

Electricity
Transmission

Deriving Value from the Utilization of Digital Technologies

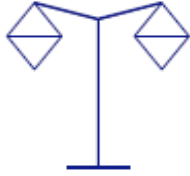
Derrick Dunkley
Data Lifecycle Manager

nationalgrid

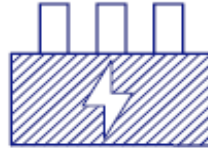


Electricity Transmission

Together we take care of:



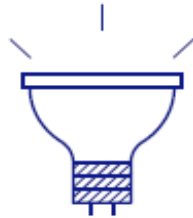
4,474
miles (7,200 kilometres)
of overhead line



346
substations at around
240 sites



969
miles (1,560 kilometres)
of underground cable

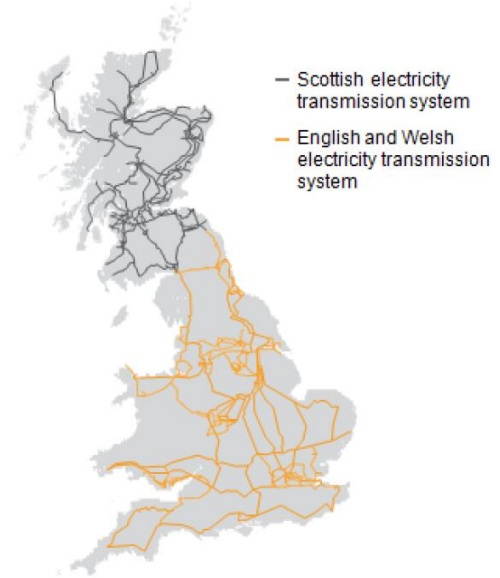


99.999984%
reliability during 2017/18

**We keep the lights on in
England & Wales!**

**The motorways and A
roads of electricity
transportation!**

**“comprised of a diverse set of
assets with **different policies
and specifications** to support
the efficient and coordinated
management of the assets”**



**Are you missing an opportunity
to extract value from your data?**



Digitisation

Digitisation is the automation of existing manual and paper-based processes, enabled by the Digitisation of information; from an analogue to a digital format.



Digitalisation

Digitalisation means the use of the digital technologies and of data (digitised and natively digital) in order to create revenue, improve business, replace/transform business processes (not simply digitising them) and create an environment for digital business.

