

Bridging the Gap: Empowering Civil Engineering Projects through DevOps and Fusion Teams



Dan Mazzella
Sr. Global Director of Software Development
Arcadis

Who is Dan?! (M-A-Double-Z E-Double-L-A)

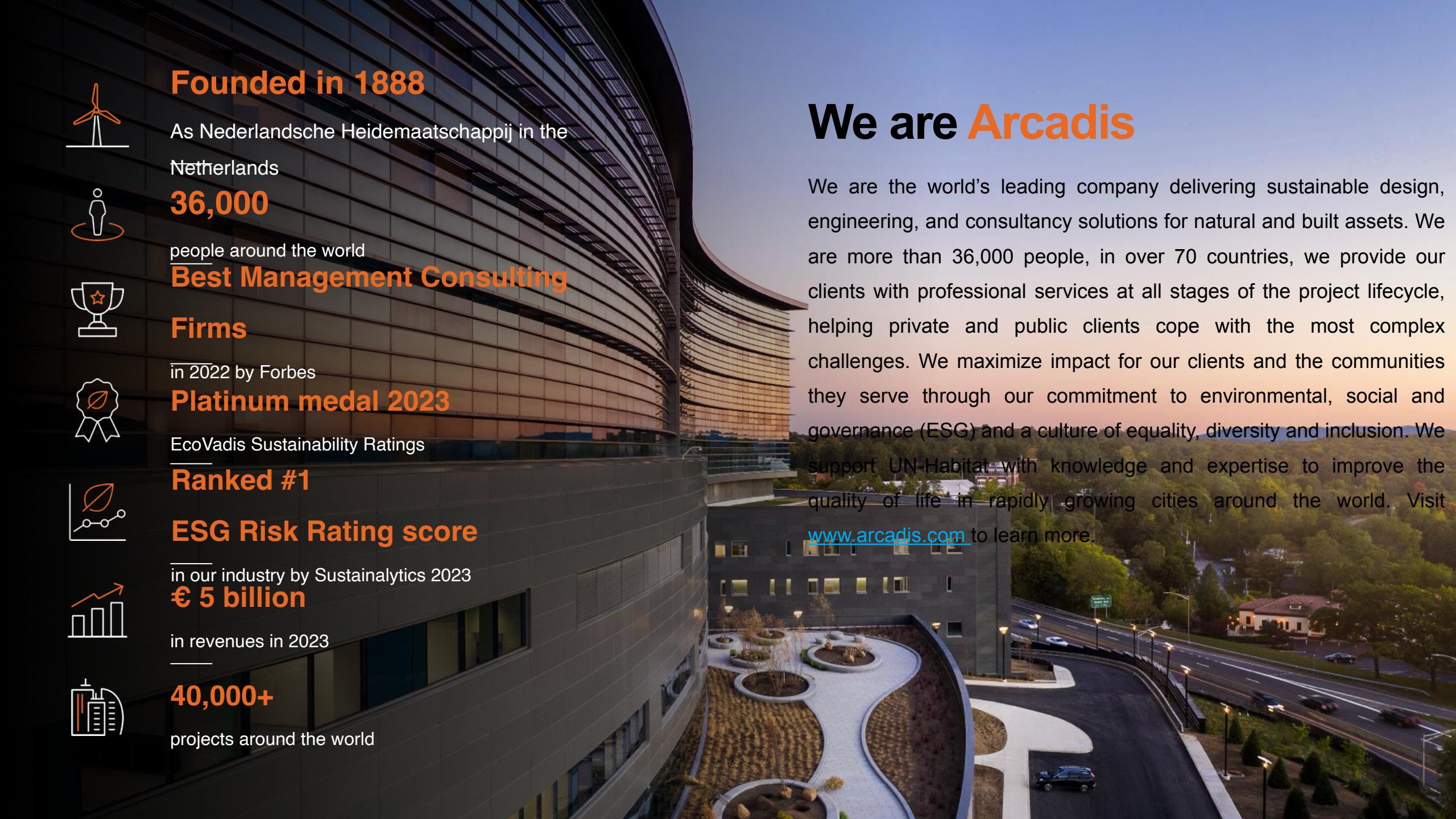
Software Engineer - Voluntold to be Leader

