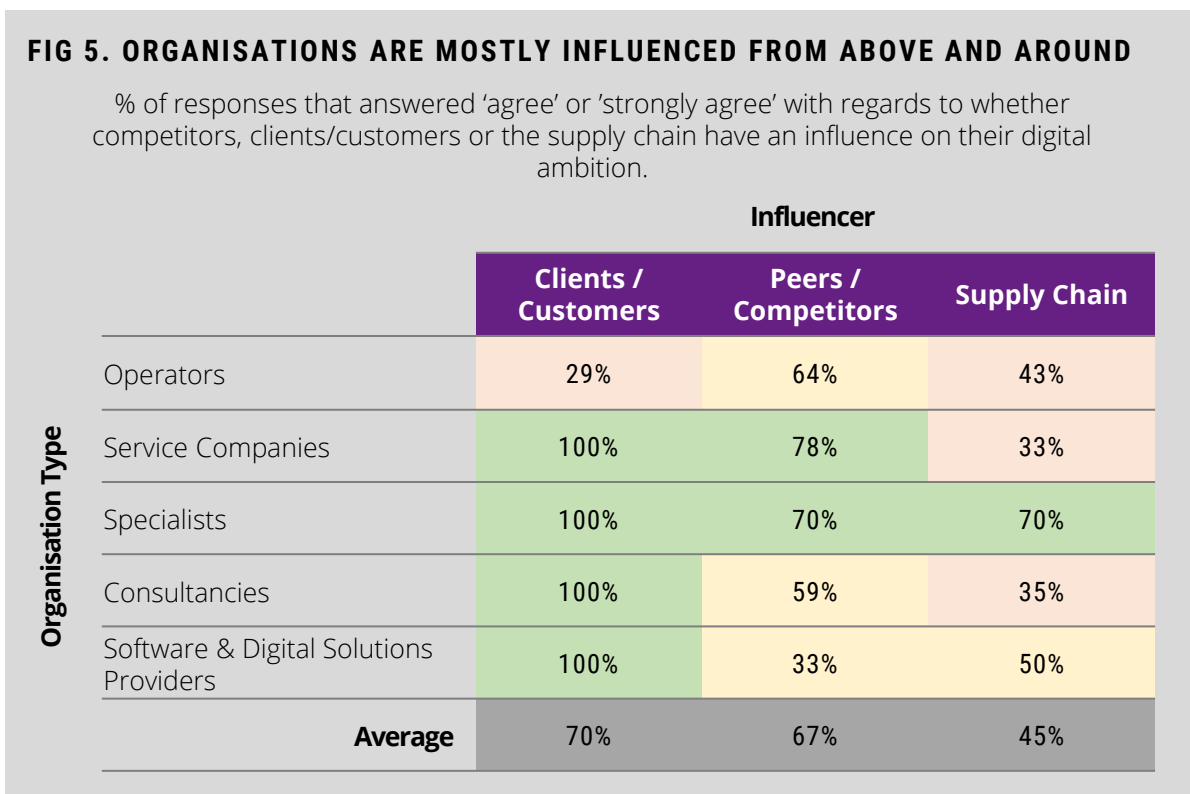
CHANGE IS BEING DRIVEN FROM THE TOP

- **Organisations are third more likely to be influenced by their customers than by their supply chain. The extent of competitor influence is in between.**
- **Operators have a responsibility to step-up transformation efforts and listen to the supply chain, as their influence is significant.**

The survey asked respondents to agree or disagree with a series of statements around the types of organisations which have an influence on their digital ambitions, including competitors, clients/customers and the supply chain.
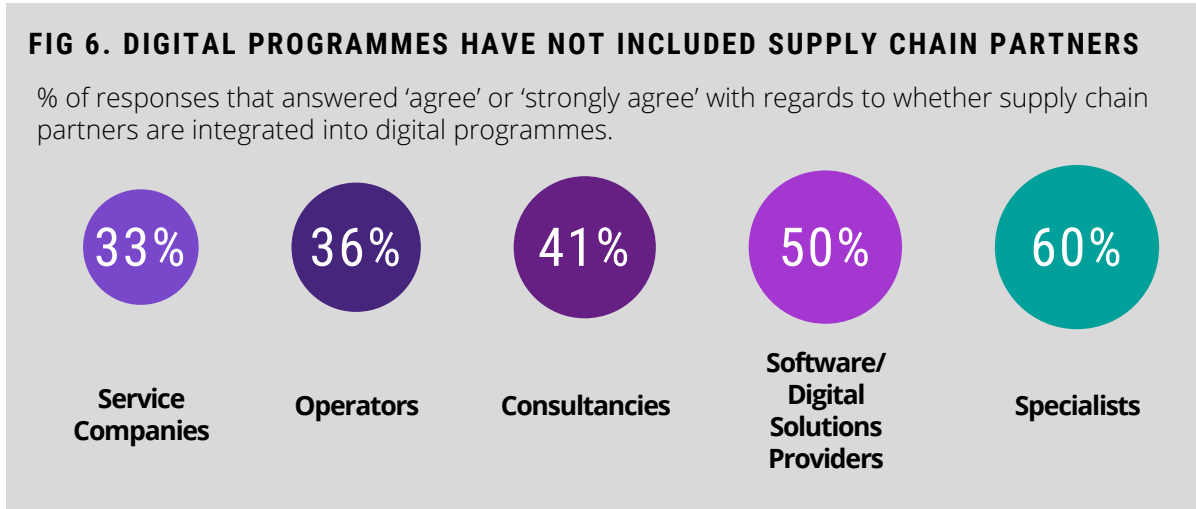
FIG 5. ORGANISATIONS ARE MOSTLY INFLUENCED FROM ABOVE AND AROUND

% of responses that answered 'agree' or 'strongly agree' with regards to whether competitors, clients/customers or the supply chain have an influence on their digital ambition.

		Influencer		
		Clients / Customers	**Peers / Competitors**	**Supply Chain**
Organisation Type	Operators	29%	64%	43%
	Service Companies	100%	78%	33%
	Specialists	100%	70%	70%
	Consultancies	100%	59%	35%
	Software & Digital Solutions Providers	100%	33%	50%
	Average	70%	67%	45%

Regardless of an organisation's position in the supply chain, influence is more likely to come from clients and customers. Where more competition exists (oilfield services and specialists), competitors also are likely to play a significant role in influencing digital ambition.

Even though operators do not have 'competitors' in the same way as the supply chain (after license award they are not in direct competition) there is a still a significant degree of operator-to-operator competition over technology and digital capability.

It is clear from the above (and from the interviews) that operators have a significant responsibility in driving digital transformation in the right way. This will include listening to the supply chain to incorporate their views where possible.

Survey responses also outlined several other influencers – nine responses (8%) referred to the influence of the government/regulator. Other influencers mentioned included shareholders, advisors (including consulting firms) and other industries – although these responses were less common. The shareholder influence is likely to be driven by the existence of digital as one of the few remaining cost reduction levers, now that other inefficiencies have been stripped out.

Additional data to support the minimal influence of the supply chain is provided by the survey question related to incorporating supply chain partners into digital programmes.

FIG 6. DIGITAL PROGRAMMES HAVE NOT INCLUDED SUPPLY CHAIN PARTNERS

% of responses that answered 'agree' or 'strongly agree' with regards to whether supply chain partners are integrated into digital programmes.

33%	36%	41%	50%	60%
Service Companies	Operators	Consultancies	Software/ Digital Solutions Providers	Specialists

From the interviews, it was clear that although organisations had considered the influence of customers and competitors (e.g. to develop new solutions that would differentiate themselves), more successful organisations have started by identifying the challenges that exist within the organisation, with the awareness of what is going on elsewhere in the industry providing a steer rather than inspiration.

BOTTOM UP VS. TOP DOWN INFLUENCES

Organisations have typically started by identifying challenges within their own business. This approach has generally been more successful than starting with top down or external influences.

Bottom Up Influence

What areas of business process can we improve?

What are other industries doing?

What challenges are our teams facing?

Can we improve what we already have?

Top Down Influence

What do our customers want?

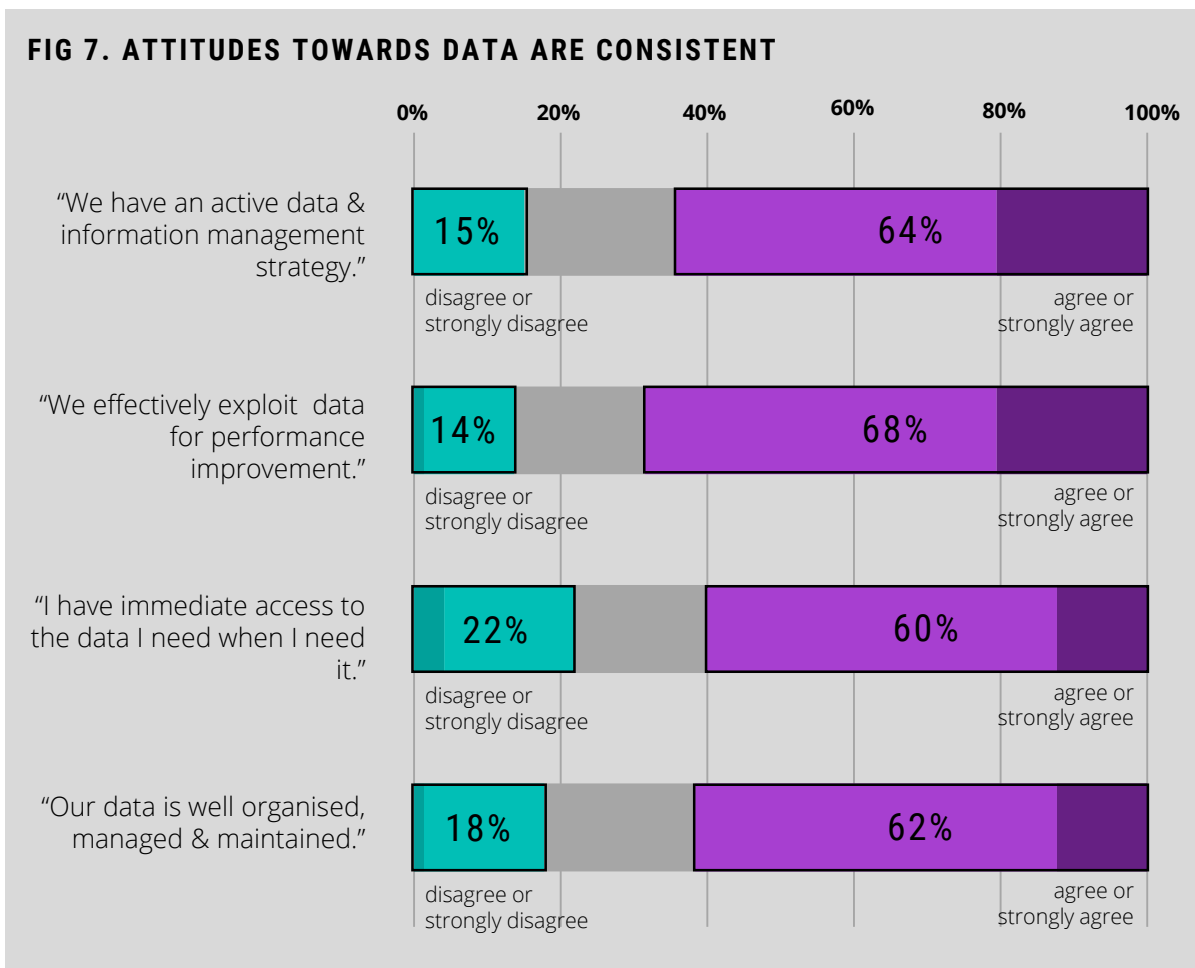How can we differentiate ourselves from the market?

