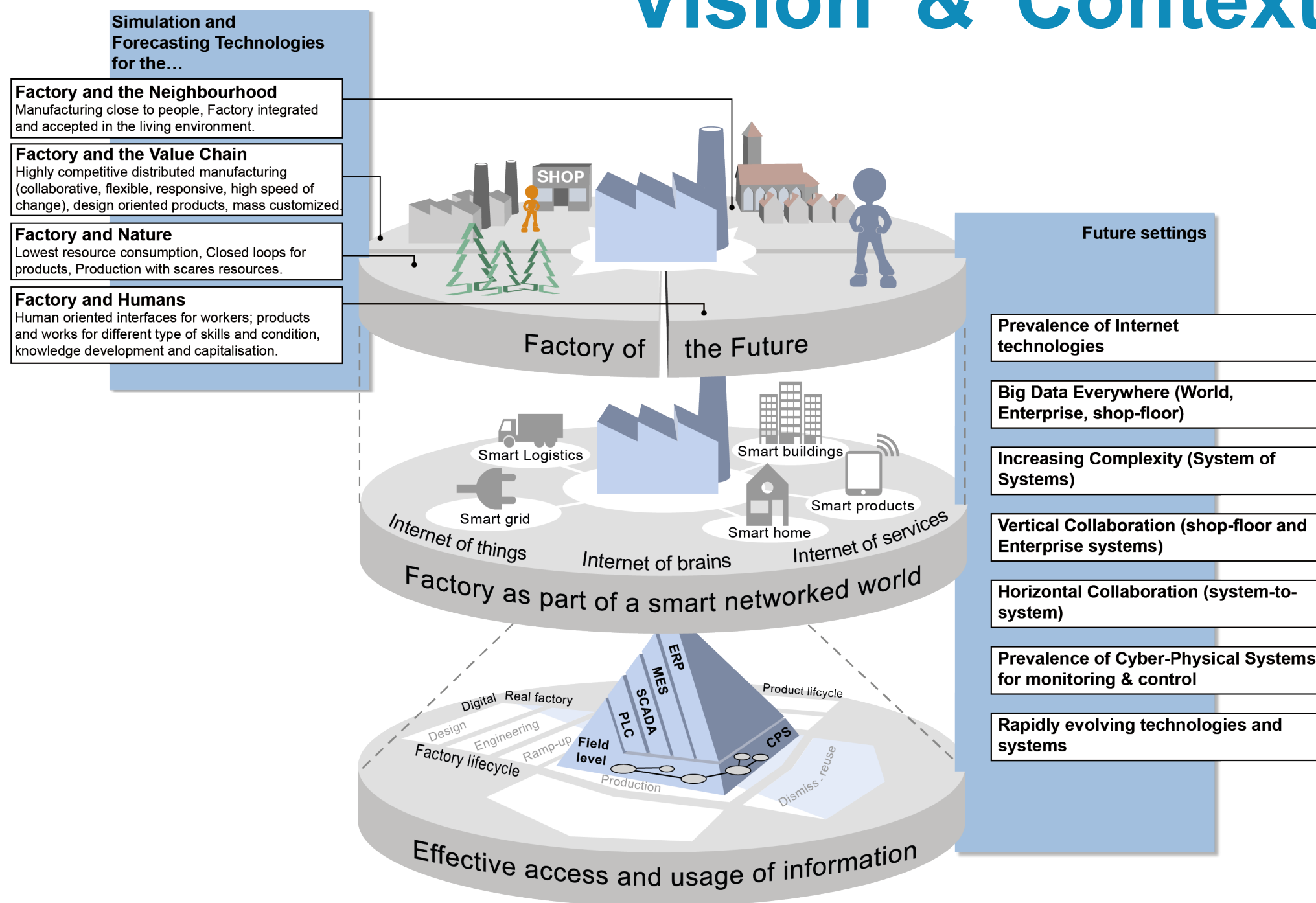


PATHFINDER

Drafting the next research agenda for Simulation & Forecasting Technologies

Vision & Context



Challenges

S&FT and Digital Continuity

Digital Continuity refers to the ability to maintain the digital information available all along the factory life-cycle, despite changes in purpose and tools, allowing data (the oil that fuels manufacturing) to be enriched and used as needed for that specific phase. This challenge addresses: Interoperable simulation and forecasting systems; Digital continuity across product and factory lifecycle of engineering information; Seamless use and reuse of engineering data; Reduce modelling effort; Modelling of complex problems; Multidisciplinary integrated modelling; Standardization.

S&FT and Scalability

Scalability refers to the ability of an application to function efficiently when its context is changed in size or volume. This challenge addresses: Step-by-step integration and adoption of S&FT; S&FT solution scalable on different devices and platforms; From on-premises software to cloud-based services.

S&FT and Synchronization of Digital and Real World

Synchronization of Digital and Real World refers to the convergence of physical world and virtual world, where the second must closely mirror the first and where the first generates an unprecedented volume of data to be taken care of by the latter. This challenge addresses: Self-adjustment of digital models triggered by smart objects (embedded intelligence – Cyber Physical System paradigm); Co-simulation in real-time; Handling of big-data.

S&FT and Advanced Human-Machine Interfaces

Advanced Human-Machine Interfaces (HMI) must provide transparent insights into the digital-virtual world and must allow to interact with S&FT in an intuitive and natural way. This challenge addresses: intuitive, mobile, context-sensitive and collaborative user-interfaces.

S&FT and Digital Consistency & Security

Digital Consistency & Security refers to the fact that data originating from and travelling along the factory lifecycle should be safe and shouldn't contradict each other. This is a significant challenge especially in the context of the digital continuity, vertical integration and horizontal integration, where distributed and heterogeneous data sources will be linked and made available in an open and interoperable manner. This challenge addresses: optimised provision of consistent data, data security and privacy.

S&FT, Data and Knowledge

This challenge addresses: Big Data and Data Analytics; Ontologies definition; Relevant knowledge capture and reuse, also for training and education.

Research priorities so far

RP1 – Integrated simulation and modelling tools, empowering digital continuity and real-world synchronization all along the factory life-cycle.

RP2 – Scalable factory models, integrating real-time data acquisition, to support S&FT access and usability at different levels, from operators to managers.

RP3 – Simulation and Forecasting models for highly reconfigurable production.

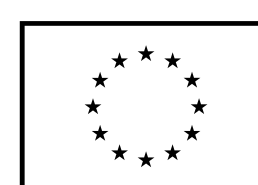
RP4 – IoT based Simulation and Forecasting Technologies towards reduced footprint manufacturing.

RP5 – Exploiting VR and AR technologies, empowered by cyber-physical systems, towards humans full potential realization, safety and work satisfaction.

RP6 – Knowledge enhanced digital factory models towards high quality interoperability among S&FT applications.

RP7 – Digital factory real-time synchronisation to tackle unexpected product and process re-configurations.

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