- Startup World in late 90's
- TRIRIGA - CAFM
- IBM - IWMS

Now @ Arcadis - AEC

Jazz Saxophonist – Youth Orchestra Volunteer





Founded in 1888

As Nederlandsche Heidemaatschappij in the
Netherlands

36,000

people around the world

Best Management Consulting

Firms

in 2022 by Forbes

Platinum medal 2023

EcoVadis Sustainability Ratings

Ranked #1

ESG Risk Rating score

in our industry by Sustainalytics 2023

€ 5 billion

in revenues in 2023

40,000+

projects around the world

We are Arcadis

We are the world's leading company delivering sustainable design, engineering, and consultancy solutions for natural and built assets. We are more than 36,000 people, in over 70 countries, we provide our clients with professional services at all stages of the project lifecycle, helping private and public clients cope with the most complex challenges. We maximize impact for our clients and the communities they serve through our commitment to environmental, social and governance (ESG) and a culture of equality, diversity and inclusion. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world. Visit www.arcadis.com to learn more.

Health and Safety Moment

Test Driven Development and Unit Testing is a form of safety!

Build software to build physical infrastructure...

All our responsibilities to “push back on the push back”

Arcadis Culture: “Stop work authority”



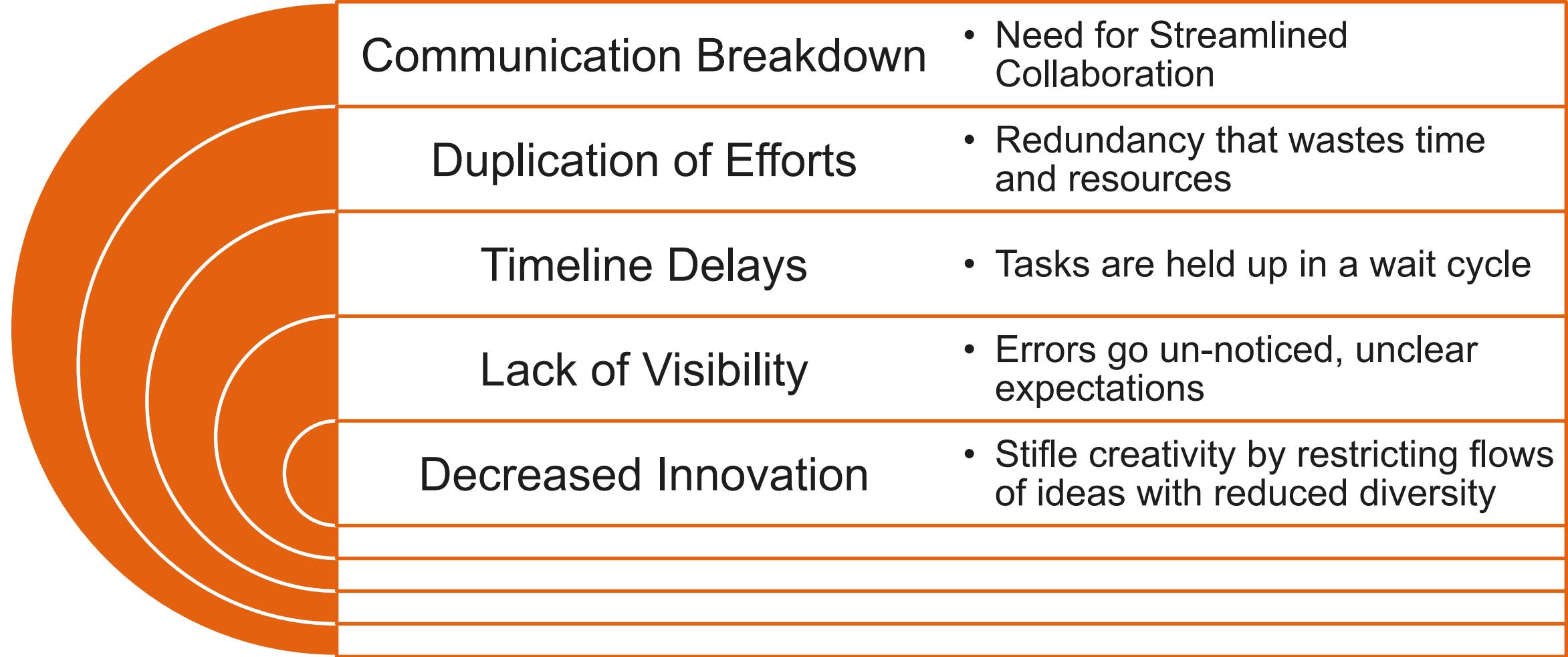
Applying unit testing principles to civil engineering upholds safety and reliability

