Deloitte.

Digital Capital Projects
Realising value through
digital maturity

Capital project insights

Contents

Capital Project Insights is a series of papers bringing together the latest thinking from members of our team on optimising performance and value across the lifecycle of capital projects.

Executive summary
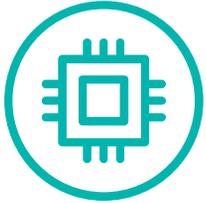
Realising the full value from digital transformation can only be achieved with an approach that encompasses multiple digital dimensions – across data, technology, innovation and people and culture.

Digital leaders are beginning to realise productivity increases of up to 30% through fundamental shifts in business and operational processes. However, the digital maturity journey for capital project organisations is complex, with numerous barriers to overcome in pursuit of full value.

One of these is the 'digital deluge' – the overwhelming amount of digital technologies, methodologies and terminology. For many organisations, the biggest difficulty is to develop a roadmap to digital which is balanced, focused on challenges rather than solutions and specific enough to make a genuine impact.

From our work at Deloitte with programmes globally across the entire capital projects sector we have distilled digital maturity into a successful outcome that can be characterised clearly and simply through four dimensions:

- A digital mindset that permeates teams, culture and behaviours within capital projects
- A data-driven approach encompassing all parts of the project
- An ongoing innovation process that tests the opportunities and value of technology, backed by a sustainable strategy that recognises the evolving nature of technology

- An approach to prioritising and deploying technology, with continuous learning and iteration at its heart, supported by a trusted network of technology partners.

Most organisations now understand the importance of digital
The pace of change within digital is rapid, vastly outstripping what most organisations are able to keep up with. Even in the past three years, attitudes to digital have shifted – with most organisations now having a digital strategy in place. Historically, digital transformation was often overly focused on the implementation of technology, but today organisations are beginning to realise the fundamental value of data in digital transformation.

Digital culture and innovation lag behind
Whilst data and technology are at the forefront of most digital transformations, innovation, people and cultural change are often overlooked. Regardless of how much effort is invested in data platforms, visualisation tools and data quality processes, the behaviour of people matters. Every time an individual submits data in a spreadsheet rather than providing access to the data source, progress towards digitalisation is undermined. Equally, without an innovation process that addresses the problems that the *whole* organisation is facing, the focus of attention may be on the wrong digital initiatives.

Digital Maturity Spectrum

DIGITAL MATURITY SPECTRUM

Passively Digital	Exploring Digital	Doing Digital	Becoming Digital	Being Digital
REACT	ANTICIPATE	INTEGRATE	COLLABORATE	ORCHESTRATE
Introduce only the minimum necessary digital technology advances to meet minimum industry standards and market demands	Leverage traditional technologies to introduce digital technologies into existing capabilities. No change to the organisation	Leverage digital technologies and data to extend capabilities, but still largely focused around the same business and operating processes	Moving from technology led to business led, with digital capability permeating the organisation and significant changes to processes	Business and operating processes are optimised using digital, and are very different from the previous ways of working

What is digitalisation?

Digitalisation refers to use of data and technology to make fundamental changes in business and operational processes, with change being supported by organisational agility and focus on innovation.

Organisations have been introducing 'digitisation' initiatives for many years - using data and technology to enhance existing business processes. However, true 'digitalisation' offers far more significant opportunities, and represents a fundamental change to how an organisation operates.

A basic definition of digitalisation is that it "involves the use of data and technology to gain additional insight, support better decision making, reduce risk and improve efficiency across the organisation". We have found it useful to break down digitalisation into four elements: People & Culture, Data, Innovation and Technology. All of these must be supported by a robust digital strategy.