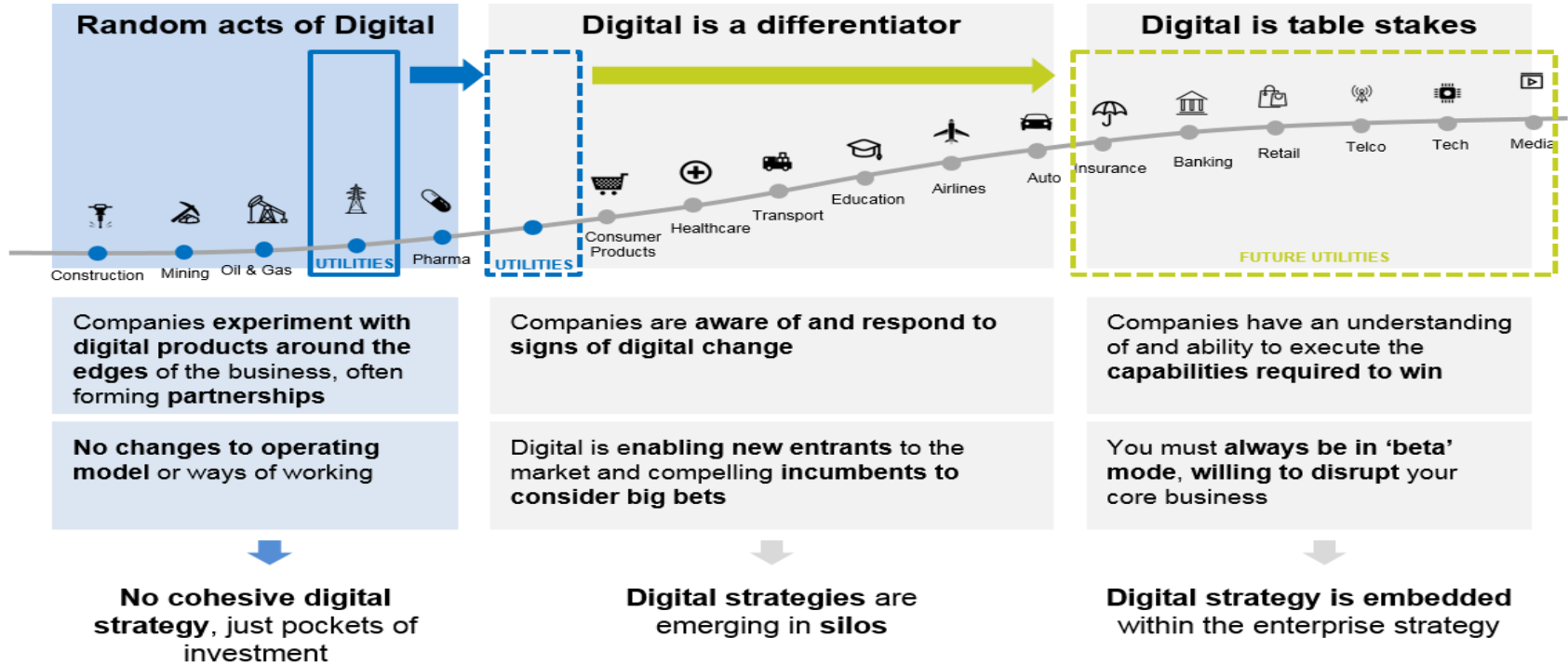


Digital Transformation













Digital transformation is the profound and accelerating transformation of business activities processes, competencies and models to fully leverage the changes and opportunities of digital technologies and their impact across society in a strategic and prioritized way.



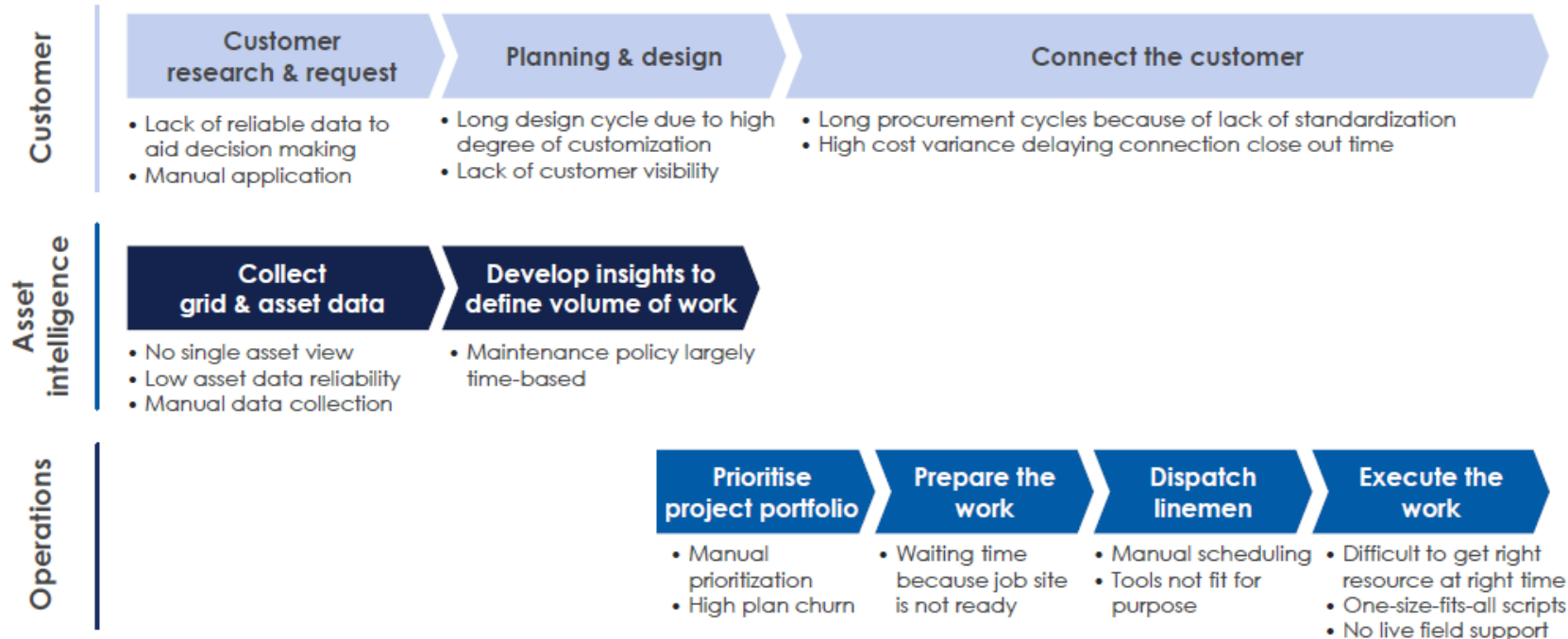
Utilities are in the early phase of digital transformation



