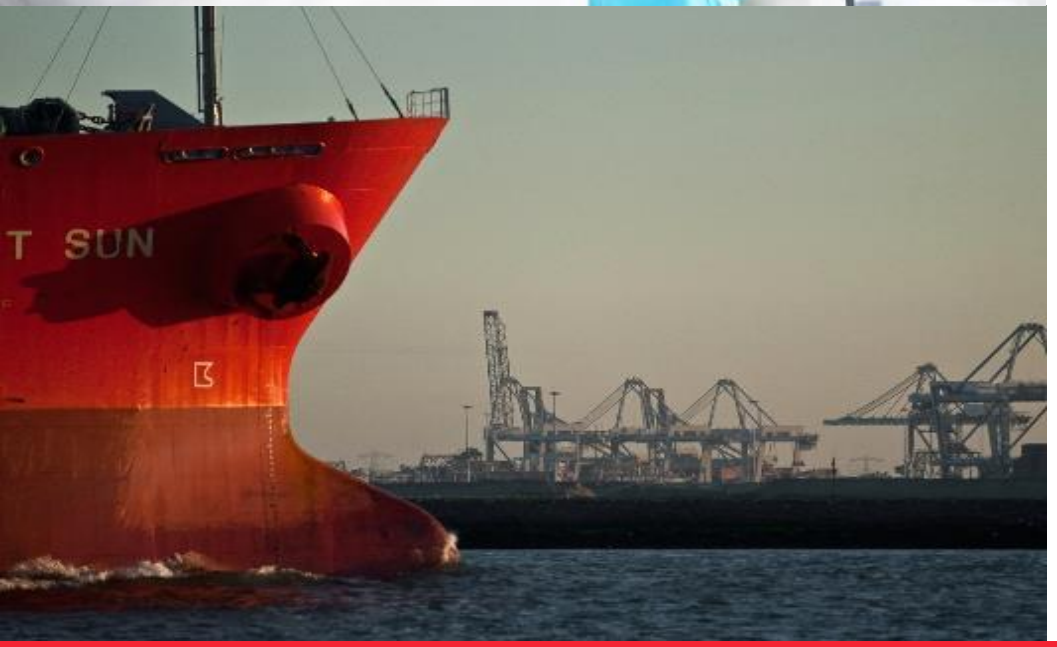


Standarder som möjliggörare för den smarta industrin

Ann-Sofie Sjöblom, SIS
projektledare Smart Industri

Ulf Carlsson, Syntell
medlem i SIS/TK 280 Information och automation i produktlivscykeln
expert i ISO/IEC/JWG21 Smart Manufacturing Reference Model(s)

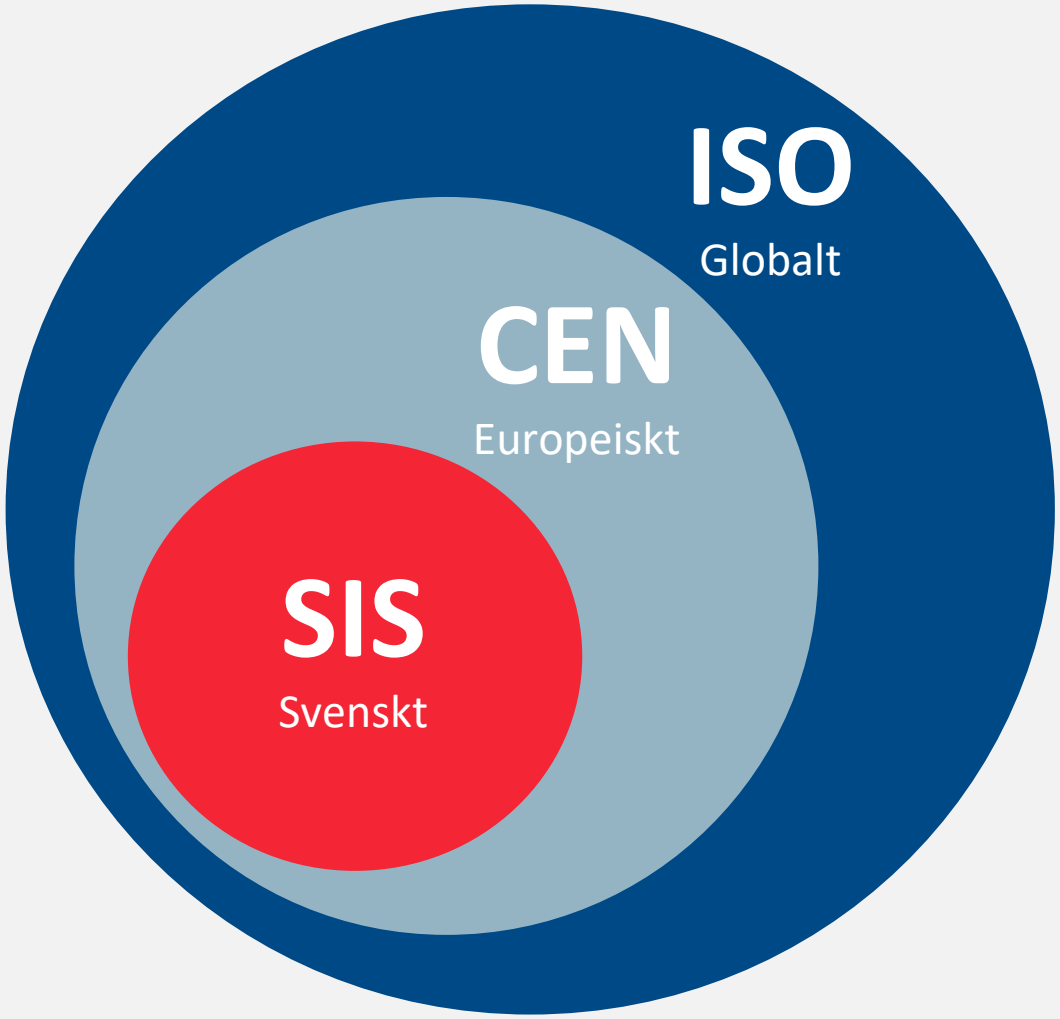
Charlotta Johnsson, LTH
medlem i SIS/TK 280,
ordförande ISO/TC 184/SC 5 Interoperability, integration, and architectures for enterprise systems and automation applications och projektledare för 4S, Strategies and Standards for Smart Swedish Industries

En dag med standarder…

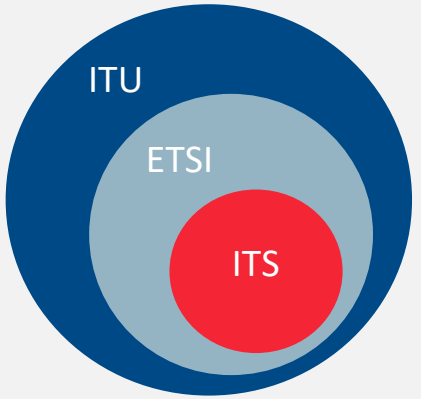
Svenska institutet för standarder

- SIS är Sveriges medlem i CEN och ISO
- Ideell förening
- Projektleder standardiserings-kommittéer, säljer standarder och håller utbildningar
- Aktiva standardiseringskommittéer: 286
- Ca 4 500 svenska experter från 1 900 företag deltar i det internationella standardiseringsarbetet
- Världshandelsorganisationen WTO:s regler styr