Digital Maturity is low in Primary Capital Project Sectors

Digital Maturity Index[1]

Sector	Value
Technology	3.2
Telecom	3.1
Travel, Hospitality & Leisure	3.1
Banking & Securities	2.9
Media	2.8
Automotive	2.8
Retail & Distribution	2.7
Real Estate	2.4
Consumer Products	2.2
Insurance	2.2
Health Plans	2.1
Process & Industrial	2
Aerospace & Defence	1.9
Life Sciences	1.8
Asset Management	1.6
Power & Utilities	1.4
Oil & Gas	1.3

● **Primary Capital Project Sectors**   ● **Secondary Capital Project Sectors**

People are the foundation for change

As with any transformation within organisations, people and culture are a crucial influence. Regardless of how much change there is in tools, technology and processes, it is mindset, behaviours and ways of working that make something 'feel different'. A useful analogy for many capital project organisations is the impact of HSSE (Health, Safety, Security and Environment) and how this is driven within an organisation. A strong HSSE culture seen throughout the oil and gas, mining and construction sectors, is driven by a set of acceptable behaviours that are universally understood. A strong digital culture is driven by behaviours, not through formal learning or process implementation.

Data is a pre-requisite, but not the full story

Data is often seen as the 'place to start', with the three main divers of digital investment being to increase access to data, increase data quality, and increase levels of insight gained from data. High quality, accessible and (critically) well-linked datasets are a pre-requisite for gaining value from digital, but data can also act as a barrier. Over-investment in data (and the challenges of legacy, cross-functional systems and structures) can result in digital transformation programmes being halted in their tracks before benefits are realised.

An innovation process supports bottom-up transformation

Organisations that are leading in digital transformation are taking a 'bottom-up' approach – initiatives are sourced mainly from the challenges that operational teams are having to overcome, rather than from a leadership or 'top-down' view. The implementation of many initiatives fails because the user group is not sufficiently engaged and ideas come instead from leaders who force them on the teams that will apply them. In its most simple form, an innovation process helps identify, nurture, pilot and scale digital 'ideas' from across the business.

Technology turns data into insight

Technology turns data into insight, from simple reporting dashboards that support decision making, to physical technologies such as drones, wearables and robotics. Investing in clusters of technology will bring better results than a piecemeal or scatter-gun approach. The digital strategy, and thorough understand of the digital maturity of the organisation will help to determine which technologies will add value, through an understanding of both the potential impact, and ease of implementation.

[1] Deloitte Digital Maturity Index
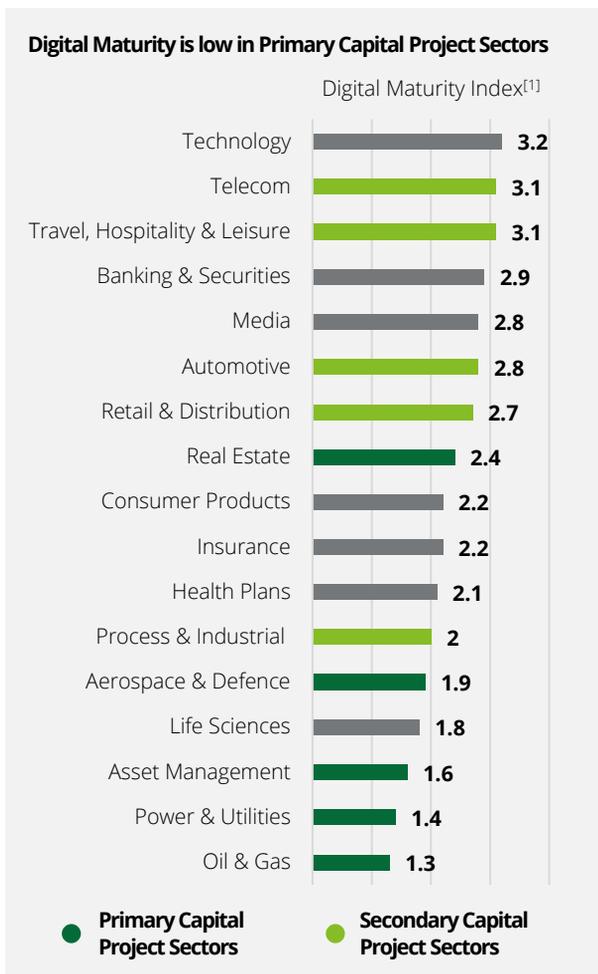
What's the value of digital?

Articulating the value of digital can be a challenge. However, organisations that get digitalisation right are seeing productivity increases of up to 30%, with savings to be made across programme life cycles.