SECTION 2

DATA IS THE FOUNDATION

- **Data was quoted as the most important value driver for digital, highlighting that it is a priority for most organisations.**
- **Attitudes towards data are reasonably consistent, however, senior leadership are more likely to have positive experiences of the state of data within their organisation.**
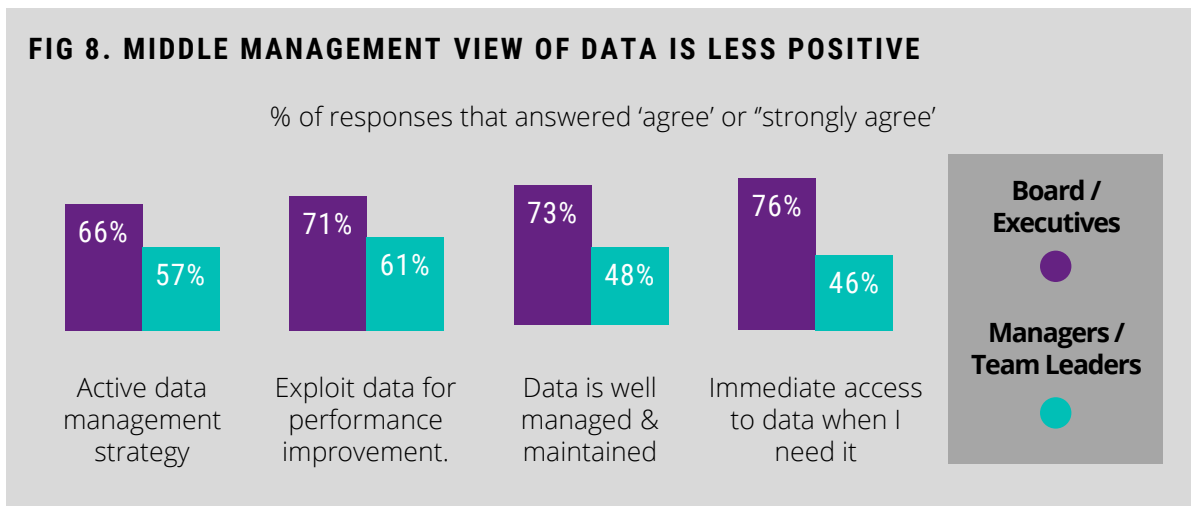
The survey asked several questions around the state of internal datasets within organisations. The results were extremely consistent across organisations, with the majority giving the same responses across the board.

FIG 7. ATTITUDES TOWARDS DATA ARE CONSISTENT

"We have an active data & information management strategy."
15%
disagree or strongly disagree
64%
agree or strongly agree

"We effectively exploit data for performance improvement."
14%
disagree or strongly disagree
68%
agree or strongly agree

"I have immediate access to the data I need when I need it."
22%
disagree or strongly disagree
60%
agree or strongly agree

"Our data is well organised, managed & maintained."
18%
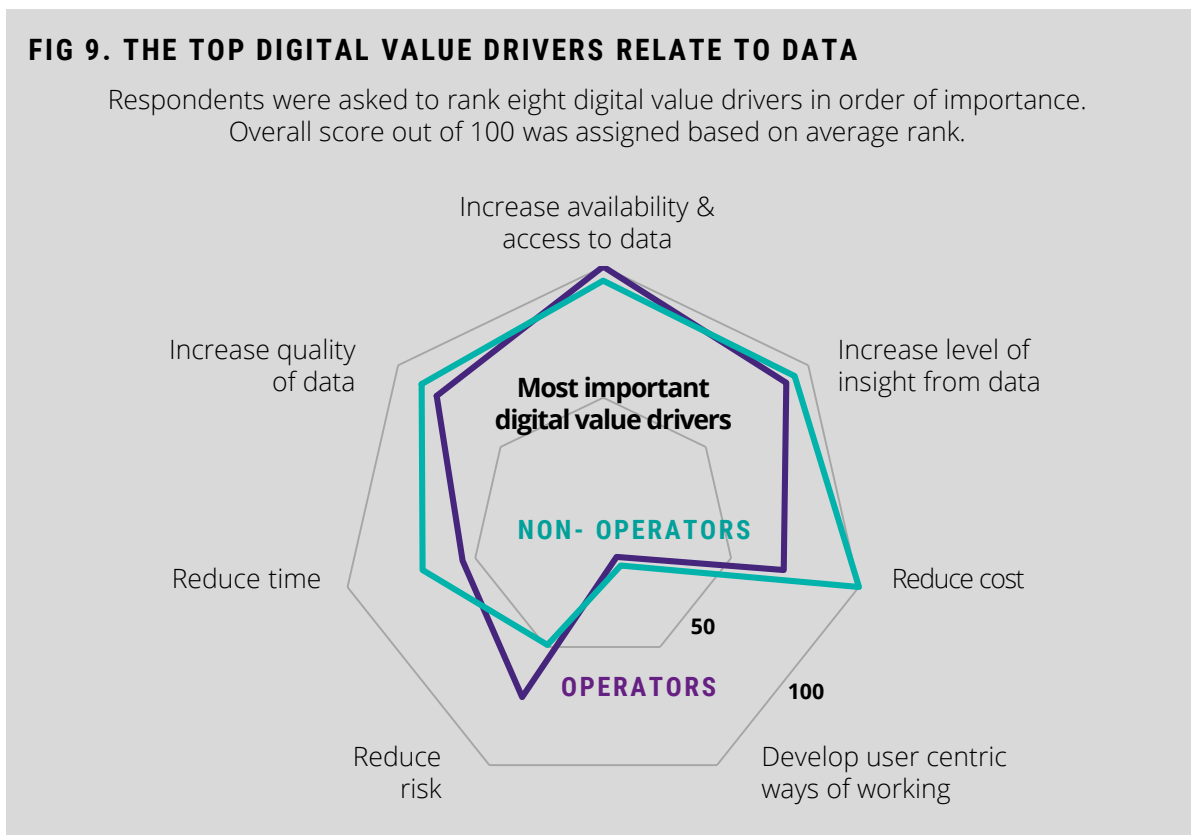disagree or strongly disagree
62%
agree or strongly agree

Typically, less than 20% of organisations are seeing significant shortcomings with their data, with the vast majority indicating positive responses to questions around data strategies, access, management and exploitation.

The above figure helps to demonstrate that the industry is moving in the right direction when it comes to data.

Comparing responses around data from board members/executive against managers/team leaders provides a slightly less positive picture. It is likely that the data in the figure above is clouded by a significant number of senior leaders who may be provided curated reports and datasets generated by others, without having to go through the process of accessing, extracting and manipulating the data themselves.

FIG 8. MIDDLE MANAGEMENT VIEW OF DATA IS LESS POSITIVE

% of responses that answered 'agree' or "strongly agree"

66% / 57%	71% / 61%	73% / 48%	76% / 46%
Active data management strategy	Exploit data for performance improvement.	Data is well managed & maintained	Immediate access to data when I need it

Board / Executives ●
Managers / Team Leaders ●

Results related to the value drivers for digital provide a clearer picture of the fact that organisations are prioritising data, even if the reality for those further down the organisation is that there is still some way to go.

FIG 9. THE TOP DIGITAL VALUE DRIVERS RELATE TO DATA

Respondents were asked to rank eight digital value drivers in order of importance. Overall score out of 100 was assigned based on average rank.

Increase availability & access to data
Increase quality of data
Increase level of insight from data
Reduce time
Reduce cost
Most important digital value drivers
NON-OPERATORS
OPERATORS
Reduce risk
Develop user centric ways of working
50
100

For operators, the top three value drivers all relate to data, whereas for non-operators, data is displaced at the top only by cost reduction – likely to be influenced by the current oil price environment. The results above correlate strongly with the technologies which are being widely used – these are focused on providing value from existing datasets.

FOUR LEVELS OF DATA MATURITY

Governance ▶ **Quality** ▶ **Accessibility** ▶ **Portability**

Governance	Quality	Accessibility	Portability
Assigning roles & responsibilities. Developing and embedding processes.	Ensuring datasets are structured, reliable and understood.	Making datasets widely available. Connecting datasets to provide additional insight.	Providing means for data exchange through platforms and data models.

TRUST IN EXTERNAL DATA IS LOW

- **Confidence in data exchanged between organisations is low compared to data received from within.**
- **Operators are less affected by data exchange issues, as they are able to influence formats and methods through which data is provided to them.**

The survey asked respondents to agree or disagree with a series of statements around the ability to rely on data received from both within their organisation, and from other organisations.

FIG 10. CONFIDENCE IN DATA FROM OTHER ORGANISATIONS IS LOW

	0%	20%	40%	60%	80%	100%

"I can always rely on the data received from within my organisation"
22%   46%
disagree or strongly disagree   agree or strongly agree

"I can always rely on the data received from outside my organisation"
45%   11%
disagree or strongly disagree   agree or strongly agree
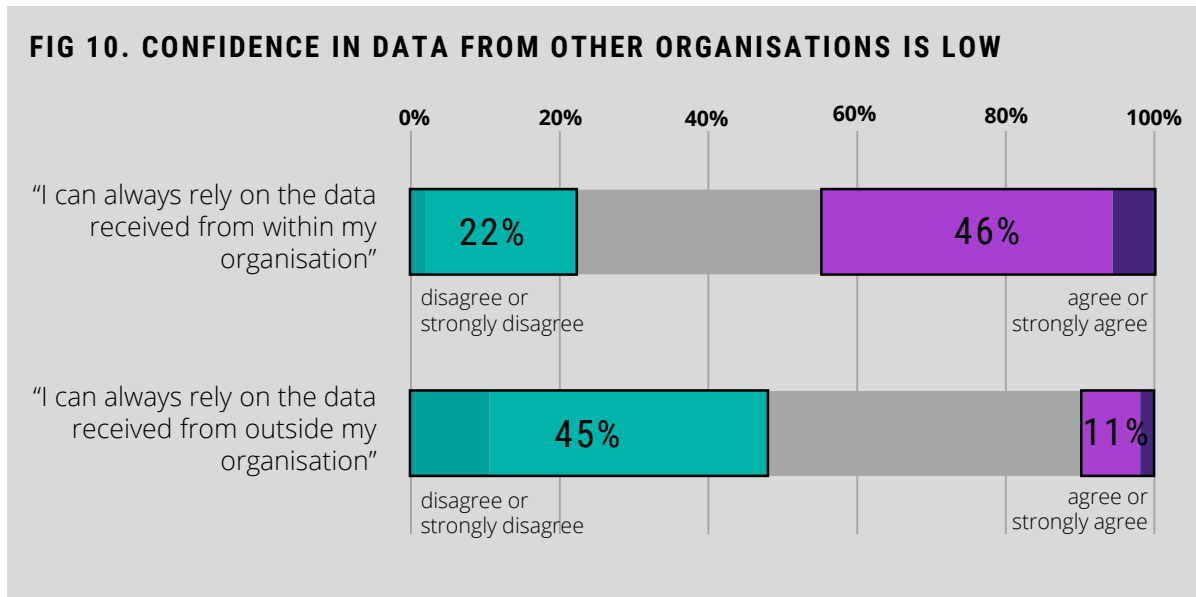
From the previous section, it is clear that organisations understand the foundation and value of robust data. Many respondents commented on data initiatives related to governance, quality and accessibility, but the challenge remains that organisations are unable to effectively and efficiently exchange data.
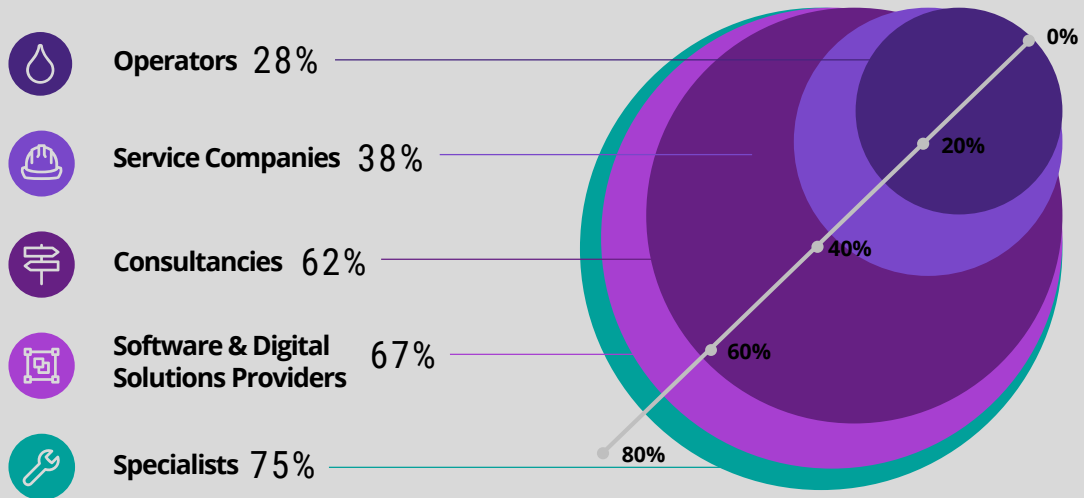
From follow up interviews, many commented on the need to get their own data governance and management in order before focussing on externally exchanged datasets. Information exchanged between organisations is often 'locked in' to a certain tool or platform, making it challenging to effectively utilise the data for other purposes without significant amounts of re-work. This re-work often has to take place each and every time analysis is required.