Integration between Software Development and Civil Engineering



AEC Industry isn't as advanced as you may think!

Impact of Siloed Processes



The Concept of Fusion Teams



- Important to define roles within Fusion Teams
- Benefits of Integrating Software Development and Civil Engineering
- Adapting Agile principles
- Using technology beyond spreadsheets

Document the current reality, and adapt as organization changes

Collaborative Strategies

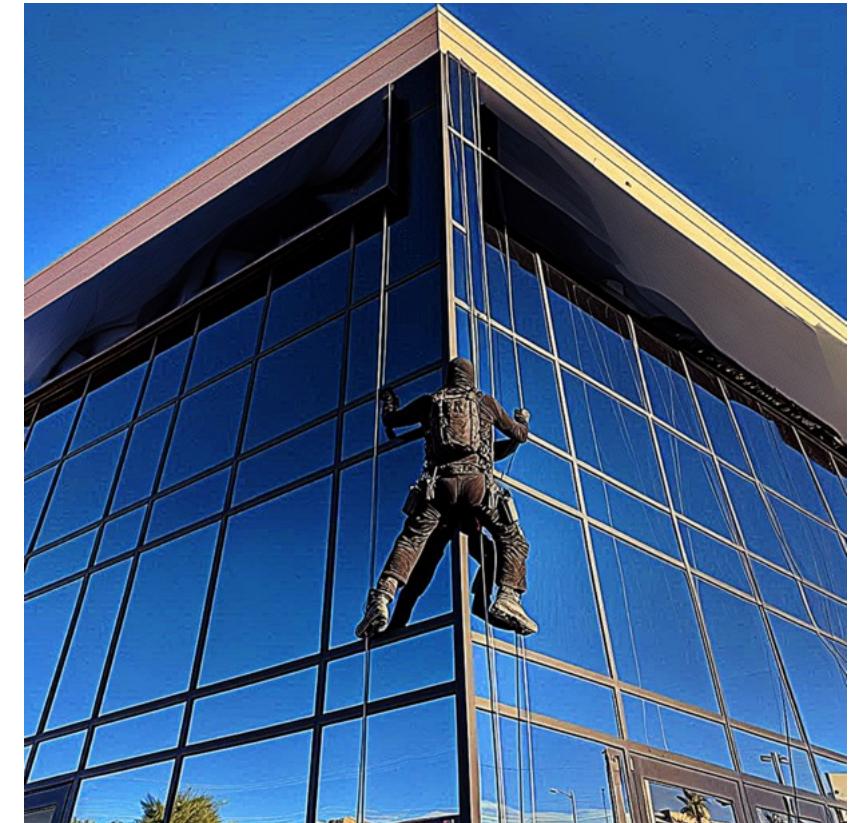
-  Lessons learned from Software Industry
-  Test Driven Software Development
-  Agile Tools and Techniques for Maximizing Collaboration
-  Workshops to analyze history, align the vision, and act upon a roadmap
-  Product and Program ownership is shared
-  Open Communication, sidebars are brought into the fold

DevOps Principles in Civil Engineering S&A Efforts

The Core Principles of TDD

1. Get acceptance criteria and write Tests First
2. Think of a contract between tiers
3. Write the Code to Pass Tests
4. Refactor Code – Clean as you code

Projects that implemented TDD have led to increased code quality, reduced bugs, and more robust software



