

Demystifying digital twins: why, what and how?

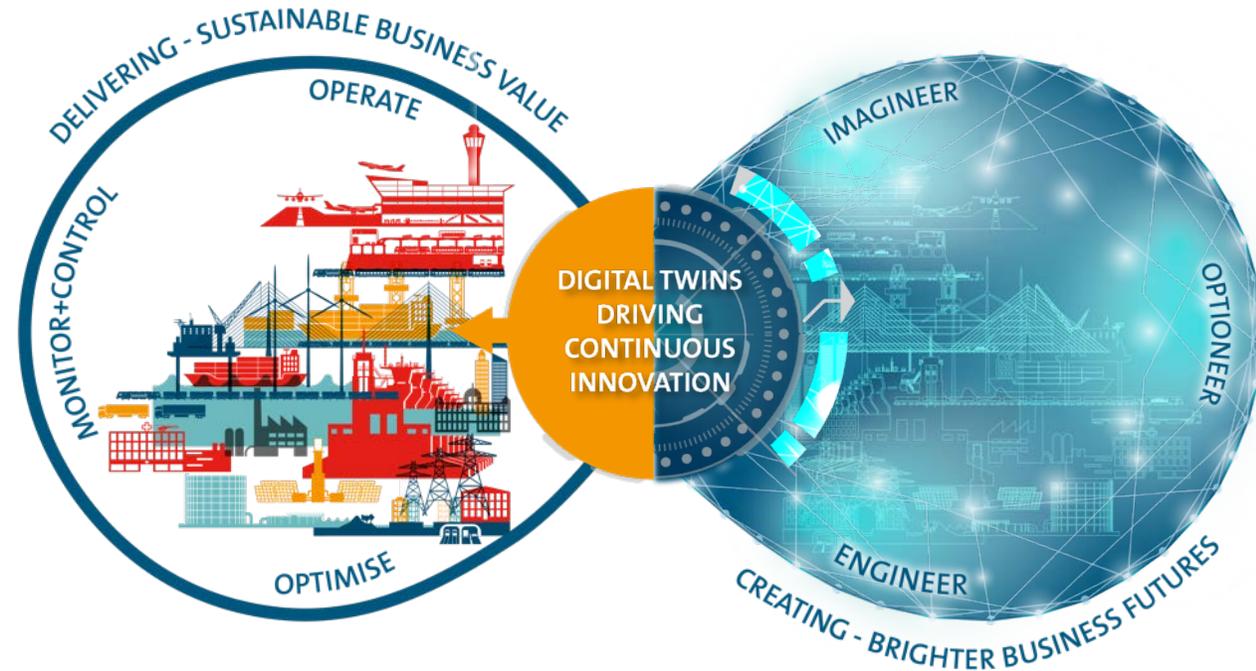
April 1st 2021

Bart Brink

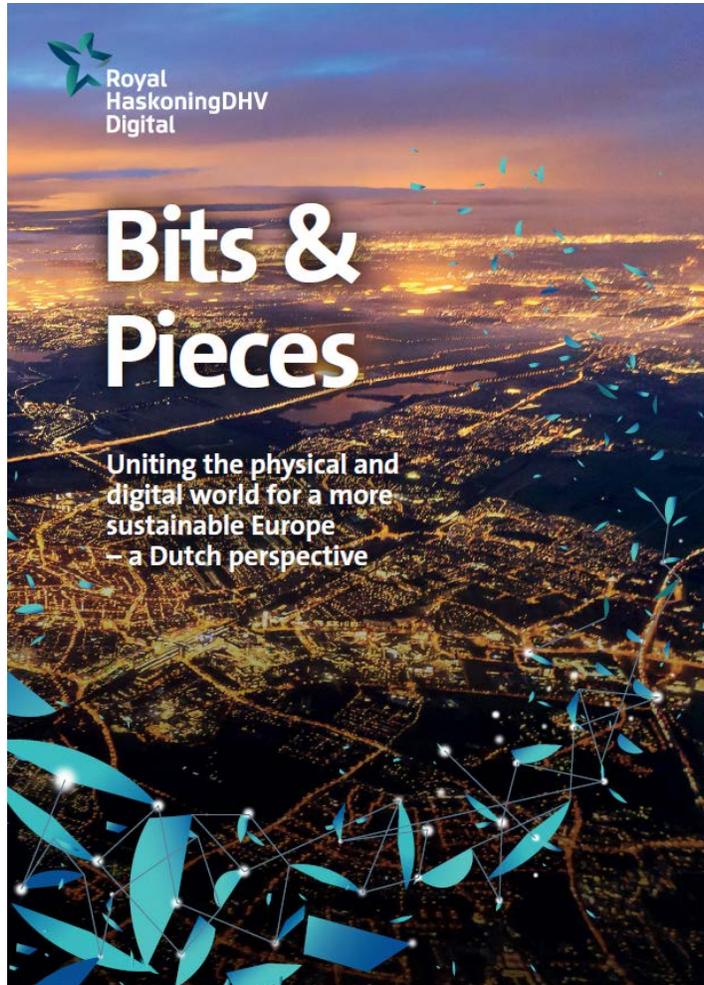
Global Director Digital Twins – Royal HaskoningDHV