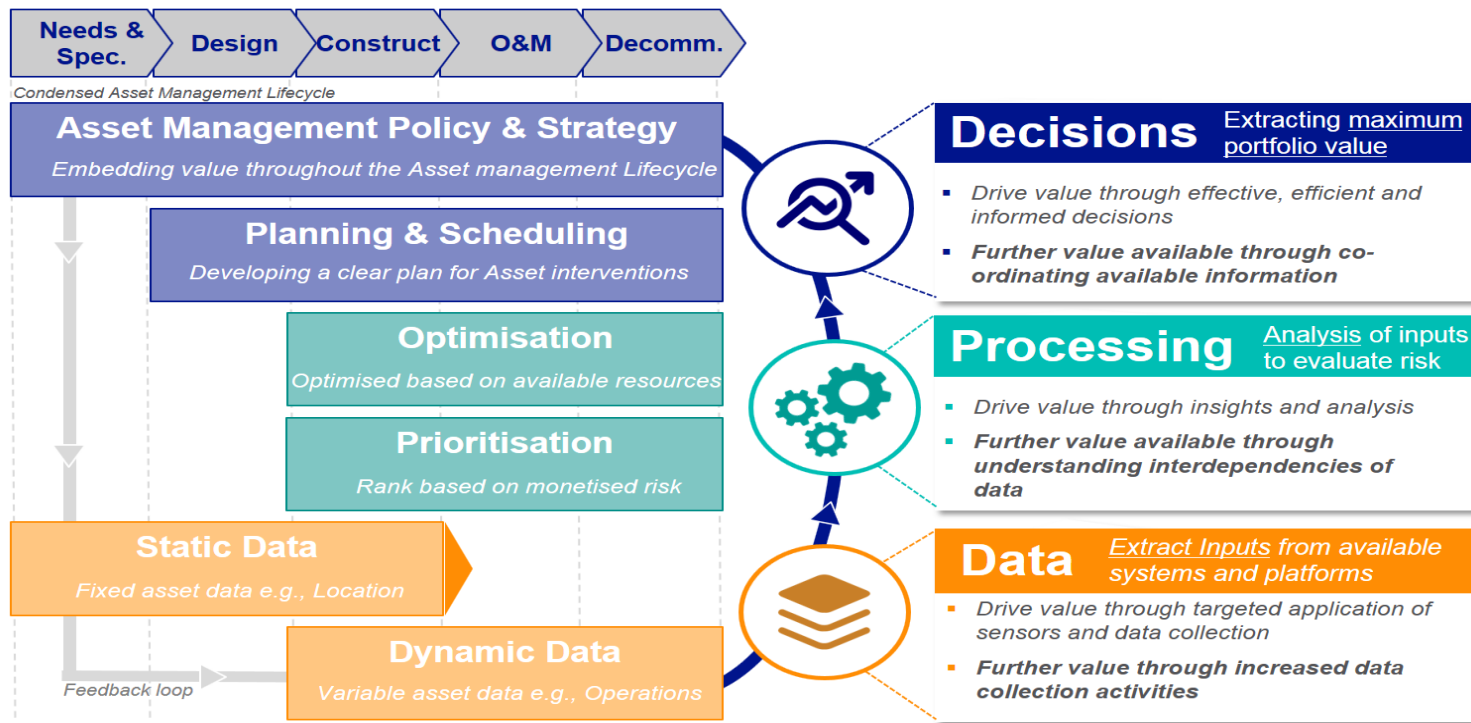
New and emerging digital technologies also exist with many potential applications for National Grid

