

Jersey4.0

Path to Digital Transformation

@jacitytalks



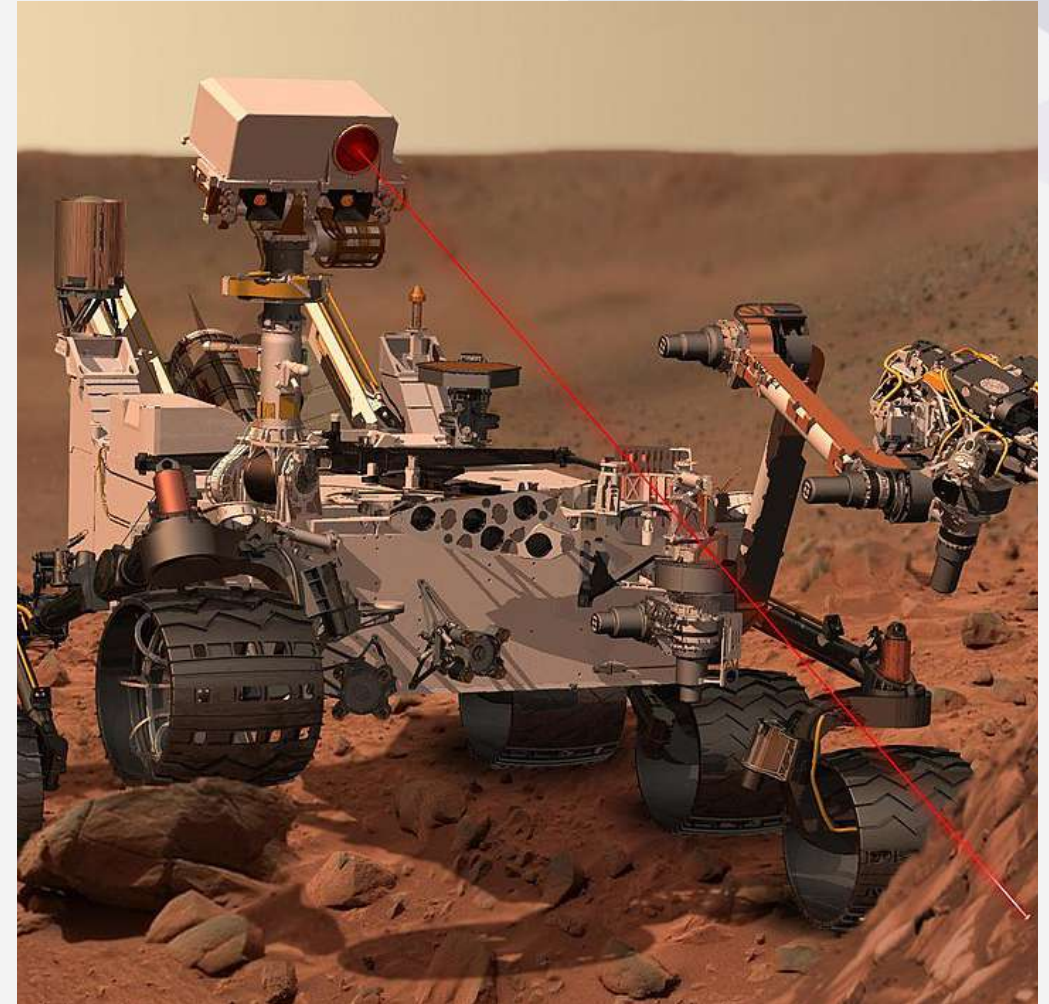
Jersey4.0

Path to Digital Transformation

@jacitytalks



MARS ROVER: Curiosity Project



NASA Rover Curiosity & Siemens PLM



NASA Rover Curiosity

- The most technologically complex project in the space agency's history
- A \$2.5 billion, car-sized rover designed to explore Mars as part of NASA's Mars Science Laboratory mission. It landed on Mars' Gale Crater on 6 August 2012
- Developed and tested using Siemens's product lifecycle management (PLM) software



Siemens PLM

- PLM system stimulated and tested every step of the journey, from thermal analysis to the multi-physical interactions the vehicle would encounter as it entered the Mars atmosphere
- Siemens's Teamcenter is the world's most widely used PLM system that connects people and processes across functional silos with a digital thread for innovation
- Teamcenter, in manufacturing operations, is able to reduce the use of physical prototypes by 30%, thereby cut errors by 50% in first production runs and accelerate development time by 30%

Industry 4.0

Autonomous Robots

Improve speed and accuracy in manufacturing, assembly and warehousing.

Reduces operating costs by 70%

Cloud Computing

Consolidating into a cloud based platform helps automate tasks, and increase transparency. Effective cloud strategy can reduce banking infrastructure by 40% can deliver 22% increase in staff efficiency



Simulation

Allows analysis and experimentation in supply chain process in a virtual setting. Individual events from an entire system can be represented, uncertainties can be tested and can reduce operation costs by 20%

3D Printing

A major asset in the energy industry in production of eg solar panels with costs reductions in production costs of 50%. The efficiency of the asset is also now improved by 20% due to precision techniques

