



Offshore Energy Data & Digital Maturity Survey

SURVEY REPORT 2023

Understanding progress, attitudes and challenges in delivering data and digital strategy for the UK energy sector



FOREWORD

The waters surrounding the UK are the jewel in the crown of the UK's energy system. They provide offshore wind, world-class carbon storage potential, oil and gas reserves, and away from energy also offer a range of other resources including fishing and leisure uses.

The transformation of the UK energy system to Net Zero is the aim of the North Sea Transition Deal agreed between the industry and government to produce cleaner energy. Coordination across the energy system is needed to unlock the value of data and digital technologies and accelerate the energy transition – which will lead to reducing greenhouse gas emissions and ensuring security of supply.

The Offshore Energy Digital Strategy Group provides this coordination. Established as a recommendation of the [Digitalising Offshore Energy Systems report](#) issued last year, the group is led by the North Sea Transition Authority working with OFGEM, DESNZ, The Crown Estate and Crown Estate Scotland, along with Offshore Energies UK (OEUK), Opportunity North East (ONE), Net Zero Technology Centre (NZTC), and other leading bodies from industry and academia.

A further recommendation of the report was that the Offshore Energy Digital Strategy Group identify digitalisation requirements for stakeholders across the offshore energy sector to drive a cross-sector digitalisation strategy through an appropriate cross-sector digital maturity survey.

The results of this survey build on the first ever [UKCS Data and Digital Maturity Survey](#) launched in 2020, which set a baseline for assessing the pace and extent of digitalisation across the oil and gas sector. Recognising the need for a digitalised and fully integrated offshore energy system, this latest iteration of the survey was expanded to also include organisations and companies active in renewable energies.

This new report analyses the level of maturity of data and digitalisation across a wide range of organisations, offering insight into barriers that need to be addressed while highlighting areas where collaboration and adoption of digital technology can, and are already driving the creation of value.

The 2023 Offshore Energy Data & Digital Survey was undertaken by Deloitte in partnership with OEUK, North Sea Transition Authority, The Crown Estate, Crown Estate Scotland, NZTC, ONE and the Technology Leadership Board.

We are grateful to those organisations for their support of this work and hope the insights shared here can help all those working in the offshore energy sector to develop strategies to promote innovation and build valuable digital capabilities within their own organisations.

Thanks to all those who took the time to complete the survey and share their views.

Nic Granger

Chair Offshore Energy Data Strategy Taskforce and Offshore Energy Digital Strategy Group

Director of Corporate, North Sea Transition Authority

EXECUTIVE SUMMARY

The 2023 Offshore Energy Data & Digital Maturity Survey aims to understand the state of the sector's approach to digital, the progress made since 2020 and the ambitions for the future. It uses submissions from UK organisations across the oil and gas and renewable energy sector, including the supply chain.

The first iteration of this survey took place in 2020 and was focused on just the oil and gas sector. Key findings indicated that digital transformation was generally in its early stages and less mature among operators vs the supply chain. It was also noted that organisations were struggling to reap benefits from collaboration; only beginning to understand the link between innovation, culture and capability; and overly focused on technology.

This iteration of the survey has expanded its scope to cover the wider offshore energy sector, but covers the same core topics. These five topics are data, technology, innovation, capability/skills and collaboration. Where relevant, the same questions as the 2020 survey have been used to allow trends between years to be identified. This also helps to understand any impact from the inclusion of renewables organisations in the survey.

Digital maturity has improved by 8% across key metrics

Whilst digital maturity has improved since the first survey (with an overall improvement of 8% across key metrics), the degree of progress is variable across the sector. Smaller organisations show notably less improvement than larger ones. Larger organisations are delivering their transformation programmes through dedicated teams (including senior 'chief data/digital' positions) with centralised funds and the ability to leverage enterprise partnerships. This digital maturity trend applies equally to renewable organisations as it does to those working in oil and gas.

Data maturity lags behind improvements in technology adoption

Data maturity typically trends behind digital maturity. It is less common for an organisation to have a standalone data strategy, and often, a data strategy is a 'reactive' response to issues discovered during implementation of digital solutions, rather than a separate initiative. However, it is clear that organisations are exploring a much wider range of digital technologies than in 2020. Significant growth has been seen particularly in the use of data platforms and data visualisation capabilities.

Access to data & digital skills is a significant barrier to be addressed

One of the key barriers to data maturity was found to be access to data and digital skills. This has emerged as a key risk to the delivery of data and digital strategies, with challenges related to both the upskilling of the existing workforce and recruiting new personnel into key roles.

Collaboration has made some progress, but organisations continue to be wary of data sharing.

Organisations are increasingly adopting data related technologies (for example, cloud platforms, data mesh, data visualisation tools) that enable greater levels of collaboration. However, collaboration based on data remains a challenge, particularly where sharing of data may be seen to be a risk to an organisation's competitive advantage.

2023 DATA & DIGITAL MATURITY SURVEY KEY RECOMMENDATIONS

The results of the survey propose 8 key recommendations

Data and digital strategies should **focus on 'Business value' first, 'Data' second, 'Digital' third** to ensure adoption delivers direct value.

From Section 1 - Strategy

Organisations to **adopt a more agile, 'continuous strategy' approach**, breaking strategy into shorter periods adapting in line with trends and barriers.

From Section 1 - Strategy

Industry and government bodies should **focus support on the data and digital needs of small to medium-sized enterprises (SMEs)** where progress faces more barriers.

From Section 1 - Strategy

As an industry, **develop 'typical' digital and data strategy playbooks** to align the sector and support development of technologies, skills and collaboration opportunities.

From Section 1 - Strategy

Leadership to undertake training and ensure focus given to understanding and supporting data and digital strategy as their influence is essential to realising the benefits of more data driven, digital ways of working.

From Section 2 - Technology

A sector-wide initiative is required to address data and digital skills capacity, to develop, attract, and retain the digitally skilled workforce required to deliver the energy transition

From Section 3 - Skills

Develop contracts that support digital change so buyer and supplier can both benefit from technology and skills improvements, rather than lock in digital stasis for multiple years.

From Section 4 - Innovation

Grow a culture at all levels and functions of an organisation and allow strategies to be influenced by third party partners and external trends.

From Section 4 - Innovation

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SURVEY ORGANISATIONS

The survey has been developed by leading offshore energy sector organisations, with the aim of understanding attitudes, strategies and progress in digital, data, innovation, technology, capability and culture.

The survey uses the [2020 UKCS Data & Digital Maturity Survey](#) as a basis, allowing an insight into how the industry has changed in the last three years in key digital, innovation and leadership areas. This 2023 survey was expanded to discuss 'data' as a separate yet related strategic approach, building on findings from other industry reports including the June 2022 [Digitising Offshore Energy Systems - Offshore Energy Data Strategy Taskforce Report](#), (led by the Energy Systems Catapult team in partnership with the NSTA, NZTC, OEUK and the Technology Leadership Board, joined with a taskforce from The Crown Estate, Crown Estate Scotland, RenewableUK and The Open Data Institute).

Reflecting the energy transition in the region, the survey has also been expanded to include responses from the renewable energy industry with questions and categories expanded to capture renewable focused responses. The organisations collaborating to develop the survey and report are:



Offshore Energies UK (OEUK)

OEUK is the leading representative body for the UK offshore energy industries, with an aim to ensure that the UK continental shelf remains an attractive place for energy producers and their supply chains to do business. OEUK acts as the representative body that champions the whole sector, the definitive source of information about the UK upstream and the gateway to industry networks and expertise. <https://oeuk.org.uk/>



Technology Leadership Board (TLB)

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



**North Sea
Transition
Authority**

North Sea Transition Authority (NSTA)

The NSTA is fully committed to enabling the achievement of the UK government's commitment to reach net zero emissions by 2050, while supporting energy resilience and the drive to develop homegrown hydrogen and carbon storage. The NSTA is working with government and industry on the vital role that the oil & gas industry must play in the UK energy transition – in driving to net zero carbon across the UKCS as quickly as possible – and on realising the enormous potential of the UK Continental Shelf (UKCS) as a critical energy and carbon abatement resource.

<https://www.nstauthority.co.uk/>



Opportunity North East

Opportunity North East is the private sector economic development catalyst driving transformational change to diversify north east Scotland's economy. Developing and delivering projects to accelerate business growth and increase productivity and working in partnership regionally and nationally to maximise opportunities.

<https://www.opportunitynortheast.com/>



Net Zero Technology Centre (NZTC)

Net Zero Technology Centre develops and deploys technologies that reduce emissions, unlock the full potential of an integrated energy system and propel the energy industry towards a digital, automated, decarbonised future. <https://www.netzerotc.com/>



The Crown Estate

The Crown Estate is a unique business with a diverse portfolio that stretches across the country. We actively manage our assets in line with our purpose: to create lasting and shared prosperity for the nation. We manage the seabed, and half the foreshore, around England, Wales and Northern Ireland, and therefore play a key role in enabling the UK's offshore wind industry, as well as helping to facilitate the development of sectors such as cables, pipelines, CCUS and marine aggregates. Established by an Act of Parliament, The Crown Estate is tasked with generating profit for the Treasury for public spending. This has totalled £3bn over the last ten years.

www.thecrownestate.co.uk



Crown Estate Scotland

Managing land and property spanning seabed, coastline, rural estates and more, the Crown Estate Scotland works to make sure that all the assets in its care deliver lasting benefits to Scotland and its people. That work touches key sectors including renewable energy, aquaculture and farming, and ports & harbours, making it important to communities and businesses across the country.

<https://www.crownstatescotland.com/>



Deloitte

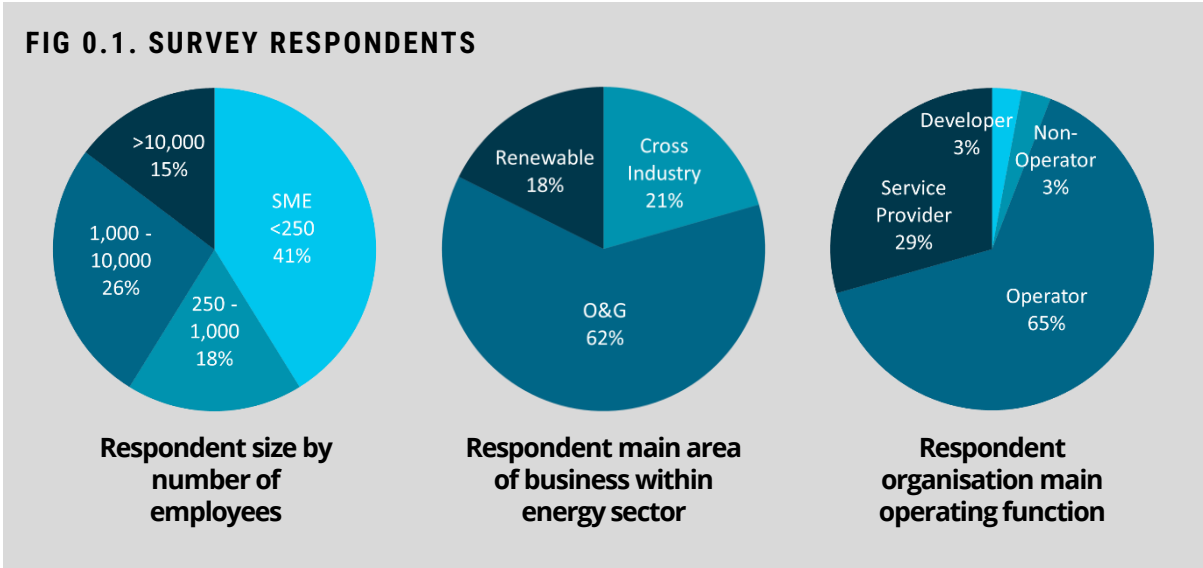
Deloitte's UK Energy, Resources & Industrials specialists provide comprehensive, integrated solutions to all segments of the Energy & Chemicals, Power & Utilities, Mining & Metals and Industrial Products & Construction sectors, offering clients deep industry knowledge and a global network. Deloitte Major Programmes focus on solving a range of major problems facing the world today: economic, environmental and societal. We bring together multidisciplinary teams of people with diverse perspectives, skills, and expertise. Creating the capability to anticipate, intervene, and respond to challenges using a flexible and trusted process. www.deloitte.co.uk

SURVEY PARTICIPATION

The report is based on the survey responses and interviews with representatives of energy sector organisations and service providers operating in the UK and Ireland. The survey builds on the [2020 UKCS Data & Digital Maturity Survey](#), allowing an insight into how the industry has changed in the last three years with respect to data and digital maturity.

Reflecting the energy transition in the region, the survey has been expanded to include responses from the renewable energy industry with questions and categories expanded to capture renewable focused responses.

This report presents insights from the 33 organisations that participated in the survey from across the energy sector. Whilst the 2023 survey expanded to include renewable operators, the majority of responses were from oil & gas operators, developers, and cross-industry supply chain service providers. The responding organisations ranged from Small-Medium Enterprise (SME) companies through to global corporations, and responses were supplemented with interviews with 12 companies to gain further insight and validate the recommendations where significant trends were observed.



The 2020 survey focused on digital strategy, technology trends and leadership. This latest survey has been expanded to reflect other trends relevant to the sector today:

- The growing distinction between ‘data’ and ‘digital’ strategies.
- The growing range of digital technologies being deployed.
- Digital and data skills and challenges within existing teams and in the market.
- Organisation’s attitudes to collaboration through data.

For more information about the survey and insights, please contact Deloitte’s Digital Capital Projects Director, [Guri Neote](#).

SECTION 1

CONTINUING THE DIGITAL AND DATA JOURNEY

The 2020 survey report set a baseline to describe and identify digital maturity and recognised that an ability to gain value from digital arises from a combination of data, people, technology, and innovation.

