



Digital Sustainability: The Path to Net Zero for Design & Manufacturing and Architecture, Engineering & Construction(AEC) in Europe

Insights from a whitepaper developed in partnership with Autodesk

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KEY MARKET FORCES OF CHANGE

Sustainability, digitalization, health & wellness and business models - 4 factors driving the industry transformation/transition

INDUSTRY TRANSFORMATION/TRANSITION

What:

Sustainability

- Emphasis on clean and efficient models of energy usage
- Emphasis on reuse, repurpose, and recycling of materials

Digitalization

- Unlock value from siloed information
- Better performance, better outcomes, reduced downtime

Health & Wellness

- Integration of health & wellness with smart building solutions
- Improve occupant's safety and productivity

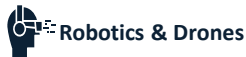
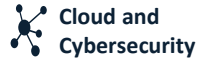
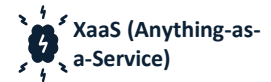
Business Models

- Better ways of realizing outcomes
- Explore added capabilities
- Transform current models of operation

Why:

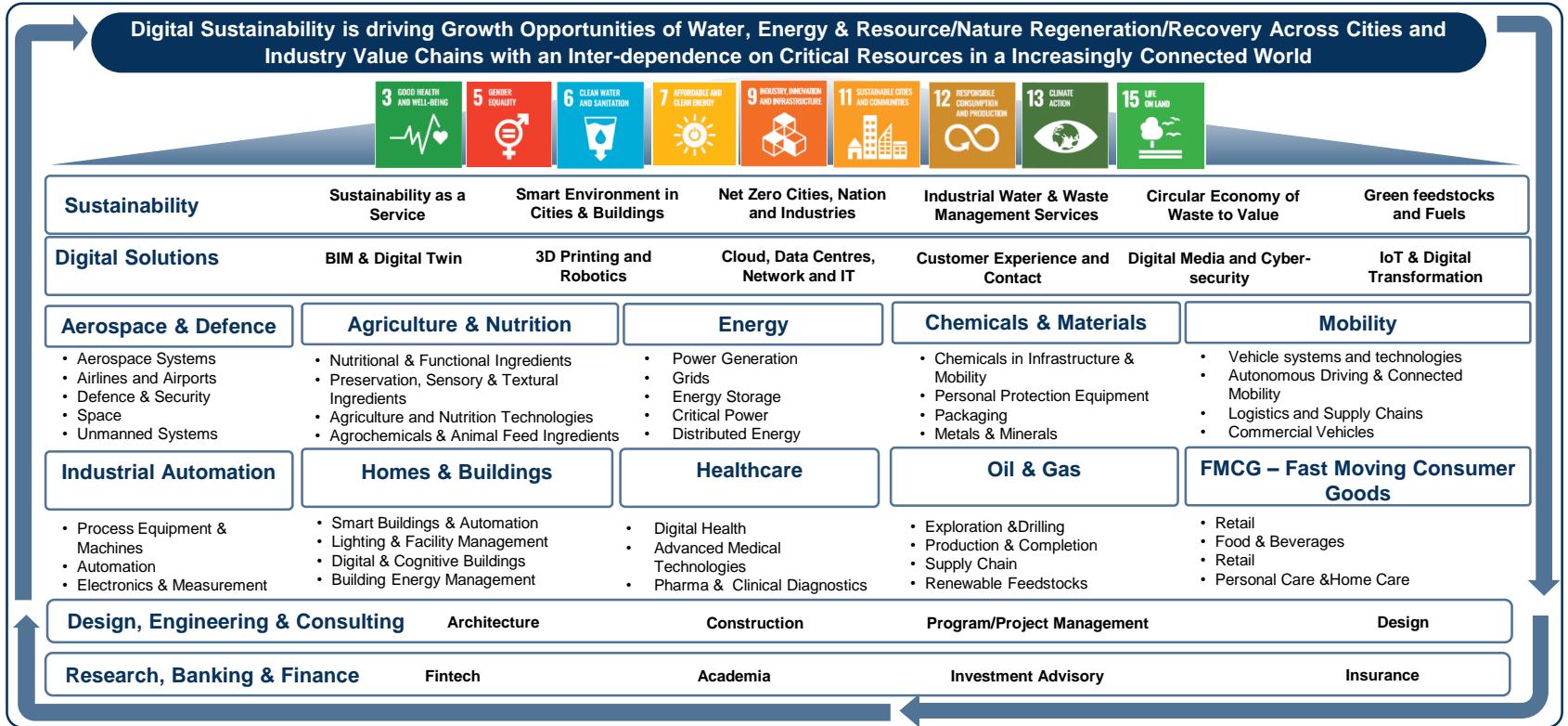
How:

Influencers:



Source: Frost & Sullivan

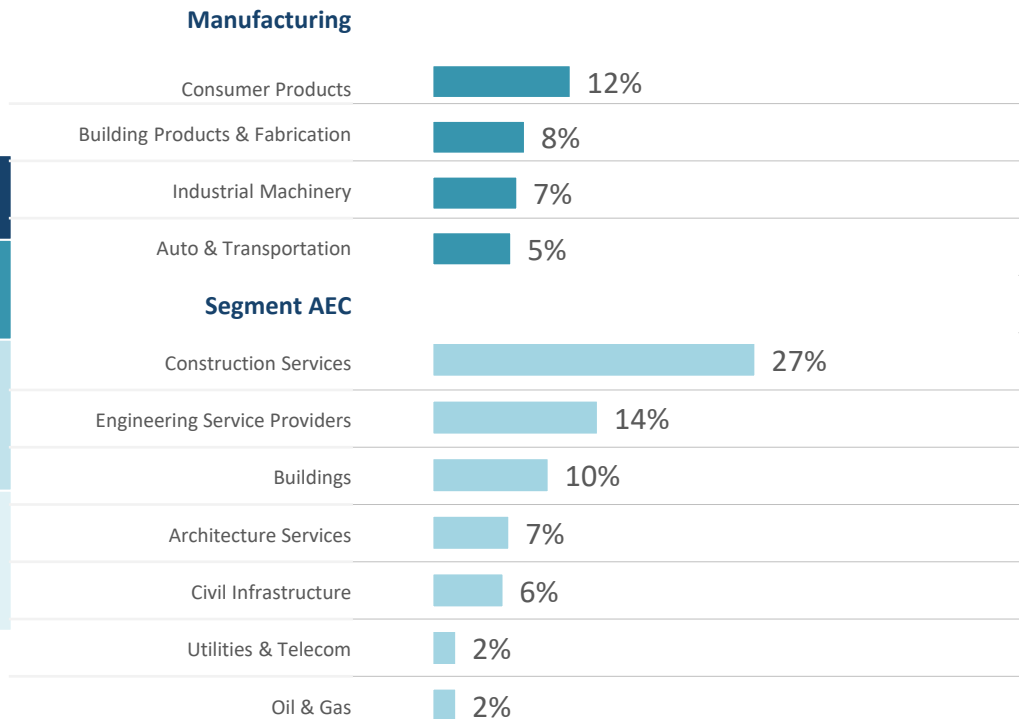
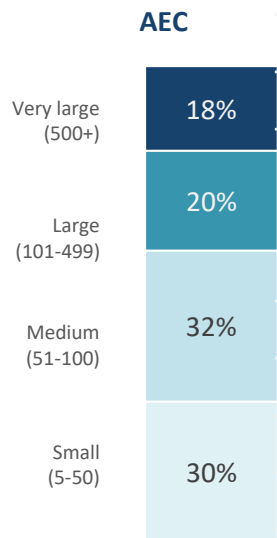
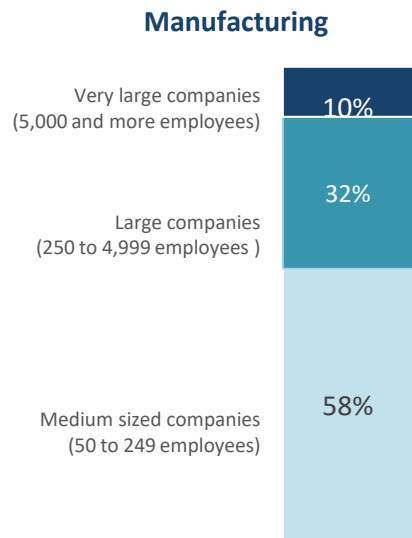
DIGITAL SUSTAINABILITY IS DRIVING B2B GROWTH OPPORTUNITIES IN THE NEW NORMAL



Source: Frost & Sullivan

CROSS-SECTION OF CUSTOMERS SURVEYED IN MANUFACTURING & AEC

AEC represented two-third of the sample size to uncover opportunities in architecture & engineering services and construction services



Source: Frost & Sullivan and Autodesk

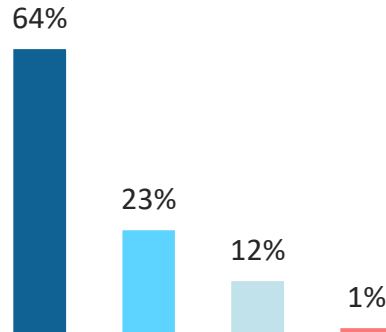
CLOSE TO 2/3 HAVE SUSTAINABILITY AS CORE PART OF STRATEGIC VISION

- 64% understand sustainability as a formal strategic vision in the leadership approach
- About 75% of manufacturing companies have sustainability as part of leadership's strategic vision
- A&E segment is a bit more ahead, however, construction segment is not far behind