Benefits of Industry 4.0



2.6%

Annual reduction in inventory levels

30%

Drop in maintenance costs

2.9%

Annual revenue increase

30%

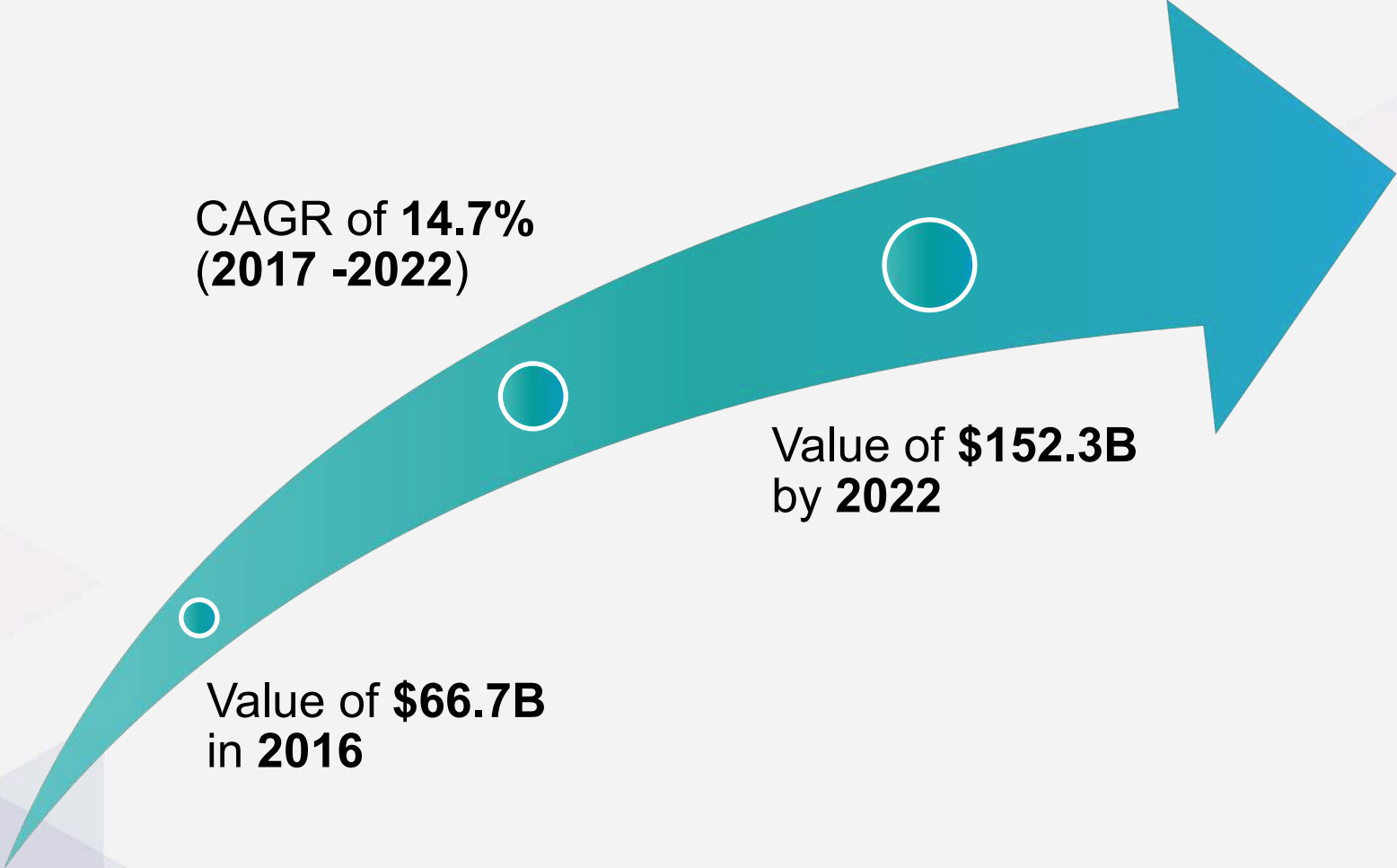
Increase in productivity

Siemens Industry 4.0 Customers

SIEMENS
Ingenuity for life



Global Industry 4.0 Market



Digital Twin

Communicate

Real time bidirectional connectivity

- *Edge processing* translating proprietary protocols into understood data formats
- *Communication interfaces* that allow for any device in any location
- *Edge security*

Create

Sensor collecting data

Operational: with performance criteria

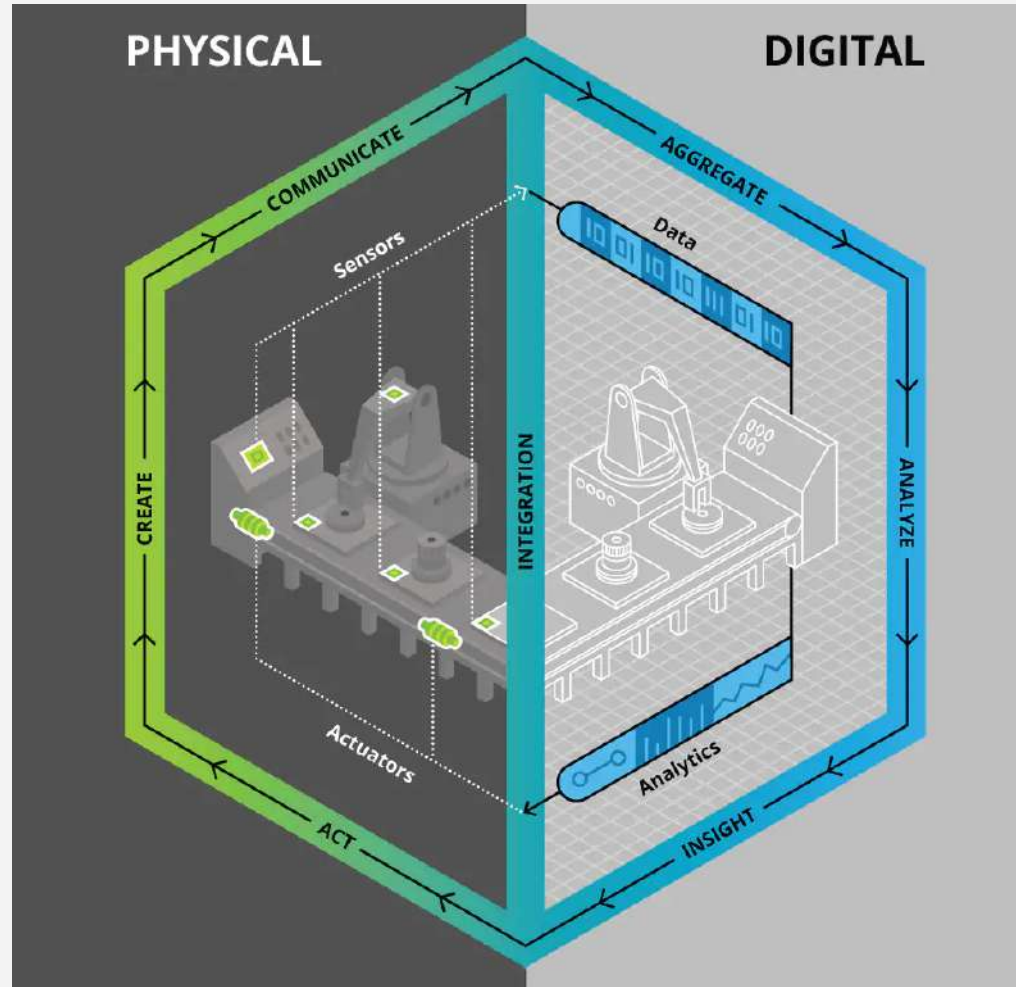
Environmental: such as temperature or water levels