Internet of Things		<ul style="list-style-type: none"> The interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data <i>E.g., Connected domestic thermostat to remotely control heating</i> 	Productivity		<ul style="list-style-type: none"> Enabling the knowledge, tools and resources of employees to perform their role and function efficiently and effectively <i>E.g., Collating all data in users into a single environment or platform</i>
Augmented & Virtual Reality		<ul style="list-style-type: none"> Overlaid computer-generated images on a user's view of the real world <i>E.g., Route guidance and directions overlaid on digital glasses</i> 	Collaboration		<ul style="list-style-type: none"> The action of working with all stakeholders to deliver something <i>E.g., Web conferencing and team video calls</i>
Blockchain		<ul style="list-style-type: none"> A digital ledger in which transactions can be made using a cryptocurrency, recorded chronologically and publicly visible <i>E.g., Trading platform for decentralised energy generated in the home</i> 	Mobility		<ul style="list-style-type: none"> The ability to move or be moved efficiently and effectively <i>E.g., iPad applications for remote working</i>
Artificial Intelligence		<ul style="list-style-type: none"> The theory and development of computer systems able to perform tasks normally requiring human intelligence <i>E.g., Speech recognition and translation of language</i> 	Connectivity		<ul style="list-style-type: none"> Facilitates the capacity for the interconnection of platforms, systems and applications <i>E.g., Employee database directories</i>
Automation & Robotics		<ul style="list-style-type: none"> The use or introduction of automatic equipment in a process <i>E.g., Automated production line in vehicle manufacturing</i> 	Communication		<ul style="list-style-type: none"> The means of sending or receiving information <i>E.g., Instant messaging capability</i>
Cyber Security		<ul style="list-style-type: none"> A set of techniques used to protect the integrity of networks, programs and data from attack, damage and unauthorised access <i>E.g., Virus protection installed on portable laptop computers</i> 	Workflow		<ul style="list-style-type: none"> The sequence of industrial, administrative, or other processes through which a piece of work passes from initiation to completion <i>E.g., A manufacturing production line, progressively building a vehicle</i>