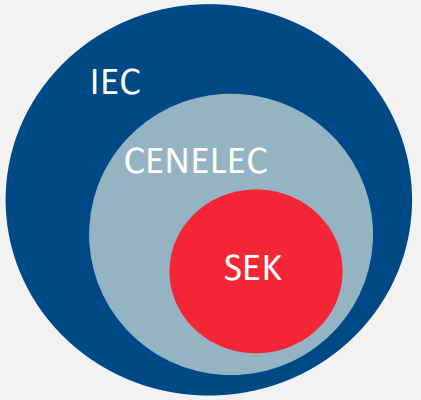
Standardiseringen – lokalt och globalt



TELECOM

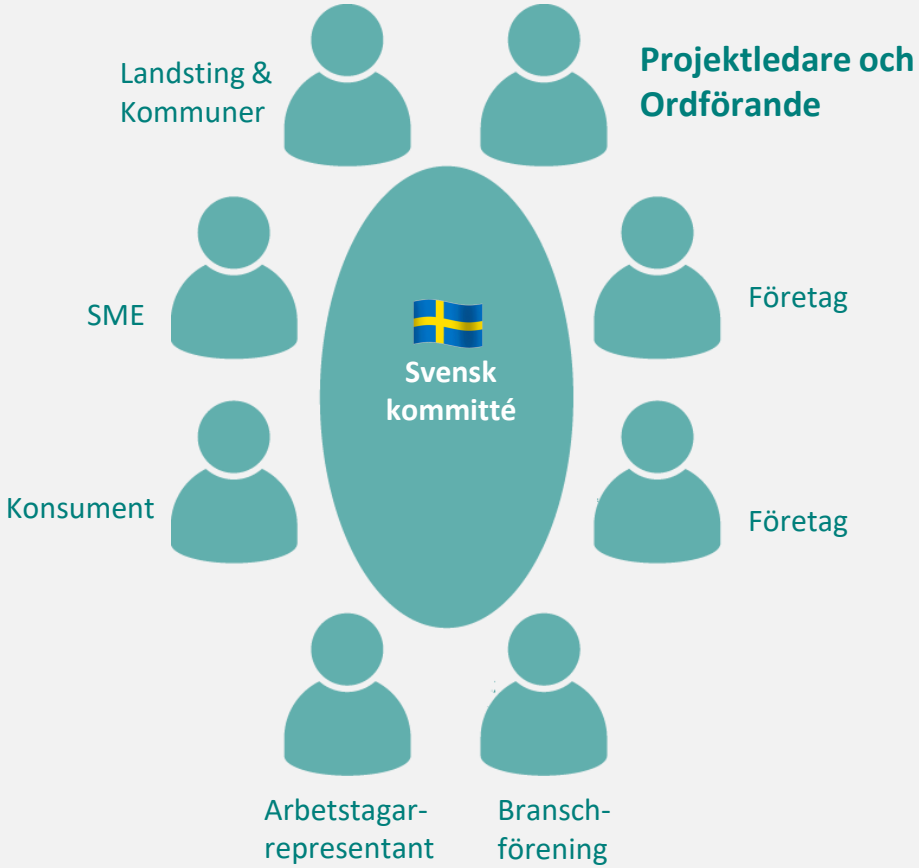


ELEKTROTEKNIK

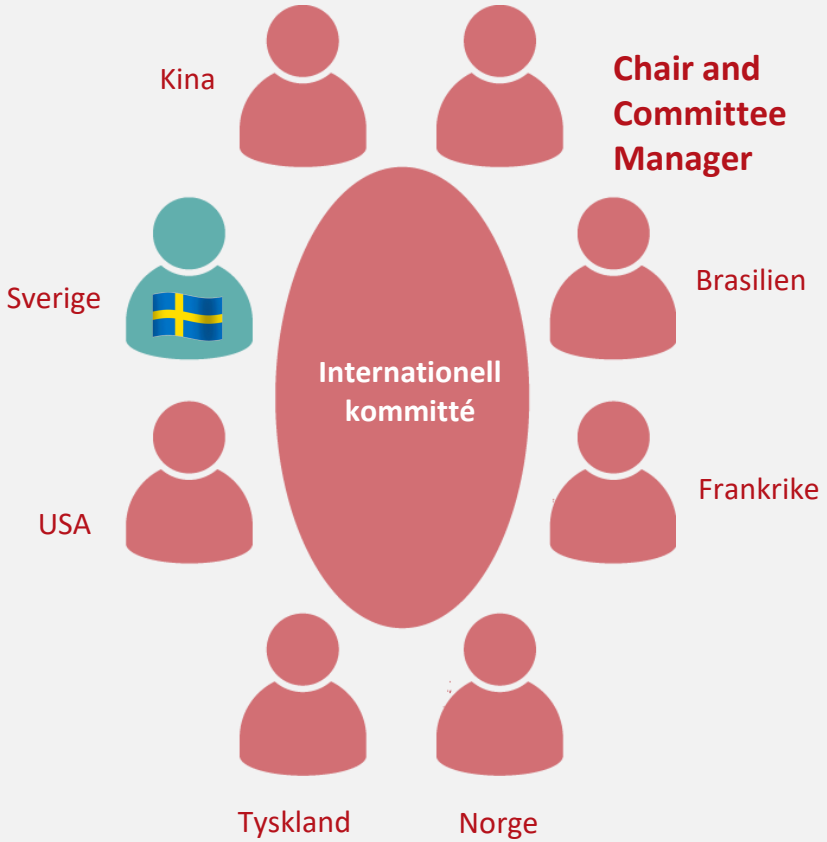


Best practice

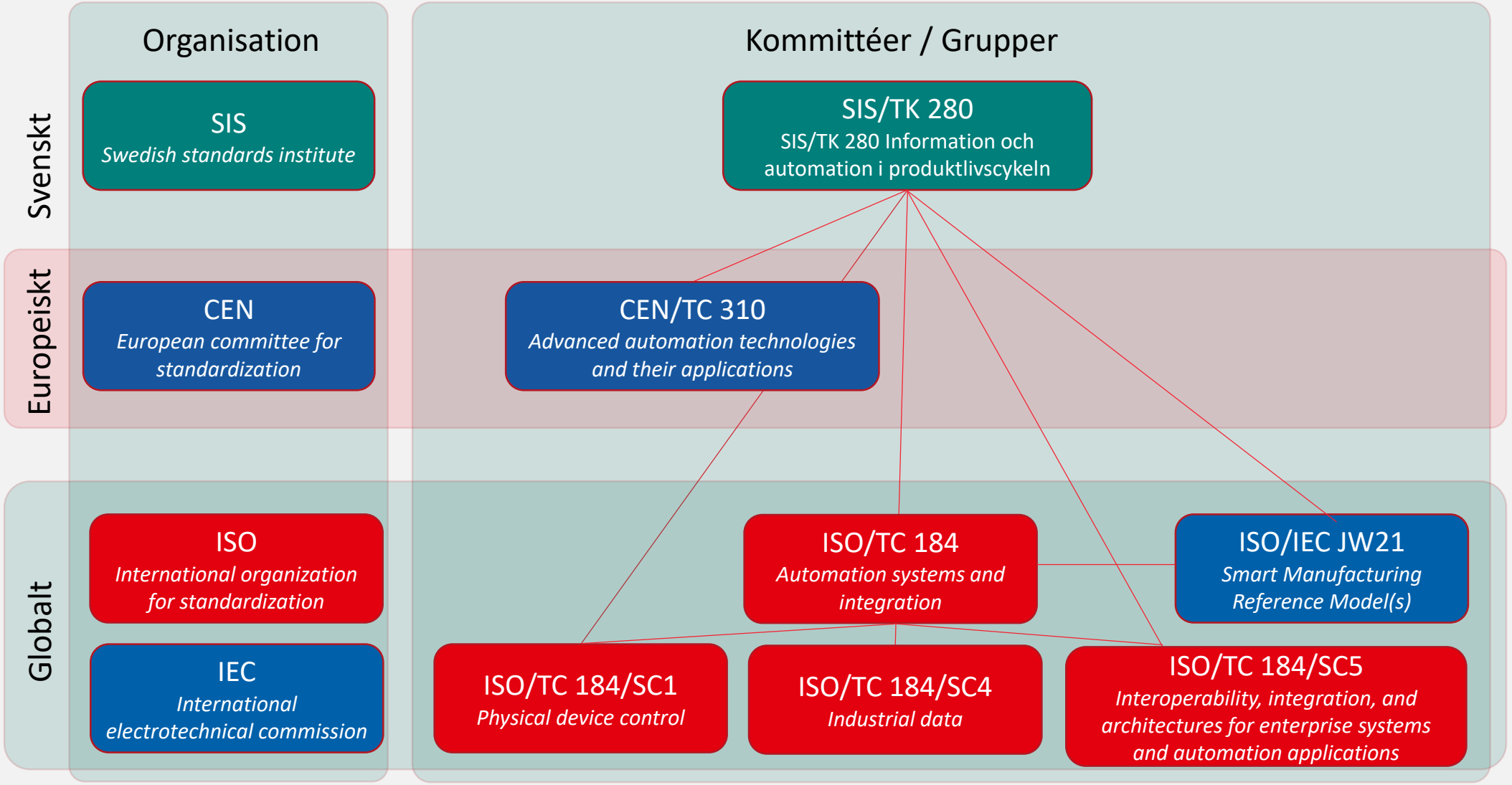
skapas i standardiseringsarbetets kommittéer