In 2023, the same maturity indicator questions show that the wider energy sector remains on the same trajectory as the 2020 dataset (oil & gas focused), with approximately 60% of organisations responding 'yes' to many of these maturity questions. Large increases (>15%) were seen in questions related to leadership driving/prioritising digital and those related to training/tools. In 2020, the four metrics related to capability, training & tools (shown at the bottom of figure 1.1) were significantly lagging behind the other metrics. In 2023 this gap has narrowed, indicating that organisations have understood and acted on the need to address capability and skills gaps they have identified, even if not as part of a capability specific programme.

Across this set of maturity indicators, there was an average increase of 8% between 2020 and 2023. This indicates a growing focus, visibility and impact of digital across the industry.

FIG 1.1. THERE IS AN 8% INCREASE IN KEY MATURITY INDICATORS SINCE 2020



The increase in maturity demonstrated by these simple indicators is supported by other areas of the survey outlined in later sections of the report, including the range and number of digital technologies being explored and implemented (see [figure 2.1](#) and [figure 2.2](#) in the next section).

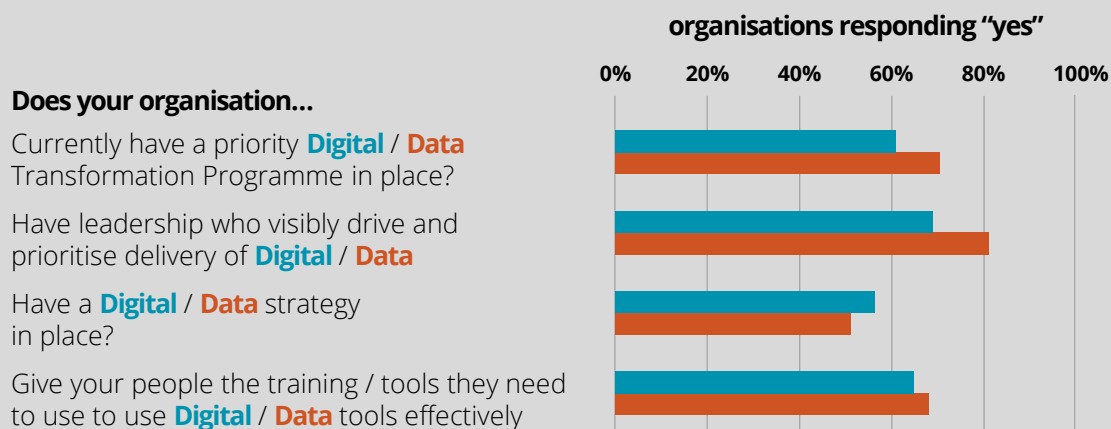
Data and Digital are closely correlated

In the 2023 iteration of the survey, a specific split between ‘digital’ and ‘data’ was made for four of the maturity questions. This decision was made to recognise that, for many organisations, digital and data are treated as separate subjects that might involve their own transformation programmes, strategies, leaders and training.

DATA STRATEGIES PROVIDE THE FOUNDATION FOR DIGITAL TO ADD VALUE

	Data Strategies	Digital Strategies
Purpose	Does not provide direct benefits, but are enablers for value to be realised from digital	Provide direct benefits when implemented (e.g. reduction in cost/time, additional insight)
Typical Contents	Data categorisations/catalogues; Data roles & responsibilities; Processes relating to data quality, management & governance; Data models & structures; Data architecture; KPIs & metrics; Data competencies, training & development	Digital value drivers; partnership approaches; digital roles & org. structures; innovation processes; technology prioritisation; data analytics; digital governance processes; digital capability & culture; technology deployment approaches; agile adoption; system architecture
Related Technologies	Data Platforms, Master Data Management Systems	Data capture/visualisation/analysis technologies; Collaboration tools; Drones & robotics; AI/Machine Learning; AR/VR; RPA; Connectivity tech; Digital Twin; Sensors & IoT

FIG 1.2. ‘DATA’ AND ‘DIGITAL’ MATURITY INDICATORS ARE CLOSELY LINKED



From figure 1.2 it is evident that when treated separately, ‘data’ and ‘digital’ maturity indicators are still closely linked – in some cases, data maturity seems to be higher. It should be noted however, that in responses to other specific data related questions (and discussions in interviews) it was evident that organisations define and interpret the term ‘data strategy’ in distinctly different ways.

The big picture is still only moderately encouraging - only half of respondents identified that their organisation has a data strategy and only one third have the data strategy defined separately to the digital strategy.

Whilst [figure 1.2](#) indicates that many respondents have data strategies in place and leadership drive for data delivery, there are many instances where this is not the case. Several interviewees indicated that senior leadership's comprehension of data (both in terms of data related technology and strategies) was not as strong as their comprehension of digital, and this has impacted the level of support for strategic data investments, especially where legacy systems are involved ([see 'barriers' data in figure 1.6](#)).

Organisation size is the biggest driver of digital maturity

As the sector progresses through the energy transition, new business and operating models are emerging with very specific business drivers, and the supply chain is adapting to serve a more diverse portfolio. However, there is no indication that this diversification is driving any trend in digital or data maturity ([figure 1.3](#) and [figure 1.4](#)). Instead, the largest variation in both digital and data maturity is driven purely by company size.

CONSUMER MARKET TRENDS ARE INFLUENCING INDUSTRY DIGITAL AND DATA STRATEGIES

From technology adoption survey responses and interviews, it is clear that the influence of the consumer market is significant. As technologies move from users' "day to day" lives into the working environment, the understanding of their use and potential increases. This, in turn, influences both senior decision makers and front-line adopters, benefitting the pace of digital and data strategy adoption. The barrier to adoption at a personal level is lower than at an organisational level, and once it is part of an individual's 'way of living', there is an increasing need for it to be part of their 'way of working' too.

Examples of this life to work transition include:

- Smart phones with cameras / video calling – taking and sharing images / video to share 'stories' (from a work perspective this has encouraged remote working and virtual collaboration).
- Google Maps and Streetview – virtually 'visiting' and finding out information about a place and linking to other data in a geolocated format (at work this appears like a form of digital twin).

In the last year, the rise and media attention of Artificial Intelligence (AI) driven products such as ChatGPT has changed the discussion around the investment and use of AI from 'exploring and understanding' to 'what are we missing?'

It is apparent that larger organisations are delivering their digital and data strategy through dedicated teams (including dedicated senior 'chief data / digital' positions) with centralised funds and ability to leverage enterprise partnerships and agreements. SMEs have more focused businesses with smaller scale operations, and are often driving digital and data strategy as an aspect or add-on to existing projects and change programmes. In addition, funding and strategy are less centralised and may be reliant on the supply chain and individual employees' expertise to ensure success. These two very different operating models result in significantly different digital and data maturity outcomes across the sector.

FIG 1.3. SIZE IS A STRONG INDICATOR OF DIGITAL STRATEGY UNDERSTANDING

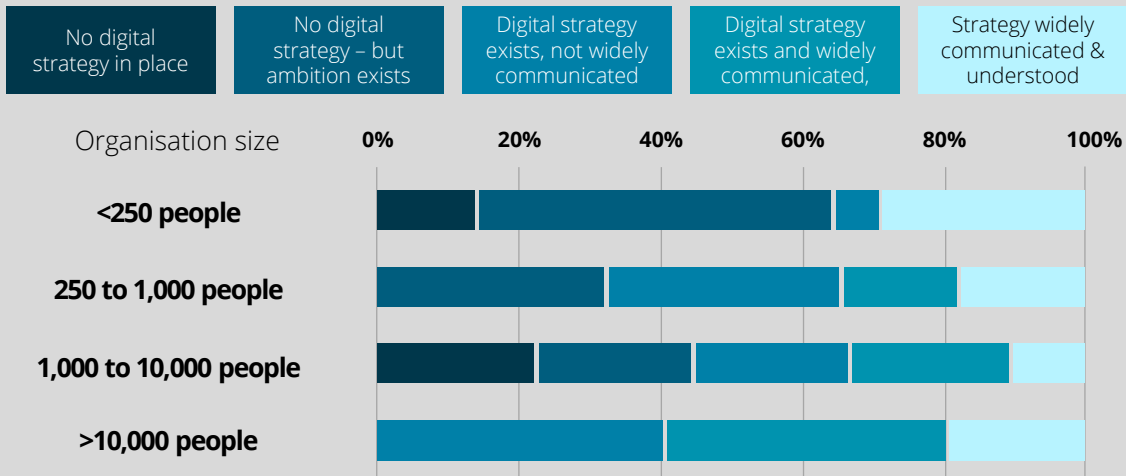
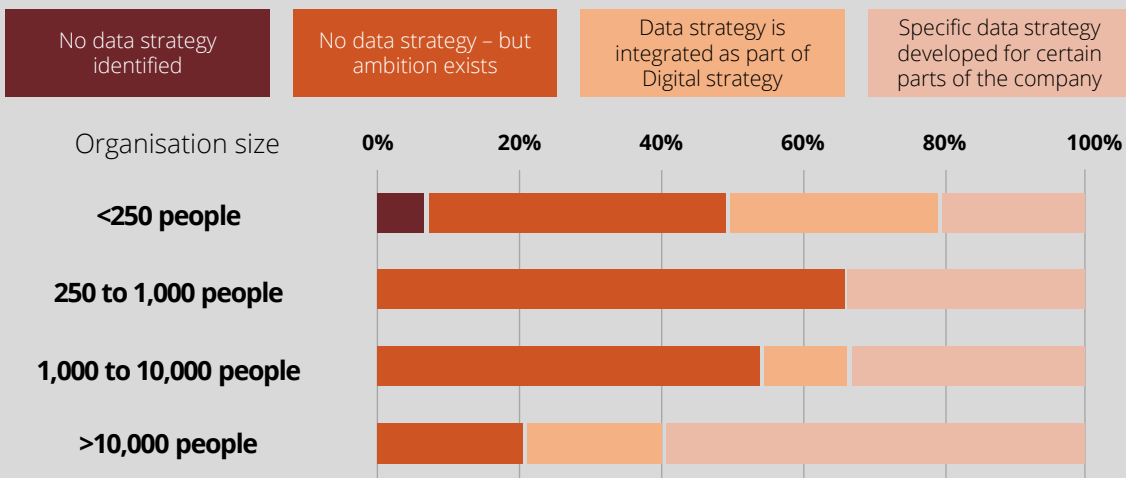


FIG 1.4. SIZE IS ALSO A STRONG INDICATOR OF DATA STRATEGY MATURITY



Further segregating of the responses in figures 1.3 and 1.4 shows minimal difference in strategy adoption between organisations in oil & gas vs. those in renewables.

Digital and Data journeys share common and complementary drivers and barriers

The top drivers, out of 12 options, for both digital and data strategies (figure 1.5) indicate an intrinsic relationship between the two strategies. Digital drivers fall into two distinct categories: traditional industry business cases (cost, time, safety) and data driven insights (decisions from, or access to, quality data). This is then repeated in the data strategies drivers, with the overwhelming focus shown to be on decision making as by far the most significant driver.

This highlights the reliance on data strategy to support and deliver digital strategy. This reliance will become even more critical as digital transformation becomes more complex. Historically, transformation has focused on 'digitisation' (automating processes through simple introduction of technology), but going forwards, complex technology change (e.g. cloud platforms, digital twin) will not be possible without underlying data transformation.

FIG 1.5. COST, TIME & DECISION MAKING ARE THE TOP VALUE DRIVERS

Digital Strategy Drivers		Data Strategy Drivers	
Reduce Cost	74%	Decision Making	76%
Reduce Time	74%	Trusted Data	41%
Increased Insights	68%	Reduce Personnel Risk	38%
Availability/Access to Information	62%	Data Quality	32%
Quality Information	56%	Reduce Cost	26%
Reduce Personnel Risk	44%	Reduce Time	21%

A similar link exists between digital and data with respect to the barriers to implementing these strategies. ‘Legacy process and structures’ is indicated as the main barrier for both (figure 1.6) - this is recognised consistently across the sector and across a range of organisation sizes.

The fact that ‘Legacy process and structures’ was seen as significant for *data* strategy barriers as well as digital is notable. In typical technology change programmes, e.g. a new type of software, the change in ways of working for end users is clearer and more direct. However, in data change programmes this may not be the case, and therefore there is a higher risk of failing to influence end-user behaviour.