TDD aims to create a reliable suite of tests that validate the behavior of the code

OTHER REAL-LIFE CASE STUDIES

Manual processes improved through S&A Program



High Speed Rail Project

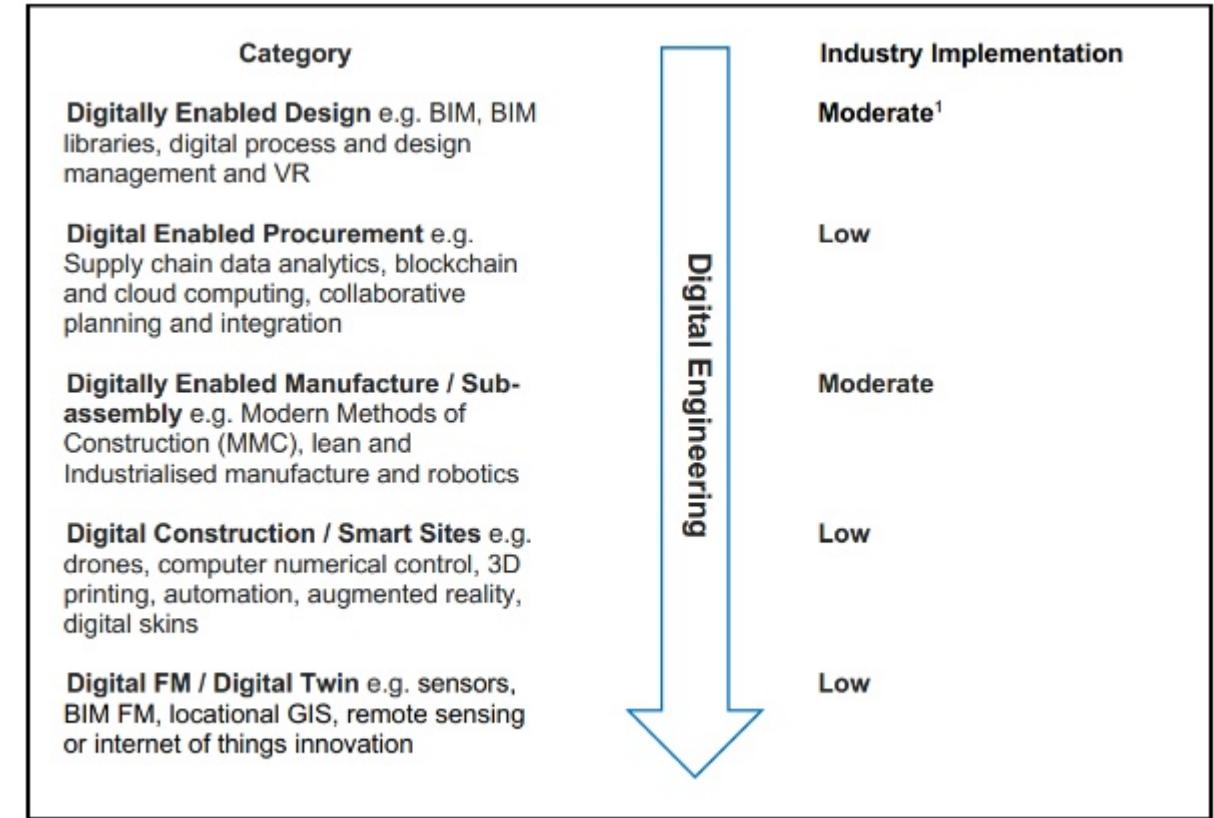
Identify categories for digital engineering

Invest in tech

Get buy-in

Reduce barriers

Quantify Impact



Form teams to implement systems and processes

East Asia - Housing Project



Working with partners, contractors
Be a thought leader in the industry
Write into contracts use of digital technology