Contracting arrangements no doubt have a part to play – one operator's specification describing the types, formats and structure of data that EPCs will provide during project delivery is a 75+ page document. Such high levels of specificity written into contracts will not easily enable changes in data requirements through the project lifecycle, leading to information being supplied in non-useful formats. This level of specificity also leads to significant amounts of data manipulation being required before it is passed to the operator, risking data errors and inaccuracies.

FIG 11. THE SUPPLY CHAIN SUFFERS MOST WHEN IT COMES TO DATA

"I can always rely on the data received from outside my organisation"

Responses that answered 'Disagree' or 'Strongly disagree'

Operators 28%

Service Companies 38%

Consultancies 62%

Software & Digital Solutions Providers 67%

Specialists 75%

0%
20%
40%
60%
80%

Whilst there was little variation between organisation types in their ability to rely on internal data, it is clear that operators and the supply chain have different experiences of data received from outside their organisations. Client organisations (likely to be operators and service companies in the list above) are more likely to have the ability to influence how data is provided, hence the lower figures.

FIG 12. CHALLENGES STILL EXIST WITH EVEN THE MOST 'DIGITAL' DATASETS

Respondents ranked process areas in order of 'digital investment to date' and 'amount of manual data re-formatting required' - for external datasets only.

Most investment

Production Monitoring & Optimisation

Maintenance and Operational Readiness

Asset Information Management

Site and Asset Monitoring

Processing and imaging

Engineering Design

Wells, HSSE Reporting, Project Mgmt, Logistics, Contracts, Reservoir Eng, Etc.

Procurement & Supply Chain

Asset Acquisition & Access
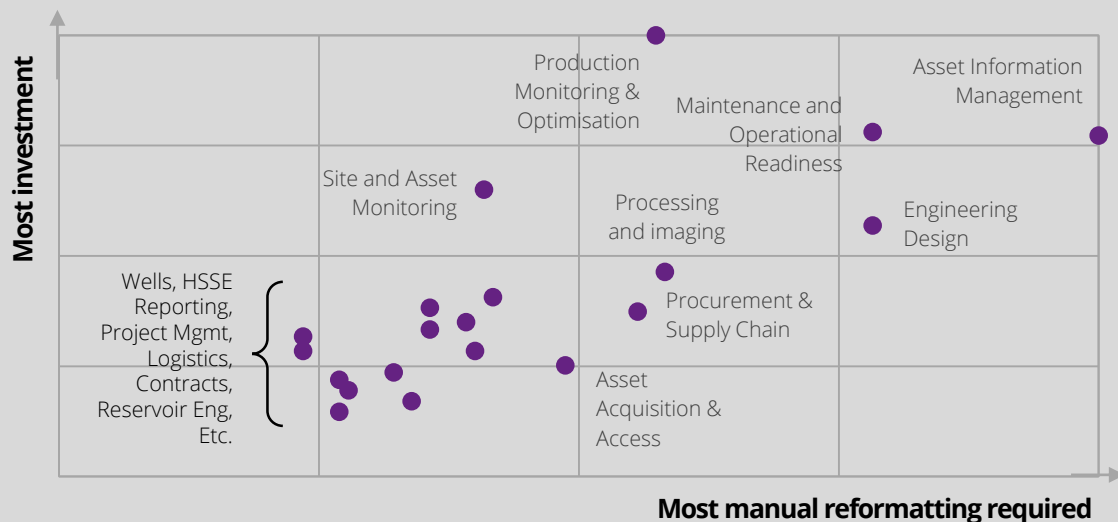
Most manual reformatting required

Figure 12 demonstrates the correlation between processes that have had the most digital investment and those which require the most reformatting before use. There was also similar correlation against the question "which datasets have seen the most value gained from digital". Survey respondents pointed to three specific challenges around data exchange.

DATA EXCHANGE CHALLENGES

Having to manipulate data in order to upload it into a certain system or tool, with information usually provided in excel spreadsheets. Operators commented on their ability to control the format that data is provided in – figure 11 shows that the supply chain are likely to have more significant challenges.

Conversion of data between different formats to suit system requirements. One example given was the need to convert well data on the NDR (National Data Repository) from LIS to DLIS format before use.

Information exchange using paper based documentation requiring wet-signatures. Several interview participants talked about the positive impact of the COVID-19 crisis in accelerating the move away from paper formats.

The ability to accurately and automatically exchange data is a foundation for digital transformation. The human element will always be required to safeguard the process and quality outcomes, but humans should not be doing the data transfer or manipulation work.

The fact that organisations are still focussing on understanding the vast amounts of data they have, correcting data quality issues and developing governance mechanisms means that the challenges of data exchange has not yet been fully considered as part of the transformation journey.

MOST INVESTMENT IS IN OPERATIONS

- **Operational processes have been prioritised for investment, however, low oil prices now make non-operational ('back office') process improvement financially important.**
- **Information management and applications & systems are receiving high levels of investment, with data expected to deliver more value over applications & systems.**

The survey asked respondents to rank their top five process areas indicating which have received the most digital investment, which have provided the most value, and which have the most future investment planned.

FIG 13. OPERATIONAL PROCESSES HAVE HAD THE MOST INVESTMENT

Process areas ranked on digital investment received

Operational ●
Non- Operational ●

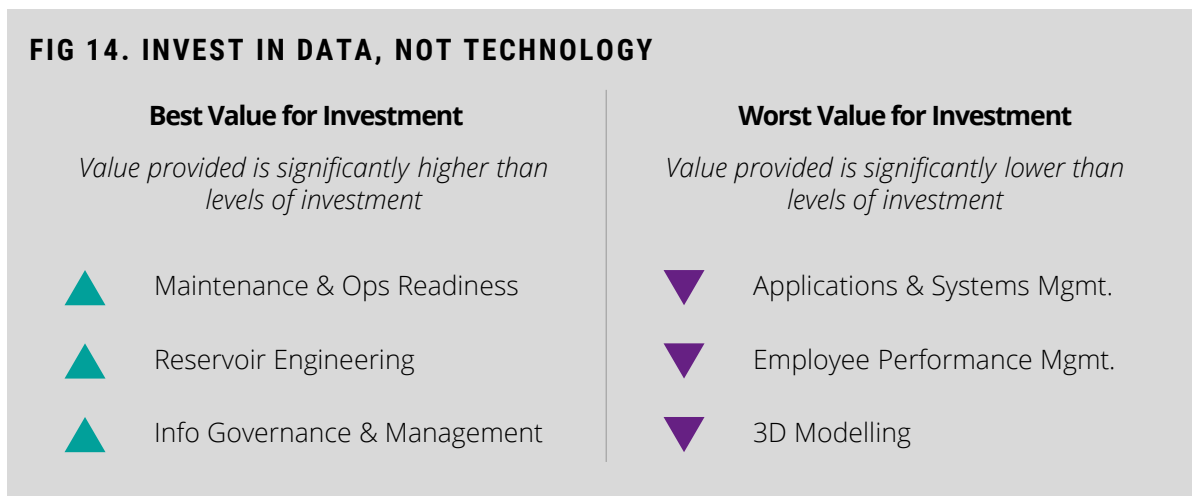| Top 10	Bottom 10
1. Production Monitoring & Optimisation ●	1. Schedule Management ●
2. Maintenance and Ops Readiness ●	2. Quality Control ●
3. Asset Information Management ●	3. Legal ●
4. Site and Asset Monitoring ●	4. Product Quality Control ●
5. Engineering Design ●	5. Risk Management ●
6. Processing and Imaging ●	6. Benefits Management & Value Tracking ●
7. Applications & Systems Management ●	7. Product Servicing and Repair ●
8. Financial Accounting ●	8. Recruitment and Resourcing Strategy ●
9. Reporting & KPIs ●	9. Budgeting & Cost Management ●
10. 3D Modelling ●	10. Construction and Installation ●

The vast majority of the process areas within the top 10 relate to operational core processes. In follow up interviews, organisations talked about the perception of lower value in back-office processes with many also mentioning the challenges of long-standing, inflexible ERP systems.