Påverkan/Utbyte

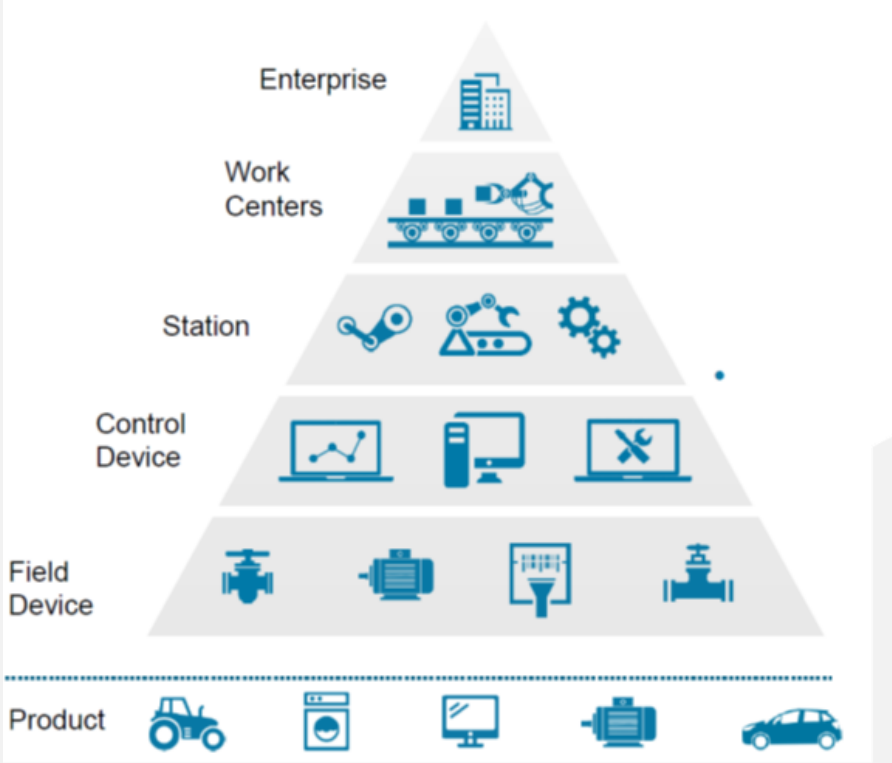


SIS/TK 280 Information och automation i produktlivscykeln

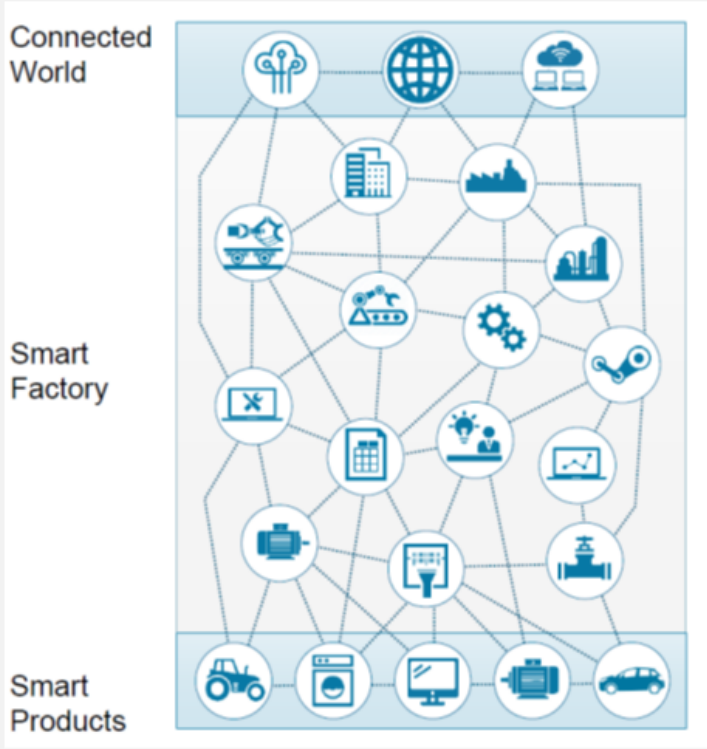


6 2019-10-08

Smart Manufacturing: from Hierarchy to Network focus



- Everything is connectable to each other.
- All participants can interact with each other.
- The product becomes an active part of the whole system
- Less Engineering, Plug & Produce
- New quality of Flexibility in machines and factories.
- Seamless Cross Vertical Integration
- Improved scalability



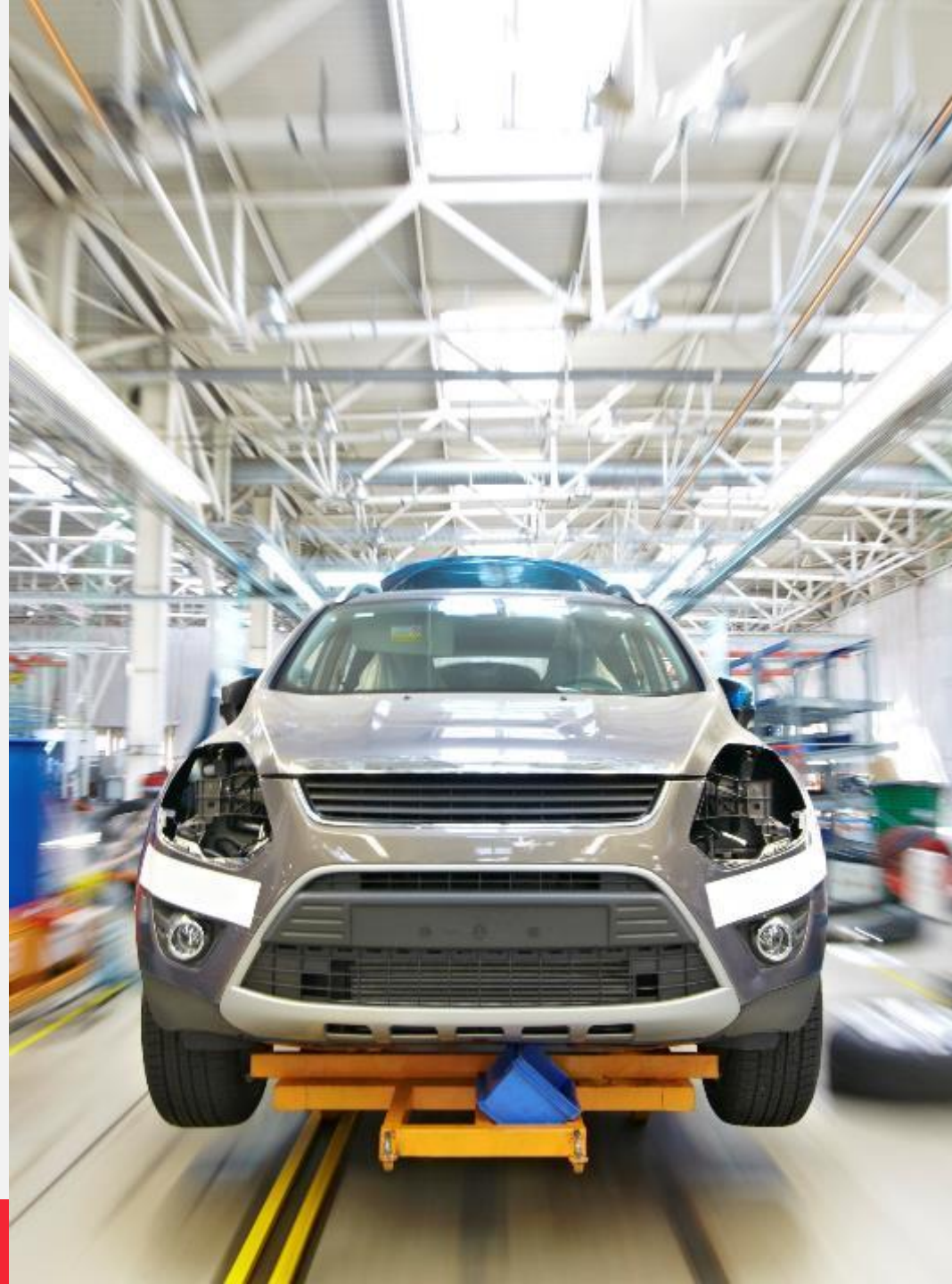
Today's hierarchy → **Smart Manufacturing capabilities** → **Tomorrow's Network**

The future workforce?

© Can Stock Photo - csp6214763

ISO Smart Manufacturing Coordinating Committee

- Established 2017, mandate until 2020
- Composition: 25 ISO TC and SC Chairs and IEC-representative
- Enable sharing of information
- Identify new work or identify harmonization areas of existing standards
- Three new members:
  - TC 307 Blockchain and distributed ledger technologies
  - JTC 1/SC 42 Artificial Intelligence
  - TC 213 Dimensional and geometrical product specifications and verification



Medlemmar i ISO SMCC

- Information technology
- Software and systems engineering
- Cards and personal identification
- Security techniques
- Data management and interchange
- Biometrics
- Cloud Computing and Distributed Platforms
- IT Service Management and IT Governance
- Internet of Things and related technologies
- Artificial intelligence
- Blockchain and distributed ledger technologies
- Technical product documentation
- Process plant documentation
- Machine tools
- Safety
- Automation systems and integration
- Physical device control
- Industrial data
- Interoperability, integration, and architectures for enterprise systems and automation applications
- Safety of machinery
- Geographic information/Geomatics
- Additive manufacturing
- Security and resilience
- Robotics
- Dimensional and geometrical product specifications and verification
- IEC

Integrating standards in your horizon 2020 project, CEN-CENELEC

- Standards in Horizon 2020 Standardization is identified in Horizon 2020 as one of the innovation-support measures.
- Standardization can help bridge the gap between research and the market, by enabling the fast and easy transfer of research results to the European and international market.
- The research community acknowledges this; nearly three-quarters (73%) of FP6 and FP7 project coordinators, who included standards in their previous projects, said that they would be willing to address standardization again.
- Link on CEN-CENELC-website

Integrating standards in your H2020 project, CEN-CENELEC

Do you need standards?

If you answer "yes" to any one of the questions below, you may need to seriously consider standards!

- Will your R&D results need to be compatible and interoperable with other technologies? ☐ YES
- Do you intend to bring your research results to the market? ☐ YES
- Will you need to ensure reliability and comparability of your R&D activities or results? ☐ YES
- Does your project intend to have a long-term impact? ☐ YES
- Do your results have a potential European or international market application? ☐ YES
- Would you like to display some kind of mark of product or process quality? ☐ YES
- Will any products or processes arising from your project be of interest for public procurement? ☐ YES
- Will you need to reassure consumers and others regarding the safety of your innovation? ☐ YES

What types of standards exist?