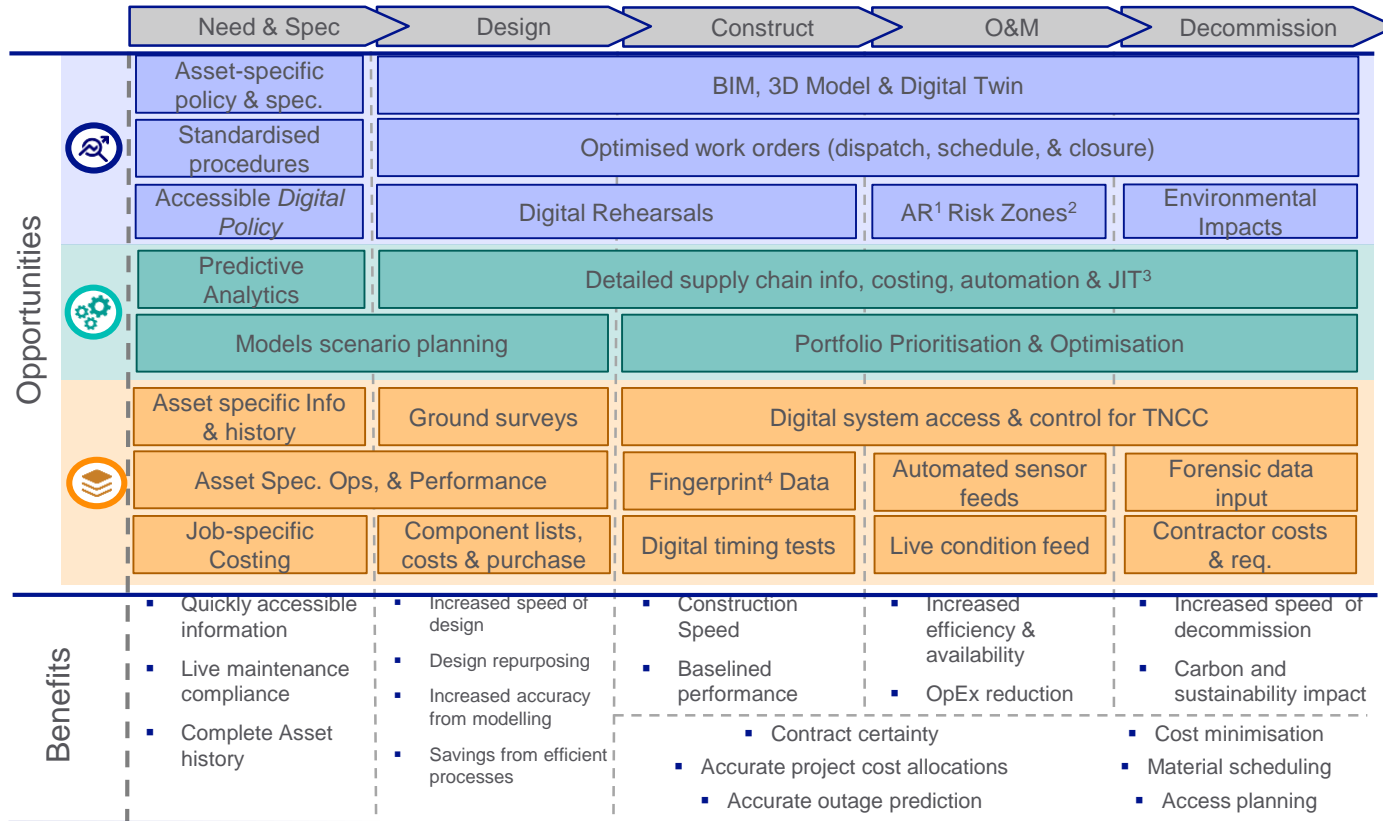
Organisational Reality



Digital applications exist across the Asset Management Lifecycle; value-driven decisions from Processed Data



Digital opportunities present benefits throughout the Asset Management Lifecycle



[1] AR – Augmented Reality (In the form of head-set visualisation)
 [2] Risk Zones; More specifically Risk Management Hazard Zones (RMHZs)

[3] JIT – Just in Time production
 [4] "Fingerprint" is the initial performance data when an asset is commissioned, acting as a baseline for future reference