The immense cost of programmes within the capital project sector compared to other industries increases both the risks and opportunities from digital implementation.

Where oil rig rental costs for an operator reach $250k+ per day, the cost of technology failure during a critical phase of operations is high, and this risk adds to the barriers that must be overcome to deploy digital initiatives in the first place. On the other hand, the operation phase of many capital projects lasts dozens of years, and even a small % OPEX saving represents a significant amount overall.

Within the past year, a growing number of household-name businesses have announced net-zero targets. Digital technology will be at the forefront of achieving them, delivering over one-third of the carbon emission reductions required by 2030[1]. The challenge for many organisations is to demonstrate the tangible benefits, and it is here where the industry's typical waterfall methodologies may come unstuck. As with most technology deployments, the most successful initiatives are introduced to the end users at the earliest

possible point – ideally as part of a co-design process between the operational and digital teams. Once a successful proof of concept is developed, it should be piloted and scaled as appropriate, with funding released in stages. As with any capital programme, appropriate metrics should be used to demonstrate the tangible impact that digital initiatives are having. Metrics that indicate the levels of engagement with digital tools are also useful for showing progress too.

Through our work with organisations across the sector, the biggest opportunity presents itself during the engineering design phase of the project. A reduction of up to 30% in engineering hours[2] can be achieved with analytics tools that provide rapid access to information, support collaboration in the design process across geographies and functions, and manage workflows. Slightly smaller but still substantial OPEX and CAPEX savings can be achieved across construction, operations and asset management, and decommissioning – even a 1% saving over the 25+ years of an asset's life can be significant.

Digital value across the life cycle[2]

Engineering & Procurement
10-30% reduction in engineering hours

Construction
10-15% reduction in build costs

Operations & Asset Management
10-20% reduction in handover/maintenance costs

Decommissioning
5-10% reduction in decommissioning costs
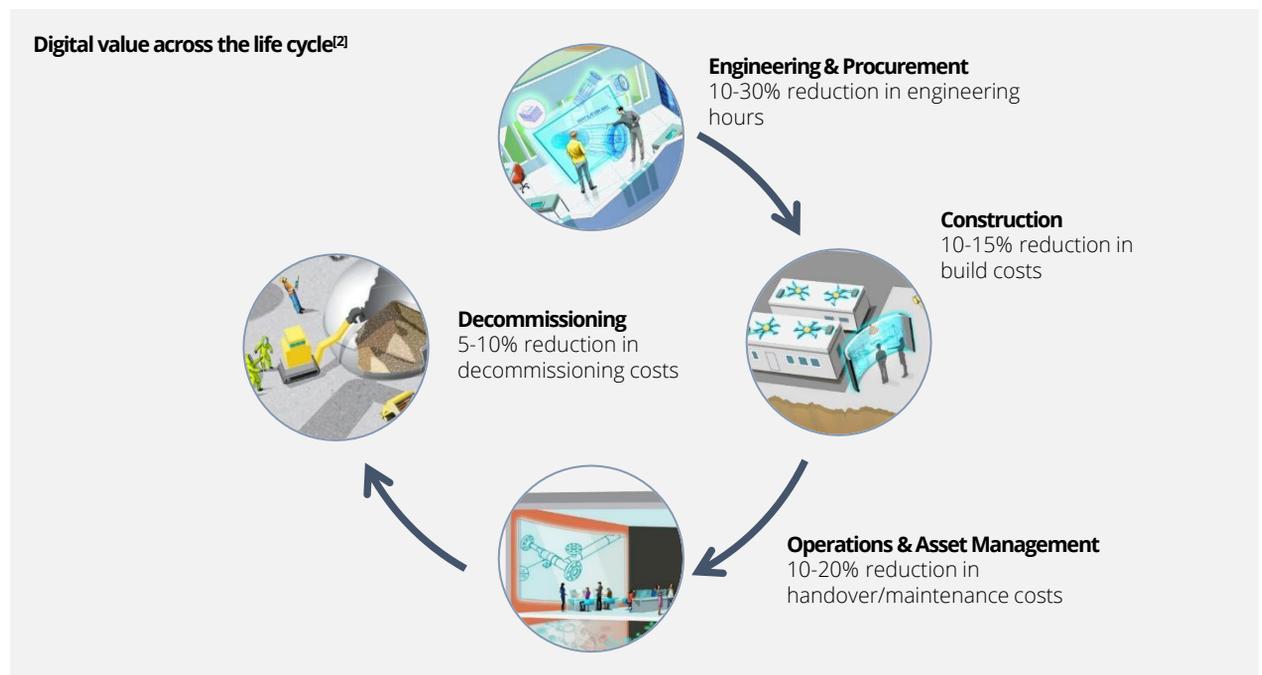
[1] Royal Society Digital Technology and the Planet Report 2020
[2] Deloitte cross-industry analysis