According to the needs and specific interests of stakeholders, different solutions are available. Fast-track standards for example are relevant to quickly-evolving environments such as R&D.

European Standards (ENs)

The European Standard (EN) is the flagship of the standardization activity in CEN and CENELEC. The process to deliver an EN takes a maximum of 3 years from the date that the technical work begins. Once approved, ENs are implemented as identical national standards and all conflicting national standards are withdrawn. This means that one EN replaces 33 national standards.

Technical Specifications (TSs)

A Technical Specification (TS) can be produced when there is no immediate need or not enough consensus for an EN. It might also be appropriate to projects where the technology developed is not yet mature or the subject matter is still under technical development. The average timeframe for the delivery of a TS is 2 years. National Standardization Organizations are not obliged to adopt a TS as a national standard.

CEN/CENELEC Workshop Agreements (CWAs)

Workshops are fast - relatively informal - consensus-building groups, open to direct participation of any interested party. The result of their work is published as a CEN or CENELEC Workshop Agreement (CWA). Workshops are particularly suited for experimental topics, often in connection with the output from research and innovation projects. The average timeframe for the delivery of a CWA is 18 months, allowing CWAs to be integrated in the lifetime of an R&D project. National Standardization Organizations are not obliged to adopt a CWA as a national standard.

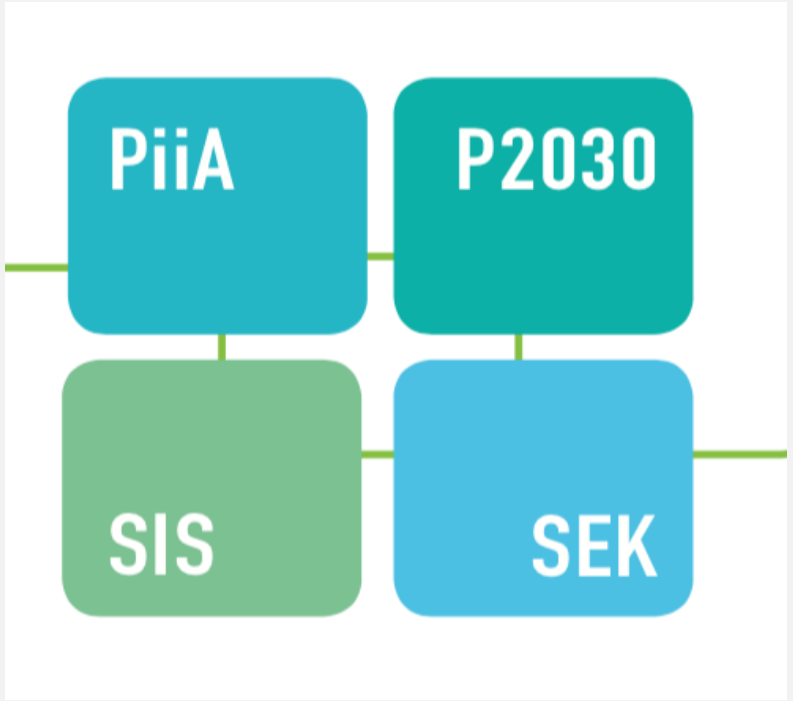
Strategies & Standards for Smart Swedish Industry

Projektledare: Charlotta Johnsson, Lunds universitet

Projektet 4S …

… länkar samman resultat från svenska utvecklingsprojekt för industrins digitalisering, främst inom PiiA och Prod2030, med det internationella standardiseringsarbete som pågår inom ISO och IEC.

... kan ge relevanta utvecklingsprojekt rådgivning och ekonomiskt stöd så att de svenska forskningsresultaten kan få inflytande på det internationella standardiseringsarbetet.

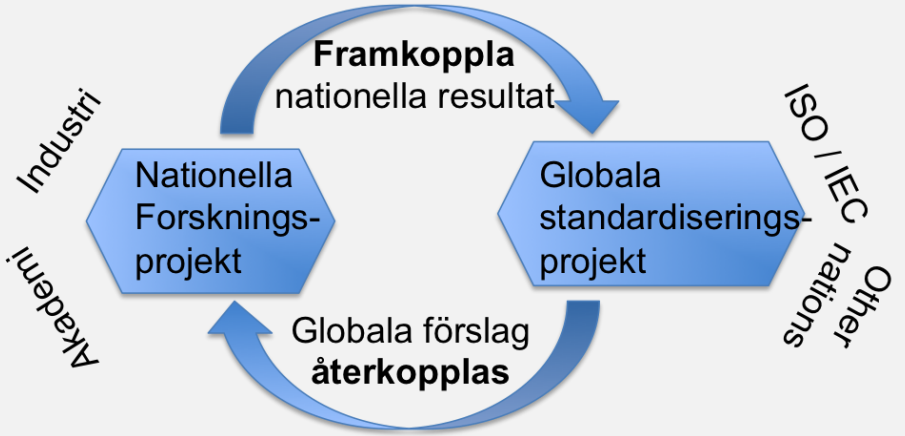


(Etapp1: 2017-09-01 -> 2018-10-30)

Etapp 2: 2019-01-01 -> 2020-12-31

Hur jobbar vi?

1. Identifiera utvecklingsprojekt (P) inom Prod2030 and PiiA som fokuserar på Smart industri.
2. Mappa dessa mot arbetsgrupper inom IEC och ISO som tar fram standarder för Smart industri.
3. Ge rådgivning till utvecklingsprojekten angående vad/hur de kan bidra till det kommande innehållet av standarderna.
4. Ge ekonomiskt stöttning till utvecklings-projekten så att de kan medverka på de internationella arbetsmötena.



SUMMARY

- 4S länkar samman resultat från svenska utvecklingsprojekt för industrins digitalisering, främst inom PiiA och Prod2030, med det internationella standardiseringsarbete som pågår inom ISO och IEC.

- 4S kan ge relevanta utvecklingsprojekt ekonomiskt stöd så att svenska forskningsresultat kan få inflytande på det internationella standardiserings-arbetet.

- Av den budget på 2,1MSEK vi kan dela ut till projekt, har vi intecknat 1,1MSEK till identifierade projekt. De projekt som erhållit finansiell hjälp ser detta som mycket värdefullt för projektet.

Standarder en strategisk fråga i det digitala industrilandskapet

Vad är Smart industri?

- *Definition (ISO resolution 114/2017):*
- *“Manufacturing that improves its performance aspects with integrated and intelligent use of processes and resources in cyber, physical and human spheres to create and deliver products and services, which also collaborates with other domains within an enterprise's value chains “*