FIG 1.6. LEGACY PROCESSES & STRUCTURES ARE THE BIGGEST BARRIERS

Digital Strategy Barriers		Data Strategy Barriers	
Legacy processes and structures	68%	Legacy process and structures	53%
Legacy IT and systems architecture	44%	Lack of business case	47%
Pace/ability to influence change in IT architecture	35%	Legacy IT and systems architecture	44%
Limited access to high quality, well governed, trusted data	32%	Challenges for integration	41%
Absence of a coordinated strategy	32%	Challenges for governance	35%
Lack of leadership buy-in	32%	Lack of leadership buy-in	32%

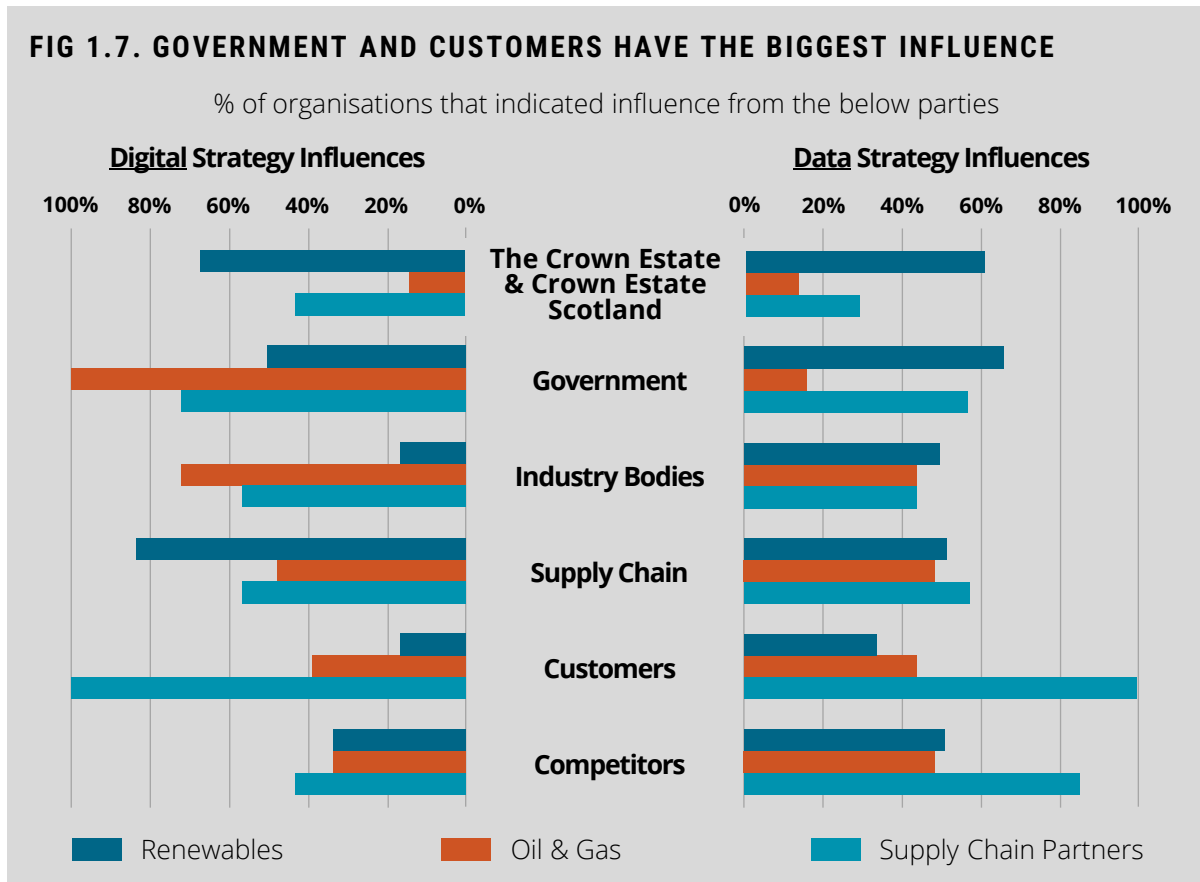
Influences on strategy come from a range of external parties

The 2023 survey asked a number of questions related to the types of parties influencing data and digital strategies. The results are shown in [figure 1.7](#), with a number of conclusions.

- The renewables sector has key influencers in The Crown Estate and Crown Estate Scotland whilst digital and data strategies for oil & gas organisations are heavily influenced by government/ regulatory compliance

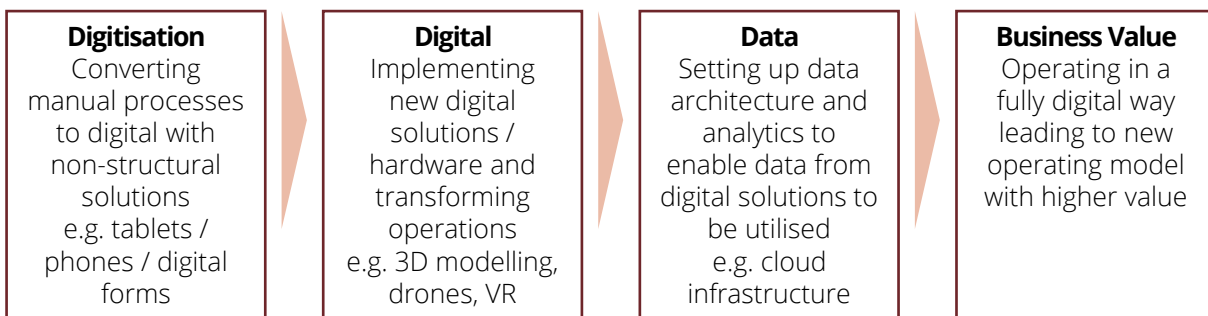
- Both the renewables and oil & gas sectors are strategically influenced by compliance, regulation and consent significantly more than being influenced by either their competitors or customers
- Unsurprisingly, supply chain partners are heavily influenced by customers and competitors, requiring a high level of adaptability and a business model to suit a wide range of demands.

From this, it is evident that government and industry bodies have an opportunity to provide some consistency across the sectors and influence digital and data strategies, to help grow the sector in a collaborative way. By bringing together best practices from across the sector and connecting the supply chain with customers outside of commercial agreements, industry bodies can help collaborate on tackling industry wide barriers and issues.

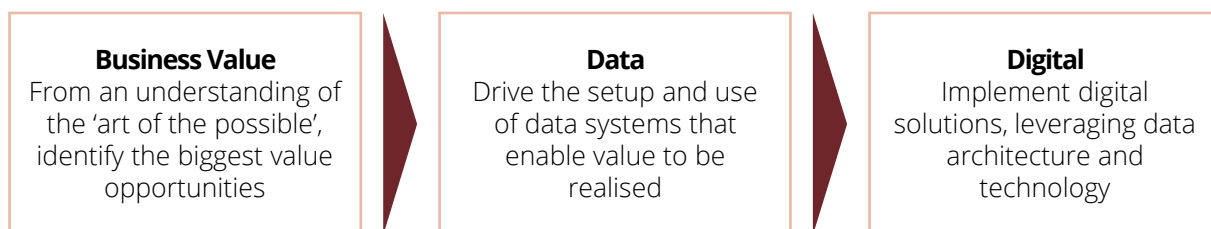


A coordinated, continuous strategy approach to data and digital

As digital and data technologies have evolved, the strategic approach has traditionally been:



As technology accelerates and becomes more commercially mature (and accessible) and the business values of the sector evolve in line with the energy transition, organisations should consider an alternative approach:



A focus on 'Business Value' and operating with a 'continuous strategy' mindset

Ensuring business value is well assessed, articulated and understood enables leadership to make both strategic and tactical decisions around how, when, and where solutions are enabled and adopted. With a growing number of influences on the maturity journey of any one solution, there is always a risk that the end state value may be lower than predicted, or the barriers may be higher. For an organisation, being able to adapt strategy to internal and external influences will enable more value from solutions in the long run.

Adapting strategy into a more continuous approach can be made possible by breaking a longer term vision into shorter strategic sprints, and most importantly, accepting that only the foremost sprints are likely to be defined at the beginning of the journey. Leaders should embrace ambiguity in the delivery of a digital and data vision. Whilst the end-state outcome may be clear, the technology and transformation steps needed to get there may not be well defined beyond the next 1-2 years. This will allow for new technologies and approaches to influence strategy with minimum disruption or regretted investment.

A CONTINUOUS STRATEGIC MINDSET ENABLES ORGANISATIONS TO:



Focus on delivering quick wins to move the organisation forward, 'embracing failure' and capturing lessons learned quickly to further inform the next strategic approach.

Example: Undertaking a cloud transformation for one high value data set and understanding the process and use cases instead of full scale asset data transformation across a whole organisation.



Assess issues and barriers on a smaller scale, helping to demonstrate value and overcome barriers before they become insurmountable.

Example: Certain small teams may have the capabilities to adopt a new solution quickly as a pilot, whereas an entire department could take longer to adapt without specific recruitment or training.



Change tactics if external influences change.

Example: If competition in the market leads to an inability to recruit required digital skills, an organisation can change approach and leverage a service provider or technology partner.



Quickly and decisively redirect resources and funds from poor performing initiatives.

Example: If return on investment is not as expected for one solution, resources and funds can be redirected to the next best-value opportunity at the earliest instance, reducing wasted time and money.

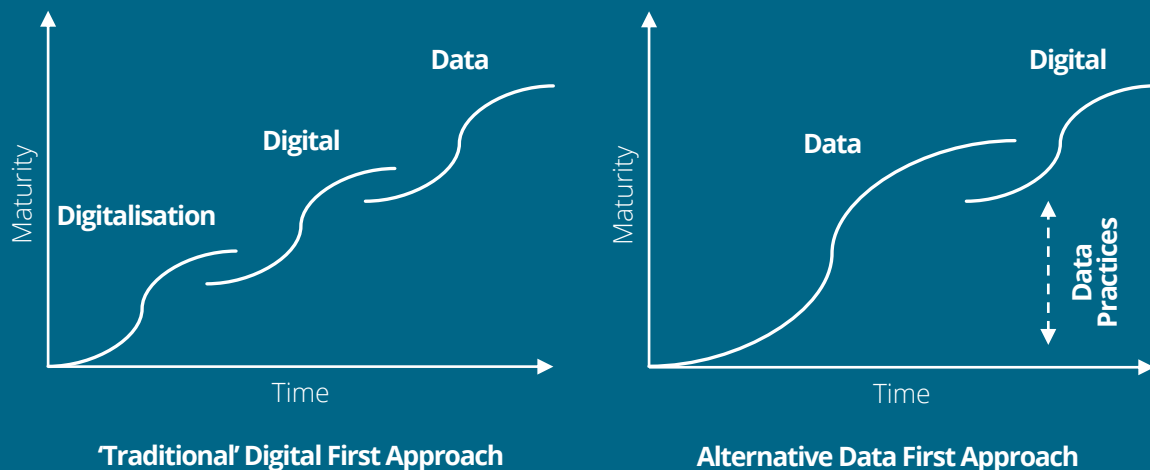
Data before Digital

As the energy sector has matured so has the technology industry, and so data solutions are becoming more prevalent with more accessible, reliable and scalable solutions being adopted. This indicates a move from the traditional approach of adapting 'what we do today' with digital tools and only then leveraging the resulting data. The fundamental differences between data and digital strategies were discussed at the beginning of this section, on page 10 of the study.

Organisations should consider a 'data first' approach - using the business value opportunities of data solutions (such as visualisation and reporting, cloud services, Artificial Intelligence (AI)/Machine Learning (ML), predictive analytics, digital twin and simulation) to prioritise:

- Establishing good data practices (governance, security, collaboration, quality).
- Investing in structural agreements and data management practices.
- Developing skills to support and grow data handling capabilities.
- Quick productivity wins reducing time and resource on processing data and reporting.

ALTERNATIVE DATA DRIVEN STRATEGIC APPROACH



In summary, implementing a data strategy first will:

- Identify opportunities where a new digital capability can provide value (due to gaps in data).
- Provide infrastructure for data first, making it technically easier to adopt new digital technologies, several times over.
- Reduce the cost to adopt additional digital technologies, helping to support all future business cases for digital by providing easily adopted data infrastructure, processes and standards.
- Make data accessible to third parties/vendors to enable development of future solutions bespoke to the organisation. This can take place in parallel to day-to-day operation, whilst simultaneously planning for the future.

FINDINGS & RECOMMENDATIONS

Summary Findings

- Digital maturity of the energy sector has improved in the last three years - with an 8% increase across key metrics.
- Data maturity requires further focus with only a third of organisations operating with a bespoke data strategy, where data strategy is a key enabler of data maturity.
- Digital and data maturity is comparable across oil & gas, renewable and cross industry service organisations and is more dependent on organisation size than organisation type. 'Lean' Small-Medium Enterprise (SME) sized companies operating with a small team, often covering several roles, have a higher chance of facing barriers that will impede progress.
 - Larger organisations operate with a breadth of digital approaches supported by dedicated teams implementing structural changes in digital and data practices.
 - Smaller organisations focus on a few, high value opportunities leveraging third party expertise to implement the strategy.
 - Both approaches require the supply chain to play a supporting and leading role in the sector's digital and data maturity.
- When compared to elements of digital strategy (e.g. technology), data strategy is less well understood and will require additional stakeholder engagement throughout the transformation process to obtain buy-in and realise full value.

Recommendations

1. Individual organisations should review existing digital and data strategies and reposition such that:
 - a) The priority is 'business value' and identifying how and where opportunities exist to support an organisation's strategic goals.
 - b) A data strategy is prioritised over the wider digital strategy to capitalise on data technology developments (both industry specific and non-industry solutions), for both short and long-term value opportunities.
 - c) The digital strategy reflects both near term requirements for data strategy enablement (such as connectivity, interoperability, Internet of Things (IoT)) and long-term technology development (robotics, remote vehicles etc).