Barriers to overcome

BARRIER

SOLUTION

By their nature, capital projects are complex. This makes transformation more challenging than in other industries

Implement digital initiatives by starting small and scaling up. Initiatives that attempt to cover the whole organisation will struggle to find footing.

Reliance on the supply chain means that individual projects/organisations cannot transform on their own

Form strategic relationships with organisations that share the same intent. Innovative approaches to contracting have a part to play.

High cost of failure and high aversion to risk due to significant spend during the construction and operational phases – compared to other sectors

Incentivise innovation and continuous improvement. A cultural shift must take place to tolerate failure and encourage experimentation.

Engineering mind-set is often at odds with agile ways of working which are usually more appropriate for the implementation of digital

Support development of agile mind-set. Support the development of behaviours and mind-set rather than rushing to implement Scrum/Kanban.

Introduction of new safety risks from unproven digital solutions may impede rapid rollout, requiring time to test suitable mitigating measures

Regardless of the implementation approach to be used, proper governance is still required. Agile deployment doesn't mean no governance!

Commodity price fluctuations in mining/oil and gas have led to a stop and start approach to digital transformation

Adopt a benefits tracking mindset from the start. The potential for reducing costs through digital is huge, but only if a robust business case exists.

'Expertise-intensive' organisations are more common in capital projects – it takes time to encourage teams to adopt new ways of working.

Business change management is critical. Involve delivery / operations teams early – digital can be intimidating to those 'on the outside'.

The Digital Maturity Model

Digital maturity derives from the ability to embrace digital fully across all aspects of a capital project organisation. Understanding these aspects is vital for leveraging the true value of digital

To fully embrace the value that digital has to offer, capital project organisations must transform their ways of working, improving control on digital both inside their own organisation and throughout their supply chain.

A framework to understand digital

Our Digital Maturity Model provides a framework for identifying where your organisation can best leverage the potential value of digital. From our experience, there are five dimensions that underpin digital in capital project organisations, alongside a robust digital strategy.
The Model is broken down into twenty sub-dimensions, and further into 83 digital criteria.

Each sub-dimension focuses on a key aspect of digital maturity. Capital project organisations must have a clear vision to guide the development of a robust strategy. The strategy should encompass the development of people and culture to support digital ways of working; a mechanism for funding, piloting and scaling innovative ideas from across the organisation; resilient data management providing a foundation for digital and supporting enhanced decision making; and prioritisation of the right technologies for the right problems with the right support for successful uptake. A digital diagnostic can be completed against a number of criteria for each sub-dimension, across five levels of maturity.

Example Criteria: Innovation – Process

1	**Ad-hoc**	• Formal innovation process does not exist. • No established innovation forum for discussion of digital developments.
2	**Developing**	• Innovation process exists, but may be poorly defined or used to a limited capacity. • Some oversight exists, either through a regular governance forum or senior management review.
3	**Established**	• Innovation process established with 5+ initiatives at varying stages of development. • Innovation process well-structured and reviewed at regular intervals.
4	**Enhanced**	• Innovation process established with 5+ initiatives at varying stages of development. • Standardised approach and automated process for submission of ideas.
5	**Optimised**	• Highly iterative innovation process well established with 10+ initiatives at varying stages of development. • Digital idea submissions process well-publicised and extensively used. • Innovation governance forum attended by leaders from across the organisation.

An 'optimised' digitally mature capital project organisation will be fully leveraging digital across the maturity model dimensions.