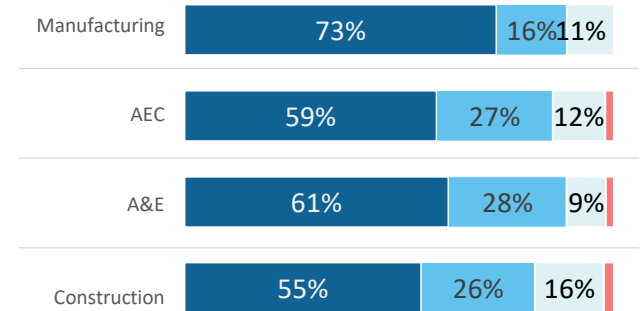
Total
Important part or cornerstone in corporate strategy



Company Approach towards Sustainability



- Sustainability is part of our leadership's formal strategic vision, purpose and / or company goals
- Sustainable practices are viewed important in my company but there is no formal approach to it
- Leadership is looking to establish a strategic approach to sustainability in the future
- I don't think leadership view sustainability as a priority for the company



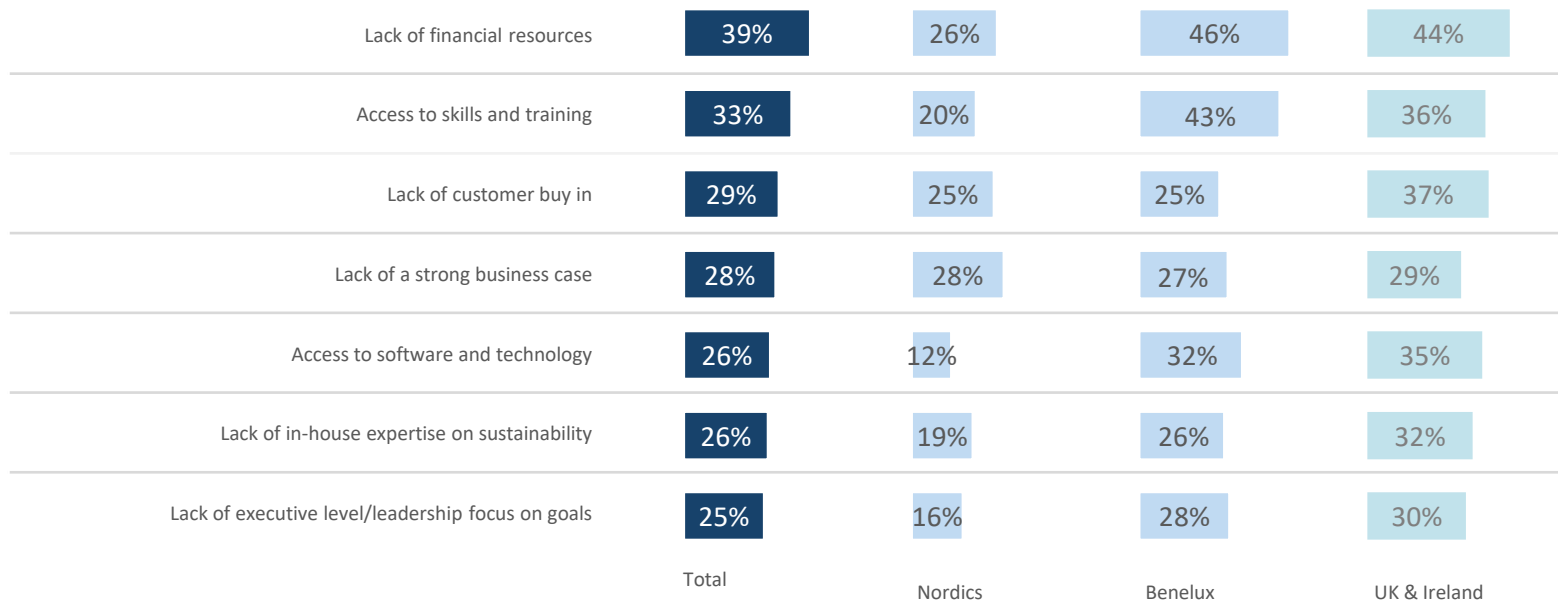
Source: Frost & Sullivan and Autodesk

CHALLENGES ARE RELATIVELY HIGHER IN BENELUX AND UK & IRELAND COMPARED TO NORDICS

- Lack of financial resources committed to sustainability is the biggest challenge in Benelux and UK & Ireland.
- Nordics has lower level of challenges – with access to software and technology being the least challenging