Part of the challenge with non-operational processes is that they are often complex and have many dependencies and touch points with other processes and systems. Running a small scale procurement or finance pilot is, in most cases, much more difficult than trialling a set of tablets on a single platform as it will require a much more 'complete' solution to demonstrate any value.
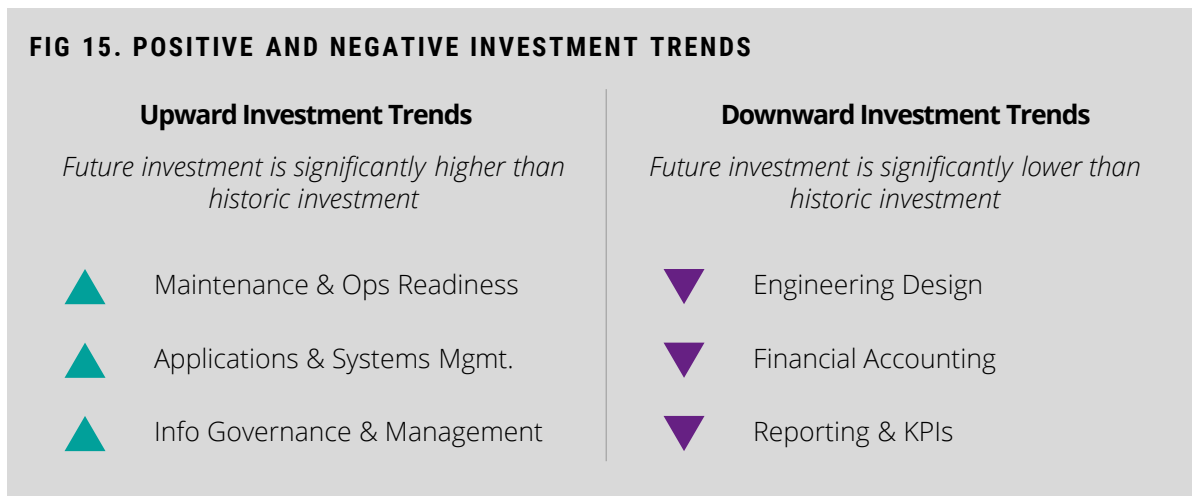
In a high oil-price environment where production revenue is so much more significant than internal costs, investment in operational processes is justified - a 5% increase in production yields vastly more value than a 5% cut in costs. However, in the current climate, focus must shift towards back-office processes, as the financial case for investment become stronger. Based on OGUK internal analysis, the average UKCS lifting cost is ~$15/bbl. The difference between this figure and the average oil & gas breakeven cost of ~$53/bbl represents the remaining opportunity to decrease costs. Although a significant proportion of the difference is made up by dividends, debt servicing, acquisitions and other non-variable costs, it is estimated that there is at least $15/bbl of opportunity that could be addressed through digital transformation of onshore processes.

In the area of non-operational processes, the oil & gas industry will find useful comparators across other process intensive industries (automotive, aerospace, mining) – the nuances of oil & gas become less accentuated in areas such as procurement, commercial, finance and project management.

There was generally good alignment between processes which had high levels of investment and the processes which had provided the most value, with a few exceptions, shown in the figures below.

FIG 14. INVEST IN DATA, NOT TECHNOLOGY

Best Value for Investment	**Worst Value for Investment**
Value provided is significantly higher than levels of investment	*Value provided is significantly lower than levels of investment*
▲ Maintenance & Ops Readiness	▼ Applications & Systems Mgmt.
▲ Reservoir Engineering	▼ Employee Performance Mgmt.
▲ Info Governance & Management	▼ 3D Modelling

Maintenance & operational readiness and reservoir engineering are likely to be in the 'best value' list due to a significant history of investment – value being provided today could be from historical investment many years ago.

FIG 15. POSITIVE AND NEGATIVE INVESTMENT TRENDS

Upward Investment Trends	**Downward Investment Trends**
Future investment is significantly higher than historic investment	*Future investment is significantly lower than historic investment*
▲ Maintenance & Ops Readiness	▼ Engineering Design
▲ Applications & Systems Mgmt.	▼ Financial Accounting
▲ Info Governance & Management	▼ Reporting & KPIs

With data & technology being the foundations of digital transformation, it is perhaps not surprising that these are areas where investment is planned to increase – they are also process areas which are relevant regardless of organisation type and size.
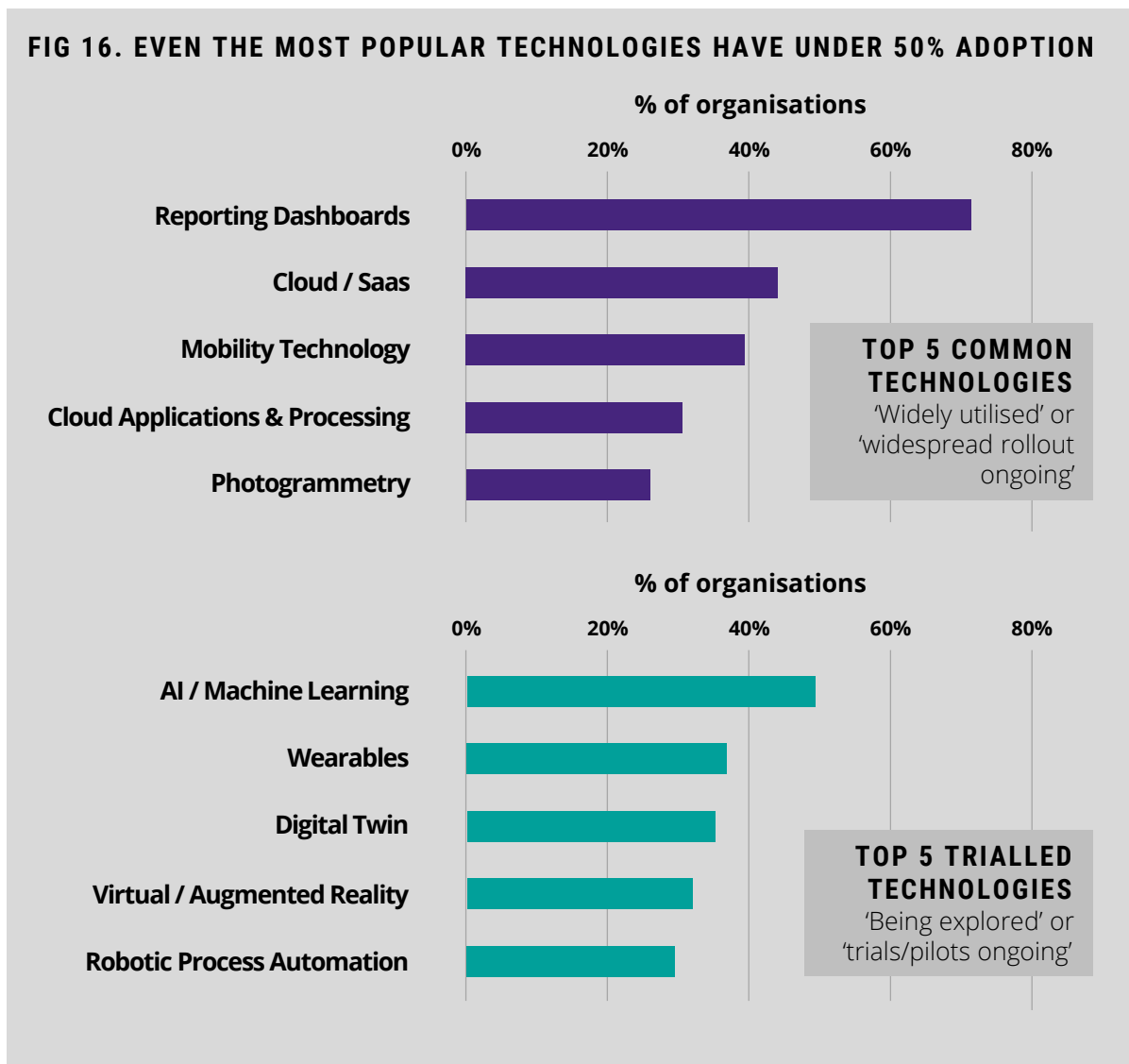
Many organisations have already invested in the process areas in the downwards trends list – the section in this report on technology shows the widespread use of reporting dashboards. Most organisations are likely to have a financial accounting (i.e. ERP) system in place, therefore it is likely to be perceived that there is limited value remaining in these areas compared to others.

SECTION 5

VISUALISATION DOMINATES TECH

- **Technology implementations have mostly focussed on the foundations of visualisation and connectivity. All technologies other than visualisation have under 50% adoption.**
- **Organisations towards the top-end of the spectrum are running five or more pilots, with a similar number undergoing wider rollout or being widely used.**

The survey listed a set of 39 technologies, across data capture, data processing, productivity, connectivity, visualisation and systems – with respondents able to mark which technologies are 'being explored', have 'trials/pilots ongoing', have 'widespread rollout ongoing' or are 'widely utilised' within their organisations.

FIG 16. EVEN THE MOST POPULAR TECHNOLOGIES HAVE UNDER 50% ADOPTION

% of organisations

TOP 5 COMMON TECHNOLOGIES
'Widely utilised' or 'widespread rollout ongoing'

% of organisations

TOP 5 TRIALLED TECHNOLOGIES
'Being explored' or 'trials/pilots ongoing'

Reporting dashboards are the most widely adopted technology, with 'widely utilised' or 'undergoing widespread rollout' reported across 71% of responses. However, for the remaining top four technologies, wide adoption was still under 50%. These top five technologies are all focussed around getting the most out of existing datasets or enhancing business processes that are in place – there is no surprise that this is the place to start for most organisations.

For the technologies with 'trials/pilots ongoing' and 'being explored', the focus is on connecting datasets and providing automation.

FIG 17. OPERATORS AND SERVICE COMPANIES ARE PILOTING THE MOST TECH

Average number of technologies being trialled / piloted by operators and service companies is twice as high as the other organisations combined.
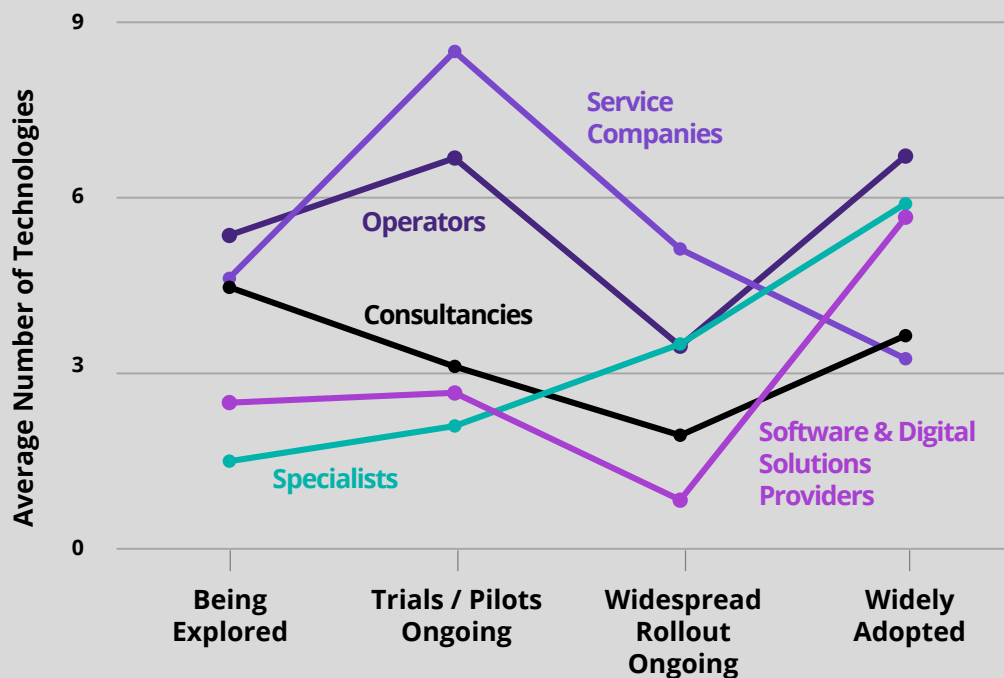
From figure 17, it is evident that operators and service companies are piloting the most technologies – these are also likely to be the larger organisations that have the ability to spend more on investing in technology. The upward trending shape of the curves for specialists and software & digital solution providers would indicate that many can only afford to invest in a technology when value is proven, and they can move straight to widespread rollout.

In follow up interviews, many organisations commented on the need to focus on data rather taking a pure technology approach. Although investment in data may not always capture the headlines, properly governed, accessible and connected datasets provide the foundation for technology to add value.

"We were too focussed from a technology perspective, with teams responsible for specific solutions and forcing them onto the business. We've made a big change to focus on where the value is, not to mandate based on the tool or technology."