Augmented: with process information such as resource planning or CAD models

Act

Actionable insights can be fed back to the physical asset process responsible for control mechanisms

These systems control supply chains or process flows or design choices



Aggregate

Supports data ingestion into a repository processed for analytics

Analyse

Data is analysed and visualised. Iterative models can be developed to generate outputs for decision making

Insight

Insights are presented through dashboards highlighting differences in performance of the digital twin and the physical world in one or more dimensions indicating areas for further investigation and optimisation

Siemens & Bentley Systems Partnership

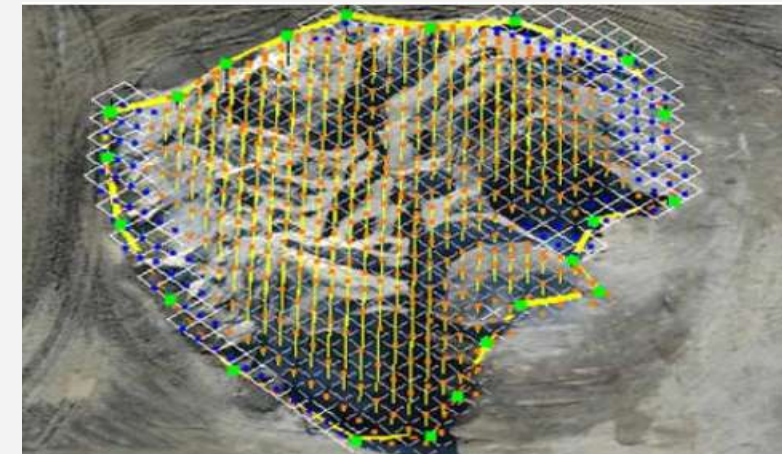


Bentley's CONNECT Edition

- It is a software solution, built on the Microsoft Azure Cloud platform to enable digital transformation by connecting all users across projects
- Participants can choose to synchronise to and from particular timeline milestones and can visualise, summarise, analyse and interpret the impact of ongoing changes
- A full history of all the changes made to the 3D model and 2D designs are synchronised to including who made changes, what was changed, when changes were made and the date the changes were completed

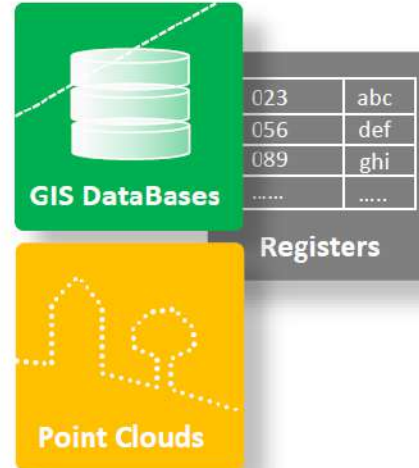
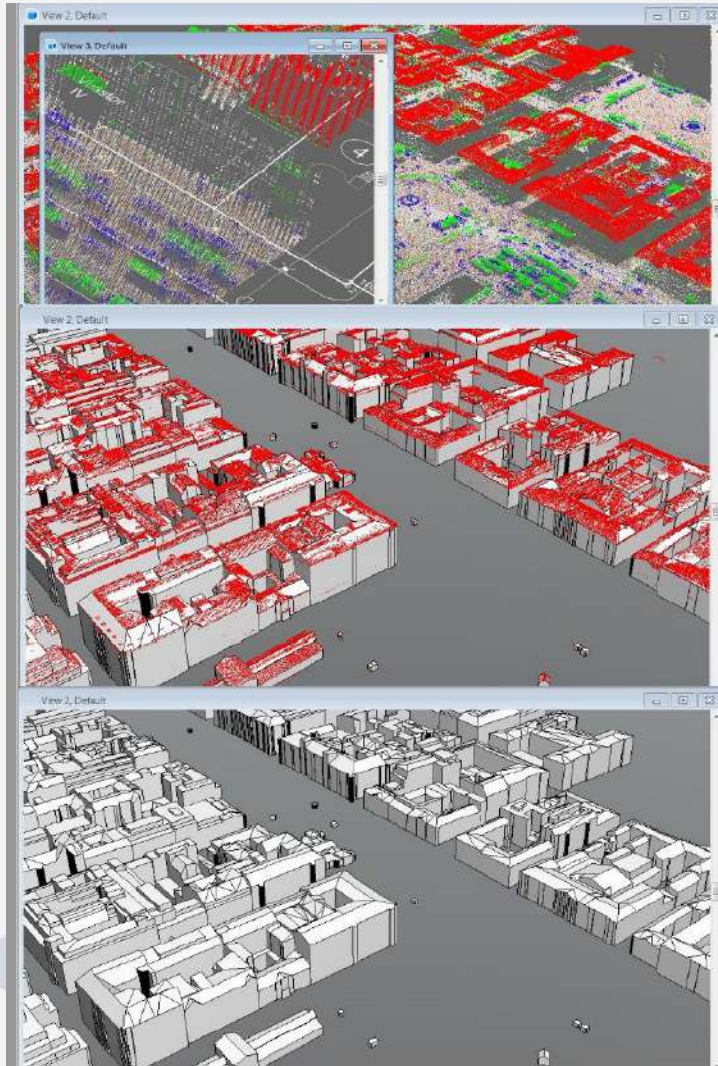
Siemens & Bentley Partnership

- A 2-year partnership (2018-2020) aiming at creating digital twins for building projects
- The result will be an integrated solution for delivering capital projects more efficiently as the connections of project digital twins will expand into their enterprise context, and drill down into their manufactured components – advancing infrastructure through digital DNA