Main Challenges for Achieving Sustainability – by Region

Share of Extremely and Very Challenging Ratings

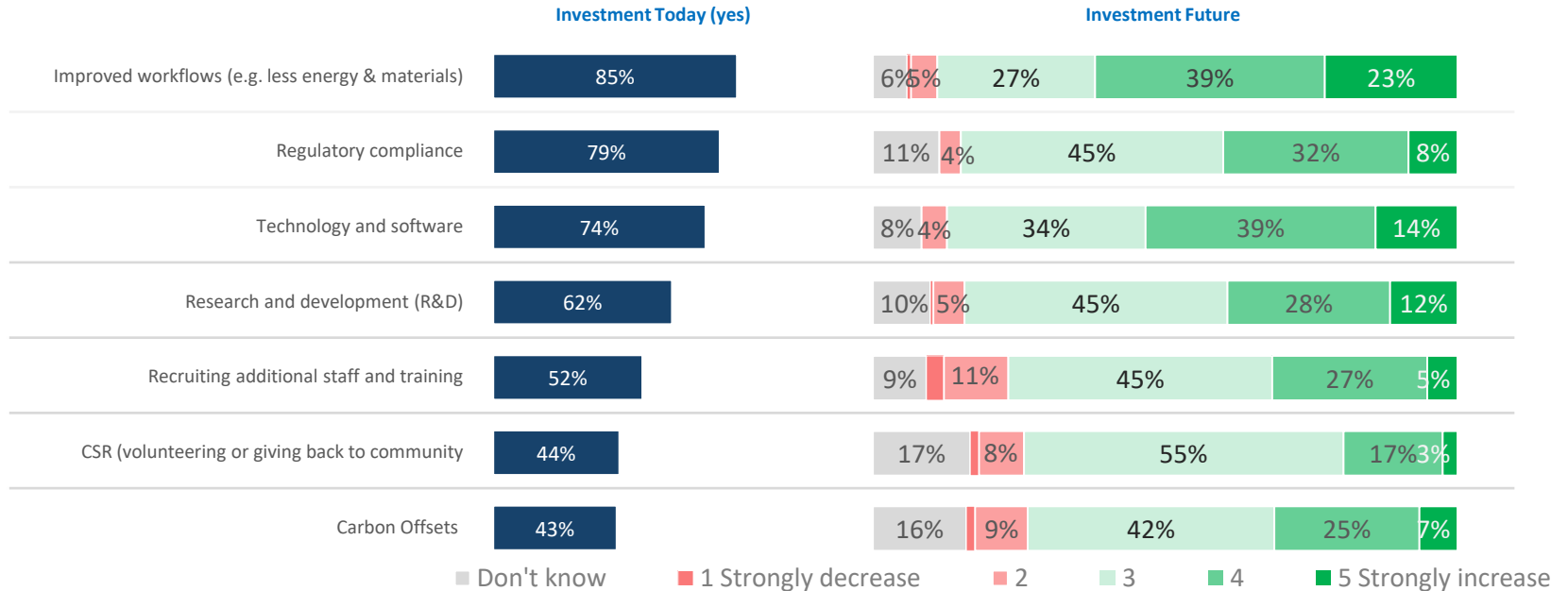


Source: Frost & Sullivan and Autodesk

STRONG INVESTMENT IN WORKFLOWS, COMPLIANCE AND TECHNOLOGY / SOFTWARE

- Companies have already invested in improved workflows, regularly compliance and technology / software.
- Improved workflows and sustainable technology / software companies plan to increase the investment.

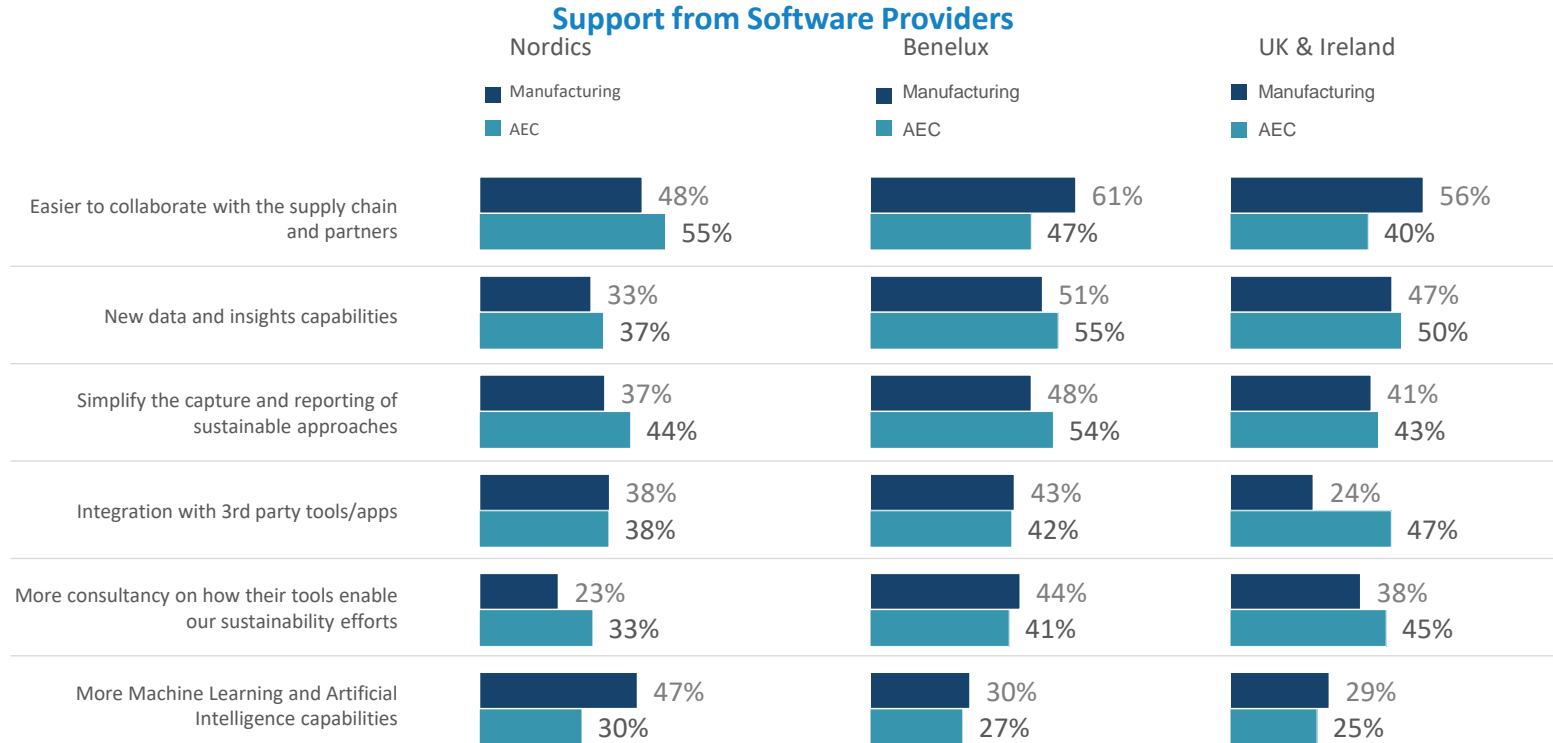
Areas of Investment in Sustainability – Today and in Future