Varför behövs standarder för Smart (Framtidens) Industri

Industrialisering

Hållbarhet

Standarder

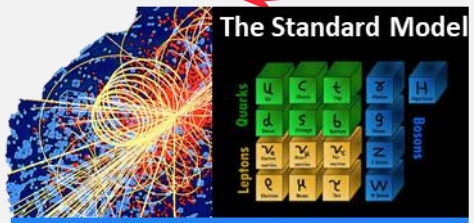
Innovation

SMRM

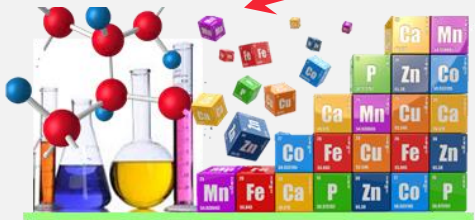
Konsumtion

Standarder

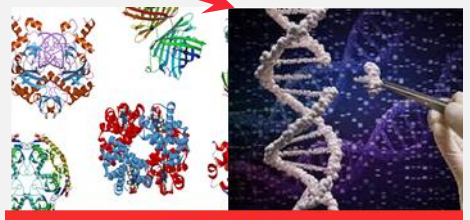
Hållbarhet



Fysik



Kemi

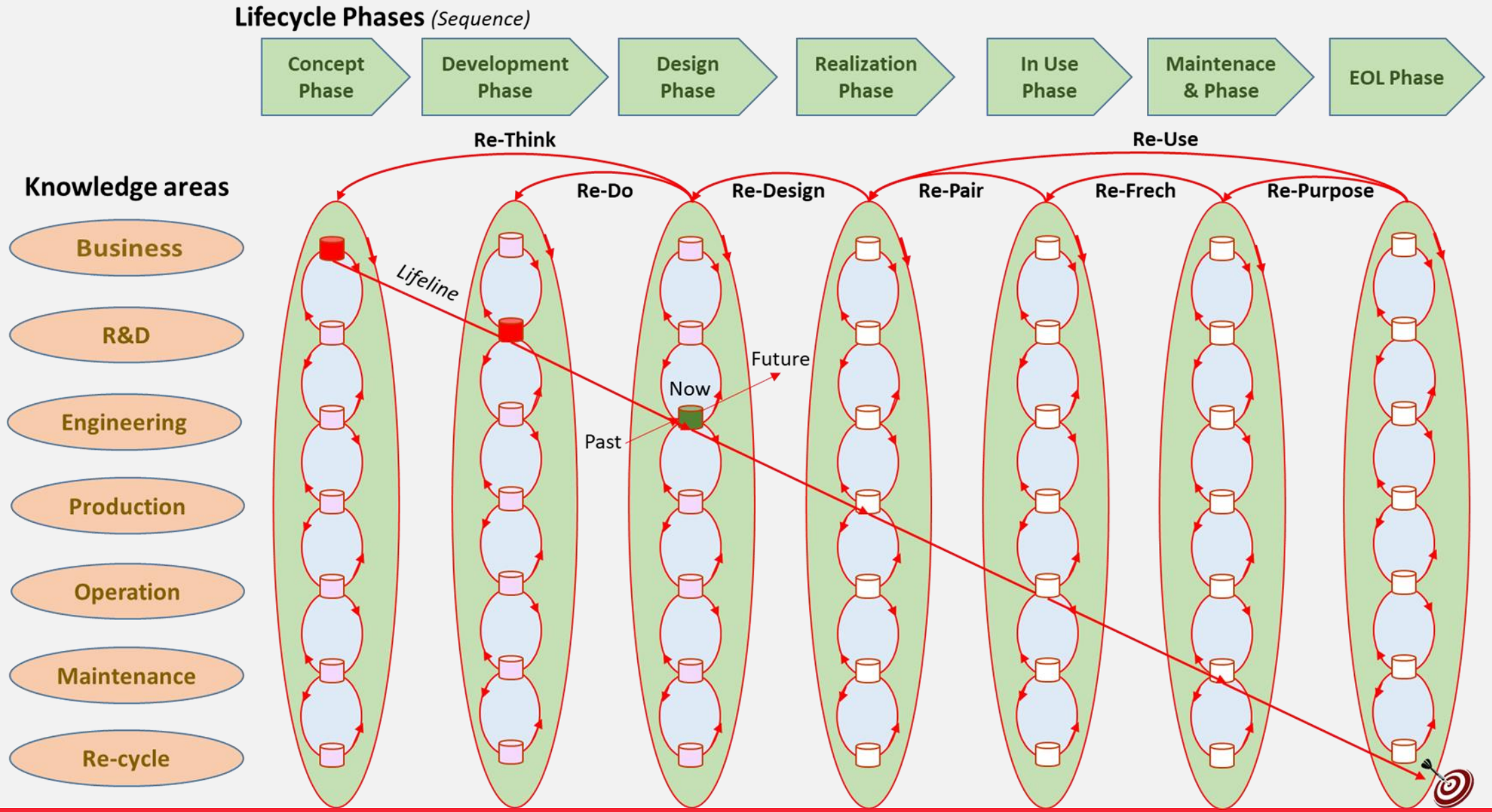


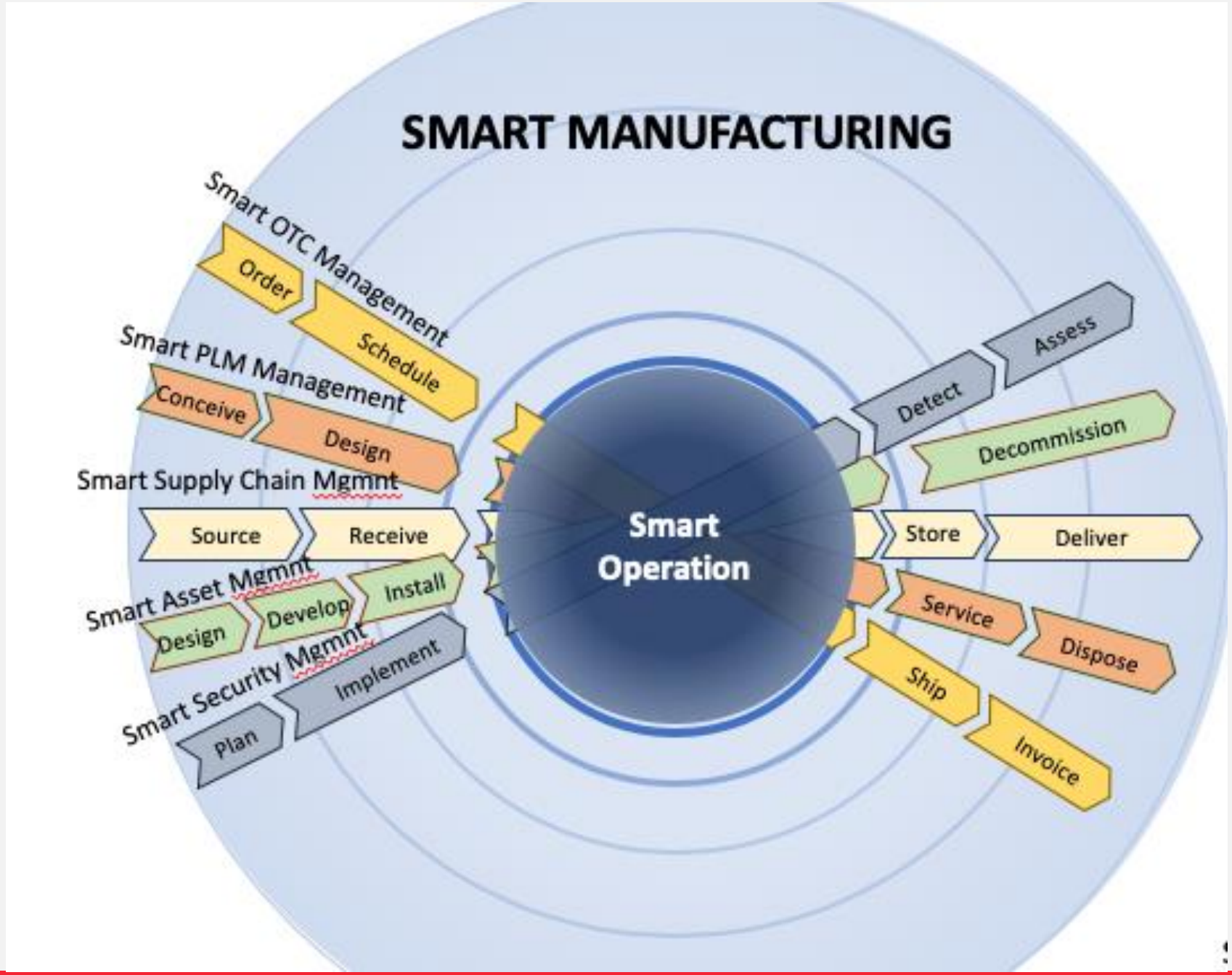
Biologi

Data

Circular Life Cycle for a Sustainable Society

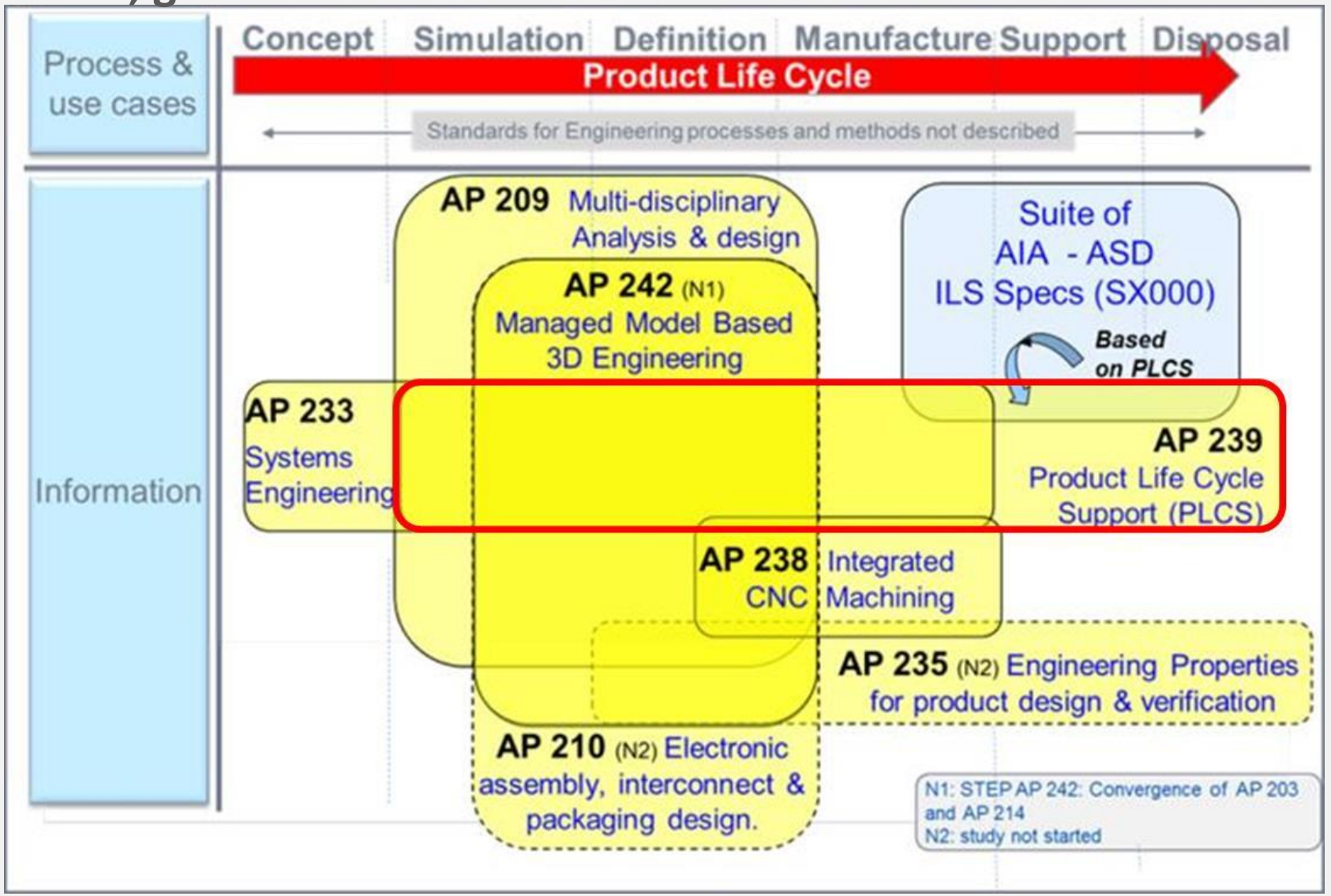
Lifecycle managed Object: X Time Scale 1:n Sice Scale 1:n