Where manual processes are still used, look for opportunities for improvement

Overcoming Resistance to Change

Sustainment

Buy-In

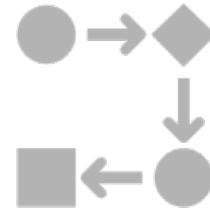
Contracts

Highlight Time-Savings

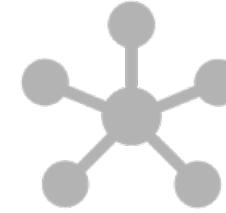
Show Health and Safety Improvements



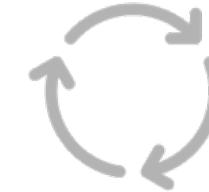
Continuous Improvement and Evolution



Agile Practices for
Continuous Development



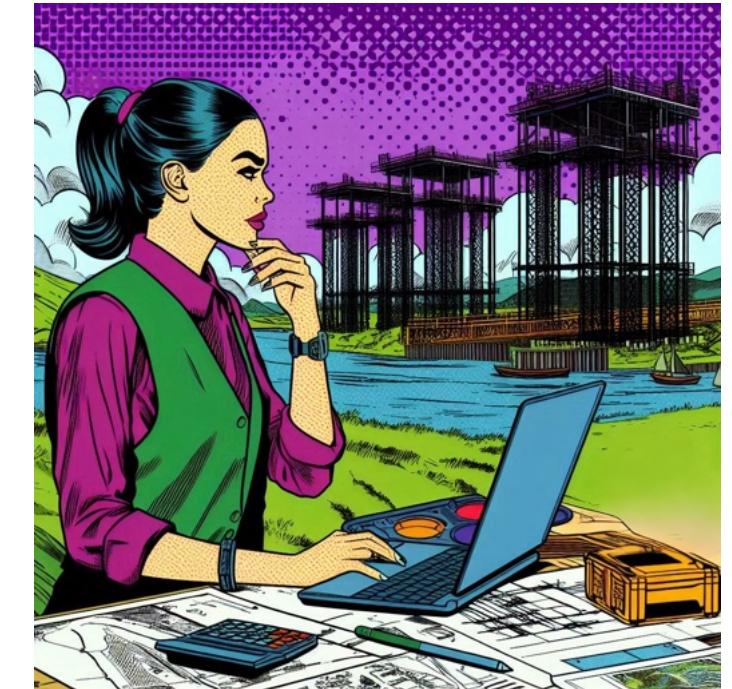
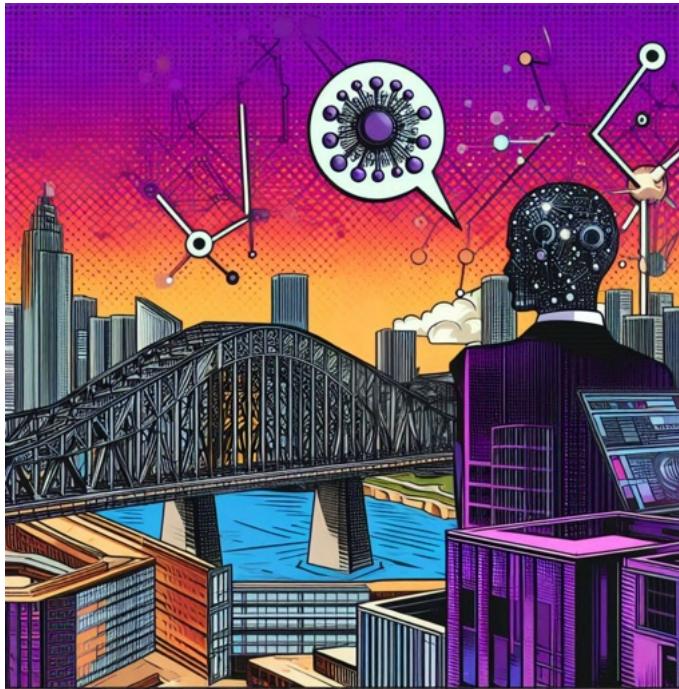
Monitoring and Adapting
Fusion Teams



Feedback Loops and
Iterative Processes

The “AI Slide” - Future Trends and Innovation

- Emerging Technologies Impacting Fusion Teams
- Predictions for Future Collaboration in Civil Engineering
- Encourage Experimentation and Innovation, “Citizen Development”