Maturity model dimensions and sub-dimensions

Strategy & Vision	People & Culture	Innovation	Data	Technology
Strategy	Culture	Process	Governance	Deployment
Sponsorship	Training	Funding	Analytics	Usage
Drivers	Skills	Collaboration	Management	Partnership
Change	Organisation	Value	Exchange	Prioritisation

Sub-dimensions

83 digital criteria
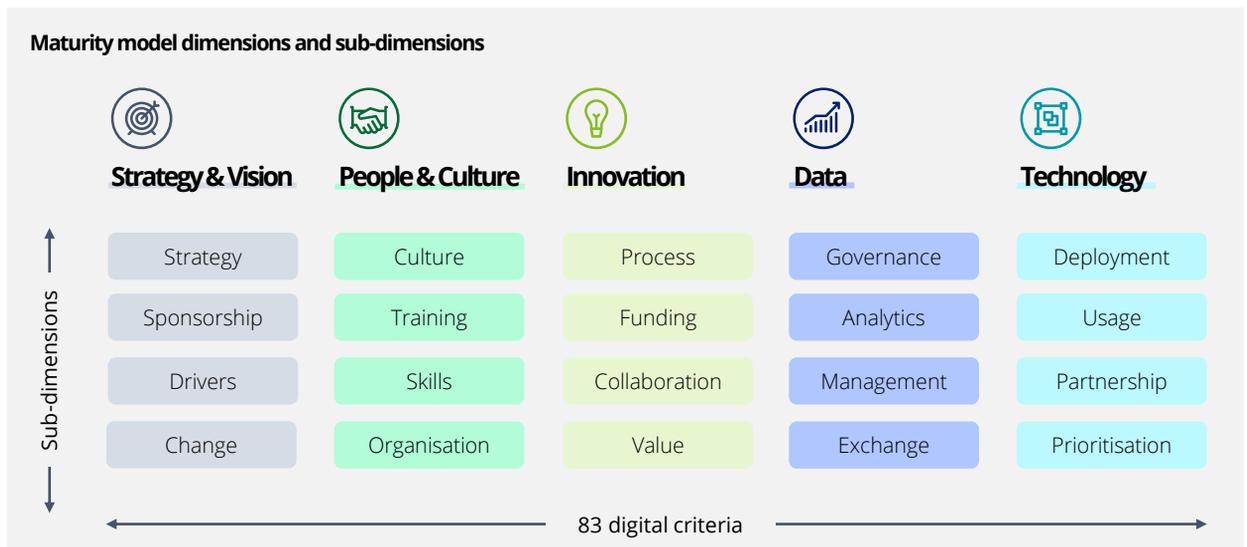
Dimension 1: Strategy

Vision and sponsorship from the top of an organisation is key for any transformation or shift in ways of working. Digital is no different. A clear strategy is vital in ensuring a successful transition to digital.

A truly digital capital project organisation will have a well-communicated and consistently reinforced strategy encompassing data, innovation, people and technology, with a roadmap that sets out the plan for improving digital capability.

The strategy will be sponsored by leaders across the organisation, with change initiatives led by project teams with support from IT/digital when required. A capital project organisation showing high performance around strategy and vision will also have a clear understanding of how digital drives value, with performance metrics established, monitored and widely understood.

It is key that this vision should extend outside the parent organisation. A recent Deloitte digital study across the UK Oil

Strategy Subdimensions

Strategy
Well communicated long term vision and plan for an organisation.

Change
Robust change management approach with impact understood.

Sponsorship
Strong and proactive leadership, with the role of championing digital.

Drivers
Clear understanding of how digital drives value and how these will be tracked and monitored via KPIs

and Gas industry revealed the significant influence of the supply chain on digital transformation. In an industry that is heavily reliant on supply chain partners, digital transformation must take place across the ecosystem.