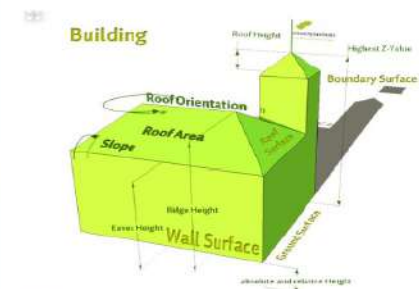


Siemens & Bentley Systems Partnership

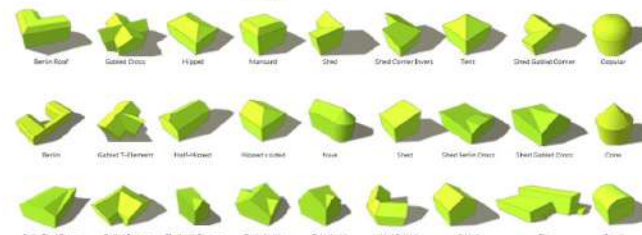
SIEMENS
Ingenuity for life



- Base map footprint is city model footprint
- Register information attached (id etc.)
- Surface models from point clouds
- Lifting the footprint to the terrain level
- Extrude footprint and matching roof templates to the roof surface



- CityGML/3DCityDatabase/PostgreSQL
- LoD1, LoD2 (textured)
- Continuous maintenance 2018→
- More themes (terrain, bridges, trees...)





Siemens & Bentley Systems Partnership



Helsinki's 3D Models

There are two next generation 3D city models of Helsinki, that are available as open data:

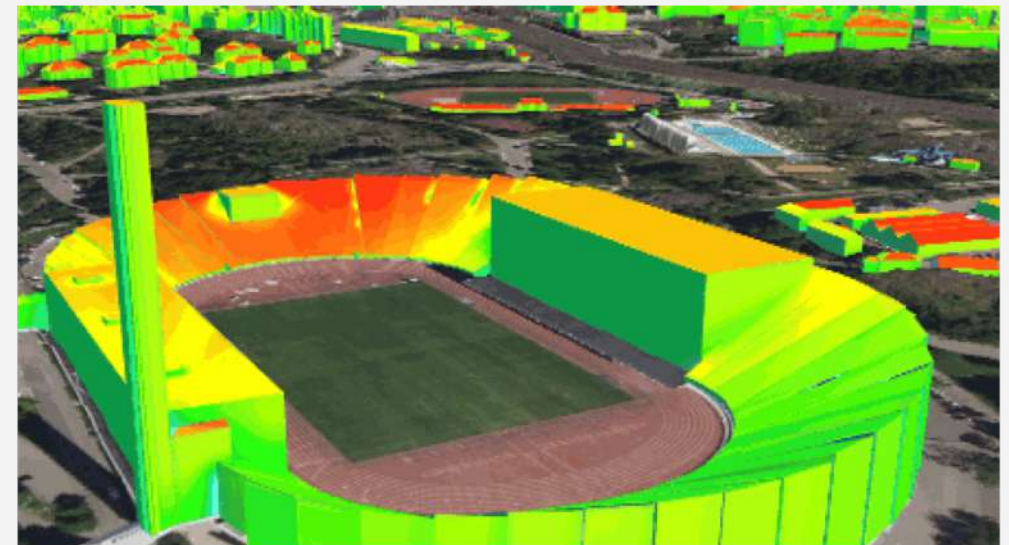
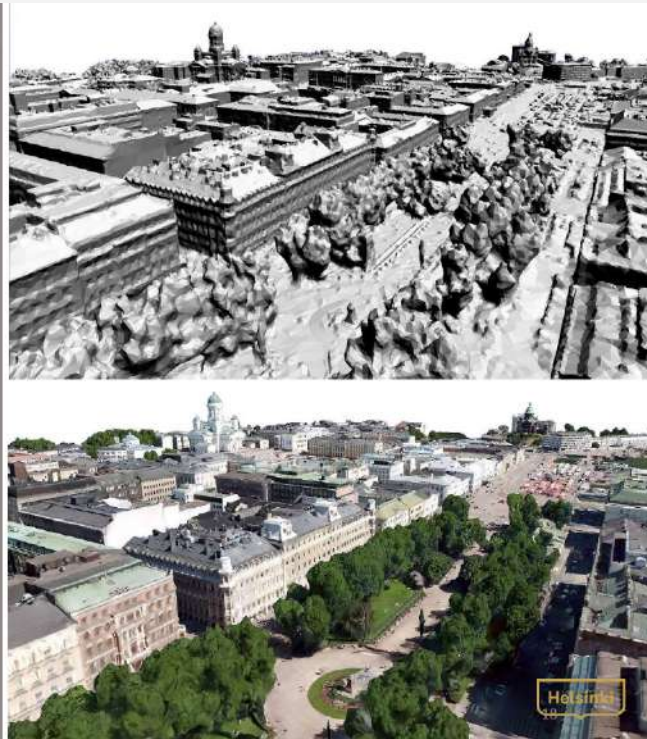
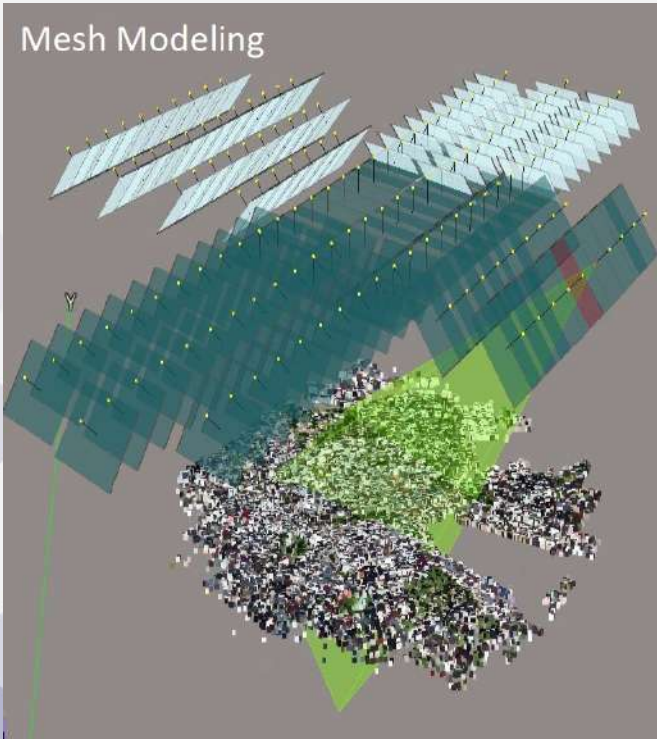
A semantic city information model