SMART MANUFACTURING
Smart OTC Management
Order
Schedule
Smart PLM Management
Conceive
Design
Smart Supply Chain Mgmnt
Source
Receive
Smart Asset Mgmnt
Design
Develop
Install
Smart Security Mgmnt
Plan
Implement
Smart Operation
Detect
Assess
Decommission
Store
Deliver
Service
Dispose
Ship
Invoice

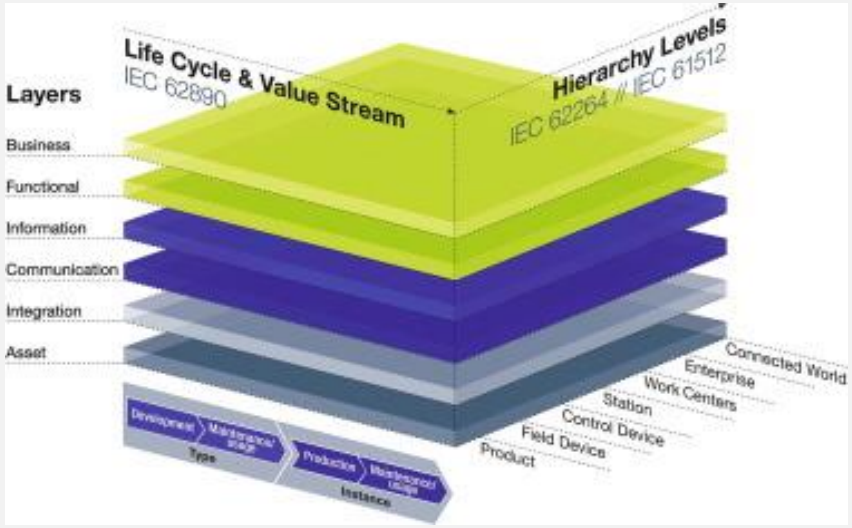
Standarders täckning av information över livscyklen