Iterative development of strategy drivers

What is our winning aspiration? → Where will we play? → How will we win? → What digital initiatives must we have? → What management systems do we need?
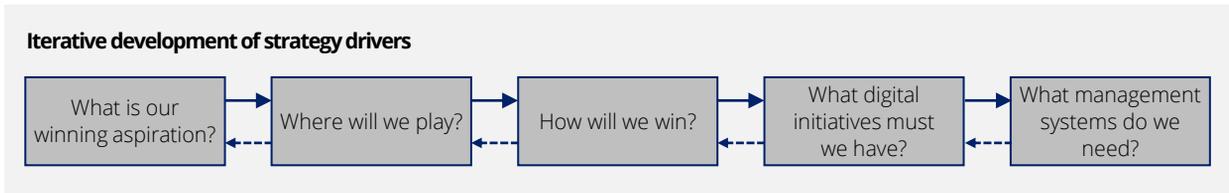
Dimension 2: People and culture

Mindset, behaviours and ways of working are fundamental drivers of organisational transformation.

Creating a digitally competent organisation and workforce involves developing a culture that is open to change. With rapid advances in data and technology, individuals must be given clear direction and encouraged to enhance their skills through digital training and access to support materials and appropriate tools.

Within the Deloitte Digital Maturity Model, a high performing digital capital project organisation will have teams and individuals championing digital across the organisation, moving away from a mind-set that digital is driven by the IT function to one where it is driven by people within the business itself.

This, alongside capability programmes to support high digital

Levels of digital capability

Level 1	"I am digitally capable enough to do my job. I understand how to use the digital technologies and solutions within my role."
Level 2	"I have sufficient understanding and experience to identify how I could use digital to do my job more efficiently and safely."
Level 3	"I have a deep conceptual and practical understanding of digital which enables me to drive digital change within my team and wider."

literacy and a culture where leadership openly supports digital growth and employee led initiatives forms a strong basis for leveraging the value digital has to offer.

People and culture sub-dimensions

Culture
Fail fast, learn fast culture built into how people are recognised and rewarded.

Skills
High digital literacy with competency frameworks and development pathways in place.

Training
Support and training available across the organisation with clear direction and guidance.

Organisation
Data and technology an integral part of how an organisation operates championed across functions.

Dimension 3: Innovation

Innovation stems from a desire to learn, deliver improved efficiency and effectiveness, or gain a competitive edge. More often than not, innovation comes from within an organisation or from close partnerships with others.

In an innovative capital project organisation Deloitte's Digital Maturity Model identifies high performance in four key sub-dimensions. A well-documented innovation *process* with regularly reviewed and stage gate-assessed *funding* is key. A Focus around *collaborative* and cross-organisation inputs, with clear metrics to support growth and engagement, are also vital for ensuring that organisations fully understand the *value* that digital has to offer.

The most successful approaches to innovation start by identifying challenges within the business that are raised by delivery teams. This ensures that initiatives will solve real problems, rather than those perceived by leadership, or generated through comparison with other organisations.

Bottom -up vs. top-down influence on innovation

Bottom-up influenced

Top-down influenced

What areas of business process can we improve?

What are other industries doing?

What challenges do our teams face?

How can we differentiate ourselves in the market?

Can we build on what we already have?

What do our customers want?
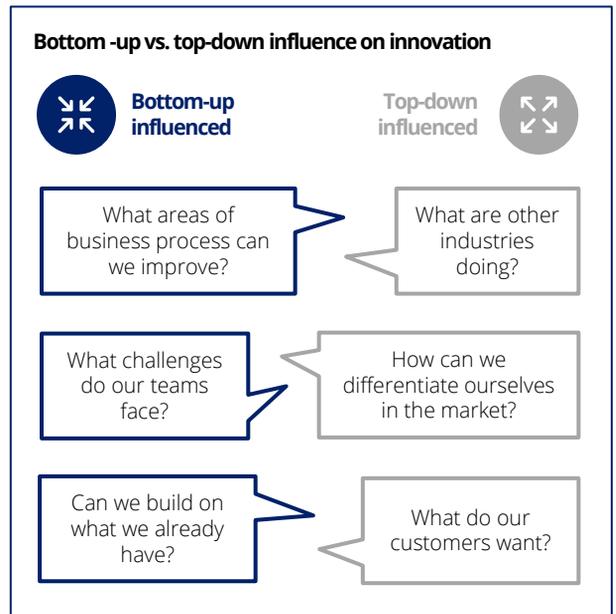
Innovation sub-dimensions

Process
Well-documented and functional system for forming, developing and testing of new ideas.