The semantic city information model allows users to perform a variety of analysis, focusing on energy consumption, greenhouse gases or the environmental impacts of traffic. For instance Helsinki's solar energy potential is an analysis based on this model in which the applicability of the roof and wall surfaces of all Helsinki's buildings for solar energy production is being studied

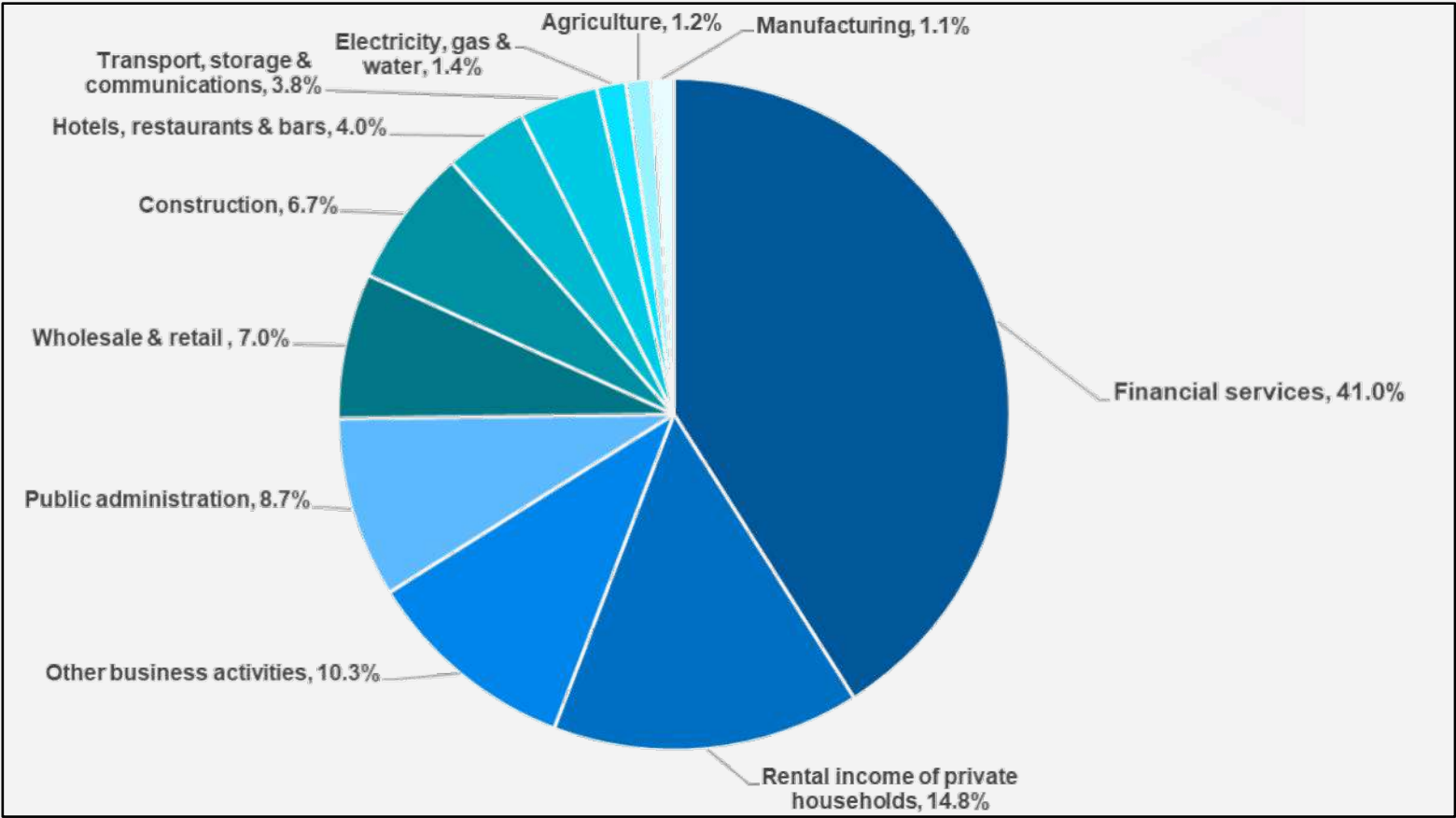
A visually high-quality reality mesh model

The reality mesh model can be utilised in various online services or as the basis for all kinds of design projects, such as planning the exit routes and the locations of performance stages and sales stalls for city events

Mesh Modeling



GVA by Sector, 2016



Future banking will be integrated in the day to day activities of the consumer, not requiring a separate interface. It will encompass **seamless, completely integrated and intuitive processes**:

- **Product Search** – Customers will not be looking for banking products specifically. For instance, a large purchase will automatically trigger a loan
- **Onboard** – Customers' onboarding will be done via federated identity, garnering information from multiple sources rather than asking the customers to provide the details
- **Authenticate** – Security and authentication will be ensured by using AI technology. For example, based on analysis of devices used and behavior of customer
- **Deepening of Relationship** – This would be driven by advanced analytics where customers' needs are anticipated. The aim of product suggestions would be to help customers achieve their goals and aspirations