Focus areas for National Grid

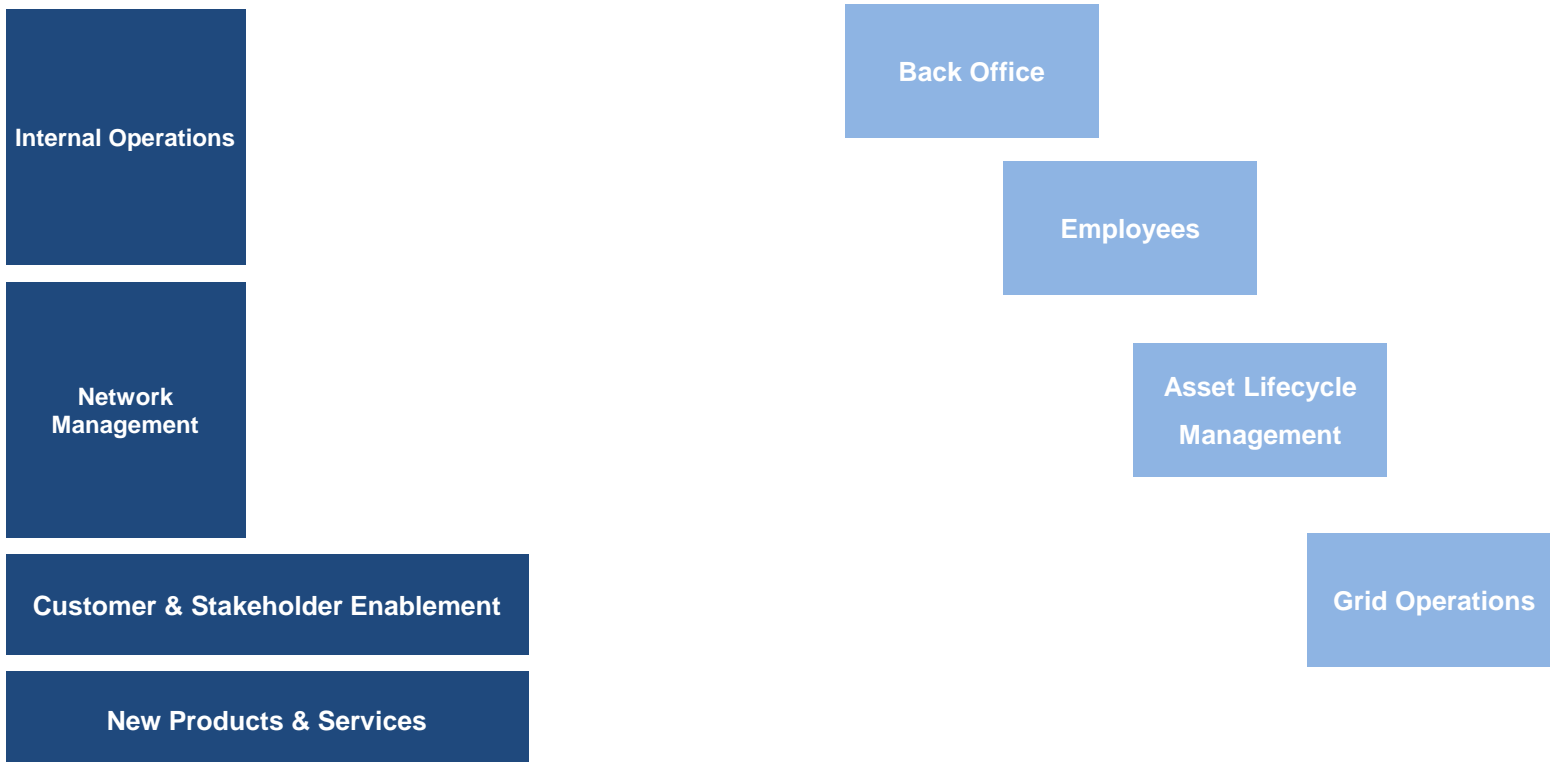
Internal Operations

Network
Management

Customer & Stakeholder Enablement

New Products & Services

Focus areas for National Grid



Focus areas for National Grid

Focus Areas		Definition	Example Application
Internal Operations	Back Office	<ul style="list-style-type: none"> Automation and optimisation of processes and outputs to drive performance and efficiency, using digital tools and capabilities 	Reduced human intervention through automation <ul style="list-style-type: none"> <i>E.g., German utility automated 50-80% of finance function processes through robotic process automation (RPA)</i>
	Employees	<ul style="list-style-type: none"> Optimised employee output, to drive performance and efficiency using digital tools and capabilities 	Digital tools and mobile enablement for field force <ul style="list-style-type: none"> <i>E.g., PG&E'S mobility tool with integrated GPS technology enables dispatchers to act in real-time on automated alerts to drive technician performance</i>
Network Management	Asset Lifecycle Management	<ul style="list-style-type: none"> Optimisation of intervention planning, scheduling and resource dispatch using automated digital solutions 	Predictive maintenance analytics and techniques to reduce inspection and maintenance frequency <ul style="list-style-type: none"> <i>E.g., US utility is targeting 25% cost reduction by optimising cycle schedules and increasing crew productivity using advance machine learning model</i>
	Grid Operations	<ul style="list-style-type: none"> Automation and optimisation of network performance using data-driven tools, processes and capabilities 	Improve network stability, reduce costs, and increase network capacity <ul style="list-style-type: none"> <i>E.g., ConEd deferred \$1.1bn substation construction through a variety of DER programmes</i>
Customer & Stakeholder Enablement		<ul style="list-style-type: none"> Digitally optimised and automated end-to-end customer journey 	Automation and digitisation of the end-end processes of customer journeys <ul style="list-style-type: none"> <i>E.g., Innogy built a Customer Experience factory to harmonise customer journey across countries</i>
New Products & Services		<ul style="list-style-type: none"> Create ideas for new, digitally enabled revenue pools and to scale new, insights-based business activities 	Expand revenue opportunities into new business areas <ul style="list-style-type: none"> <i>E.g., European utility with ~2mn clients developed an early warning machine learning model to predict B2C bad debt</i>

Utilities' traditional operating models struggle with several pain points when undertaking digital transformations



Misalignment of speed & cadence

- Pace of change out of sync with tech evolution
- Leadership tend to big 'one off' investments



Decision making to risk averse

- Regulatory reporting & licence work dominate
- Lack of test & learn culture; fear of failure



Talent gaps to deliver change

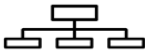
- Disparate allocation of talent across business
- Lack of practise with digital partnerships



Innovation hard to scale & integrate

- Insufficient cross-business collaboration
- Missing processes to scale initiatives to BAU¹

A successful digital transformation requires focus on four elements



Operating model

- Org structure changes to deliver transformation
- Associated ways of working & governance



Corporate culture

- Mind set
- Ways of working



People capability

- External talent recruitment
- Internal talent development



IT stack

- Tools, data, models & ecosystems
- Governance & standards

Final thoughts

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