Source: Frost & Sullivan and Autodesk

MACHINE LEARNING AND AI SUPPORT STRONG DEMAND IN NORDICS MANU

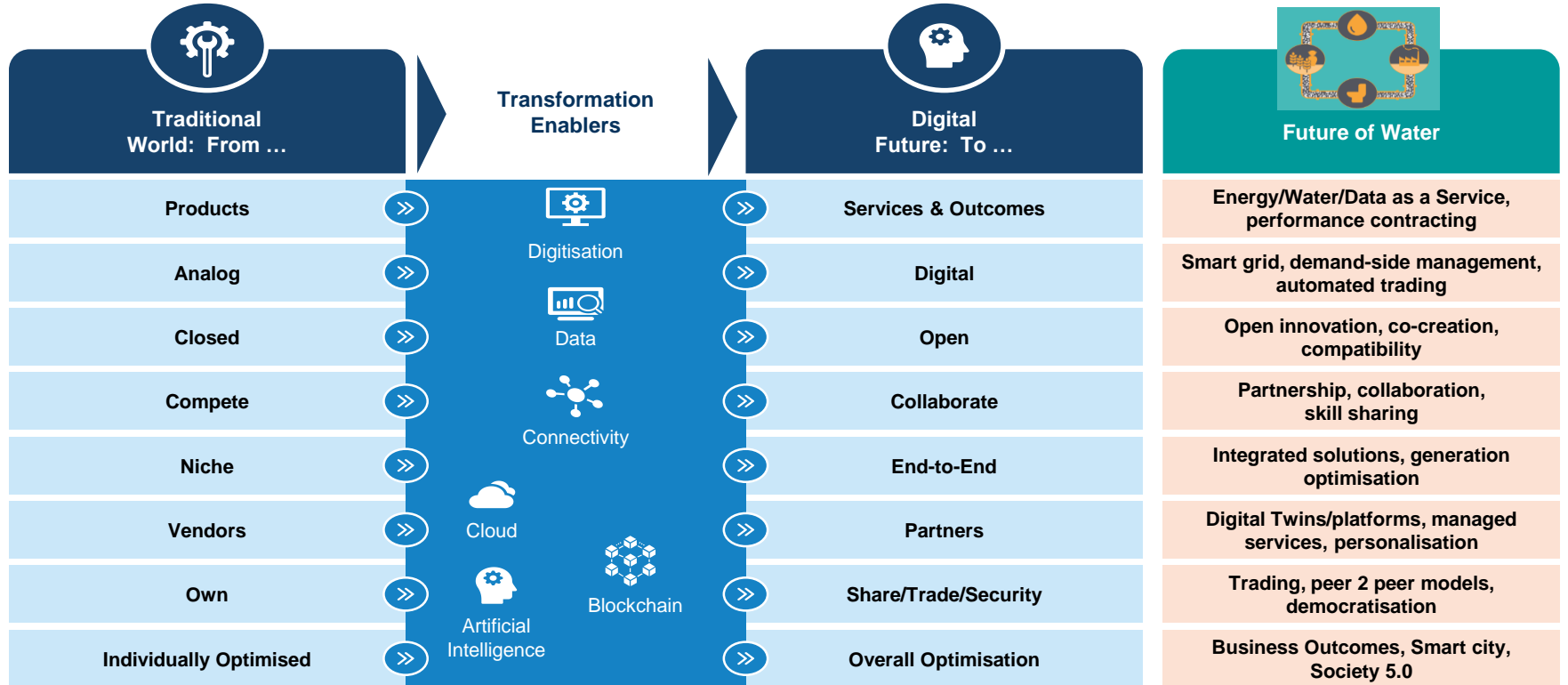
- Supply chain collaboration with partners is the highest need in manufacturing in Benelux and UK & Ireland
- Reporting on sustainable approaches combined with new data and insights is a common need across regions