Public Service 4.0

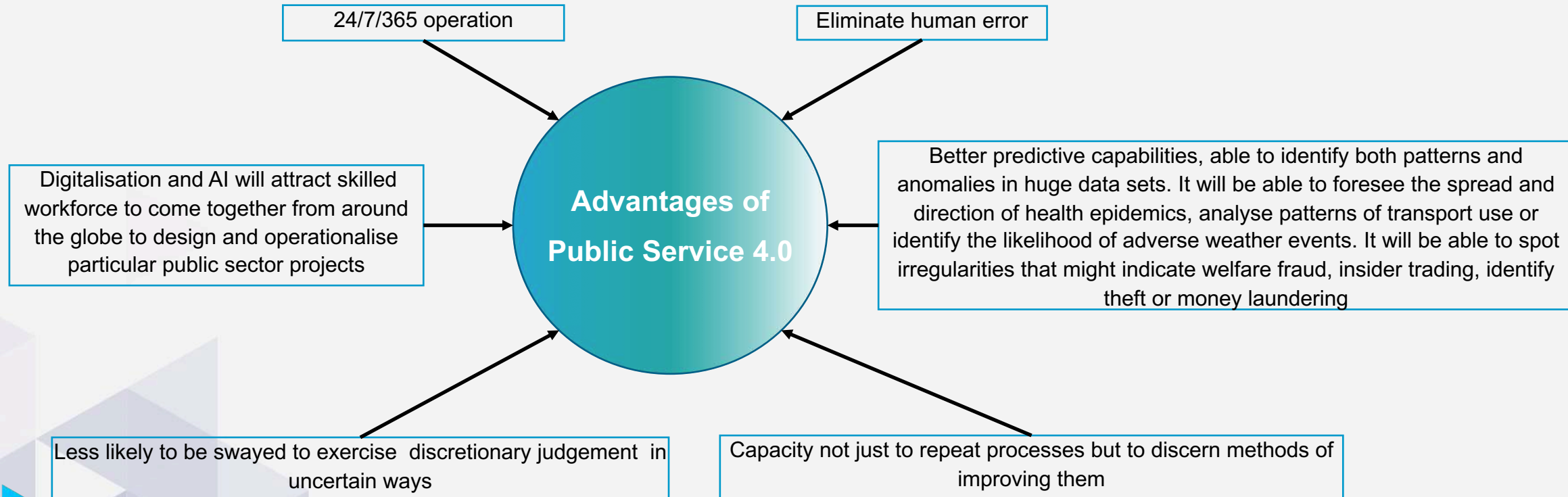
Back-office jobs

The character of bureaucracy, as a rules-based system that is governed by legislative and administrative guidelines compromising many routines procedures for decision making, is ideally suited to RPA

Robotic Process Automation (RPA) in Public Service

Frontline jobs

Sophisticated “chat-bots” that conduct human-like conversations by text or voice



Digital Twin in Public Service 4.0



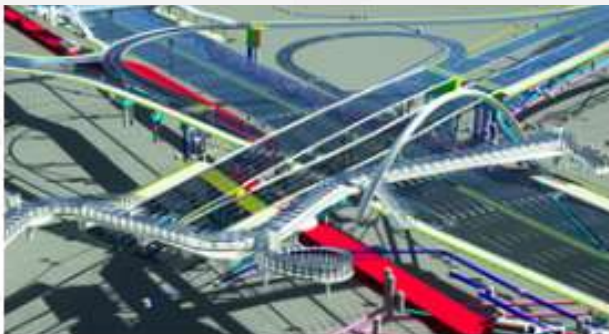
Benefits

- Allow city administration bodies to simulate any plans for improvement before physically implementing them, checking for potential problems before they can become a reality
- Facilitate public engagement as citizens have access to digital replicas of future plans. This would improve public service efficiency through an enhanced relationship with the citizens

Construction 4.0

Computational Design

Rules-based digital programming where complex design and advanced structures can be processed extremely quickly



Machine Learning

Machines able to respond to construction site situations in real-time without the need for them to continually connected and reconnected to back-end servers and for a human to download and analyse their information

Robotics

Robots are increasingly capable of performing a huge range of construction site duties (e.g. bricklaying, demolition, excavation)