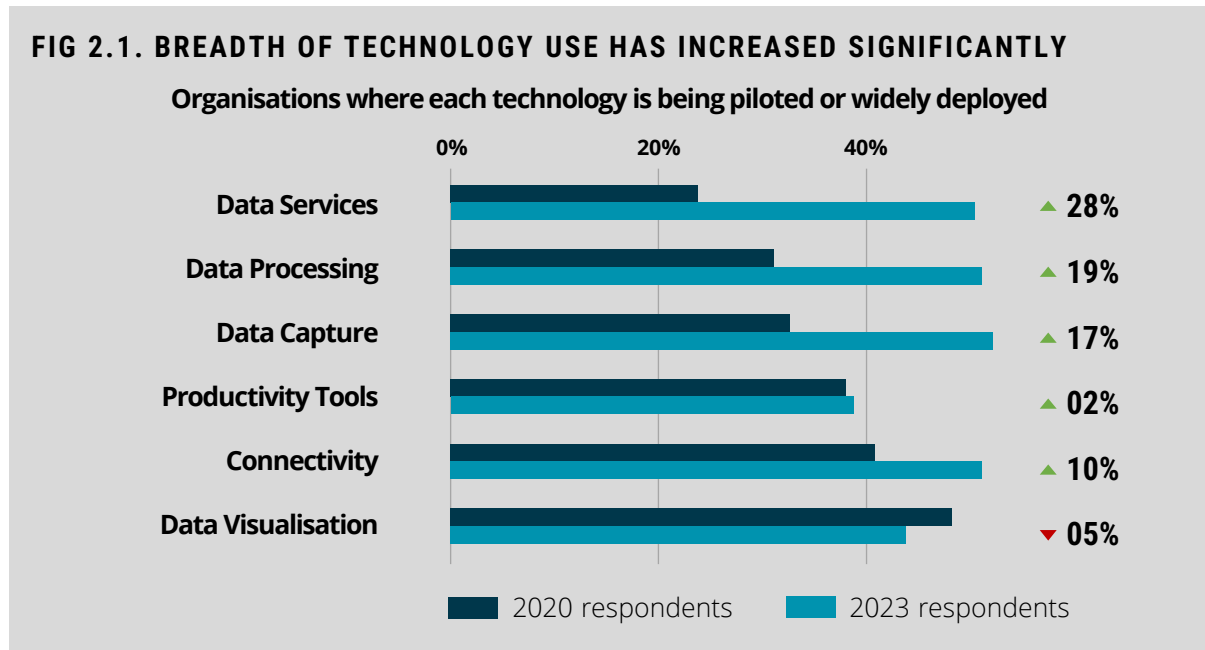
- d) They adopt a 'continuous strategy' approach such that digital/data strategies remain 'agile' with shorter periods between review. This will ensure that the latest technologies, lessons learned and limiting factors (e.g. skill supply) are considered.
- 2. Organisations should lean into forums run by industry and government bodies and engage in collaboration opportunities at the energy sector level to leverage insights from the industry's existing digital maturity gains to help identify and specify business value.
- 3. Industry and government bodies should lead the development of playbooks for digital and data strategies that support leading industry practices. This will help to accelerate best practice adoption and enhance leadership buy-in. Focus areas should include SME organisations as a priority and offshore/onshore wind (in development and operation phases).
- 4. Individual organisations should ensure data strategies include investment into data management solutions and practices as well as structural agreements for application with supply chain partners.

SECTION 2

TECHNOLOGY APPROACHES ARE BECOMING BROADER

Since the 2020 iteration of the survey, it is clear that the range of technologies organisations are both investing in and using is increasing. In 2020, the technology spectrum was significantly dominated by visualisation tools – e.g. reporting dashboard and use of tablets for information display. In 2023, there is a much broader set of technologies being used, with some technology areas (data services, data processing) increasing by 20% or more.

The breadth of technologies is helping to enable the full value chain for data instead of focussing purely on end user capabilities, and suggests more structural investments are being leveraged to enable this shift.



THE DATA VALUE CHAIN CONNECTS FIVE TECHNOLOGY TYPES

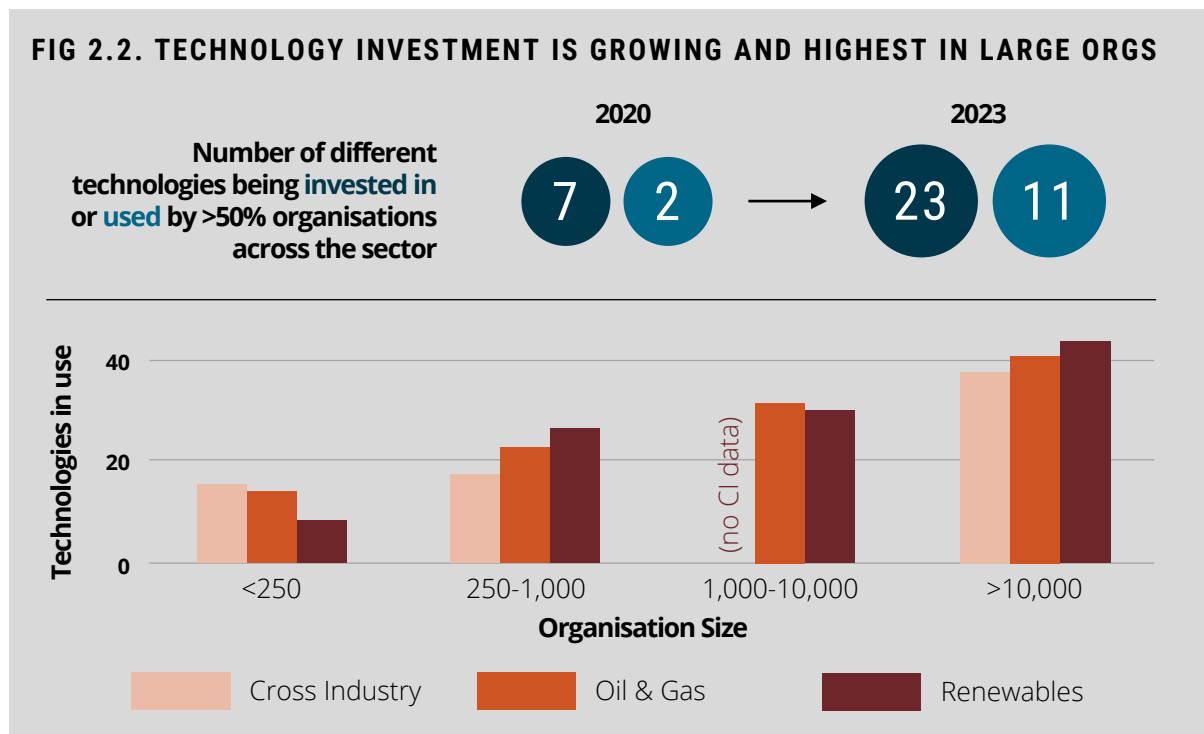


Digital technology investment continues to grow across the sector

Whilst all organisations identified some level of investment in and use of digital and data technologies, compared to 2020 there has been a significant increase in the range of technologies being used (figure 2.2).

In the previous survey, only two technologies were identified to be used by more than half of the responders, whereas this number is now 11. In 2020 the most common solutions identified were closely linked to end user reporting ('Automated Reporting' and 'Reporting Dashboards'), whereas the range of significantly used technologies in 2023 is much broader.

The range of technologies being invested in and used has a direct correlation to the size of an organisation, with smaller companies implementing fewer solutions (on average 12 for SMEs), whilst larger corporations are using almost three times as many (39 for large companies). Larger companies were also found to be using solutions across a wider set of functions and teams.



Top technologies – ‘firm favourites’ and investment in data

Across the sector there are several predominant technologies that continued to be the focus of digital strategies from 2020, with some additional emerging priorities too. There were four ‘firm favourite’ technologies that appeared in most respondents’ top 15 technologies – Automated Reporting/Dashboards, Geographical Information Systems (GIS), Cloud Services (including SaaS (Software-as-a-Service), IaaS (Infrastructure-as-a-Service) and Cloud Applications and Processing) and Mobile Technology & Connectivity.

From the subsequent interviews conducted, a number of notable insights were gathered (shown on the next page) covering topics relating to: uptake of mature technologies; robotics & drones; digital twin; 2D vs. 3D Asset data; and low-code & no-code.

THE SURVEY IDENTIFIED FOUR TECHNOLOGY 'FIRM FAVOURITES' AMONG RESPONDENTS:

Automated Reporting & Dashboards

Software solutions such as Power BI and Tableau, reported to be 'easy for (non-IT) engineers to learn and apply' with less central support, show growing use across organisations.

Some organisations are taking strategic approaches to develop centralised formats and centres of excellence, whilst others talked about instances of individuals / teams driving adoption independently. This remains in the top 3 technologies from 2020 with >75% of organisations continuing to invest in and use solutions.

Cloud Services (SaaS, IaaS, Cloud Applications)

Cloud services use across the sector has increased since 2020 with SaaS +33% and IaaS +51% indicating a significant shift to cloud enabled data storage and processing.

At least 67% of responding organisations have cloud capability and 85% indicating investing in cloud-based technology.

Geographical Information Systems (GIS)

Remains a dominant capability across the sector with two thirds of organisations continuing to invest in and use the technology across the renewables and oil & gas sectors.

Mobile Technology & Connectivity

Apps for mobile technology supported by offshore internet connections (Satellite, 4G and Fibre) maintain a presence in the top ranked technologies from 2020 and have an increase in use across the sector by 15-20%.

OTHER NOTABLE TECHNOLOGY INSIGHTS INCLUDE:

Digital Twin still gathering pace

Investment is still being made by ~60% of the respondents. Use has almost doubled from 20% to 39% indicating organisations are seeing investment pay off.

Robotics & Drones

Technologies such as crawlers and tethered vehicles (ROVs) have seen an increase in investment and use (+15%) since 2020 whilst passive autonomous systems (GRV, AUV, BVLOS) and drone delivery/inspection remain low in use (<10%).

Like with the prevalence of Power-BI and Tableau, 'low code/no-code' software is being used by 55% of the responding organisations with a further 10% investing in such solutions.

Low-Code / No-Code

Mature solutions over leading edge

The majority of technologies with high popularity are mature technologies or, where less mature, have support from large corporations and tech suppliers. Other 'leading-edge' technologies such as robotics, and blockchain remain low in priorities of investment plans. It may take market breakthroughs and supplier integration/support to enable a step change in uptake.

45% of respondents are using 3D scanning / LIDAR / SLAM for asset capture with a further 70% investing in the technology.

2D vs 3D Asset Data

Digital technology strategy is focused on key functions where it can deliver direct value.

Responding organisations ranked the top 5 functions where digital technology ‘has had most investment to date’, ‘has delivered most value’ and ‘has most investment planned’.

In 2023, the industry is investing across a range of functions, although there is significant focus on: infrastructure and support for digital/data systems (IT and Data Management); and areas with high volumes of data, third party interactions and remote facilities. Across most functions, future investment aligns with where the most value will be gained.

FIG 2.3. I.T & DATA MANAGEMENT IS TOP FUNCTION FOR TECH INVESTMENT

Ranked functions with most technology investment and value gained

Function (Ranked)	Investment (past)	Investment (planned)	Value Gained
Information Technology & Data Management	1	1	1
Acquisition, Exploration, Appraisal, Feasibility & Consenting	2	4	2
Operations & Asset Management	=3	=2	=3
Design, Engineering, Construction & Decommissioning	=3	=2	=3
Project, Programme & Portfolio Management	5	7	5
Emissions Management & Reporting	=6	=5	6
Health, Safety & Environment	=6	=5	7

‘Emissions Management and Reporting’ has become a focus area in recent years as a result of legislation and net zero targets. This has resulted in an increase in investment as this topic becomes a higher business priority with more value to be demonstrated.

Investment patterns are changing with a shift in focus to emerging business priorities (emissions) and technology capabilities (data sharing platforms).

Technologies which have had most investment to date	Technologies which have most planned investment
Production Monitoring & Optimisation	Production Monitoring & Optimisation
Geophysical/Acquisition/Seabed Data	Geophysical/Acquisition/Seabed Data
Maintenance & Operational Readiness	Point Cloud Surveys & Digital Twins
Point Cloud Surveys & Digital Twins	Asset Information Management
Survey Data Processing & Imaging	Data Sharing Platforms
Systems Architecture	Emissions Reduction

FINDINGS & RECOMMENDATIONS

Summary Findings

- The sector has moved from a 'focused' portfolio of use cases to a broader, end-to-end approach.
- Exploration and use of technology is progressing to support mature, end user data visualisation with data infrastructure and processing capabilities.
- Smaller organisations remain focused on fewer tactical technologies in key business functions.
- The sector continues to operate with a 'late adopter' approach – mostly focussing on exploration and implementation of mature and established technologies. Comparatively few are exploring 'leading edge' solutions.

Recommendations

1. Individual organisations should review both workforce and leadership knowledge and understanding of data strategy and technologies with aim to identify opportunities for further training and awareness.
2. Assess readiness for an organisation's data sets and stakeholders to leverage related technologies (collaboration/sharing, quality/connectivity of data). Identify if and where policies and practices may be required to ensure these technologies deliver value.
3. Further support for 'leading edge' solutions is required from individual organisations to help evolve from concept to integral industry 'way of working'.
 - Industry and government bodies can accelerate this by demonstrating to individual organisations how to identify, recognise value of and integrate leading edge solutions into digital and data strategies.
 - Industry and government bodies should also use forums and engagements with individual organisations to identify and encourage participation in collaboration opportunities.

SECTION 3

SKILLS ARE BECOMING A LIMITING FACTOR

In 2020, the results of the survey indicated that development of capability (skills, training etc.) was significantly lagging behind other ‘strategic’ digital initiatives (e.g. existence of digital strategies, existence of digital transformation programmes, hiring of digital leaders and roles).

It is perhaps no surprise that in 2023, half of respondents (51%) indicated they are actively recruiting roles to bring in skills to support digital and data initiatives. Although this trend was typical across renewable, oil & gas and cross industry sectors, only 30% of SME sized organisations were recruiting.

From follow-up interviews with organisations where recruitment was lower, upskilling of existing teams and internal role changes were mentioned as critical to developing and delivering digital and data initiatives.

Internal upskilling is challenging and requires focused investment

Upskilling relies on the individuals and teams in an organisation to have the capability and capacity for change, both with those delivering the change and those driving new ways of working:

INTERNAL UPSKILLING REQUIRES CAPABILITIES AND CAPACITY FROM END USERS AND CHANGE AGENTS

	Requirements of End Users	Requirements of Change Agents
Capability	Base technical skills and knowledge to comprehend, adopt, adapt, and apply next stage technology to existing processes	Skills to coach and champion adoption of new ways of working at both organisational and individual level
Capacity	Time to train in and practice new ways of working, recognising typical tasks may take longer in early adoption	Time to learn new ways of working to competency that can coach others and availability to support on-going training, questions, troubleshooting.
	Willingness to adopt new way of working where employee may not be direct beneficiary or not local organisation's priority	Change agent role may not be full-time nor primary function of an individual in smaller organisations

Whilst organisations are upskilling internally, significant challenges were identified - only 62% believe their teams have the skills to use *existing* technology, nearly halving to 32% when considering the skills to adopt *new* technology. Training and tools (vs. skills) match the same pattern ([figure 3.1](#)). For many organisations, recruiting from outside may be seen as an easier way of bringing the required skills into the business.