The approach through which technology is deployed and adopted is important too, with some organisations talking about the pressures of getting it 'right first time' when a piece of technology is introduced offshore. A more effective approach should involve the end users from the start to ensure the solution is fit for purpose at the point of deployment.

An overall score was assigned to each technology based on the number of organisations utilising it, and the maturity within each organisation. The below graphic shows the relative popularity of each type of technology.

FIG 18. VISUALISATION HELPS UNDERSTAND WHERE TO GO NEXT

Technology groups weighted based on number of organisations adopting, and maturity of adoption in each organisation.

Systems
e.g. Cloud, Open Source Systems

Data Processing
e.g. Analytics, Machine Learning

Data Capture
e.g. Drones, Cloud Point Survey

Visualisation
e.g. Tablets, Reporting Dashboards

Connectivity
e.g. IoT, Offshore 4G

Productivity
e.g. Robotic Process Automation, RFID

12% 12% 16% 17% 25% 18%

The ability to display and understand data is an important foundation for the rest of the transformation process, as data shines a light on areas which require improvement. Visualisation can be used to better understand project progress, identify risks, track benefits and help build understanding of the data that an organisation has available, as well as demonstrating the power of data.

Data processing being the least invested in technology highlights an upcoming challenge for many organisations. Once the work being done on governance, data quality and accessibility, the next stage is to be able to connect and analyse datasets through data platforms and analytics. Organisations who are not beginning to invest in these technologies may be required to make up ground quickly once the data preparation phase is finished.

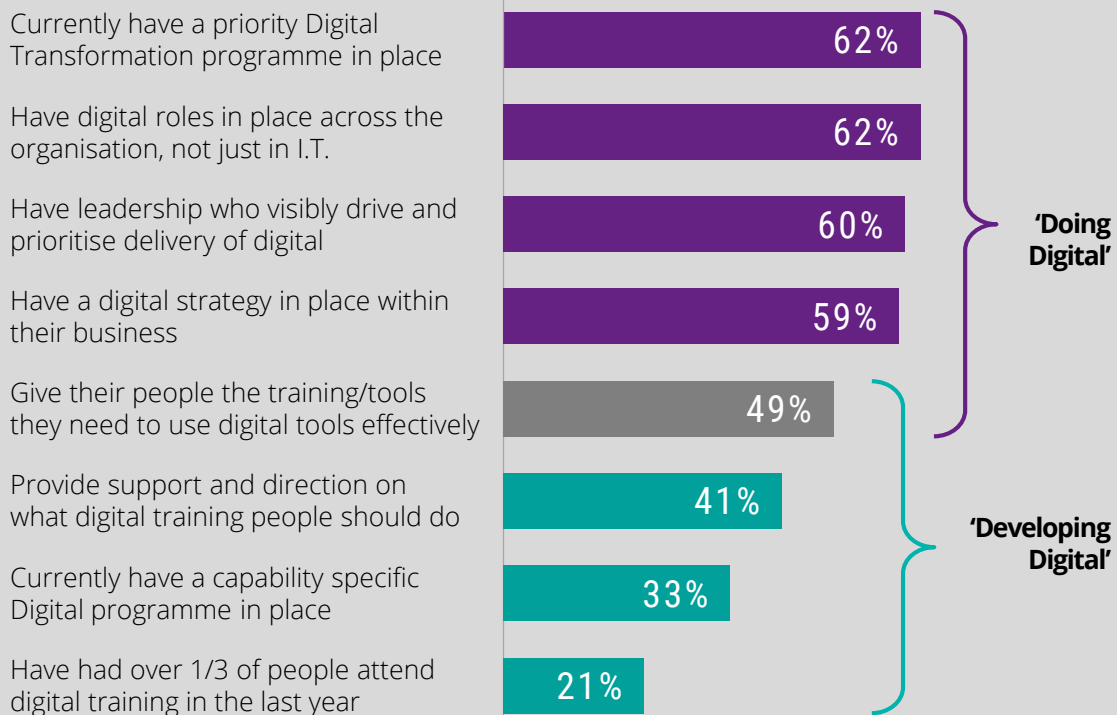# CAPABILITY IS BEING LEFT BEHIND

- **Capability development has focussed on understanding specific tools and systems, rather than building a digital culture and increasing digital fluency.**
- **Only one-third of organisations have a digital capability or skills programme in place, and even fewer have one-third of people attending digital training in the last year.**

The survey asked a series of questions around capability, including those related to training programmes, perception of digital capability, digital roles across the business, and the part that leadership has to play. From the follow up conversations, most organisations could not talk in-depth about specific initiatives implemented to drive digital capability, and it was evident that capability has not had the same focus as innovation, technology or data – even among more digitally mature organisations.

FIG 19. ORGANISATIONS ARE 'DOING' DIGITAL, NOT 'DEVELOPING' DIGITAL

There are a significant number of organisations who are clearly delivering digital initiatives, but are not building their capability beyond the minimum requirements.

% of organisations that:

Currently have a priority Digital Transformation programme in place	62%	
Have digital roles in place across the organisation, not just in I.T.	62%	'Doing Digital'
Have leadership who visibly drive and prioritise delivery of digital	60%	
Have a digital strategy in place within their business	59%	
Give their people the training/tools they need to use digital tools effectively	49%	
Provide support and direction on what digital training people should do	41%	'Developing Digital'
Currently have a capability specific Digital programme in place	33%	
Have had over 1/3 of people attend digital training in the last year	21%	

Across all of the "developing digital" metrics, results for operators were consistently lower than other organisation types.

Several respondents commented on the challenge of developing digital capability, particularly with the wide ranging remit of digital, and the many different ways it can impact people's roles - there is no 'one-size-fits-all' training programme that will be useful.

"In the past we have perhaps overestimated how easily people will pick up new digital initiatives. Even considering widespread tools such as Excel, competence isn't as high as you think. People are quite intimidated by things they don't understand."

Alongside solution specific training, organisations should be driving an attitude adjustment towards what to expect from a digital transformation journey. This will likely be more related to culture, the digital strategy and 'what it will feel like'. Digital introduces a fundamental shift in how an organisational operates across strategy, process, governance, organisation and technology, and will take time for the workforce to change.

Building capability isn't just about learning. One organisation heavily involved in logistics (often perceived as a non-digital process area) talked about changing recruitment and talent processes to make it clear that "digital would become 5% of everyone's jobs". Several organisations have acquired technology companies which further adds to the digital culture, and makes it clear to everyone else that digital is a long term investment, not a quick fix.

Three levels could be considered for digital capability, with most organisations sitting at level 1. It is only at levels 2 and 3 that teams become aware of how digital can represent a fundamentally different way of working.

LEVELS OF DIGITAL CAPABILITY

Level 1 — "I am digitally capable enough to do my job. I understand how to use the digital technologies and solutions within my role."

Level 2 — "I have a good enough understanding and experience to identify how I could use digital to do my job more efficiently and safely."

Level 3 — "I have a deep conceptual and practical understanding of digital which enables me to drive digital change within my team and wider."

Although for many, level 3 might seem like a long way away, a useful parallel is to consider how health and safety capability has become part of the oil & gas culture. Although dedicated HSSE teams do exist, the responsibility to drive health and safety improvement is shared across the organisation. There are many factors contributing to this, and it is useful to consider how digital could be driven in the same direction.

For many organisations, core capability development needs to look past training on tools and systems, and consider how digital literacy within the organisation can support a shift towards a more digital culture.

INNOVATION PROCESSES ARE IMMATURE

- **Innovation is a strong indicator of digital maturity, however, less than 40% of organisations have an end-to-end process and a mechanism to feed ideas into it.**
- **There are a wide range of approaches to innovation, but most 'bottom-up' innovation processes are relatively immature. Bottom up innovation processes are most likely to succeed.**

There are various ways by which organisations can explore digital initiatives, with 88% of organisations indicating that they were performing some kind of internal innovation.

FIG 20. INTERNAL INNOVATION IS BEING DONE BY MOST

13% **Buy off-the-shelf**

11% **Build in-house** + **23%** **Collaborate with partners** + **54%** **Mixture** = **88%** Some internal innovation

The survey seeked to explore more about the internal innovation processes – the more formal mechanisms through which digital ideas are identified, developed and scaled.

FOUR FEATURES OF AN INTERNAL INNOVATION PROCESS

An innovation process is a mechanism through which digital ideas are turned into value adding solutions.

Identify — The ability to identify and collect digital ideas, whether from within the organisation or from outside

Fund — An approach to funding ideas – through a central innovation fund, or as part of project budgets

Govern — The roles, responsibilities and team structures that will support development of digital ideas
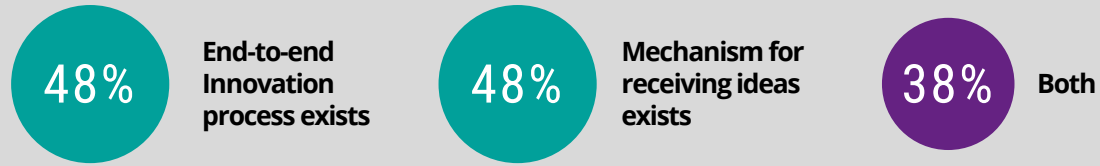
Develop — A process for developing ideas, running pilots and scaling solutions. This could be through stage gates, or a more agile method
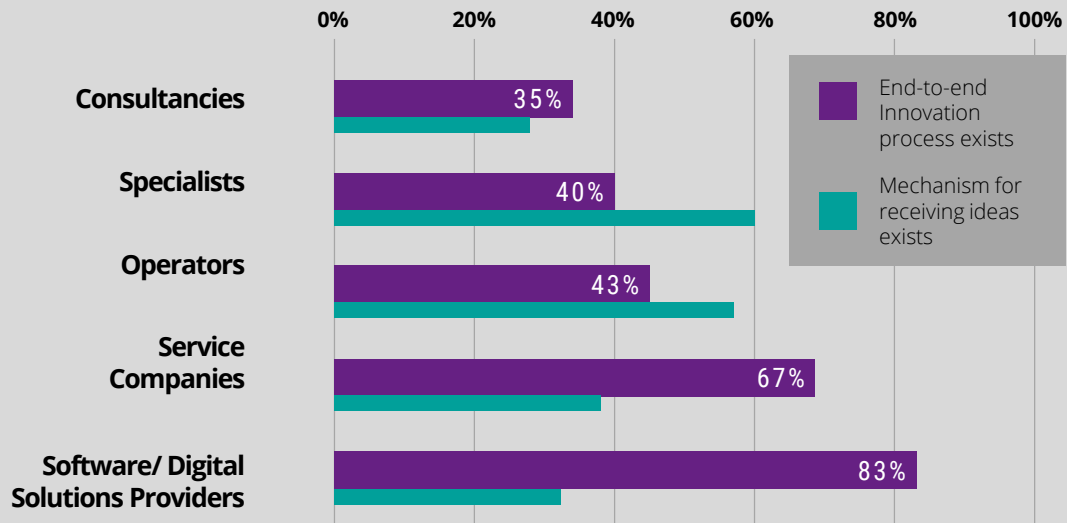
FIG 21. ONLY HALF OF ORGANISATIONS HAVE AN INNOVATION PROCESS

48% End-to-end Innovation process exists

48% Mechanism for receiving ideas exists

38% Both

The overall figures show that slightly less than half of organisations have an end-to-end innovation process in place, and a very similar proportion have a mechanism for incorporating digital ideas in the innovation process. There was a significant difference in innovation processes across different organisation types.