Digital Twin in Construction 4.0

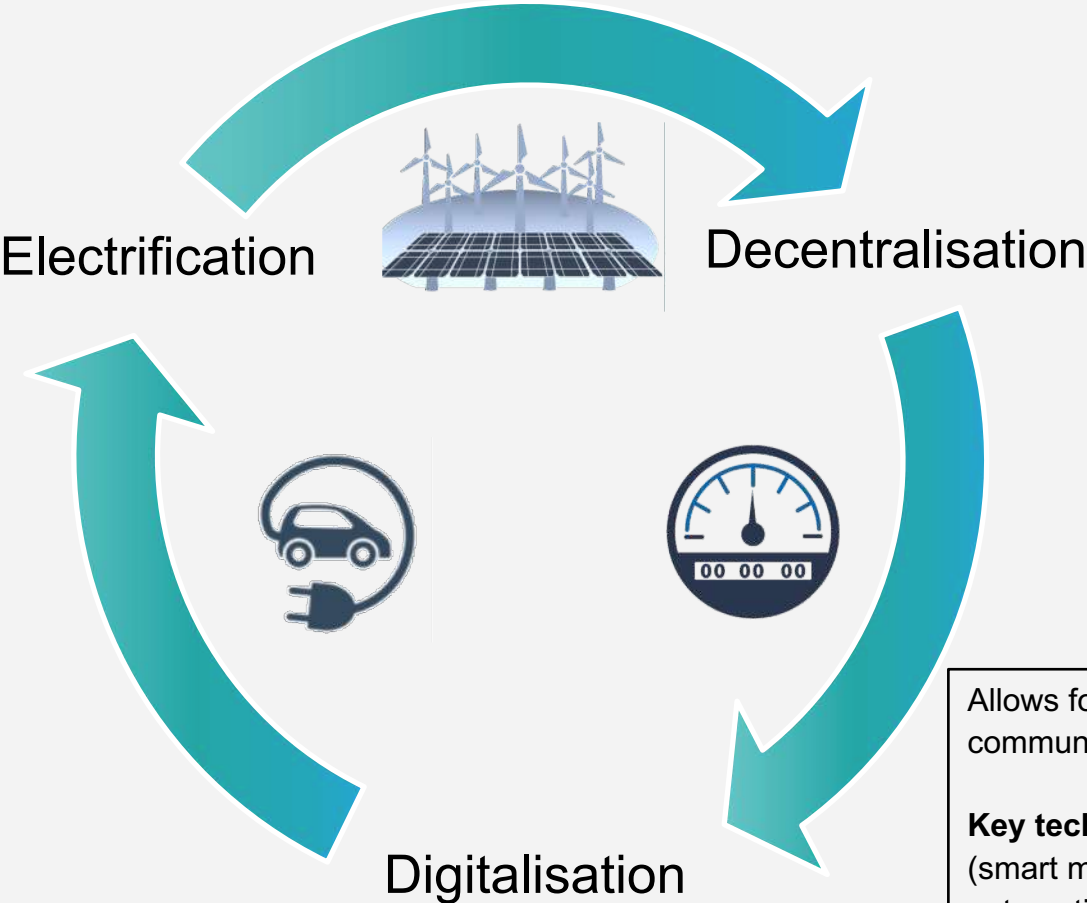


Applications

- **Automated progress monitoring**, verifying that the completed work is consistent with plans and specifications
- **Automatic resource allocation monitoring and waste tracking**, allowing for a predictive and lean approach to resource management
- **Track people and hazardous places on a site**, so as to prevent inappropriate behavior, usage of unsafe materials, and activity in hazardous zones
- Image-processing algorithms make it possible to **check the condition of concrete** through a video or photographic image
- **Optimisation of equipment usage** via advanced imaging and automatic tracking

Critical to long-term carbon goals and will be a relevant distributed resource

Key technologies: Electric vehicles, vehicle to grid/home, smart charging, heat pumps



Makes customers active elements of the system

Key technologies: energy efficiency, solar PV, distributed storage, microgrids, demand response

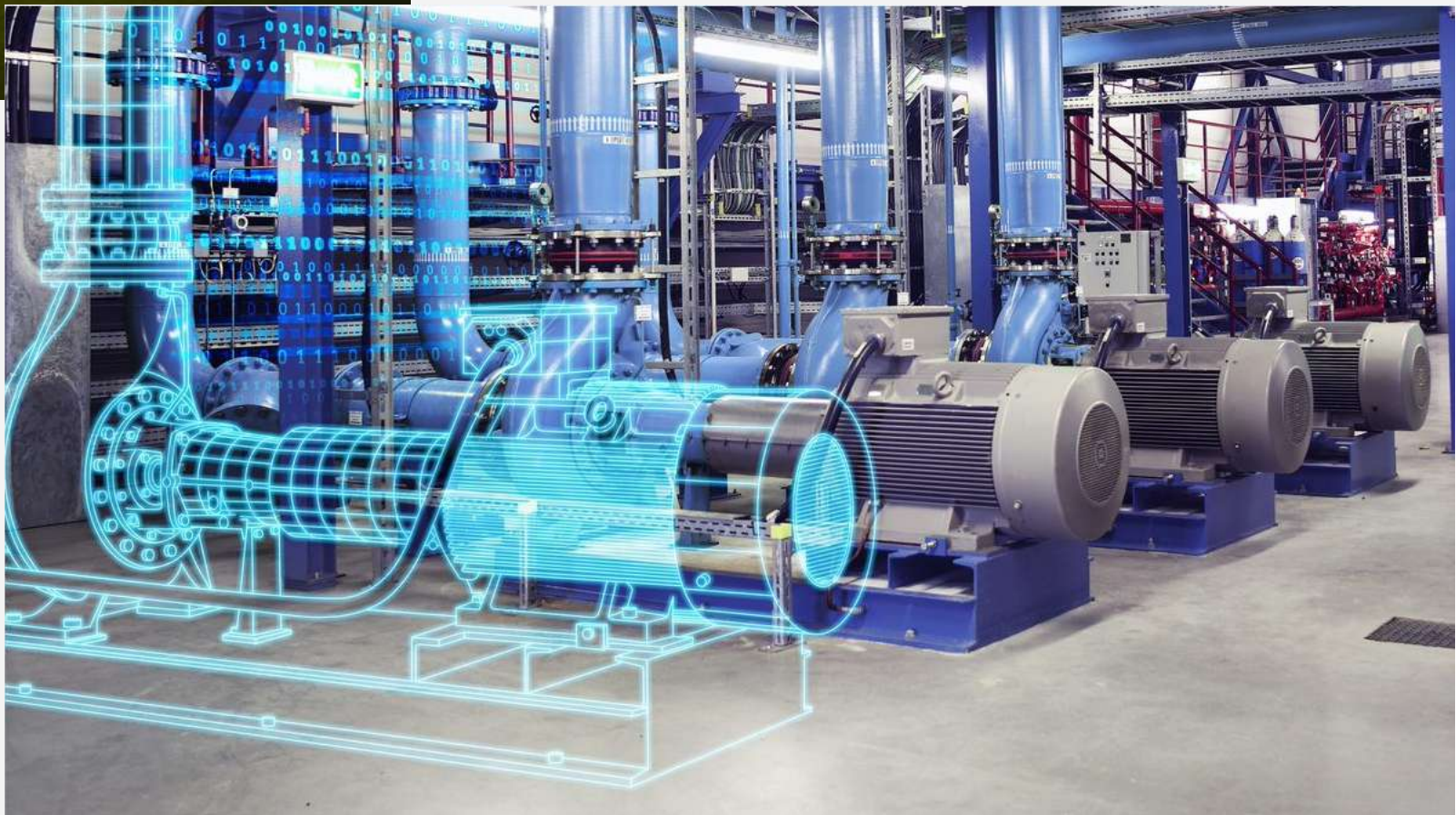
Allows for open, real-time, automated communication and operation of the system