FIG 3.1. ORGANISATIONS ARE NOT EQUIPPED TO ADOPT NEW TECHNOLOGY



Another question discovered that within an organisation, Digital, Data and IT teams are in the best position for delivering digital and data strategies (41%), but business teams (end users) are likely to require more training with only 27% of respondents recognising they have the necessary skills, and 29% of respondents suggesting business teams may need 'significant training'.

Whilst organisations have data and digital 'ambition', the ability of teams to adopt and utilise is likely to be a limiting factor resulting in: taking longer to see a return-on-investment; higher efforts from change agents; and a delay in the development of the foundations for the next iteration of solutions.

FIG 3.2. THE INDUSTRY IS ENCOURAGING SELF LEARNING MORE THAN IN 2020



A typical approach for the sector is for individuals to upskill and learn about technologies outside of any structured training, and since 2020, this has become increasingly popular with more support and direction given.

The continued existence of a skills gap is clear, however the percentage of organisations with skills and capability programmes in place is unchanged in three years. However, training is only a small part of the story – without understanding the capabilities and skills required, there is a risk that the training efforts of an organisation are wasted. There are very few organisations that have a structured capabilities assessment programme - only one third of respondents have had any form of assessment, of which most were large corporations and non-operating SMEs ([figure. 3.3](#)).

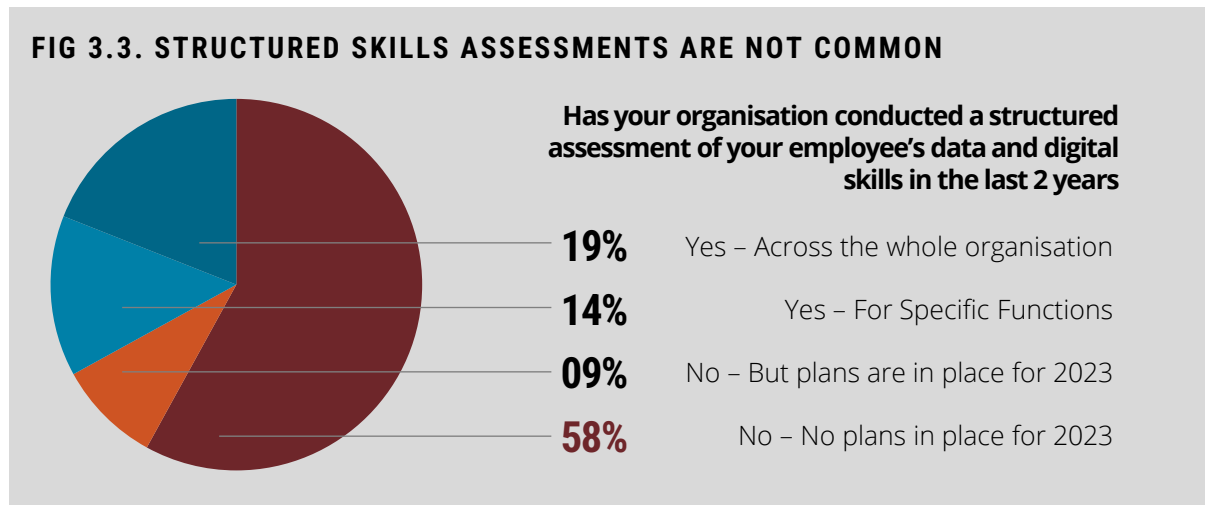
A digital and data strategy may be under threat where upskilling and adopting new technologies is key, especially where skills in existing technologies may need developing as well.

Carrying out a targeted or organisation wide capability assessment can help with:

- Identifying training requirements for existing technologies.
- Assessing investments needed to deliver new technologies.
- Validating effort and time needed to deliver strategies including support resources required.
- Pinpointing where skills may need to be recruited in and when.

For SME organisations, this level of understanding is critical where investment in technology is more targeted and fewer support roles exist. Being able to align capability with opportunity and understand investment in skills will support better investment decisions and strategic planning.

FIG 3.3. STRUCTURED SKILLS ASSESSMENTS ARE NOT COMMON

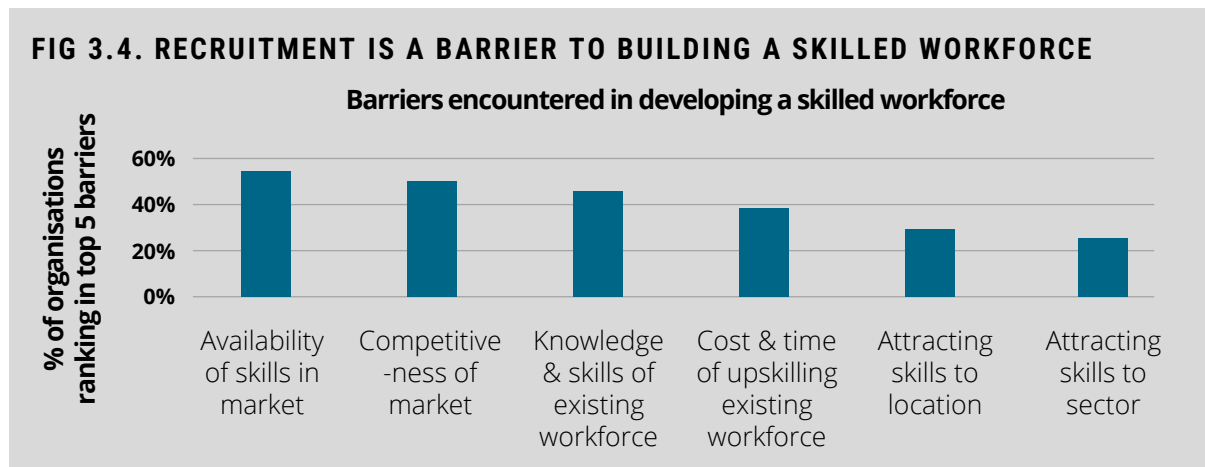


Success with recruiting data & digital positions has been mixed with significant barriers

Half of respondents are recruiting for digital or data roles, with the proportion likely to increase as more tools are adopted, technology advances, and ways of working shift. Of the half looking to fill data and digital roles, there have been a range of experiences with 'data' roles proving more difficult to fill without further effort, compromise or duration.

One medium sized oil & gas operator noted they have a data position that has been open for nine months and still unfilled. Similar trends were echoed by SMEs and very large organisations too across renewable, oil & gas and service providers.

FIG 3.4. RECRUITMENT IS A BARRIER TO BUILDING A SKILLED WORKFORCE



CHALLENGES IN DEVELOPING A SKILLED WORKFORCE

As the sector becomes more mature and adopts more broadly utilised technologies (i.e. cloud platforms/data analytics vs GIS or hardware solutions) the technical skills required are less 'niche' which accesses a larger, although more competitive, pool of resources.

CAREER MODELS

Whilst the larger resource pool provides more options for recruiting, it also exposes companies to a retention challenge. Respondents noted that retention of key digital and data skills was a barrier to delivering their strategies, and that employees were moving on to other opportunities after 1-2 years.

This is typical in the technology sector, especially as industrial experience can be a 'stand-out' attribute on résumés (as well as be highly valued within the energy sector). This can allow prospective employees to negotiate better contract terms, especially where large firms may have more scope for higher wages / flexibility.

BLEND OF KEY CHARACTERISTICS

Many data & digital roles have a unique requirement for a blend of technical knowledge, industrial experience and change agency soft skills. Each on their own can be sourced from specific resource pools or industries but when combined, there are unique challenges for the sector (below). Finding resources with all three characteristics is extremely difficult.

Technical Skills with Industrial Experience

As an industry that is still early on the digital and data journey, there is a small pool of industry experienced personnel who are also highly trained in specific technologies.

Technical Skills with Change Agency

Change experience is critical to digital transformation - those with change experience may operate with less technical depth and need support from other technical roles.

Change Agency with Industrial Experience

Most likely to be possible to source from within the existing business but will require upskilling technically and may face competition from other areas of the business.

APPEAL OF SECTOR

In interviews with respondents, factors related to 'sentiment' were identified, including:

Purpose: One large organisation identified there were noticeable improvements in recruitment following rebranding from an 'oil & gas' to an 'energy' company.

Flexible working: Individuals want to choose where to work and flex working hours to suit their lifestyle. Most tech/digital organisations offer flexible working options including working location and working pattern – this type of flexibility is rare in the energy sector.

Technical community: Not all organisations have the size and scale for digital teams to operate within a wider community of technical peers, with mutual support, learning, and development – something which is often strongly desired.

Developing alternative approaches to meeting skills requirements

With limitations and barriers present in both upskilling and direct recruitment, other methods are required to provide specific and general capabilities to deliver data and digital strategies. These include:

- Agencies and consultants: Almost half of respondents identified that they were using agencies or consultancies to provide data and digital skills (48% and 60% respectively). This was to leverage the flexibility and expertise of these services as well as to fill where recruitment was not able to.
- Technical service providers: One SME identified that most IT/digital/data services were contracted out to an IT specialist and this was key to developing and delivering the technical strategy. Another respondent was a large technical service provider who has been developing digital and data services and products to meet a growing need in the industry.
- Offshoring (outside of UK): Respondents from large companies identified that they were accessing IT/digital/data skills in countries in Europe and Asia through setting up and utilising service centres. Whilst this may not meet the full requirements to deliver the strategy, it provided guaranteed quantity and quality of technical skills.

FINDINGS & RECOMMENDATIONS

Summary Findings

- Teams are, to an extent, set up and supported for applying existing solutions. However, they are limited on capacity and capability to adopt future solutions.
- Few organisations are structurally assessing required skills or their capability and capacity for implementing strategic solutions.
- The recruitment market is not yet being tested to the full extent but issues around market capacity, industry perception and ways of working are already impacting strategic delivery.
- Organisations are taking a blended approach to fill the skills gap, primarily with upskilling existing teams, and then recruiting in roles and leveraging external service providers.

Recommendations

1. Individual organisations to develop model for or adopt existing structured digital and data skills capability assessment, taking into consideration requirements for different sub-sectors and maturity of the organisation. Findings will help inform current and future technologies and strategies. BCS' SFIA Framework may be a suitable model for some organisations
2. Carry out a structured digital and data skills capability assessment across the organisation. Assess and review every two years to reflect fast paced changes in organisation and strategy.
3. Map the organisation's *capability* to both develop and adopt solutions and identify any limitations in strategy delivery. Adjust strategy to support teams with prioritising solutions clearly and avoid overloading teams with multiple changes.
4. Map the organisation's *capacity* to both develop and adopt solutions and recognise in strategies any limitations. Adjust strategy to support teams with prioritising solutions clearly and avoiding overloading teams with multiple changes.
5. Individual organisations should develop a blended approach in order to meet skills requirements which will include developing strategic relationships with service providers, vendors, agencies and consultancies. Being deliberate about a blended approach will help to make informed decisions about which combination may suit to fill skills gaps.
6. Individual organisations should reflect on organisation set up, culture and working arrangements and identify opportunities for modified/alternative ways of working that may be more appealing to the digital/data skills market and lead to an increase in applications for new roles and retention of existing roles.

SECTION 4

ENABLING INNOVATION IS VITAL TO SUCCESSFUL TRANSFORMATION

To sustain development of digital & data practices and operate as a mature organisation, innovation practices need to be established and maintained. Innovation ensures that new ways of working and new value cases for digital solutions are invested in, tested, and adopted.

The pace of change and development for both digital & data technologies is driven outside of the energy sector, and therefore energy organisations need a process to be able to identify, assess, trial, and adopt ideas as they emerge, recognising not all ideas will be value adding.

Innovation has gathered momentum and become mainstream

The sector in general is implementing more innovation practices. Half the responding organisations have an end to end innovation process in place, and more organisations have a mechanism to receive and incorporate digital ideas into a central innovation funnel.

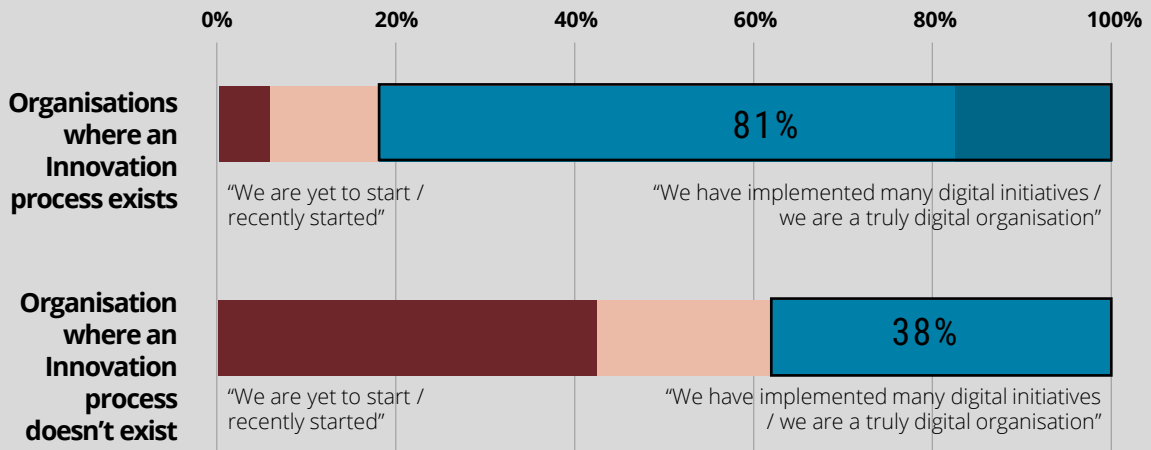


Innovation processes correlate strongly with an organisation's own view of its digital maturity. 81% of organisations with an innovation process in place identify as digitally mature whereas only 38% of organisations without an innovation process demonstrate digital maturity ([figure 4.2](#)). This trend is matched when reviewing data maturity with organisations scoring 88%/44% respectively.