Funding
Regularly-reviewed and accessible funding available for digital innovation.

Collaboration
Multi-disciplinary and highly visible innovation progress bringing in users as early as possible.

Value
Clear metrics to measure progress with innovation projects, with review from engaged stakeholder groups

Dimension 4: Data

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

Digital data maturity comes from ensuring that four key sub-dimensions are in place.
- Clear governance structures and processes across an organisation, and with adherence across the supply chain.
- Strong analytics to inform proactive decision making and provide aligned and insightful reporting capabilities across the organisation.
- Resilient data management with a clearly defined data architecture, quality management processes, and compliance with both internal and external standards and policies.
- Managed and maintained data exchange processes within an organisation and externally, across the supply chain, with reduced reliance on spreadsheets.

In recent years, organisations have increasingly recognised that data is fundamental to digitalisation. However, there is still some way to go to before users (and not just leadership) feel the benefits of data quality, accessibility and the ability to leverage data for performance improvement.

Although, data quality and governance may seem the obvious place to start, it is just as important to make data accessible, insightful, and easy to share across the organisation. The risk with focusing purely on data quality is that the appetite for transformation may be lost as the overall task of improving data quality across the entire organisation quickly appears too difficult.

The challenge, as with all transformation, is to reach and maintain a new level of data maturity. Taking a structured view to operationalising data maturity is critical - Deloitte has developed a data strategy framework to support – across governance, analytics, management and exchange.

Data subdimensions

Governance
Clear structures and processes detailing how data is to be managed and monitored.

Analytics
Robust tools and reporting capability to inform decision making.

Management
Defined structure and ownership with rigorous attention to compliance and security.

Exchange
Accessibility, immediate usability and accurate understanding of shared data sets

Dimension 5: Technology

Technology is an area where capital project organisations can access large pockets of value both in operational and non-operational areas of the organisation. However, a rushed deployment of technologies can leave an organisation open to both financial risk and significant delays. To maximise the opportunities for digital growth and adding value from digital technologies, organisations need to put several building blocks in place ahead of deploying a new technology or set of technologies across the organisation.

The Deloitte Capital Programmes team have experience working with clients where the breadth of new and evolving technologies available, and being pursed in parallel, prevented their successful deployment. Successful implementation of new technologies across an organisation calls for a digital roadmap designed to address specific problems, (preferably identified by teams on the ground), alongside a prioritisation methodology that gives each technology the attention required to ensure appropriate planning, buy-in, skills, and training ahead of deployment.

The prioritisation should be informed by the overall areas where digital is trying to contribute (e.g. productivity, health and safety, production improvement) and should take into account the ability to leverage multiple similar technologies in clusters. This should lead to a

Technology sub-dimensions

Deployment
Roadmaps with agile methods in place for roll out of digital initiatives

Usage
Technologies utilised, understood and funded across all functions

Partnership
Internal and external partnerships in place to develop digital capability with key metrics

Prioritisation
Digital technologies grouped and prioritised against value and ease of implementation

sensible number of technology initiatives, linked to areas of value, and ideally making the most of shared and connected datasets.

Notably, organisations that utilise cloud-based solutions innovate more easily and bring new capabilities to market more quickly, accelerating their growth potential; while also reducing technology risk. Continuously proving the value of technology and gaining stakeholder buy-in is critical for success, and to ensure that rollout doesn't end before any value is realised.

Digital initiative prioritisation matrix : Example

Size corresponds to potential impact

EASE OF IMPLEMENTATION

Smart hard hats

Visualisation and analytics

Mobile / Tablet

Wearables

Concept model visualisation

3D printing

Cloud

Drones

AR / VR

Autonomous vehicles

BIM

Machine learning

Block chain finance

Modular construction / pre-fabrication

Cyber security

Artificial intelligence

IoT / Digital twin

Robotics and automation

| Horizon | Concept | Adopting | Established | Common |

LEVEL OF MATURITY IN CAPITAL PROJECTS

The digital journey

At Deloitte we have helped organisations across the industry understand where they're at, where they need to be, and what they need to focus on to develop their digital maturity in a holistic way.