FIG 22. INNOVATION PROCESSES VARY BETWEEN ORGANISATION TYPES

Organisations responding "yes" to whether they have a end-to-end innovation process in place, and have a mechanism for receiving ideas into an innovation funnel

Organisation Type	End-to-end Innovation process exists
Consultancies	35%
Specialists	40%
Operators	43%
Service Companies	67%
Software/ Digital Solutions Providers	83%

From follow-up interviews, it was clear that organisations have seen most success when involving the end-users from the start of the digital solution development process. This links closely to the need for a bottom-up innovation process, where ideas come from listening to the needs within the business, and idea generators become part of development teams.

This method ensures that solutions address a genuine need, and helps to break down organisational barriers to ensure development teams come from a cross-section of business functions. Conversely, top-down innovation can often lead to the same teams (often from IT) being given responsibility to develop solutions and 'push' into the business again and again.

The results of the survey indicated that innovation is also a significant indicator in assessing the digital maturity of an organisation, based on the existence of an innovation process compared to the likelihood of an organisation being further along on the digital journey.

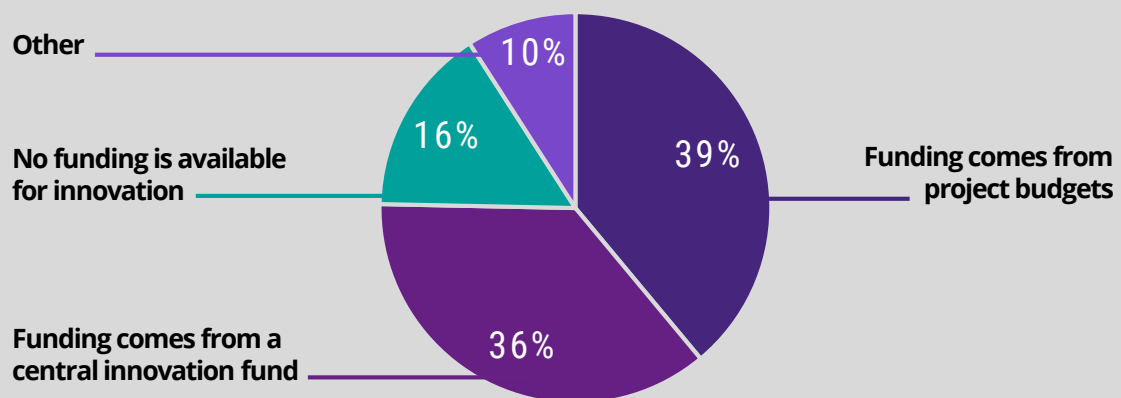## FIG 23. INNOVATION PROCESS IS A STRONG INDICATOR OF MATURITY

Digital Maturity vs. existence of an end-to-end innovation process

Organisations where an Innovation process exists
- We are yet to start / recently started
- 77%
- We have implemented many digital initiatives / we are a truly digital organisation

Organisation where an Innovation process doesn't exist
- We are yet to start / recently started
- 42%
- We have implemented many digital initiatives / we are a truly digital organisation
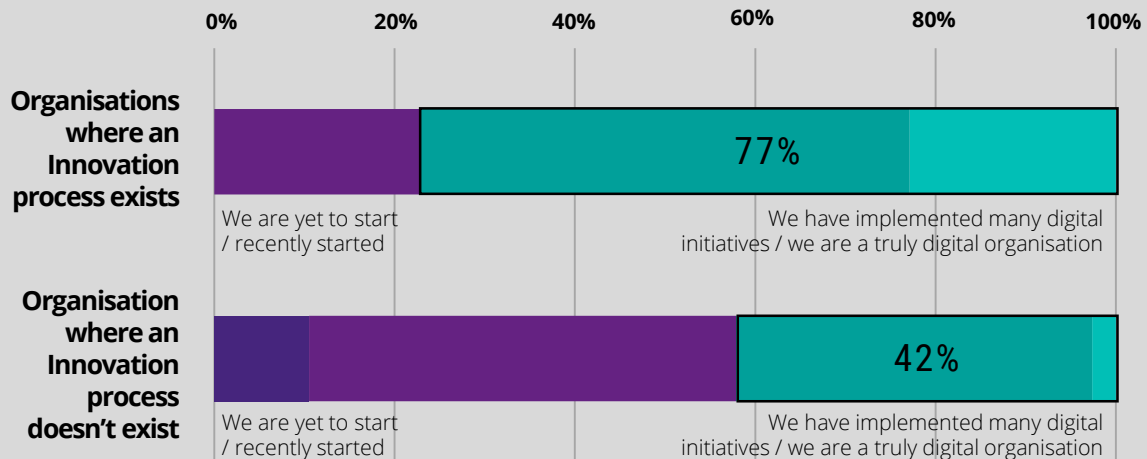
Organisations with an end-to-end innovation process were a third more likely to describe themselves as digitally mature than organisations who do not have one, or are unsure. The above is even more significant considering that the number of organisations without an innovation process in place is significant.

As well as the varying existence of innovation processes above, there was no favoured option for how funding for innovation is managed.

FIG 24. FUNDING ALLOCATIONS FOR INNOVATION VARY

- Other — 10%
- No funding is available for innovation — 16%
- Funding comes from project budgets — 39%
- Funding comes from a central innovation fund — 36%

There was no data to suggest that organisations using a certain type of funding model were seeing more success, however, as organisations move towards scaling a larger number of initiatives, a central innovation fund is likely to be a more suitable model. A central innovation fund supports an organisation-wide view of innovation, helping break down cross-functional barriers, and lowering risk that a single digitally inclined project leader will dominate.

Survey responses around the number of initiatives organisations had trialled in the last year showed that focussing on a small number of initiatives is the approach adopted by most.

FIG 25. 'FOCUS ON A FEW' IS THE APPROACH FOR MOST ORGANISATIONS

How many initiatives did your organisation pilot/trial in the last year?
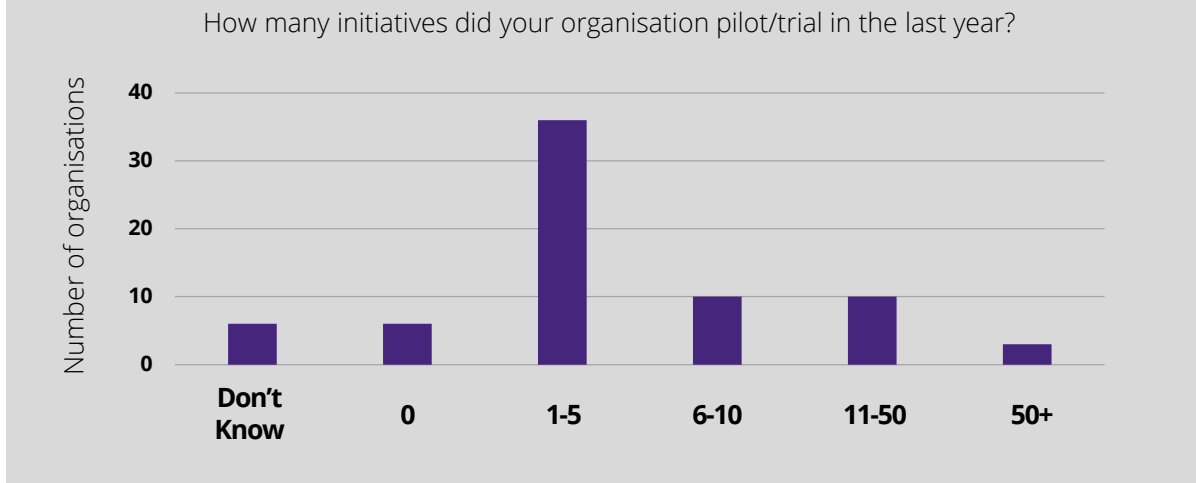
With over 50% of organisations trialling/piloting between one and five digital initiatives in the last year, it is likely that organisations have not felt the need to focus too much on the innovation process behind it, as the pipeline is not yet large enough.

The barriers presented in figure 29 provide a further view of why innovation is a challenge – legacy organisational structures/processes and a lack of investment serve to stifle innovation.

"Digital Centre of Excellence partnering with the operating units "

"Form based register where perceived benefits are logged"

"Ideas hopper that routes initiatives to technical function. SMEs then assess the idea and take it forward with management."

"Leadership will form a technology group who collaborate through MS teams"

"Standalone business unit with start up funds, venture capital and some idea collation platforms"

"Multidisciplinary technology steering groups"

"Intranet page"

"Innovations workshops held across the business"

"Continuous improvement suggestion box"

"Ideas are discussed in weekly meetings"

"Multiple groups in charge of ideas generation and "

"Dedicated innovation team, cross group innovation champions, an innovation forum and innovation contests.

- APPROACHES TO INNOVATION

DESIRE FOR COLLABORATION EXISTS

- **Attitudes towards collaboration are overwhelmingly positive (>75% are in favour), and digital has an significant part to play in driving and facilitating it.**
- **The reality does not match the attitude - actual examples are uncommon as the business case for collaboration has not yet been established.**

The survey asked several questions around collaboration and data sharing within the industry, with the goal of understanding whether collaboration was a priority for organisations, and gaining further insight into the collaborative initiatives that are underway.

FIG 26. ATTITUDES TOWARDS COLLABORATION ARE GOOD
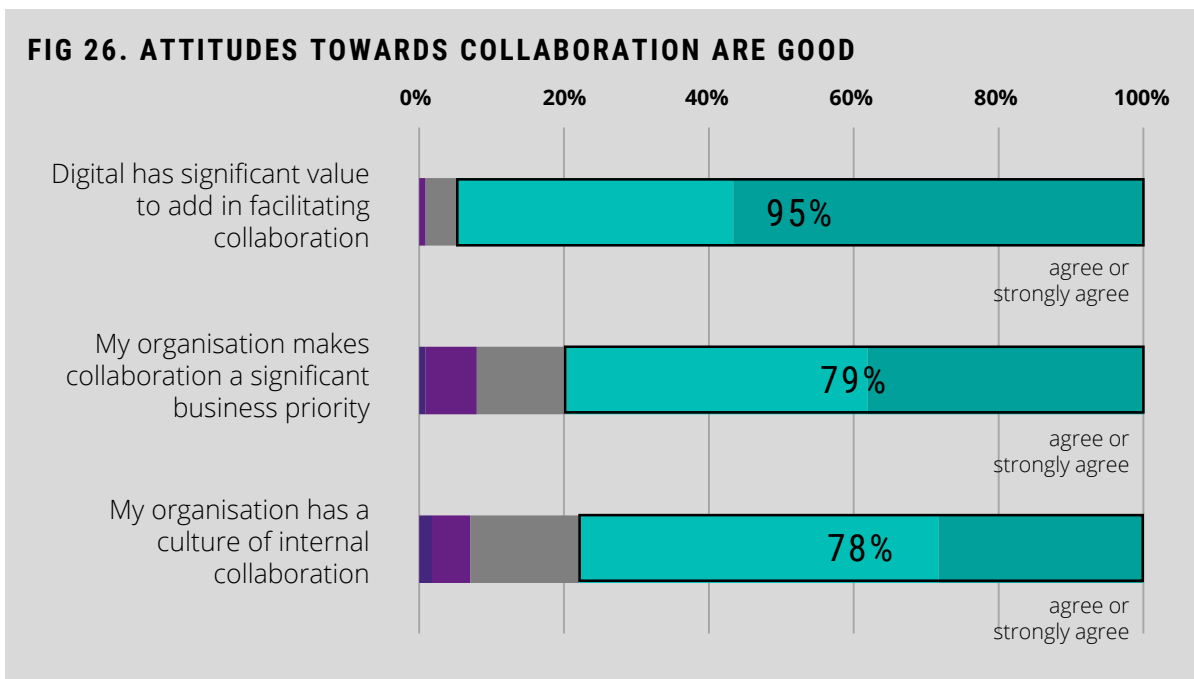
The overwhelming majority believe in the value of digital in collaboration, and believe they are making it an internal priority, however, from survey follow up interviews, organisations were not able to give specific examples of cross-organisational collaborative initiatives that were taking place.