When compared to 2020 data – this correlation between innovation and digital maturity has become even stronger. In 2023, an even higher proportion of organisations *with* an innovation process describe themselves as digitally mature, and an even lower proportion of organisations *without* an innovation process describe themselves as digitally mature.

FIG 4.2. INNOVATION PROCESS IS (STILL) A STRONG INDICATOR OF MATURITY

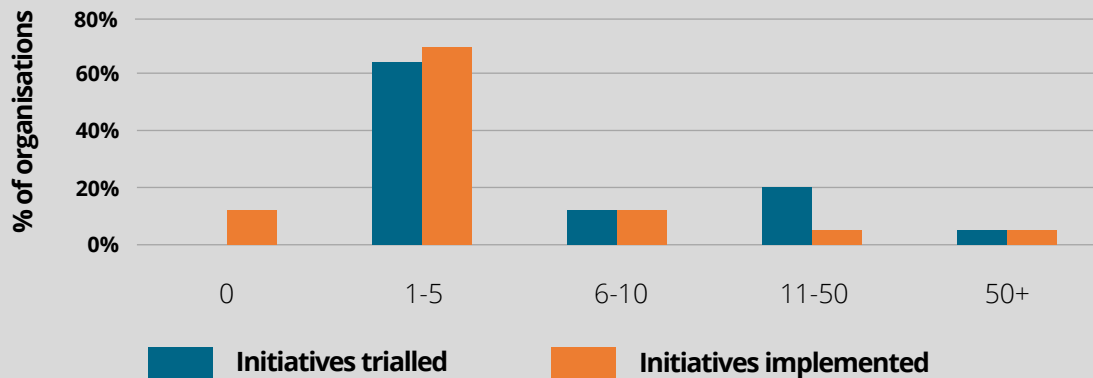
Digital Maturity vs. existence of an end-to-end innovation process



Innovation in action

Three quarters of respondents identified that digital and data innovations are being trialled and implemented, of which a third demonstrate a culture of ‘supporting failure’ - where the number of trials exceed the number of implemented solutions (figure 4.3). This indicates organisations are operating with a funnel shaped approach, and investing in significant numbers of ideas to understand and assess through proof of concepts, pilots and MVPs – and only progressing to a broader roll out if suitable for the business.

FIG 4.3. MOST ORGANISATIONS ARE TRIALLING 1-5 INITIATIVES PER YEAR



The volume of trials and implementations directly relates to organisation size and maturity with well established, global organisations typically reporting 11-50 and 50+ trials. 95% of organisations identified that funding was available for supporting innovative ideas, with half of financial support coming through specific projects. Of the other half of organisations, a central innovation allocation was the most popular form of funding, and only a small proportion of organisations (13%) possess a technology incubator as the form of innovation funding.

Anecdotal evidence identifies that funding through individual projects/teams has both significant benefits and significant risks. Survey respondents pointed to the benefits of focused, efficient, and tailored solution development, but an equally serious risk of siloed teams producing similar or incompatible products. Coordination of innovation practices and central ownership will support the visibility and prioritisation of work on going and identify opportunities for collaboration, reducing overall cost/effort to deliver. This needs to be combined with close engagement with end users and project delivery teams to ensure solutions are responding to real rather than perceived problems.

Innovation in action

Organisations continue to leverage a blended approach to developing and delivering digital initiatives (figure 4.4). Larger, established organisations are able to develop in-house solutions using own their digital teams as well as partnering with or buying third party solutions. At the other end of the scale, new SME organisations, where digital roles are limited, are solely reliant on off-the-shelf solutions.

Discussions with SME organisations (in both renewable and oil & gas) indicated a common lack of dedicated digital teams or roles. In these cases, those in digital technology roles are often using prior experience to define approaches, and have limited awareness or access to industry organisations. This may result in limited progress and organisations becoming reliant on preferred vendors’ own product development in influencing innovation.

Drivers for Innovation link directly to operational business principles but may be too internally focused

When questioned on drivers for investment in innovation, respondents’ top 5 drivers were: reducing time; remain competitive; reducing cost; emissions reduction and reducing personnel risk (in that order). These drivers for investment in innovation are closely aligned with the drivers for investment in data and digital more generally – with reducing time, cost and risk appearing in the top five drivers for each of innovation, data and digital (figure 4.4).

FIG 4.4. INNOVATION, DATA AND DIGITAL DRIVERS GO HAND IN HAND

Value Driver	Drivers of Innovation		Drivers of Digital Strategy		Drivers of Data Strategy	
	% of orgs ranking in top 5	Overall Ranking	% of orgs ranking in top 5	Overall Ranking	% of orgs ranking in top 5	Overall Ranking
Reduce Time	76%	1	21%	4	53%	3
Reduce Cost	53%	3	38%	1	62%	2
Reduce Personnel Risk	41%	5	32%	2	47%	4

'Personnel risk' continues to be a highly ranked driver for oil & gas respondents, featuring as the highest rank driver for the companies in this sector. 'Emissions reduction' features across both renewable and oil & gas organisations, recognising digital's important role in the journey to net zero. The drivers not ranked in the top 5 across the survey are mostly external influences on digital and data strategies:

- Supply chain influence
- Industry trends
- Technology enhancements
- Technology affordability
- Remote working

Reviewing the full ranking of innovation drivers suggests that organisations are looking mostly to internal leadership and business teams to identify and direct how innovation may make an impact. They are less likely to identify external (industry wide and collaborative) approaches – which may lead to strategies being developed that are not aligned with, or supported by, the broader supply chain.

Procurement practices are missing opportunities to accelerate innovation

In the survey responses, it was identified that the majority of organisations are influenced by third parties in their innovation. Through interviews, organisations described that some procurement practices may limit the effectiveness of some contractual relationships in furthering innovation:

- Contract terms are based on previous ways of working and do not allow for bidding organisations to propose and integrate new digital and data practices and roles.
- Contract bid evaluation doesn't recognise the value of digital and data practices to the owners' organisation and may exclude capability from assessment. For example, digital and data ways of working may result in higher unit rate pricing (or overheads) but the resulting efficiencies and data may also reduce costs for the operator.
- Contractual periods of 3-5 years have the potential to fix ways of working and prevent new ideas being proposed, developed and adopted between contract awards. This duration is greater than some technology development cycles and instead, contracts should promote continuous development and hold both parties accountable for adoption of improved working practices.

FINDINGS & RECOMMENDATIONS

Summary Findings

- Mature organisations operate with established innovation practices and benefit from consistent implementation of new solutions.
- Smaller organisations are more reliant on third parties to develop new ideas and turn innovations into practical solutions that meet the needs of the business.
- Innovation needs to have a connection with external influences as well as internal stakeholders to ensure innovation keeps pace with technology trends.
- Traditional procurement practices risk locking in the 'current state' of digital technology and offer limited opportunities to improve - except at contract breaks, typically every 3-5 years.

Recommendations

1. Organisations should develop a centralised innovation role to identify and coordinate innovation activities across teams and projects. Part of this role will be to promote internal collaboration, reduce risk of duplicated efforts, minimise conflicting approaches and provide overall reduced cost. Funding and prioritisation may still be localised but refer to broader business context.
2. Organisations should develop a centralised innovation model to provide consistency and transparency on innovation thinking across their company. Modelling the organisation (such as functions, headcount, contracts, cost of works) may help identify where innovation can add greatest impact or may require most effort and enable objective decision making, supporting an agile, strategic approach.
3. Organisations should seek out guidance on industry trends/best practices to reduce efforts to identify and select buy-in solutions.
 - a) Industry bodies should develop playbooks for typical organisations, reflecting on size and sector to help identify leading trends and suppliers, focussing on SME organisations.
 - b) Organisations should take part in industry groups and forums to leverage best practices and industry insights, especially in SME organisations where internal capacity is constrained.
4. Organisations should look for innovation to be increasingly influenced by external factors including technology, industry and supply chain trends to support collaborative ways of working and ensure strategies stay agile and adaptive to future capabilities and requirements.
5. Industry bodies should support the development of industry best practice to ensure the value of digital/data practices is part of procurement assessments. This will promote the use of existing and development of new solutions.

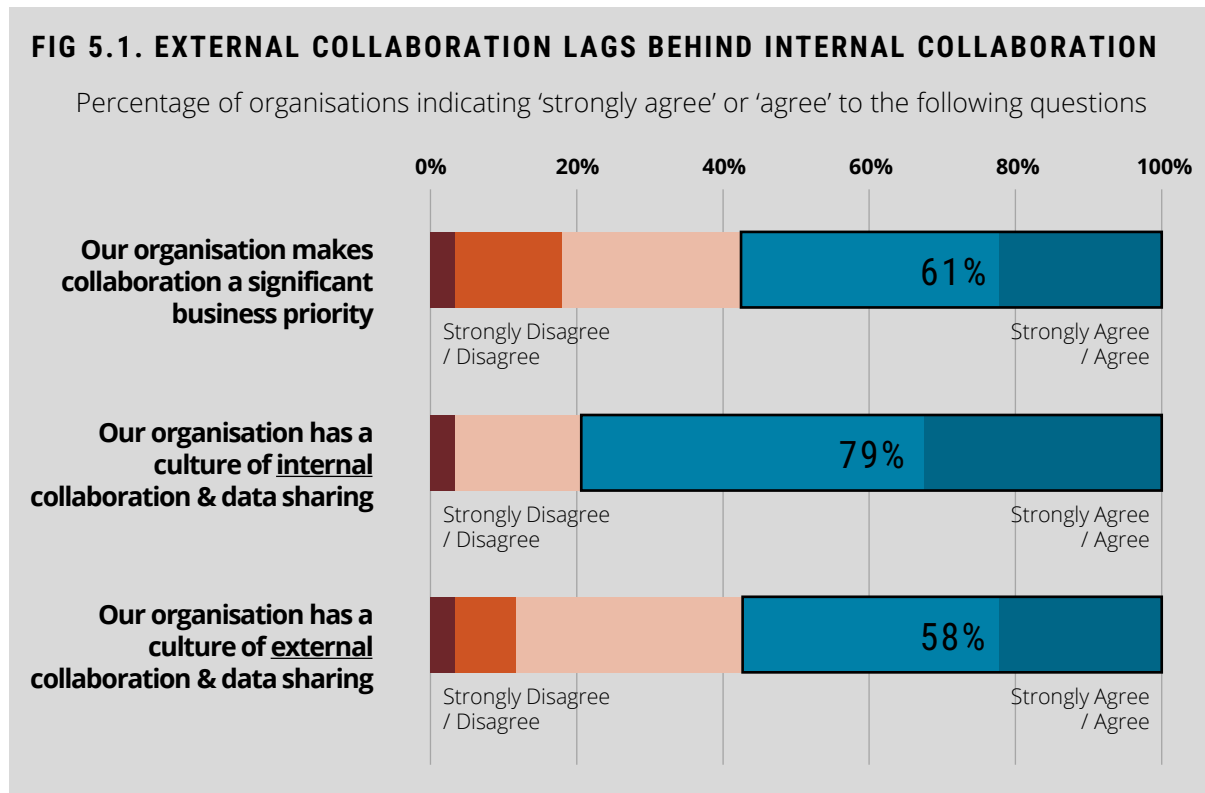
SECTION 5

COLLABORATION REQUIRES A CULTURAL SHIFT TO DELIVER

The sector widely recognises the need for more opportunities to collaborate. Similarities in ways of working and shared challenges in risk, compliance and geography provide common ground for parties to both share and learn from each other and advance solutions and practices together. However, for most organisations, making collaboration a genuine business priority may still not be enough to deliver the desired results. Several key foundational issues are preventing a true collaborative environment from evolving in the UK energy sector.

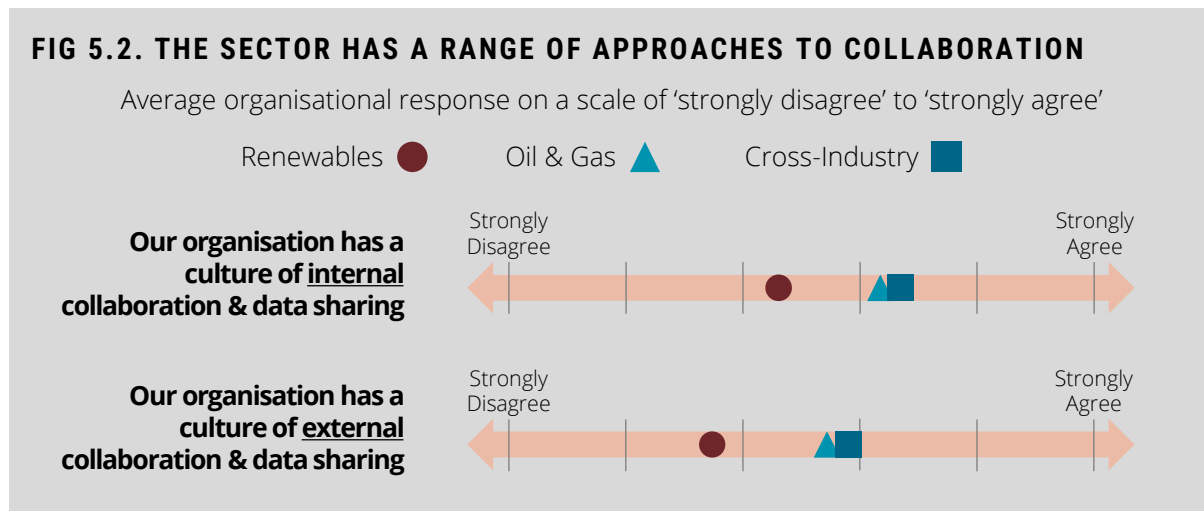
Prioritisation of collaboration is inconsistent across the sector

Most organisations across the sector state that collaboration is a 'strategic business priority' and is valued highly by 65% of SMEs and 100% of the large corporations surveyed, albeit for potentially different reasons (figure 5.1).