Using a digital diagnostic we will work with you to develop three key artefacts to support in your digital transformation journey.

Maturity assessment
Through interviews and self-assessments by leaders across the business, we will help you to get a full picture of your digital maturity, across 5 dimensions, 25 sub-dimensions and 80+ digital criteria. This will help your understanding of where you're strong, where you've got further to go, and where digital is holding you back. All too many transformation programmes fail from a poor understanding of the digital state of the organisation, which may result in making large investments on the wrong area. Regardless of the level of investment in digital, the maturity assessment provides a useful baseline against which to compare progress.

Digital charter
Following the maturity assessment, we will work with you to develop a digital charter. This provides clarity on the focus and aspirations for digital transformation. There are three key elements of the digital charter – the 'vision', development of the value drivers for digital, and the priority initiatives that will support the value drivers.

Ensuring that all those involved in digital transformation are brought into development of the charter is important, undertaking a successful transformation requires engagement and leadership from those delivering digital.

Transformation Plan
The maturity assessment and the digital charter provide the 'bookends' to support transformation – the baseline against which progress is measured, and the vision to give an understanding of both the short term targets, and longer-term goals.

The digital transformation plan sets out the activities required to develop the encompassing strategy and vision, process, governance, organisation and data and systems – with varying focus on certain elements.

For some organisations, the transformation plan may be a first step in seeking investment for a long-term, wide-ranging programme, and will be able to provide assurance that a well defined plan exists. Others may decide that for their transformation plan should focus on a small number of initiatives identified by the maturity assessment, with a more iterative approach to development over time.

End-to-end transformation approach

Start here → **Maturity assessment** — Understand existing maturity, using our Digital Maturity Model as the foundation for a comprehensive assessment. → **Digital charter** — Setting the high level digital strategy, providing clarity on the aspirations for digital transformation, and the key value drivers. → **Transformation planning** — Create an investment plan considering economic drivers against a robust evaluation model.

1. DIGITAL DIAGNOSTIC

Digital ambition delivered ← **Transformation delivery** — We'll drive you digital transformation, ensuring that genuine change is delivered across the organisation. 3. TRANSFORM ← **Operating model** — A digital operating model will provide clarity about the change across strategy, organisation, process, governance and systems. ← **Initiative prioritisation** — Aligning your portfolio of technology and data initiatives to your value drivers to ensure you are focussing in the right areas

2. DIGITAL OPERATING MODEL

Get in touch

We have supported digital transformation for some of the world's largest capital project delivery organisations

**Marc O'Connor
Partner**

Global Capital
Programmes Leader
maoconnor@deloitte.co.uk

**Hani Girgis
Partner**

Global Digital Capital
Projects Leader
hgirgis@deloitte.co.uk

**Guri Neote
Director**

UK Digital Programme
Architecture Leader
gneote@deloitte.co.uk

**David Hope
Director**

Digital Programme
Architecture
dhope@deloitte.co.uk

**Ed Lambourn
Manager**

Digital Capital Projects
elambourn@deloitte.co.uk

**Heather Campbell
Senior Consultant**

Digital Capital Projects
hcampbell@deloitte.co.uk

Thought Leadership

Digital Capital Projects

The Capital Project
of the Future

UK Oil and Gas Digital Maturity Report

Produced in partnership
with Oil & Gas UK

Digital Construction

Business Case for Digital
Technologies
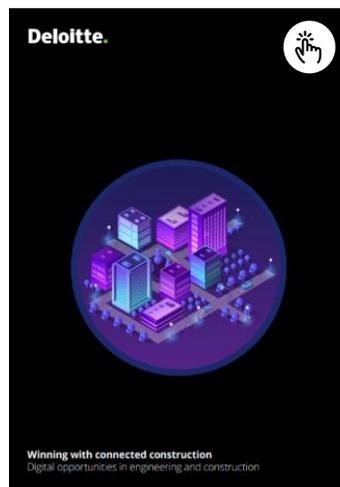
Connected Construction

Digital in Engineering
& Construction

Notes

Authors: Guri Neote, Ed Lambourn, Heather Campbell

Deloitte.