In reality, collaboration is a means to an end – a method rather than an outcome, and therefore organisations will need to develop a clearer business model for collaboration. Field development partnerships is an area where collaboration has been taking place for a long time, but only because a clear business model is in place.

"Companies need to decide where within the organisation collaboration will have the greatest impact and ensure they have a clear strategy & operating model as well as the right business systems and processes to execute it"

UKCS SUPPLY CHAIN COLLABORATION SURVEY 2019

The UKCS Supply Chain Collaboration Survey 2019 identifies three pillars for collaboration, which organisations need to consider to ensure that positive attitudes result in successful action.

THREE PILLARS FOR COLLABORATION

Collaborative Mindset & Business Culture

- The collaborative business culture is underpinned by strong leadership that sets the course, and encourages collaboration at all levels of an organisation, and externally.
- It challenges existing structures and processes to remove hurdles to closer working relationships with customers and suppliers.
- Strong leadership also decentralises decision making to empower people to make decisions at the appropriate level, creating the environment for employee-led initiatives and freedom of action.

Strategy & Business Models

- Conversations with organisations indicate that leadership is genuinely supporting of collaboration, but in reality there are not enough instances where high level business strategies are translated into business models and filtered down the organisation to enable and encourage collaboration at more junior levels.

Business Systems & Processes

- The two most significant barriers to collaboration are organisational structures and the contracting/procurement process.
- Existing organisational structures often exhibit high levels of bureaucracy, and even where willingness to collaborate exists, organisations cannot transform how they work with others.
- Tendering and contracting processes, terms & conditions, and the inability to change contracting approaches create major barriers to closer working relationships.

The positive attitudes towards collaboration shown in figure 27 indicate that the first pillar is likely to be somewhat in place, however, there is more that organisations can do to decentralise decision making and encourage collaboration further down the organisation. Organisations should focus on developing the second pillar, developing business models for collaboration and considering how mutual benefits can be gained from all parties.

An organisation's innovation process represents an excellent environment for genuine collaboration, and a good indicator for whether an organisation has a collaborative culture. Although 78% of organisations indicate they have a culture of internal collaboration, less than 50% actually have an innovation process in place.

Another indicator of collaboration is an organisation's approaches to data sharing. The survey asked several questions around willingness to open up datasets, and which datasets were likely to be suitable for open sharing.

FIG 27. BUSINESS MODELS FOR OPENING DATASETS NEED TO BE CLEARER

Are you willing to open datasets to other organisations?

34% Yes   **23%** No   **43%** Don't Know
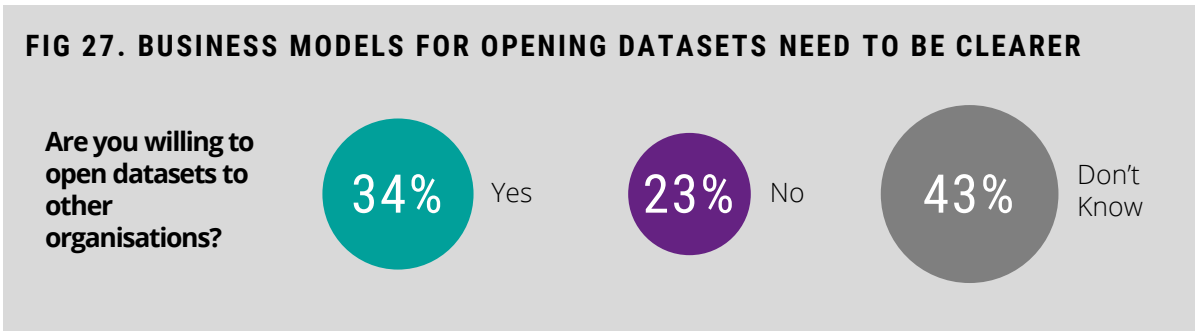
The question of data sharing received the most "don't know" responses of any in the survey, and was largely unaffected by the prescence of a digital strategy within the organisation, nor by seniority of respondent. This demonstrates that it is a factor that few have considered, regardless of their digital maturity.

One organisation with significant experience in opening up datasets said that the challenges for organisations were more likely to be in the practicalities of sharing data, rather than demonstrating the business case or competition concerns.

"It's easier to see what might go wrong than what might go right. Our most significant challenges weren't around gaining a business case, but the practicalities of sharing data - licencing models and the accompanying legal implications"

This opinion is supported by the contents of figure 29 (indicating that competition concerns are the least significant barrier to digital) and figure 10 (which outlines that external data sharing is not done well). One of the project team members commented on a quote they had heard at a conference – "we shouldn't be competing on access to data, but competing on what we do with it".
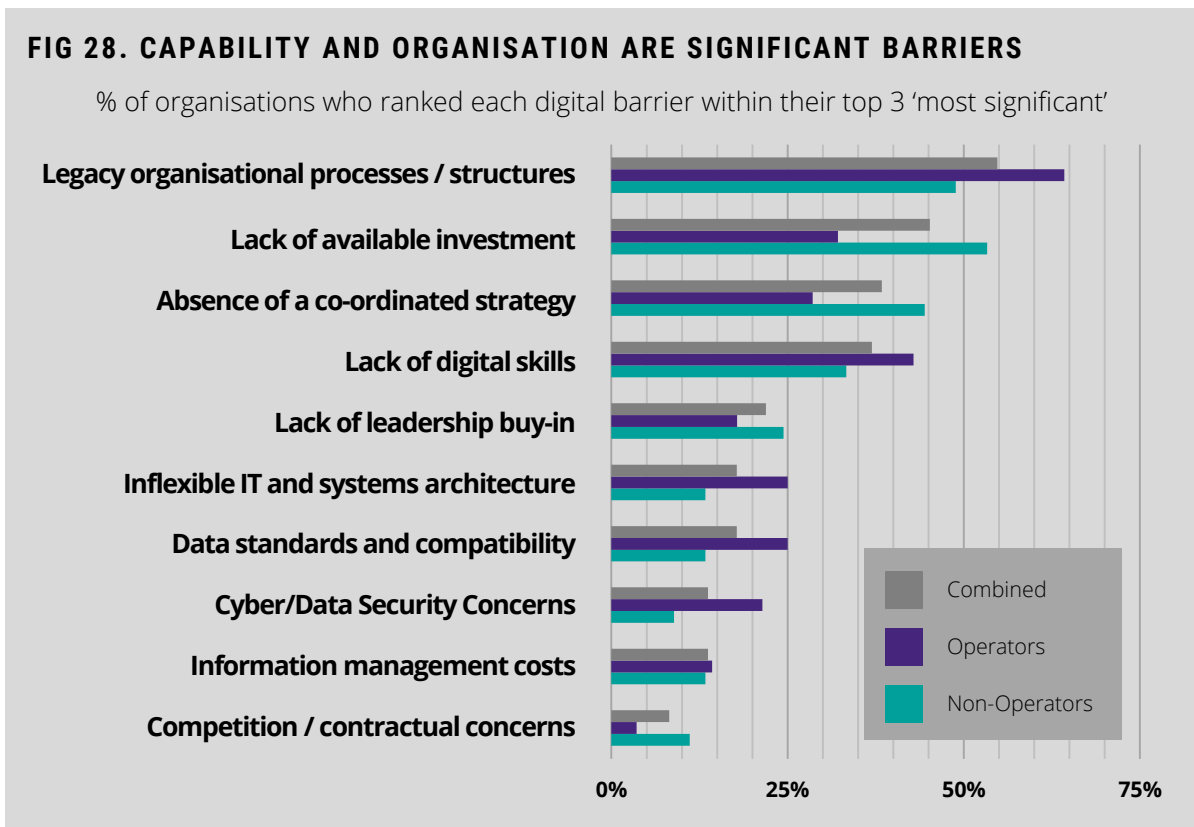
There are several collaboration initiatives in the industry which have received widespread traction, for example, OSDU and CFIHOS. These are characterised by their data centricity. For example, OSDU focuses on standard (non-proprietary) data formats on open platforms (Microsoft Azure and Amazon Web Services). However, initiatives like OSDU are only possible once data foundations are in place, with organisations moving from manual data transfer to data platforms and APIs that facilitate data exchange.

The results from this survey relating to data provide encouragement that the industry is moving in the right direction to support collaboration. One of the consistent findings from the UKCS upstream supply chain collaboration survey is that collaboration requires trust, which in turn requires leadership. Industry leaders have a responsibility to identify mutual benefits between operators and supply chain and build trust, through which the benefits of collaboration can be demonstrated.

BARRIERS ARE ORGANISATIONAL

- **For all organisations, the top four barriers are organisational not technical – related to processes, structures, investment, strategy and capability.**
- **Non operators are more significantly impacted by a lack of investment and lack of leadership buy in than operators.**

The final section asked respondents to rank their top five digital barriers from a list of ten, across areas relating to investment, capability, organisational structures, systems, and data/cyber security concerns.

FIG 28. CAPABILITY AND ORGANISATION ARE SIGNIFICANT BARRIERS

% of organisations who ranked each digital barrier within their top 3 'most significant'

The barriers above are ordered from highest to lowest based on the overall % of organisations who listed that barrier in their top three most significant. From the previous sections in the report that have discussed the challenges of adopting digital as a fundamentally different way of working, and the importance of innovation and culture, there is no surprise to see 'legacy organisational processes / structures' at the top of the list. It is also interesting to note that there is a significant drop between the top four barriers and the others in the list.

Lack of available investment, absence of a co-ordinated strategy and lack of leadership buy-in go hand in hand. This reinforces the importance of leadership and strategy in defining organisational culture, which are needed to create the conditions for digitalisation and to empower bottom up innovation.

Looking into the differences between results for operators and non-operators provides some additional insights.