Chair Digital Twin Working Group – Building SMART international

Societal challenges and digitalization of the environment



Digital twins becoming increasingly globally relevant



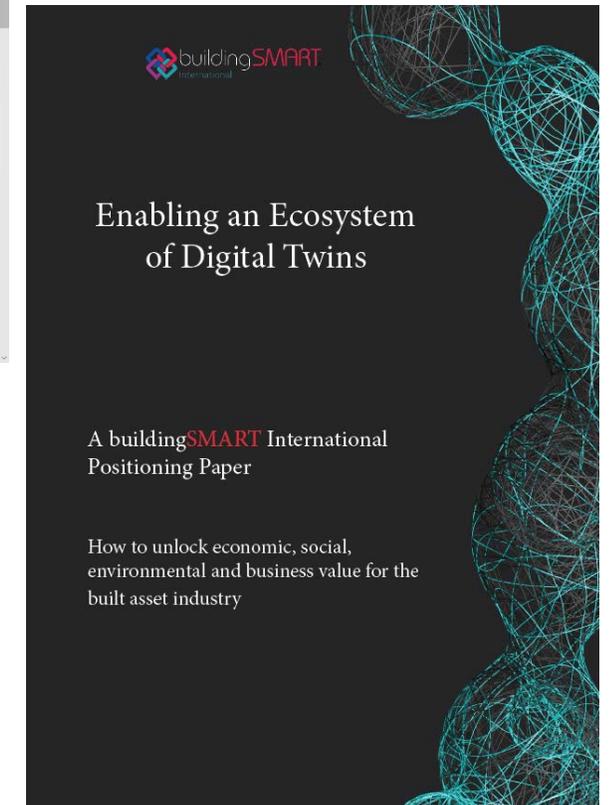
Overcoming sustainability challenges with Digital Twins



National digital twin program in the UK (source: www.cdbb.cam.ac.uk)