A culture of internal collaboration is prevalent throughout the sector yet external collaboration is less so. Whilst survey data indicated renewables organisations may be less inclined to collaborate with external parties than other parts of the energy sector, further exploration of this topic identified a range of approaches and attitudes toward collaboration, driven by specific business requirements more than a reflection on the renewable sector.

In interviews, one SME-scale renewable organisation in the development phase indicated that they had a desire to share with other similar organisations to ‘help with pace and cost’. At the other end of the scale, a large renewable organisation recognised the value of sharing non-confidential data, but were concerned that sharing may erode competitive advantage.



Culture and ways of working represent challenging barriers to overcome

Even in those organisations that do not have a strong culture for external collaboration, the majority indicate benefit would come from collaborating with different parties. However, the barriers to effective collaboration (whilst broad) fall into two main categories: ‘external ways of working’ and ‘internal culture’.

ORGANISATIONS PERCEIVE BENEFITS FROM FURTHER COLLABORATION



In terms of **external ways of working**, many responses raised concerns around intellectual property / competition as a barrier. Organisations looking to develop collaborative solutions will need to establish clear rules and guidelines about what data is used, by whom, and how it is protected. In these activities, adoption of data platforms could allow more control and protection over data whilst still making information available to parties. Configuration options exist to enable varying level of access/insight, and the ability to protect defined aspects of the supplied data whilst still uncovering insights from a wider, collaboratively created data set.

Organisations should consider which process areas generate greatest benefit from collaboration, and assess data sharing consideration, area by area.

Collaborating and sharing data has the potential to yield significant value for the sector, both in advancing digital technology but also in enabling faster energy transition in the region. The broader value is not easily mapped back to individual organisations' strategies and cannot easily be assessed against the value of retaining information. Collaboration projects and sector thinking should recognise this 'conflict' in priorities and identify ways to evaluate return on shared data in value drivers relevant to the sector.

In terms of **internal culture**, organisations expressed challenges in justifying collaborative activities internally - where capacity and funding are often diverted away from activities with direct value.

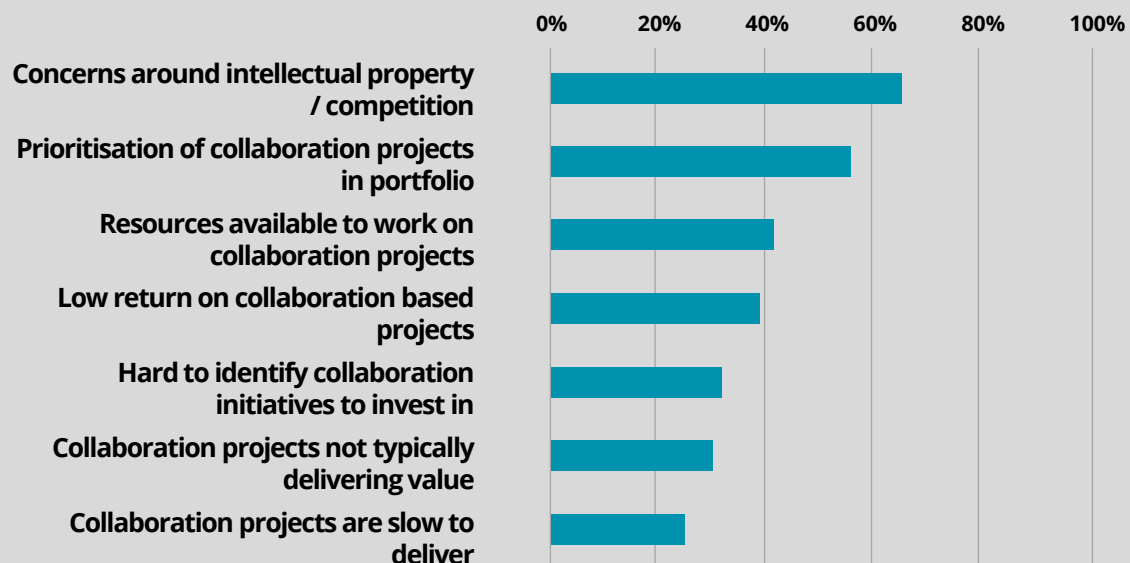
When translating strategic aims into initiatives, there should be consideration of 'if and how' collaboration with external organisations and industry would be a more effective way to deliver the required outcomes, especially with scopes that are complex, ambiguous or leverage new technology. This may help to reduce cost through joint funding and enable the ability to access specialist skills outside the organisation (instead of recruiting or taking full funding risk).

Secondly, developing a model that will map industry wide benefits from collaboration to direct organisational benefits will aid prioritisation and definition of strategy. Developing industry wide solutions and practices can enhance the supply chain and lead to direct benefits in the long term.

Thirdly, numerous collaborations do occur throughout the industry, but with a growing number of parties joining in newer areas such as renewables, it is difficult for collaboration success stories to be visible. At both an industry and company level, the provision of platforms to recognise successful and ongoing collaborations (as well as space to share strategic aims and requests to collaborate) will be beneficial. Ongoing projects such as the actions and workstreams resulting from the ['June 2022 Digitalising Offshore Energy Systems - Offshore Energy Data Strategy Taskforce Report'](#), are working to address the visibility of data collaboration opportunities.

FIG 5.3. COMPETITION CONCERNS CONTINUE TO AFFECT COLLABORATION

% of organisations indicating whether each barrier was in top 5 in terms of limiting collaboration

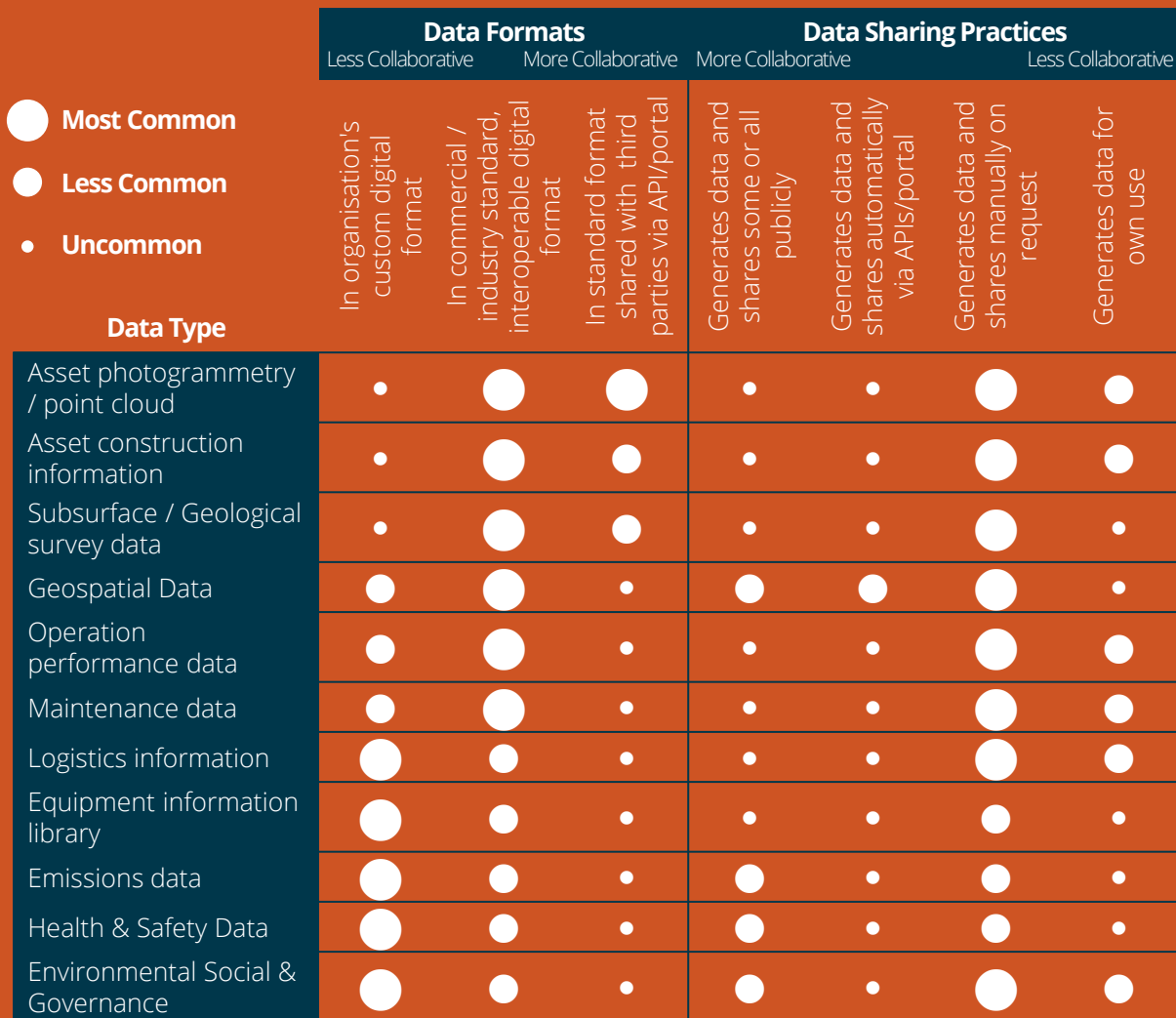


Readiness for collaboration is also impeded by data related barriers

There are some practical barriers to collaboration that need to be addressed – one of the most significant barriers is related to data formatting and the ability for data to be readily shared. In figure 5.4, organisations identified how their data is formatted and shared in key data types.

As most data is shared manually and 'on request' across a range of formats, this requires time and resource to meet the demands of third parties. Only a few data types were identified where data formats were commonly collaborative in nature (platforms / APIs / portals). The majority of data was identified as being 'moderately collaborative' in format (i.e. in commercial / industry standard, interoperable digital formats). However, some data types such as logistics and environmental information is generally in even less collaborative formats. To enable and benefit from collaboration, organisations should ensure processes adopt industry standards, leverage vendor solutions and support the development of industry wide standards where gaps exist.

FIG 5.4. DATA FORMAT AND DATA SHARING PRACTICES VARY BY DATA TYPE



FINDINGS & RECOMMENDATIONS

Summary Findings

- Organisations in the sector demonstrate both an internal and external collaborative culture and an ambition to expand and enhance collaboration.
- Collaboration is limited by the perception of its value (including but not limited to return-on-investment) and organisations are being challenged to evaluate and justify collaborative work against internal priorities.
- Collaboration will be more challenging where data sharing is required – there is a perception of this putting business competitive advantage at risk.
- Opportunities for collaboration are not well understood. Over 1/3 of organisations indicate it is hard to identify opportunities to collaborate, especially with SME organisations where resources/budget limitations also restrict involvement with external parties.

Recommendations

1. Map and identify key opportunities at industry level for data-driven collaboration. Within these initiatives, specify value at industry and organisation level to be used in broader strategies. For each initiative, recognise where data may hold competitive value and provide controls and guidance and leverage data platform solutions to secure data whilst enabling insights.
2. Organisations should recognise collaboration as a key strategic practice to deliver business value through data and digital approaches. Develop a 'model' to be able to evaluate and prioritise collaborative ways of working within a digital/data initiative portfolio.
3. Increase visibility of collaboration opportunities, industry level initiatives and accessible data sets. Create capability for organisations to flag new or sign up to join collaboration opportunities. Recognise and facilitate efficient and effective ways of working to enable contribution from SME's. One key focus area for the industry is identifying and accessing available data sets for own and collaborative use.

SUMMARY OF RECOMMENDATIONS

SECTION 1: CONTINUING THE DATA & DIGITAL JOURNEY

1. Individual organisations should review existing digital and data strategies and reposition such that:
 - a) The priority is 'business value' and identifying how and where opportunities exist to support an organisation's strategic goals.
 - b) A data strategy is prioritised over the wider digital strategy to capitalise on data technology developments (both industry specific and non-industry solutions), for both short and long-term value opportunities.
 - c) The digital strategy reflects both near term requirements for data strategy enablement (such as connectivity, interoperability, Internet of Things (IoT)) and long-term technology development (robotics, remote vehicles etc).
 - d) They adopt a 'continuous strategy' approach such that digital/data strategies remain 'agile' with shorter periods between review. This will ensure that the latest technologies, lessons learned and limiting factors (e.g. skill supply) are considered.
2. Organisations should lean into forums run by industry and government bodies and engage in collaboration opportunities at the energy sector level to leverage insights from the industry's existing digital maturity gains to help identify and specify business value.
3. Industry and government bodies should lead the development of playbooks for digital and data strategies that support leading industry practices. This will help to accelerate best practice adoption and enhance leadership buy-in. Focus areas should include SME organisations as a priority and offshore/onshore wind (in development and operation phases).
4. Individual organisations should ensure data strategies include investment into data management solutions and practices as well as structural agreements for application with supply chain partners.

SECTION 2: TECHNOLOGY APPROACHES ARE BECOMING BROADER

1. Individual organisations should review both workforce and leadership knowledge and understanding of data strategy and technologies with aim to identify opportunities for further training and awareness.
2. Assess readiness for an organisation's data sets and stakeholders to leverage related technologies (collaboration/sharing, quality/connectivity of data). Identify if and where policies and practices may be required to ensure these technologies deliver value.

Contd.