Modulär approach, gemensamma delar återanvänds

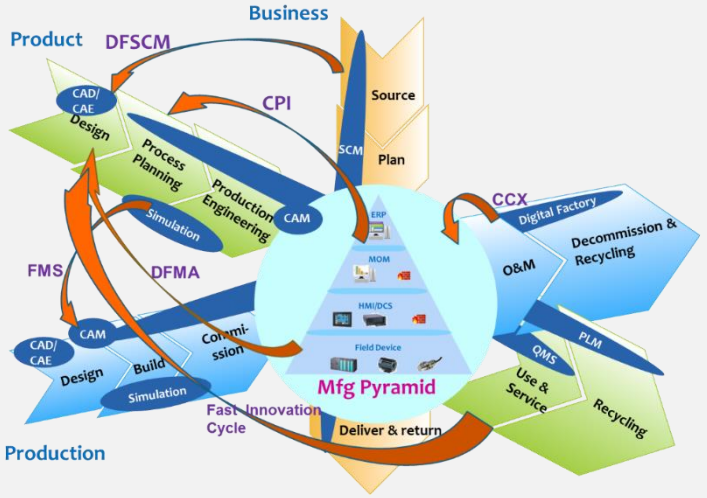


Scandinavian Smart Industry Framework

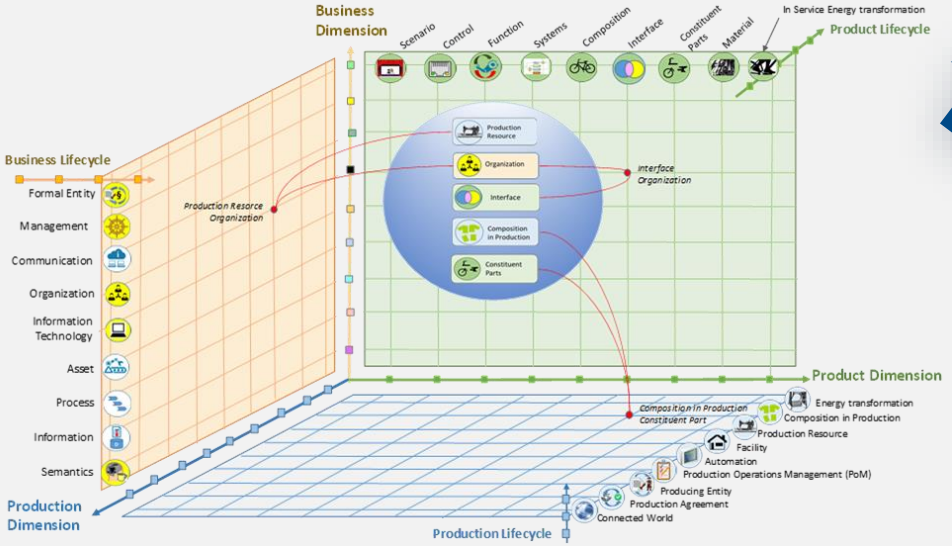
Germany, Industrie 4.0 Rami 4,0 Cube



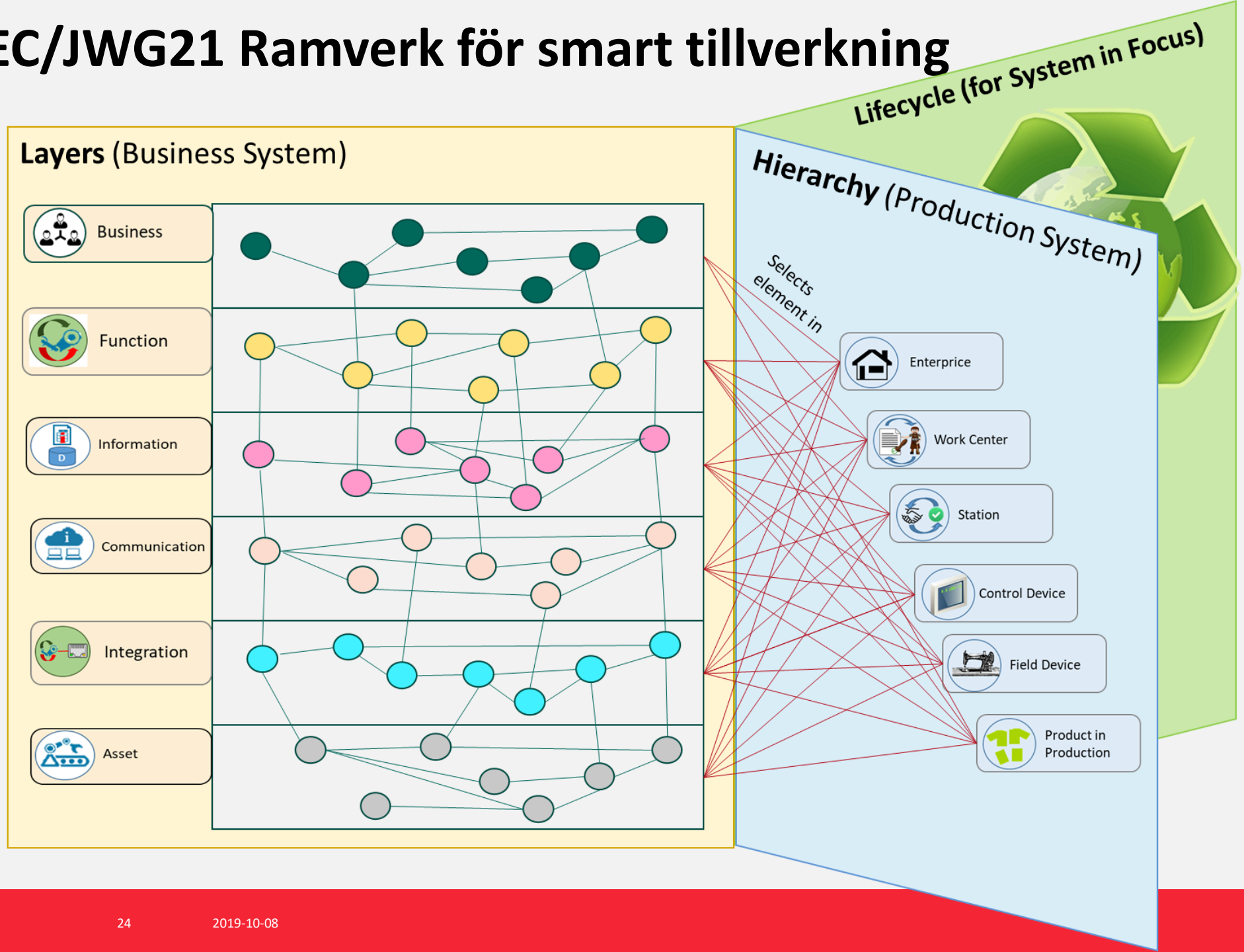
USA, NIST SMS Ecosystem



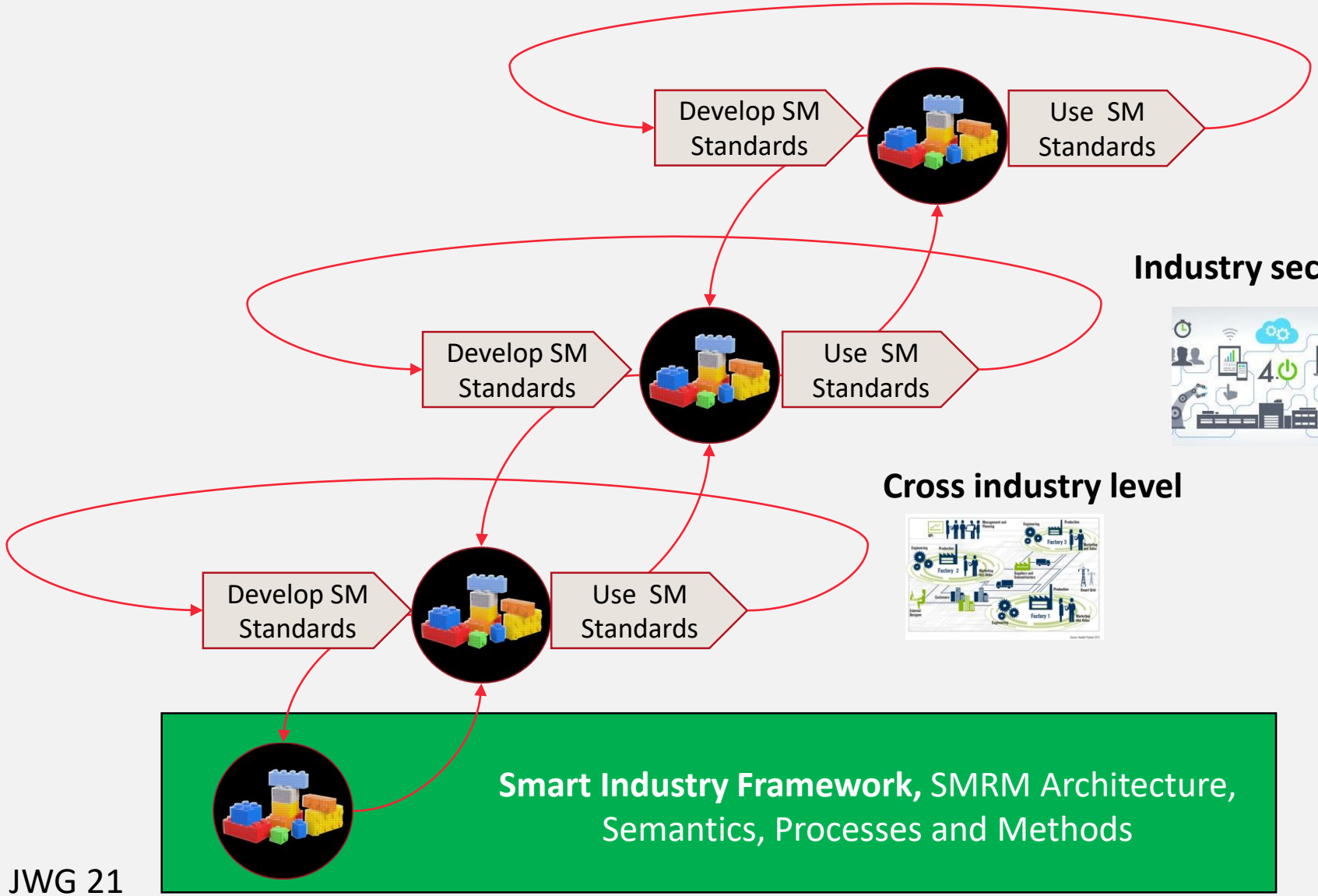
Scandinavian Smart Industry Framework Open Cube



ISO/IEC/JWG21 Ramverk för smart tillverkning



Ökad tillgänglighet till utveckling och användning av standarder



Company level

Industry sector level

Cross industry level

ISO/IEC JWG 21

SMRM, Smart **M**anufacturing **R**eference **M**odel

Vad är digital twin?

A **digital twin** is a digital replica of a living or non-living physical entity. By bridging the physical and the virtual world, data is transmitted seamlessly **allowing the virtual entity to exist simultaneously with the physical entity.**

Digital twin refers to a digital replica of potential and actual physical assets (physical twin), processes, people, places, systems and devices that can be used for various purposes. The digital representation provides both the elements and the dynamics of how an Internet of things device operates and lives throughout its **life cycle.**

Definitions of digital twin technology used in prior research emphasize two important characteristics. Firstly, each definition emphasizes the **connection between the physical model and the corresponding virtual model or virtual counterpart.** Secondly, this connection is established by **generating real time data using sensors**.