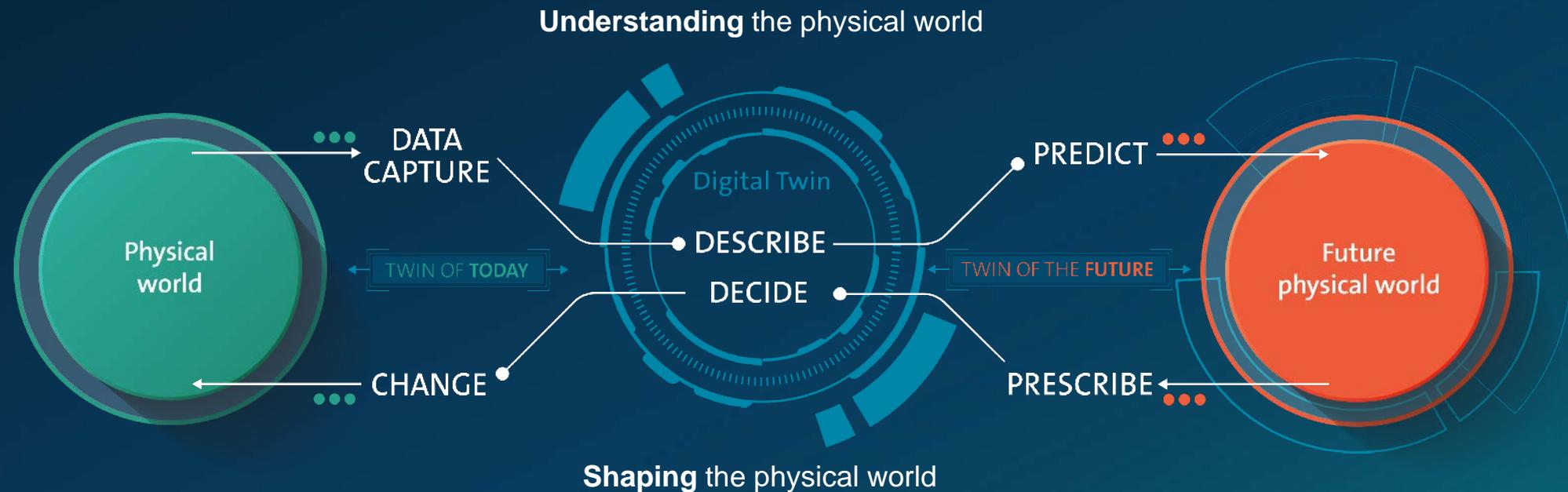


Digital twins as top-five trend (source www.venturebeat.com)



Strategic topic for Building SMART International

Digital twins as concept to provide guidance



...bringing together various concepts and technologies



ERP / MES /
historian



IoT



Other data sources
like weather,
GIS etc.

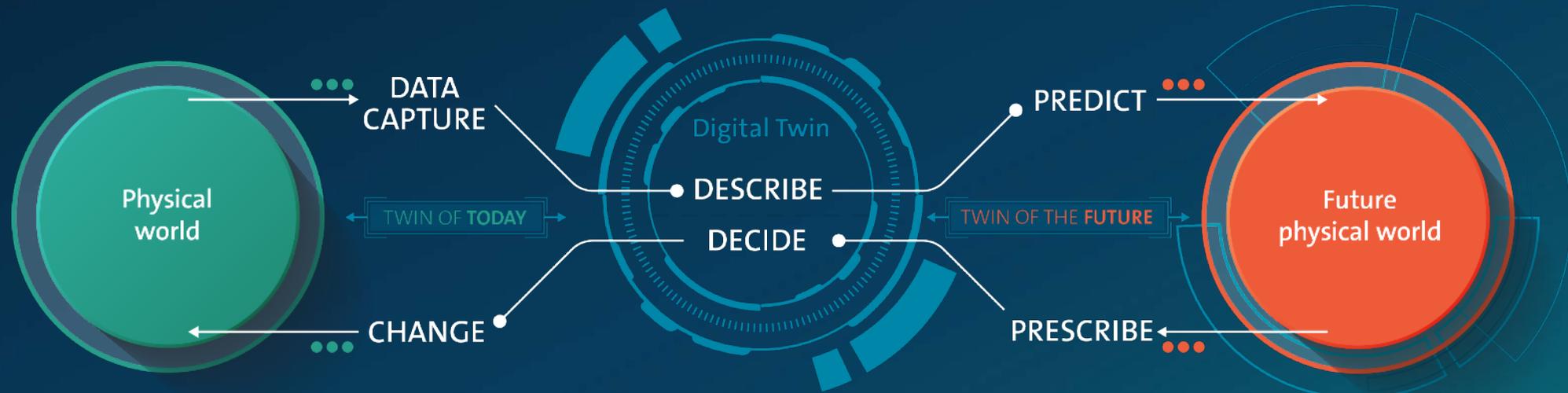


Dashboards



Predictive
simulation

Understanding the physical world



Shaping the physical world



Alerts and
notifications



Machine-to-
machine
integration



AR / VR



AI / ML

Multiple cross sector application areas



Asset management

Leverage data to optimise assets across the whole life cycle



Crowd & traffic management

Gain insights and forecast flows of people and traffic across different modes of transport



Process optimisation

Optimise key business processes and logistics with real-time monitoring and predictive technologies.



Water management

Measure, control and predict water flows across networks.



Energy optimisation

Balance supply and demand for energy generation, distribution and storage – and optimise usage.