SUMMARY OF RECOMMENDATIONS

SECTION 2: TECHNOLOGY APPROACHES ARE BECOMING BROADER contd.

3. Further support for 'leading edge' solutions is required from individual organisations to help evolve from concept to integral industry 'way of working'.
 - Industry and government bodies can accelerate this by demonstrating to individual organisations how to identify, recognise value of and integrate leading edge solutions into digital and data strategies.
 - Industry and government bodies should also use forums and engagements with individual organisations to identify and encourage participation in collaboration opportunities.

SECTION 3: SKILLS ARE BECOMING A LIMITING FACTOR

1. Individual organisations to develop model for or adopt existing structured digital and data skills capability assessment, taking into consideration requirements for different sub-sectors and maturity of the organisation. Findings will help inform current and future technologies and strategies. BCS' SFIA Framework may be a suitable model for some organisations
2. Carry out a structured digital and data skills capability assessment across the organisation. Assess and review every two years to reflect fast paced changes in organisation and strategy.
3. Map the organisation's *capability* to both develop and adopt solutions and identify any limitations in strategy delivery. Adjust strategy to support teams with prioritising solutions clearly and avoid overloading teams with multiple changes.
4. Map the organisation's *capacity* to both develop and adopt solutions and recognise in strategies any limitations. Adjust strategy to support teams with prioritising solutions clearly and avoiding overloading teams with multiple changes.
5. Individual organisations should develop a blended approach in order to meet skills requirements which will include developing strategic relationships with service providers, vendors, agencies and consultancies. Being deliberate about a blended approach will help to make informed decisions about which combination may suit to fill skills gaps.
6. Individual organisations should reflect on organisation set up, culture and working arrangements and identify opportunities for modified/alternative ways of working that may be more appealing to the digital/data skills market and lead to an increase in applications for new roles and retention of existing roles.

Contd.

SUMMARY OF RECOMMENDATIONS

SECTION 4: ENABLING INNOVATION IS VITAL TO SUCCESSFUL TRANSFORMATION

1. Organisations should develop a centralised innovation role to identify and coordinate innovation activities across teams and projects. Part of this role will be to promote internal collaboration, reduce risk of duplicated efforts, minimise conflicting approaches and provide overall reduced cost. Funding and prioritisation may still be localised but still refer to broader business context.
2. Organisations should develop a centralised innovation model to provide consistency and transparency on innovation thinking across their company. Modelling the organisation (such as functions, headcount, contracts, cost of works) may help identify where innovation can add greatest impact or may require most effort and enable objective decision making, supporting an agile, strategic approach.
3. Organisations should seek out guidance on industry trends/best practices to reduce efforts to identify and select buy-in solutions.
 - a) Industry bodies should develop playbooks for typical organisations, reflecting on size and sector to help identify leading trends and suppliers, focussing on SME organisations.
 - b) Organisations should take part in industry groups and forums to leverage best practices and industry insights, especially in SME organisations where internal capacity is constrained.
4. Organisations should look for innovation to be increasingly influenced by external factors including technology, industry and supply chain trends to support collaborative ways of working and ensure strategies stay agile and adaptive to future capabilities and requirements.
5. Industry bodies should support the development of industry best practice to ensure the value of digital/data practices is part of procurement assessments. This will promote the use of existing and development of new solutions.

Contd.

SUMMARY OF RECOMMENDATIONS

SECTION 5: COLLABORATION REQUIRES A CULTURAL SHIFT TO DELIVER

1. Map and identify key opportunities at industry level for data-driven collaboration. Within these initiatives, specify value at industry and organisation level to be used in broader strategies. For each initiative, recognise where data may hold competitive value and provide controls and guidance and leverage data platform solutions to secure data whilst enabling insights.
2. Organisations should recognise collaboration as a key strategic practice to deliver business value through data and digital approaches. Develop a 'model' to be able to evaluate and prioritise collaboration ways of working within a digital/data initiative portfolio.
3. Increase visibility of collaboration opportunities, industry level initiatives and accessible data sets. Create capability for organisations to flag new or sign up to join collaboration opportunities. Recognise and facilitate efficient and effective ways of working to enable contribution from SME's. One key focus area for the industry is identifying and accessing available data sets for own and collaborative use.

RECOMMENDATIONS FOR INDUSTRY AND GOVERNMENT BODIES

From survey responses and follow-on interviews, it was observed that some approaches and changes that may support organisations and the sector on the data and digital maturity journey may be best approached at a sector level, supported by industry and government bodies, and through collaboration across several parties.

The following highlights the recommendations that such organisations may wish to consider and prioritise. See relevant sections for full details.

- Section 1, Recommendation 3 – Industry bodies should lead the development of playbooks for digital and data strategies that support leading industry practices. This will help to accelerate best practice adoption and enhance leadership buy-in. Focus areas should include SME organisations as a priority and offshore/onshore wind (in development and operation phases).
- Section 2, Recommendation 3 – Industry bodies should support organisations with how to identify, recognise the value of, and integrate leading edge solutions into digital and data strategies.
- Section 4, Recommendation 3a - Organisations should seek out guidance on industry trends/best practices to reduce efforts to identify and select buy-in solutions. Industry bodies should develop playbooks for typical organisations, reflecting on size and sector to help identify leading trends and suppliers, focussing on SME organisations.
- Section 4, Recommendation 5 – Industry bodies should support the development of industry best practice to ensure the value of digital/data practices is part of procurement assessments. This will promote the use of existing and development of new solutions.
- Section 5, Recommendation 1 - Map and identify key opportunities at industry level for data-driven collaboration. Within these initiatives, specify value at industry and organisation level to be used in broader strategies. For each initiative, recognise where data may hold competitive value and provide controls and guidance and leverage data platform solutions to secure data whilst enabling insights.
- Section 5, Recommendation 3 – Increase visibility of collaboration opportunities, industry level initiatives and accessible data sets. Create capability for organisations to flag new or sign up to join collaboration opportunities. Recognise and facilitate efficient and effective ways of working to enable contribution from SME's. One key focus area for the industry is identifying and accessing available data sets for own and collaborative use.

RECOMMENDATIONS FOR SMALL-MEDIUM ENTERPRISE ORGANISATIONS

From survey responses and follow-on interviews, it was observed that smaller organisations, typically SME size with less than 250 employees, were identifying similar challenges with their digital and data strategy. Furthermore, due to size and organisation structure/roles, some barriers and issues around digital and data maturity may be more significant for a company of this size in the sector.

The following highlights the recommendations that such organisations may wish to consider and prioritise. See relevant sections for full details.

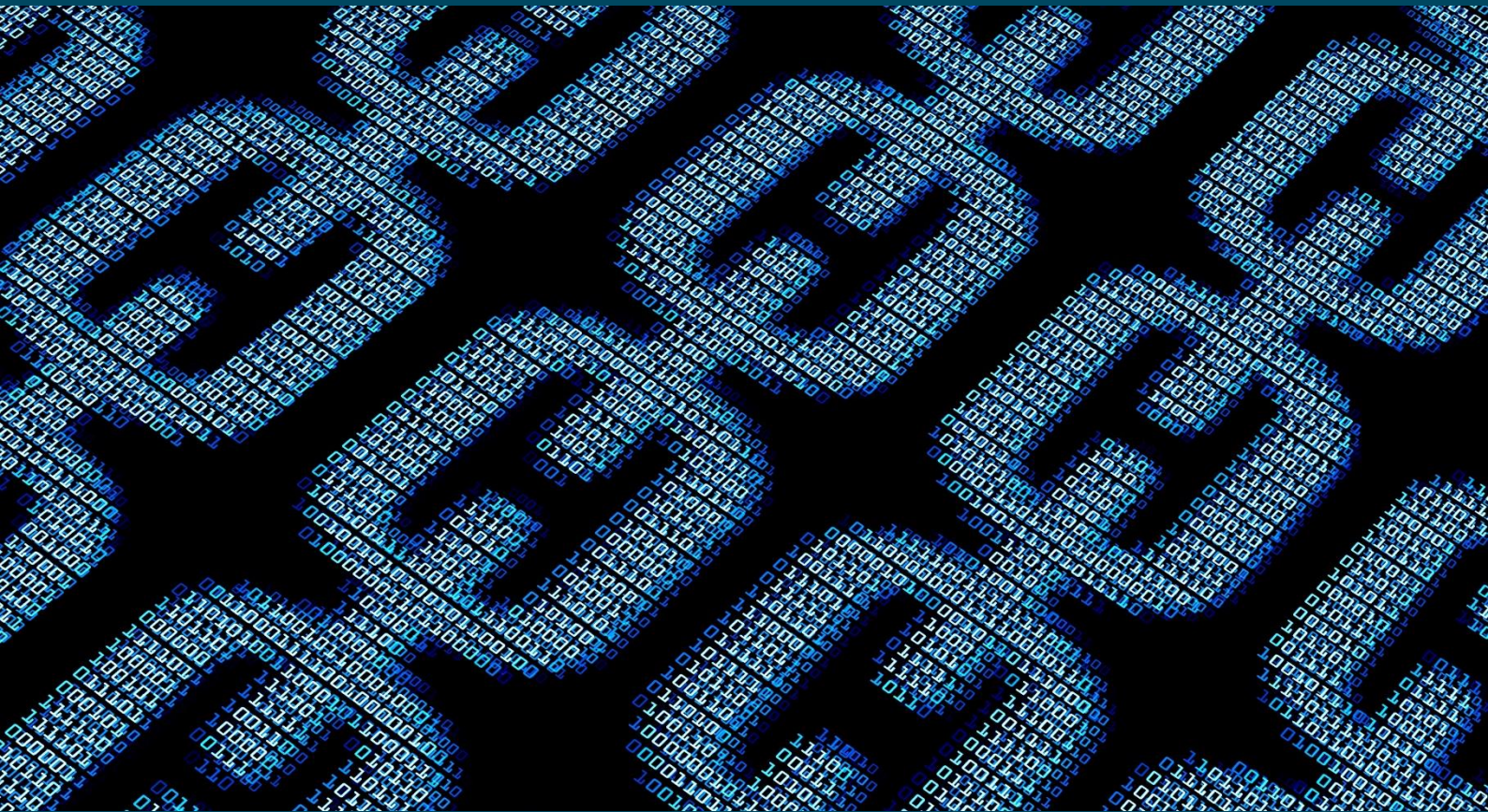
- Section 1, Recommendation 1a – Organisations should review existing digital and data strategies and reposition such that the priority is 'business value' and identifying how and where opportunities exist to support an organisation's strategic goals.
- Section 1, Recommendation 2 – Organisations should lean into forums run by industry and government bodies and engage in collaboration opportunities at the energy sector level to leverage insights from the industry's existing digital maturity gains to help identify and specify business value.
- Section 2, Recommendation 1 – Review organisation and leadership knowledge and understanding of data strategy and technologies with aim to identify opportunities for further training and awareness.
- Section 3, Recommendation 2 - Carry out structured digital and data skills capability assessment across the organisation. Assess and review every two years to reflect fast paced changes in organisation and strategy.
- Section 3, Recommendation 5 - Organisations should develop a blended approach to filling skill requirements including strategic relationships with service providers, vendors, agencies, consultancies. Use information on these approaches to be able to make informed decisions about which combination may suit filling skills gaps.
- Section 4, Recommendation 3b - Organisations should seek out guidance on industry trends/best practices to reduce efforts to identify and select buy-in solutions. Organisations should take part in industry groups and forums to leverage best practices and industry insights, especially in SME organisations where internal capacity is constrained.
- Section 4, Recommendation 4 - SMEs should look for innovation to be increasingly influenced by external factors including technology, industry and supply chain trends to support collaborative ways of working and ensure strategies stay agile and adaptive to future capabilities and requirements.

REFLECTION ON 2020 SURVEY RECOMMENDATIONS

Theme	2020 Recommendation	2023 Progress	2023 Reflection
Data	"...internal focus should continue, laying firm foundations for building the automated data processes required for more advanced analysis and decision making."	Notable progress (4/5)	Wide spread use of this technology in day to day operations with growing capability to develop and adopt new ideas
	"...organisations should apply the same principles to how they receive data from, or provide data to external suppliers, partners, and customers."	Limited progress (2/5)	As a whole the industry is operating with few collaborative data formats being adopted although some specific good practices exist where regulatory bodies enforce compliance.
	"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."	Limited progress (2/5)	Some instances of data standards being adopted into contracts but contract length and strategic approach is limiting progression
People & Culture	"A culture that defaults to digital is needed to ensure previous behaviours are challenged, and more efficient ways of working embraced."	Some progress (3/5)	More digital adoption is occurring with key technologies at an operating level but improvement in skills is still needed and more digital roles needed to support change and development of digital solutions

REFLECTION ON 2020 SURVEY RECOMMENDATIONS

Theme	2020 Recommendation	2023 Progress	2023 Reflection
Technology	“Where an organisation doesn’t have a digital strategy, it should consider developing one.”	Variable progress from Limited to Notable (2-5/5)	<p>There continues to be a spectrum of approaches to strategy with many organisations operating without explicit digital and data strategies, limited by the organisations capacity and skill set.</p> <p>Other organisations have been successful in evolving several iterations of strategies, tailoring to business function and delivering year on year improvements.</p>
	“...Where it does [have a digital strategy], it should consider whether its strategy gives enough weight to lower profile onshore functions such as logistics, finance, and procurement”	Some progress (3/5)	<p>Priority drivers and products still remain focused on operation and productivity benefits but several examples identified where investment is being made into systems to enable business function improvements such as SAP transformation or adopting cloud platform services</p>
Collaboration	“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.”	Some progress (3/5)	<p>Examples of initiatives and practices in the sector but limited examples of structural change in operations through technology solutions to enable true digital and data collaboration. However, increasing cloud solution approach will facilitate next stage in developments.</p>



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