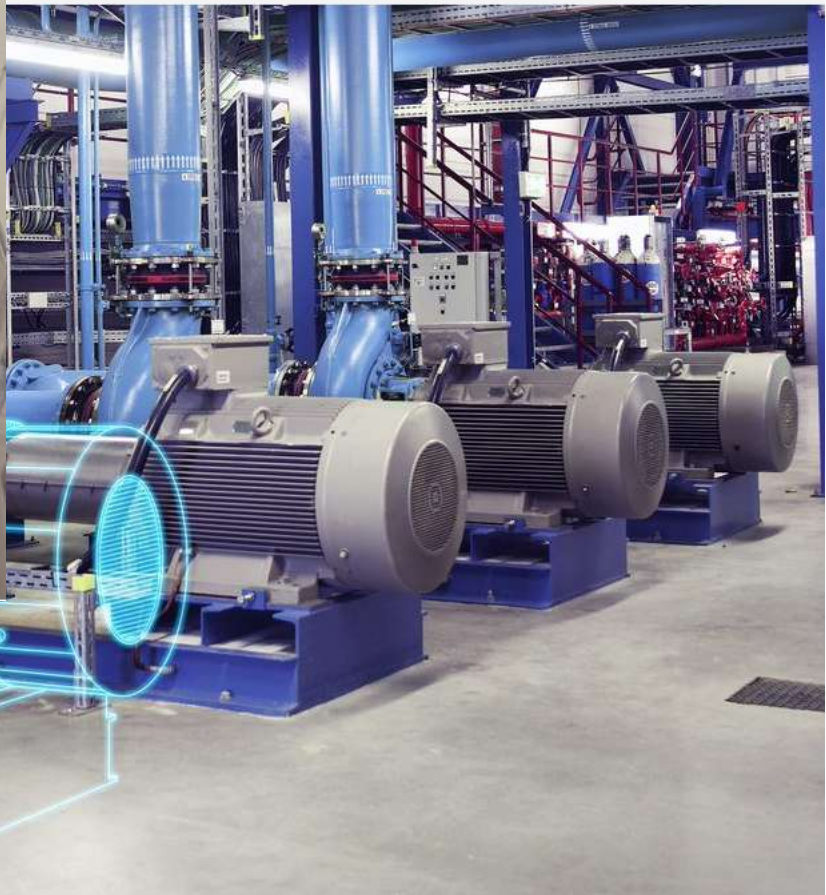
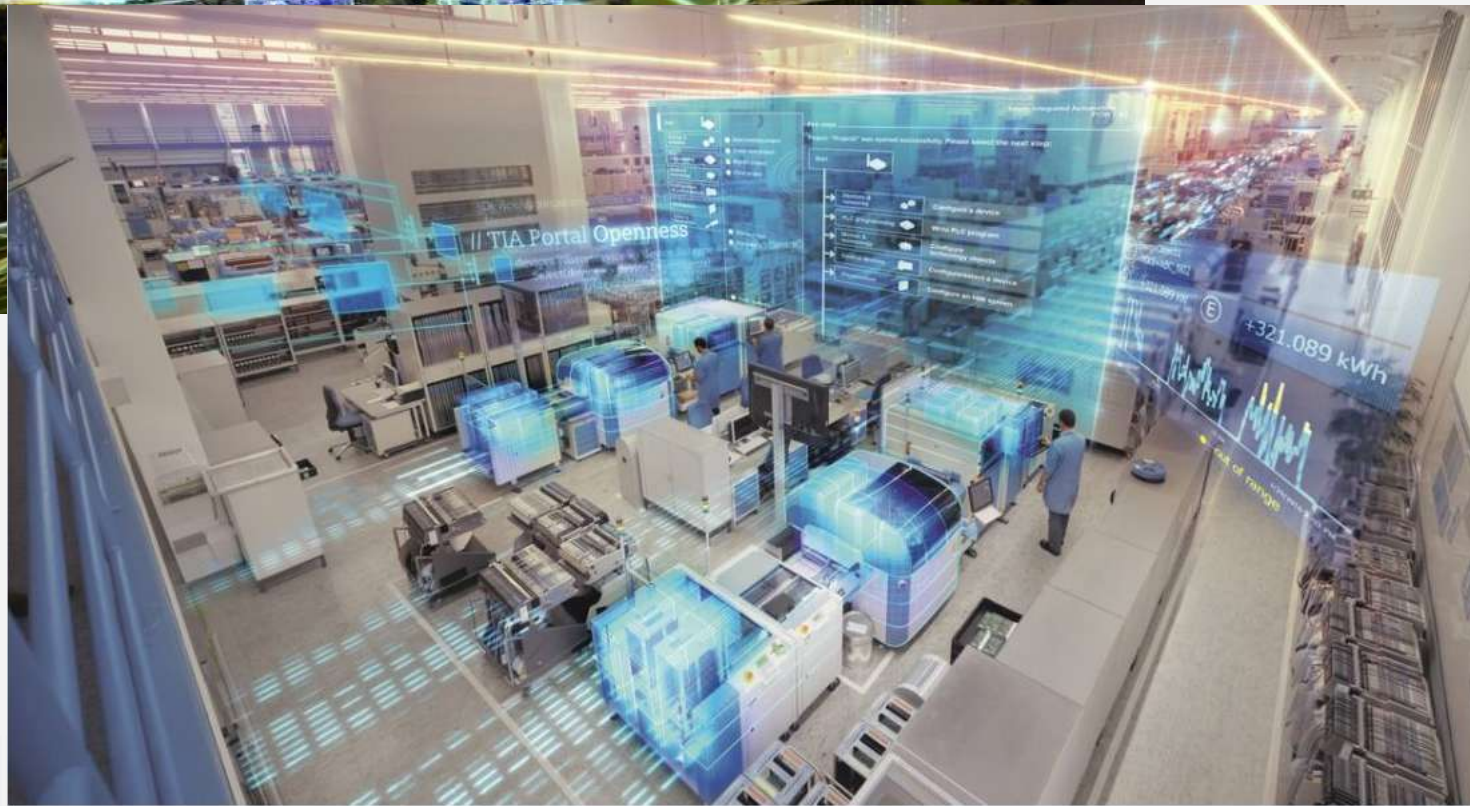
Key technologies: Network technologies (smart metering, remote control and automation systems, smart sensors) and beyond the meter (optimisation and aggregation platforms, smart appliances and devices, IoT)

Digital Twin in Energy 4.0











Thank you



Julie Alexander

Director, Urban Development & Smart Cities Lead

The Crystal
London

E-mail:

Julie.alexander@siemens.com

@jacitytalks

[siemens.com/cities](https://www.siemens.com/cities)