Source: Frost & Sullivan and Autodesk

DIGITAL TRANSFORMATION IN THE ENERGY AND WATER UTILITIES

- Transformation of the energy and water industry is generating new customer centric business models leading to smart enabled sustainable services

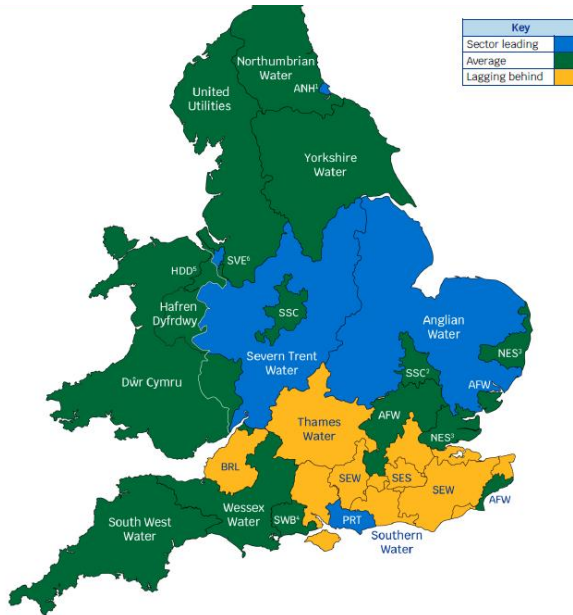


Source: Frost & Sullivan

WATER UTILITIES ARE STEPPING UP INVESTMENT IN DIGITAL SOLUTIONS TO ACHIEVE KEY OUTCOMES

- Anglian Water is a sector leading UK Water utility. Lowest level of leakage - 20% leakage reduction achieved since 2010.
- Wessex Water set to deploy AI technology across its wastewater network of 35,000 kms in a worlds first

Geographic coverage and Performance of Water Utilities in England and Wales



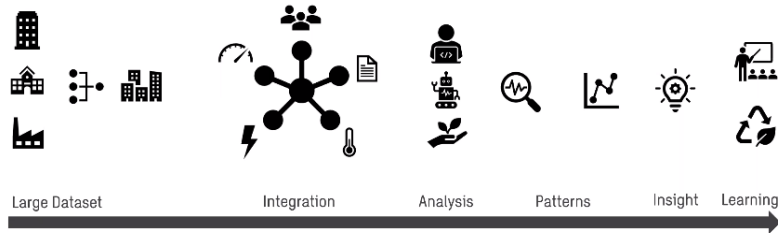
Performance of Water Utilities in England and Wales on Key Outcomes

Company	Outcomes											
	Customer satisfaction ¹	Priority services	Leakage ¹	Household water use ¹	Supply interruptions ¹	Water quality ²	Mains repairs	Unplanned outage	Sewer flooding ³	Pollution incidents ³	Sewer collapses	Treatment works compliance ²
Sector leading												
Anglian Water	Green	Green	Green	Yellow	Green	Green	Green	Green	Blue	Yellow	Yellow	Green
Severn Trent Water	Green	Green	Green	Yellow	Yellow	Green	Green	Green	Blue	Blue	Green	Green
Portsmouth Water	Green	Green	Blue	Yellow	Blue	Green	Yellow	Green	-	-	-	-
Average												
Dŵr Cymru	Green	Green	Green	Yellow	Yellow	Green	Yellow	Green	Green	Yellow	Yellow	Green
Hafren Dyfrdwy	Yellow	Green	Green	Yellow	Green	Green	Green	Green	Green	Yellow	Yellow	Green
Northumbrian Water	Yellow	Green	Green	Yellow	Blue	Green	Green	Green	Blue	Blue	Green	Green
South West Water	Yellow	Green	Green	Yellow	Green	Green	Green	Green	Blue	Yellow	Green	Green
United Utilities	Yellow	Green	Green	Yellow	Blue	Green	Green	Green	Blue	Blue	Green	Green
Wessex Water	Yellow	Green	Blue	Yellow	Blue	Green	Yellow	Green	Blue	Yellow	Green	Green
Yorkshire Water	Yellow	Green	Green	Yellow	Green	Green	Green	Green	Blue	Green	Green	Green
Affinity Water	Yellow	Green	Green	Yellow	Green	Green	Green	Green	-	-	-	-
South Staffs Water	Yellow	Green	Green	Yellow	Blue	Green	Green	Green	-	-	-	-
Lagging behind												
Southern Water	Yellow	Green	Green	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Yellow	Green
Thames Water	Yellow	Green	Green	Yellow	Yellow	Green	Yellow	Green	Green	Yellow	Yellow	Green
Bristol Water	Yellow	Green	Blue	Yellow	Yellow	Green	Yellow	Green	-	-	-	-
South East Water	Yellow	Green	Green	Yellow	Yellow	Green	Yellow	Green	-	-	-	-
SES Water	Yellow	Green	Green	Yellow	Yellow	Green	Yellow	Green	-	-	-	-