Wrap-up

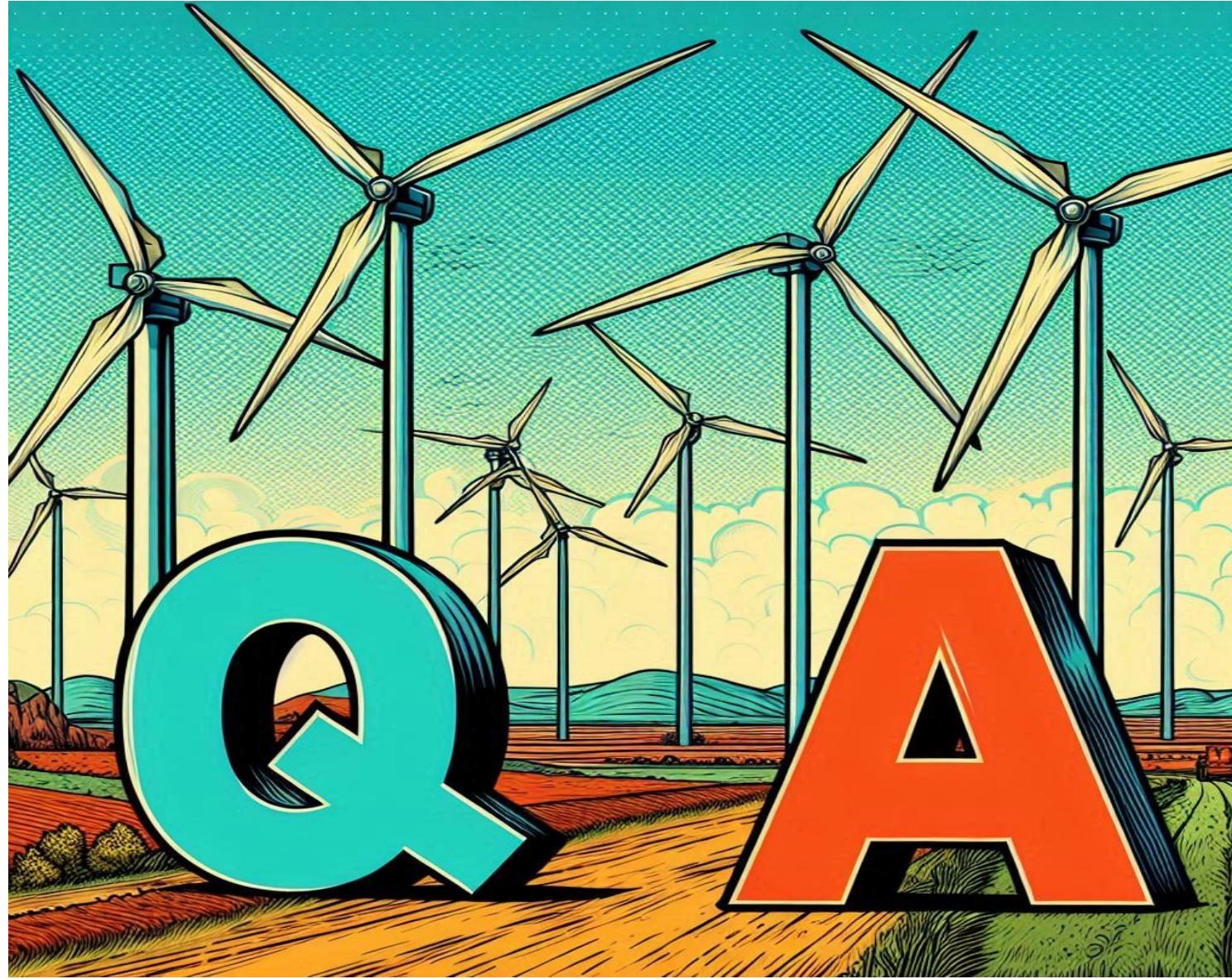
Maybe your industry is at a different point in the “digital journey”

Don't be afraid to leapfrog

Innovate and stay up to date

Open communication and Agile delivery





Arcadis.
Improving quality of life.