FIG 29. NON-OPERATORS HAVE INVESTMENT AND LEADERSHIP CHALLENGES

Ranking of barriers based on % of organisations who ranked each digital barrier within their top 3 'most significant' (same as fig 20)

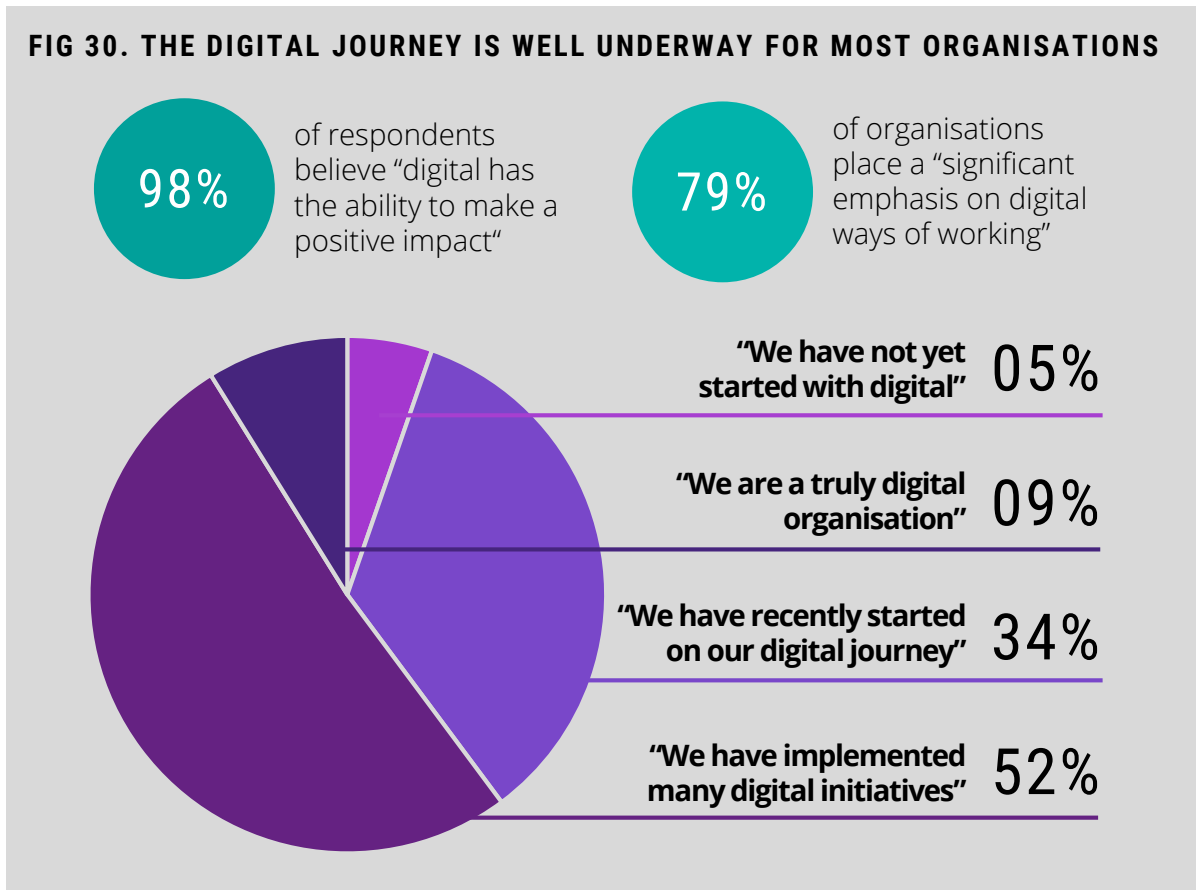| Barrier & Rank	Operators	Non-Operators	Difference
Legacy organisational processes / structures	1	2	+1 ▲
Lack of available investment	3	1	-2 ▼
Absence of a co-ordinated strategy	4	3	-1 ▼
Lack of digital skills	2	4	+2 ▲
Lack of leadership buy-in	8	5	-3 ▼
Inflexible IT and systems architecture	=5	=6	+1 ▲
Data standards and compatibility	=5	=6	+1 ▲
Cyber/Data Security Concerns	7	=6	-1 ▼
Information management costs	9	9	+0 ▶
Competition / contractual concerns	10	10	+0 ▶

Lack of investment is much bigger barrier for non-operators, who are likely to be even more challenged by margin and a need to be competitive. With operators' influence on digital transformation, there may be an opportunity for them to create market demand for more digital ways of working (e.g. specifying digitalised processes in tendering and contracting). Contracts that incentivise the supply chain to operate more efficiently (e.g. pain/gain share contracts) may support the supply chain in developing the business case and leadership buy-in for digitalisation.

Lack of leadership buy-in and investment again go hand in hand. Without leaders brought into digital, it is unlikely to be a focus for investment. Again, operators may have a part to play in driving digital expectations into the supply chain.

CONCLUSIONS

- **Although the value of digital is widely recognised, and the digital journey is well underway for most, 73% of practitioners are yet to see a positive impact.**
- **To make progress with a largely sceptical workforce, organisations must ensure they focus on organisational elements (innovation & culture) aspects of digital, as well as technical aspects (data & technology).**

FIG 30. THE DIGITAL JOURNEY IS WELL UNDERWAY FOR MOST ORGANISATIONS

98% of respondents believe "digital has the ability to make a positive impact"

79% of organisations place a "significant emphasis on digital ways of working"

"We have not yet started with digital" 05%

"We are a truly digital organisation" 09%

"We have recently started on our digital journey" 34%

**"We have implemented many digital initiatives"** 52%

There is no doubt that the industry understands the conceptual value of digital, supported by the perceptions in the figure above, and the significant proportion of organisations who have implemented many digital initiatives. However, 'implementing many digital initiatives' does not necessarily equate to maturity in digital transformation – without the accompanying culture transformation, these organisations will become 'digitised' rather than 'digitalised'.

The above figure could be interpreted as evidence that the industry is more digitally mature than this report suggests, however it is important to consider the impact that digital has made, rather than just a self-assessment of progress. Similarly to figure 3 (which demonstrates that digital investment has not led to significant productivity increase), survey data also demonstrated that for many, digital is yet to make a significant impact.

FIG 31. PRACTITIONERS ARE YET TO FEEL THE POSITIVE IMPACT OF DIGITAL

"Digital initiatives have often resulted in increased work, and delivered little benefit"

Responses that answered 'Strongly Agree', 'Agree' or 'Neither Agree nor Disagree'
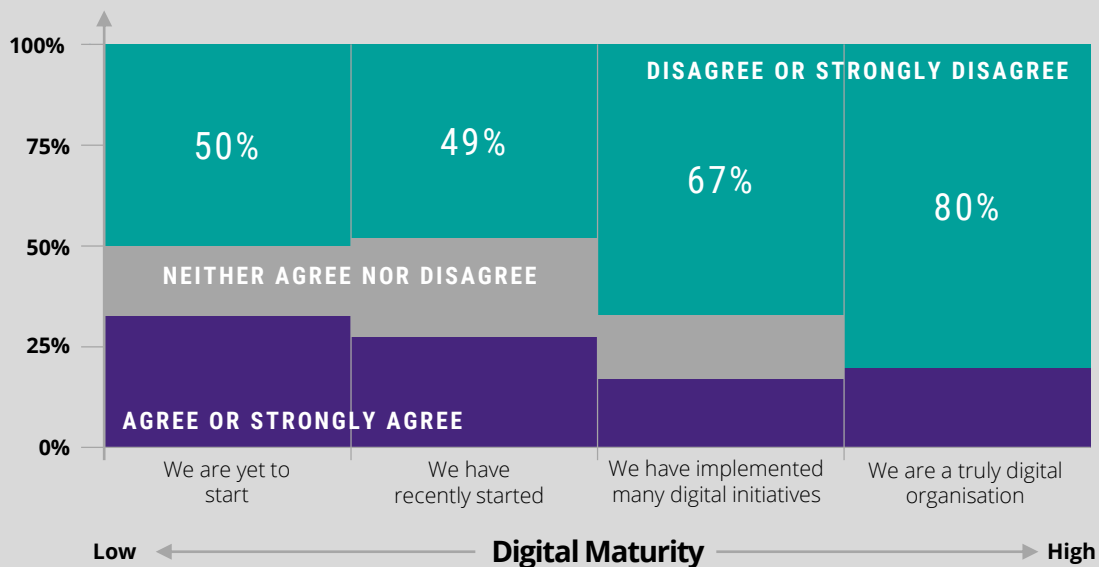
Leadership	Manager	Practitioner
41%	31%	73%
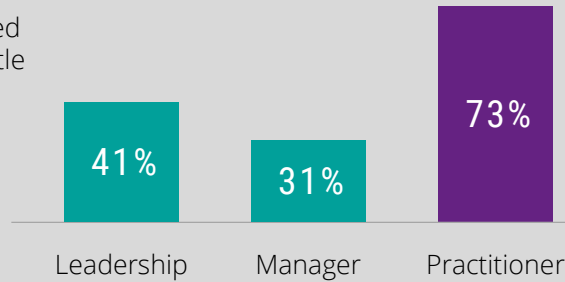
When contrasting the figures above (particularly at practitioner level) with the 98% of organisations that believe digital has the ability to make a positive impact, it's clear that there is still a gulf between the perception and reality of digital. It is worth remembering that the majority of survey respondents were in digital leadership roles, and a wider view at practitioner level would be useful to understand the real impact digital is making.

However, organisations can be reassured that impact will come with time and continued investment – figure 32 below demonstrates that organisations who consider themselves more mature, also consider digital to have made a more significant impact.

FIG 32. POSITIVE IMPACT COMES WITH TIME & MATURITY

"Digital initiatives have often resulted in increased work, and delivered little benefit"

DISAGREE OR STRONGLY DISAGREE

We are yet to start	We have recently started	We have implemented many digital initiatives	We are a truly digital organisation
50%	49%	67%	80%

NEITHER AGREE NOR DISAGREE

AGREE OR STRONGLY AGREE

Low ← **Digital Maturity** → High

Although the survey was not developed to benchmark organisations on their digital maturity, nor to formulate a definitive list of digital success factors, from the survey results and interviews, several themes have emerged – outlined in the recommendations below.

RECOMMENDATIONS

Data

Most organisations' data focus has been internal – improving data quality and data management practices to deliver value through dashboards and analytics. This internal focus should continue, laying firm foundations for building the automated data processes required for more advanced analysis and decision making. At the same time, organisations should apply the same principles to how they receive data from, or provide data to external suppliers, partners, and customers. Contracts should ensure data is exchanged in a manner that promotes automatic transfer to and from the other organisation's systems, greatly reducing time and effort, eliminating errors, and taking cost out of supply chain processes.

People & Culture

Digitalisation is as much about people as it is about technology, but progress in capability building across the sector appears patchy. Without the right levels of digital awareness in an organisation – from the front-line all the way to the board room – opportunities will be missed. A culture that defaults to digital is needed to ensure previous behaviours are challenged, and more efficient ways of working embraced. Such a transformation took place in the sector's approach to health and safety. A similar transformation and approach is needed to embed digital at the heart of a modern, efficient energy business.

Innovation

Existence of an innovation process is a primary signal that an organisation is open to change. Surprisingly many organisations do not have one, even though an innovation process can be as simple as a central email inbox for ideas, backed by regular review and prioritisation. While leadership of innovation as a priority has to come from the top, it is the front-line of the organisation where many innovative ideas originate, where digital change takes place, and where the value created through innovation is realised.

Technology

Organisations have focussed their digitalisation activities on their offshore operations, seeking efficiencies that drive down lifting cost per barrel, and increase overall operational efficiency. Indeed, simply having a digital strategy that provides this focus is a strong signal of digital progress. However, digitalisation can bring benefits to an organisation's onshore and head office operations also, speeding up back office tasks, and improving corporate agility and decision making. Where an organisation doesn't have a digital strategy, it should consider developing one. Where it does, it should consider whether its strategy gives enough weight to lower profile onshore functions such as logistics, finance, and procurement – areas that other industry sectors have worked hard to optimise, and offer some highly transferable opportunities for oil and gas.

RECOMMENDATIONS

Collaboration

The vast majority of organisations report a positive attitude towards collaboration, but examples in practice remain very rare. Digital collaboration across the supply chain, with customers, partners, and suppliers, requires clear and timely benefits for all, and trust between the parties and between their digital systems. Through regulation, or through individual company leadership, other sectors have established successful digital collaborations that deliver real value. Our sector is still challenged to create the conditions in which profitable digital collaboration is the norm, rather than the exception. Organisations such as OGUK, ONE, TLB, and the OGTC have a leading role to play in helping organisations create the strong business relationships built on trust and close engagement that, over time, will enable the value of a truly digitalised oil and gas sector to be realised.

OGUK