Source: Water UK

USE CASES OF NORCONSULT AND LANDSEC

NORCONSULT integrating Sensor Data for Building Management

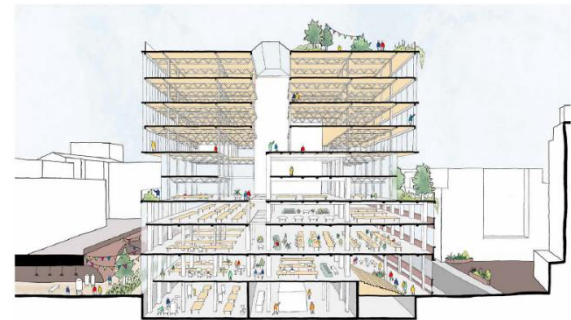


Source: Norconsult

The Forge – the first Net Zero Carbon development being developed by Landsec



Lavington Street Project – New Benchmark for operational energy and embodied carbon



Source: Landsec

USE CASES OF MACE AND ODICO

MACE is setting new benchmarks of sustainability in AEC and ODICO leading tech provider for Robotics and 3D printing for construction

Award winning construction projects of Mace that have leveraged technology

Cloud based construction management for Facebook
Datacentre



Rising Factory in Olympic Park –
90% built off-site



Source: MACE

Wire Cutting Robotic Systems for Concrete



World's First Example of
topology optimised concrete
structure in 2010



Mainstream solution using wire cutting



Factory on the Fly



Source: ODICO

AI SOLUTIONS FOR GHG MONITORING PLATFORM FOR CITIES AND BUILDINGS AS MATERIAL BANKS

Systems thinking approach involving AI solutions is driving scale, speed, accuracy and significant cost savings for customers



AIDASH

Satellite imagery based AI solution:

- Bio-diversity mapping to capitalize on Bio-diversity Net Positive Gain requirement in the UK
- Vegetation Management
- Methane emission monitoring
- Water quality monitoring

Source: AIDASH



Everimpact^o

Satellite imagery based AI near real time monitoring of GHG:

- Climate monitoring platform for cities
- Ground data for air quality and traffic management

Source: Everimpact



Loopfront

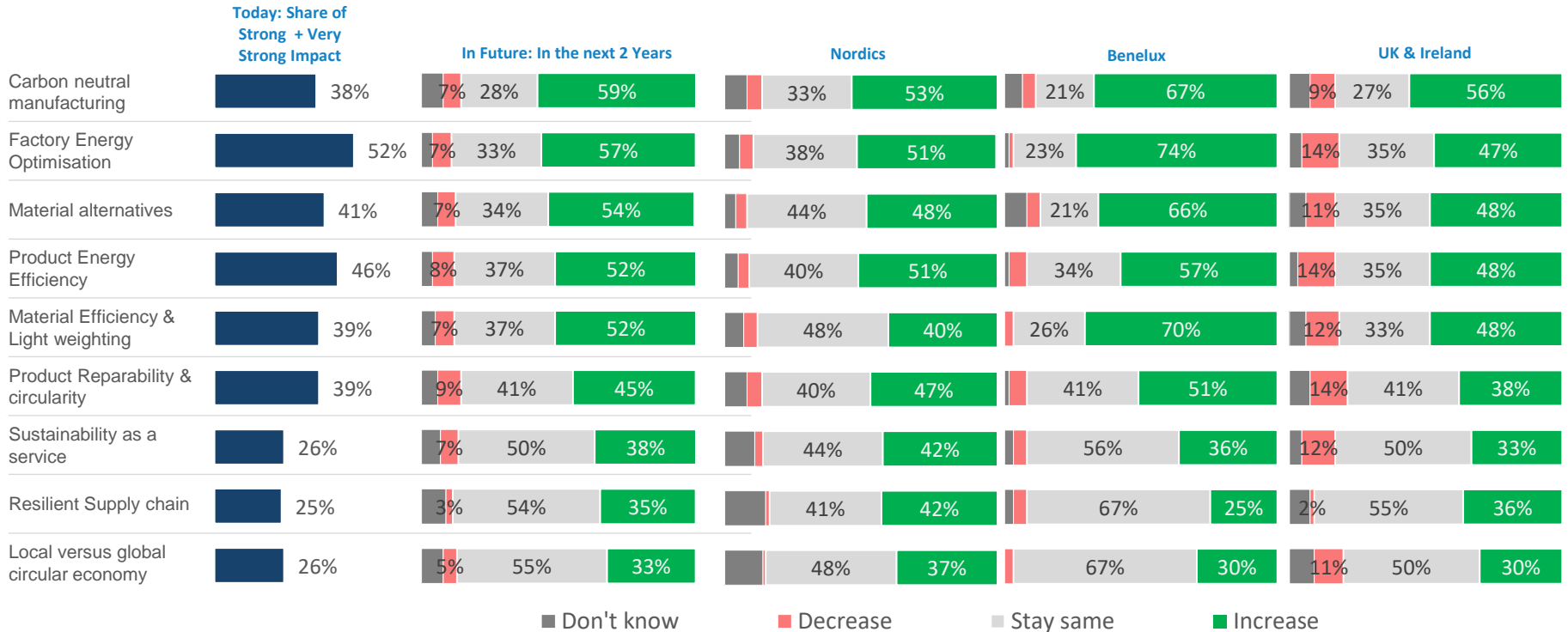
Digital solution for surveying of buildings:

- Buildings as Material Banks (BaMB's)
- Facilitating material reuse and recycling in a circular economy

Source: Loopfront

CURRENT AND FUTURE TRENDS OF SUSTAINABILITY IN MANUFACTURING

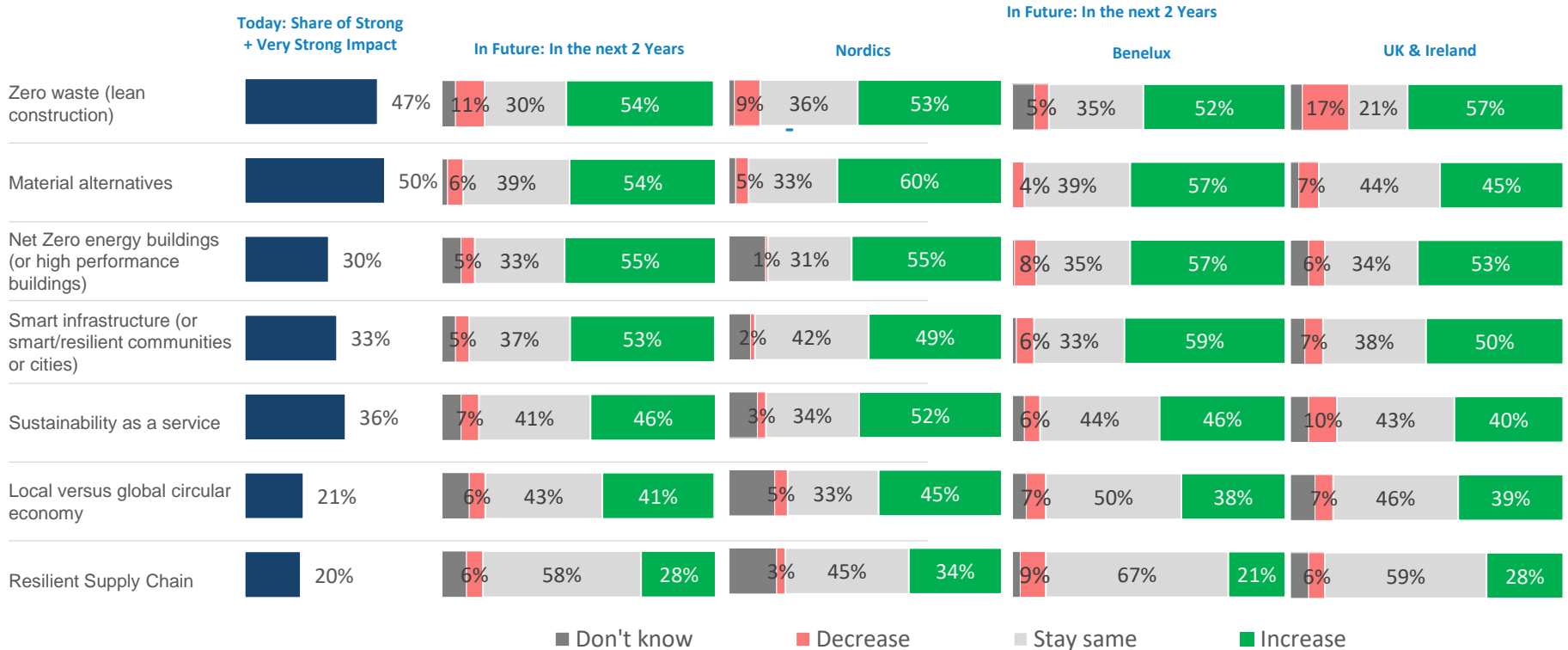
- 59% of manufacturing companies report a strong or very strong impact of carbon neutral manufacturing followed by factory energy optimisation (57%) and material alternatives (54%).
- Product energy efficiency in addition to material alternatives signals the move of the sector to focus on Scope 3.



Source: Frost & Sullivan and Autodesk

CURRENT AND FUTURE TRENDS OF SUSTAINABILITY IN AEC

- Heightened focus on embodied carbon in the AEC sector is reflected with strong current focus on material alternatives
- Zero Waste/Lean Construction highlights strong prospects for pre-fab and modular construction



Source: Frost & Sullivan and Autodesk

Thank You

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