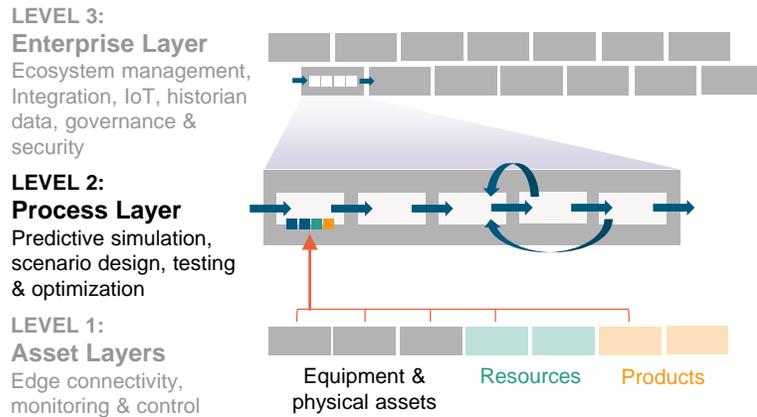
Climate resilience

Understand the impact of climate change on organization and societies

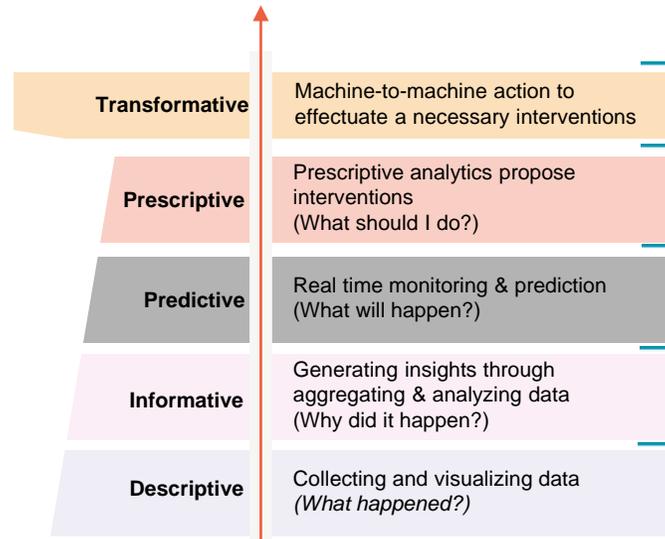


The different levels of digital twins

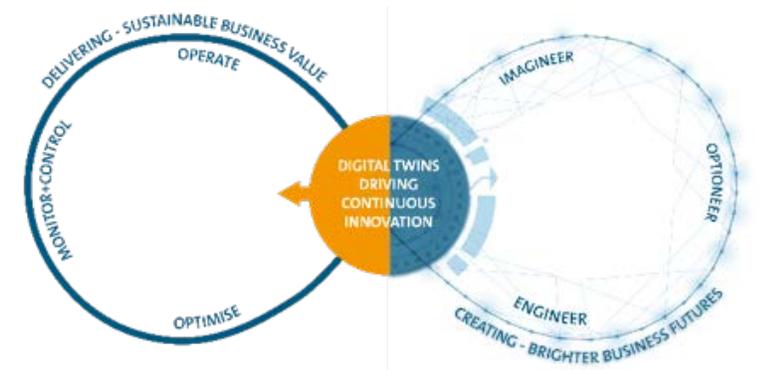
From asset to system level



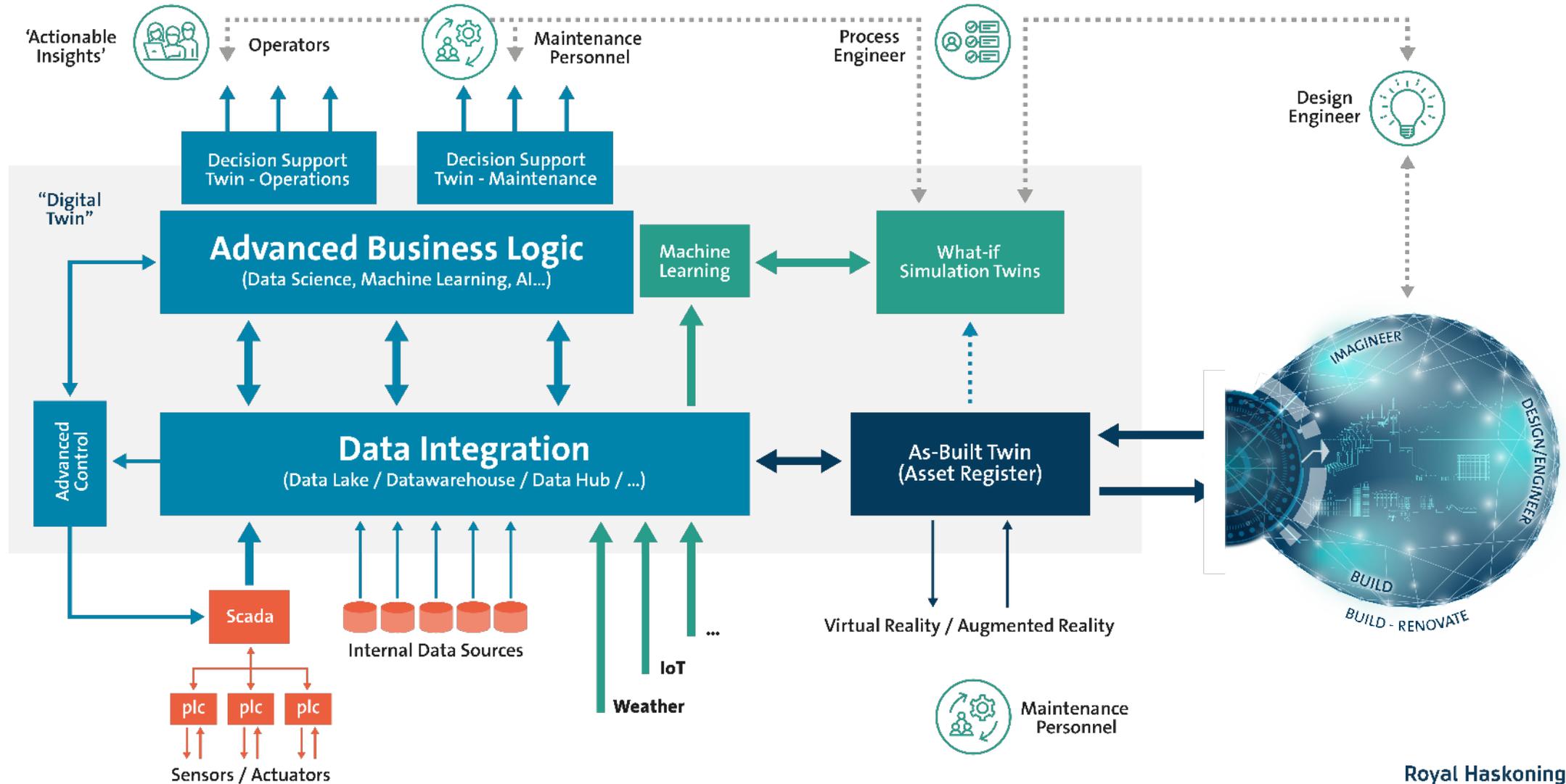
Maturity levels



Lifecycle



Digital twin building blocks

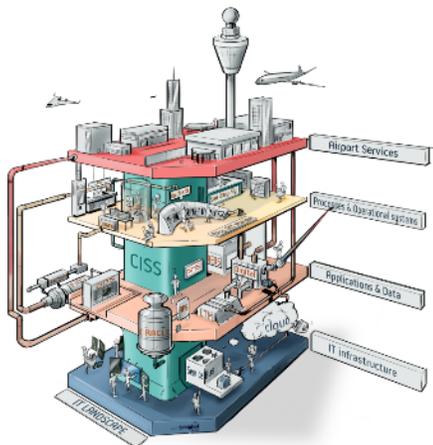


Some examples of digital twin applications

Digital twins for airports

“Schiphol Airport is extending its capacity by building a new terminal.

To ensure a fit for purpose and future terminal, in parallel to the physical design of the airport a data design of the airport was developed, resulting in a digital twin for the airport to help to optimize logistics and routing, maximizing client satisfaction, fit for purpose security and minimize impact on the society



NOVIUS
a company of Royal HaskoningDHV

Hayward Tyler: digital twin across the life cycle

For Hayward Tyler, a manufacturer of mission-critical pumps and motors, we built a dynamic, 3D virtual factory that can run a full year's worth of simulations in a matter of seconds. It's helping the company maximise efficiency, profitability, and resource allocation.

Initially developed during the design of the factory, it afterwards was fully integrated with other core systems like ERP and running in the cloud. This way it gives the team insight it needs to develop a clear roadmap for transformation in the coming years.

This innovative work won the company a UK Smart Manufacturer award.

Dutch railways: Digital twins for staff and passenger services

Dutch Railways (NS) asked for a digital strategy to deliver high quality, real-time services for passengers and staff on all their train types. We designed and built a digital twin solution using modern techniques, including complex event processing and edge computing.

The platform provides insights for travelers about their journey like departures, arrival times, availability of seats. The twin assists train staff with driver advisory services and engineers with information to plan predictive maintenance.

With its future proof architecture the twin lowers total cost of ownership and can easily be used to connect with new types of fleet coming in.

Digital twins and specific challenges



Data quality



Interoperability



People and culture



Security and privacy



Problem vs. tech-driven

Three ways to start



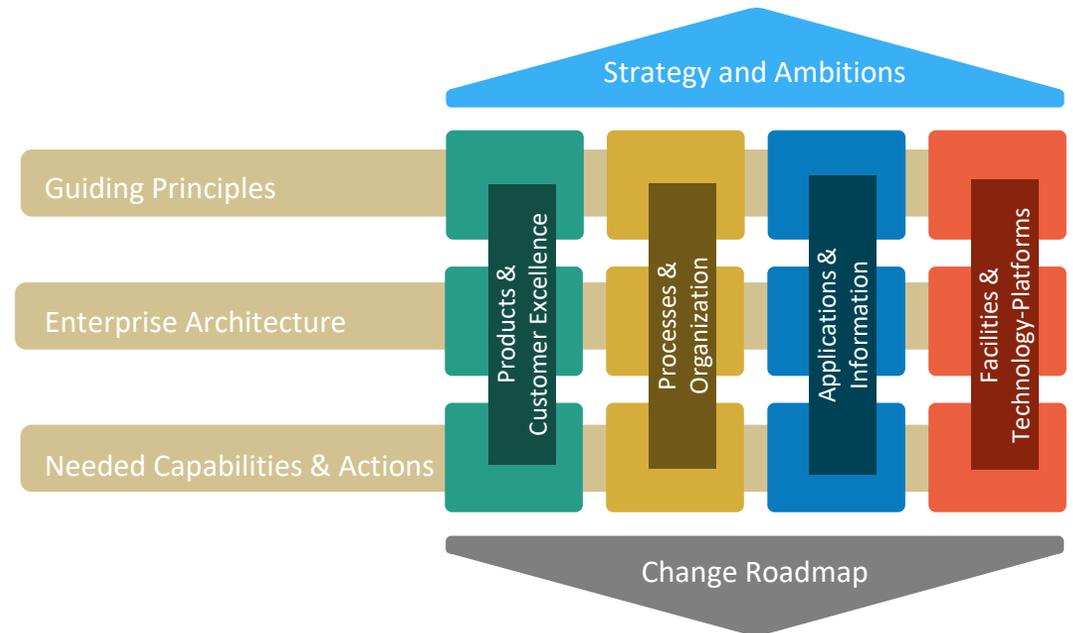
Approach digital twins as integrated part of your digital transformation



Optimize in operations: increase insight of your existing situation



Incorporate digital twins as part of every investment projects



Apply Business Transformation framework to ensure an integrated approach

An abstract digital landscape featuring a grid of glowing lines and points in various colors (blue, purple, red, green) against a dark background. The lines are vertical and horizontal, creating a sense of depth and connectivity. The points are small, bright spheres at the end of the lines, some of which are larger and more prominent. The overall effect is a futuristic, data-driven environment.

Key take away

- Digital twinning as transition vs digital twins as specific solutions
- Digital twins are on the rise and increasing playing a role in the market
- Overall no mature market, and big differences. Digital twins are in their early days in most sectors
- Various starting points for your journey: integrate in investments, optimize in operations, transformation roadmap
- To maximize impact and enable eco systems of twins we need align on guiding principles



For more information, visit our website:

Our view on digital twins:
royalhaskoningdhv.com/digitaltwin

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