Digital Twin

PERSONAL registry

ACADEMIC registry

HEALTH CARE registry

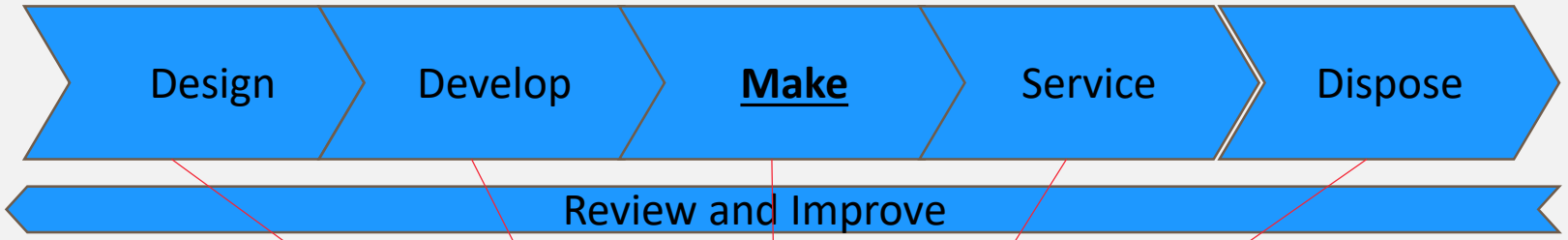
TAXATION registry

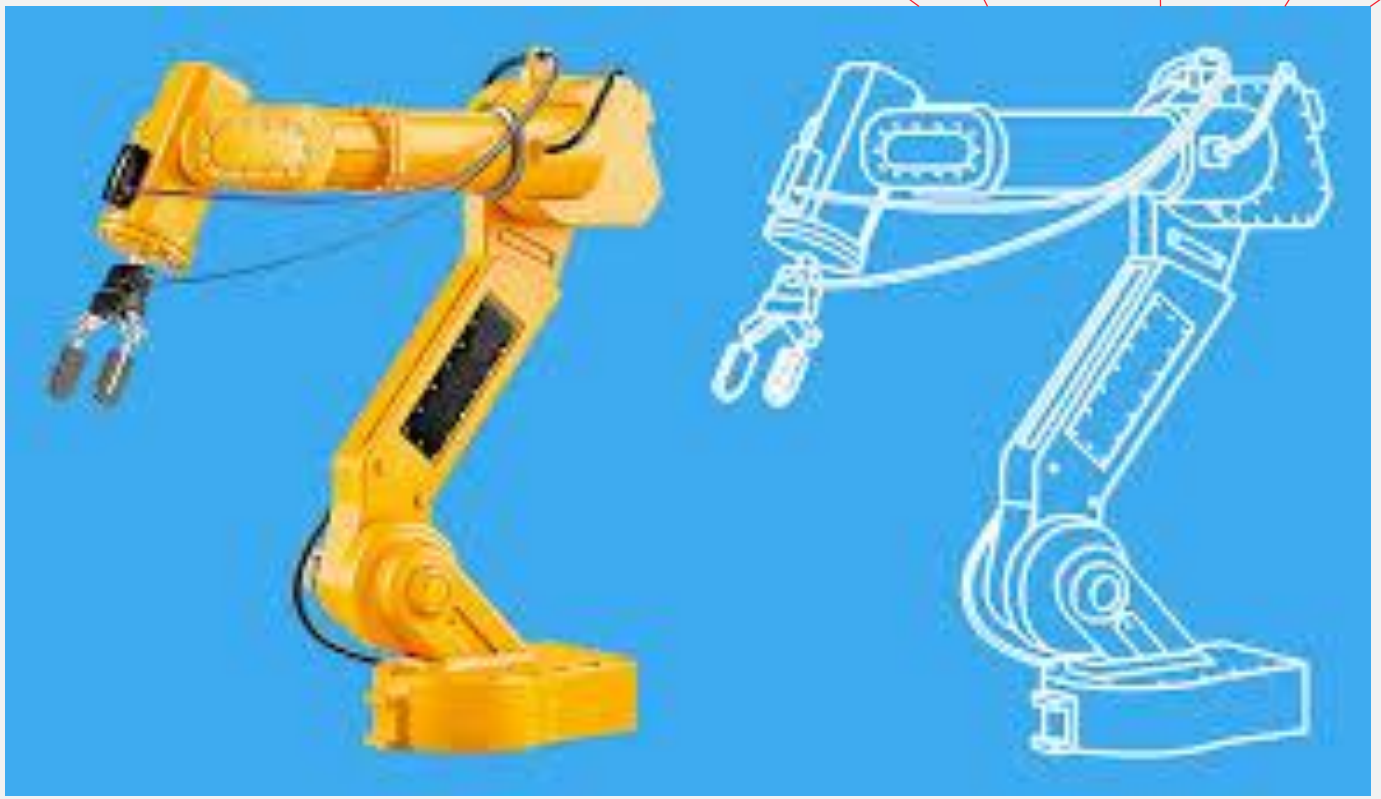
EMPLOYMENT registry

xxx registry

Digital Twin

Product Lifecycle Management





Digital Thread:
Links the various parts/twins to each other in a cronological order

Digital Twin

Product Lifecycle Management

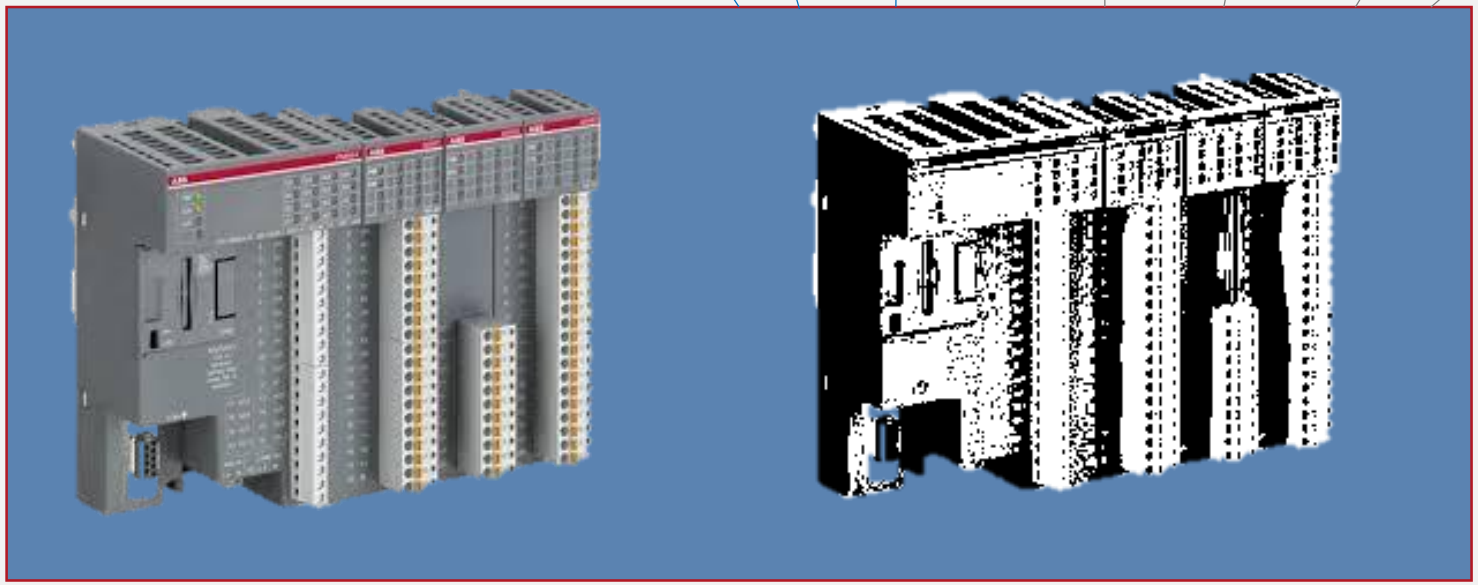
Design → Develop → **Make** → Service → Dispose

Review and Improve

Asset Lifecycle Management

Plan → Deploy → **Make** → Maintain → Decom.

Review and Improve



The same ”thing” can serve various purposes, still being the same ”thing” and having the same ”twin”

Diskussion:
Vad betyder digital tvilling för dig?
Har du kommit i kontakt med begreppet?

Case: Digital tvilling Kockums

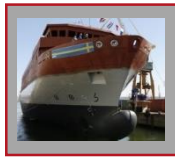
Digital Twin in Ship building

Type Ship (Design)			Instance (Produced Ship)	
Architure Design	System Design	Physical Design	Production	In Service

Digital Type Ship (Signal Intelligence Ship Type Artemis)

- The Ship
- Automation system
- Softwares
- Sensors
- Support System

Standardized Information model ISO10303 AP239 PLCS



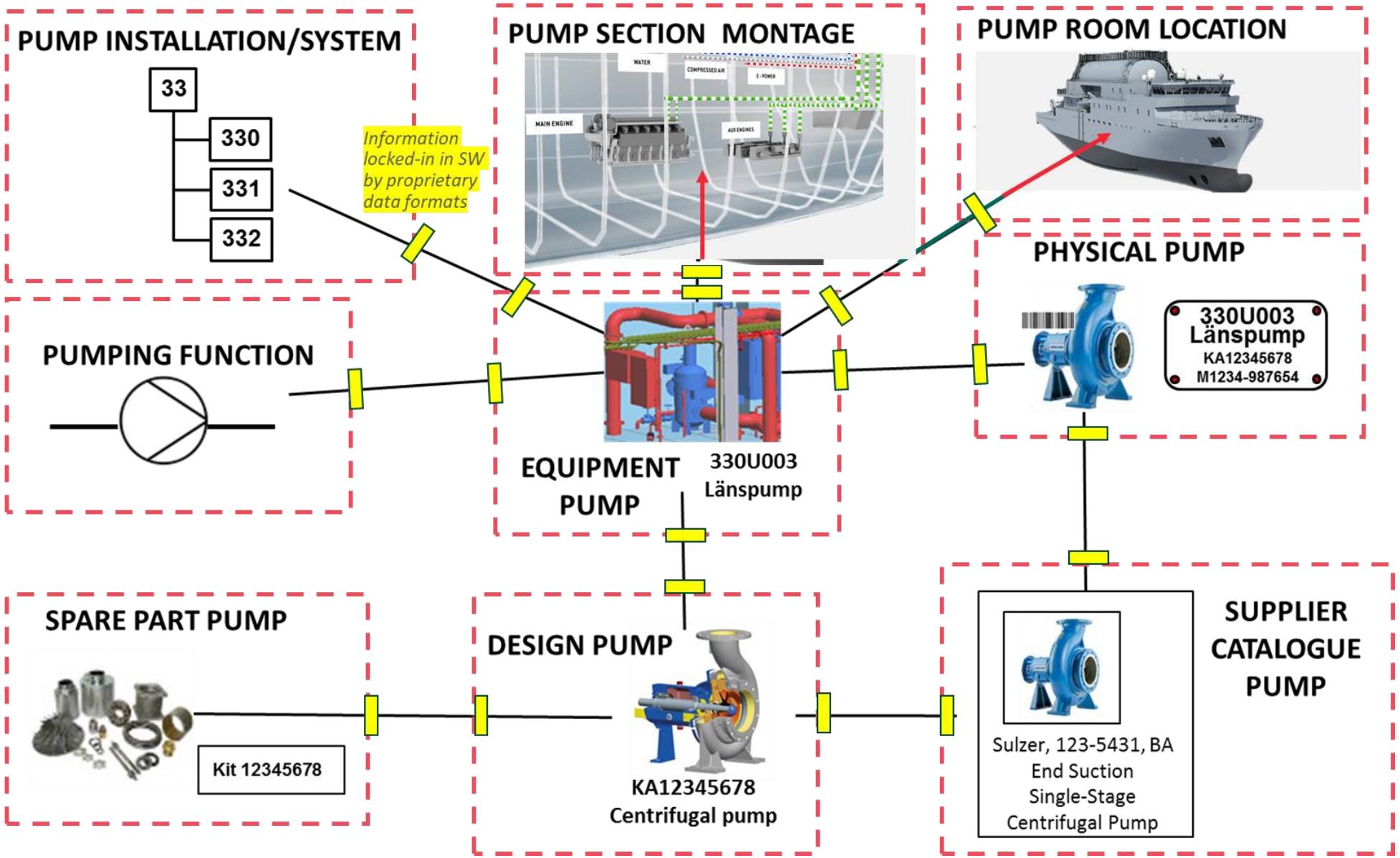
HMS Artemis Digital Twin

- Scanning
- Sensor data
- Support feedback

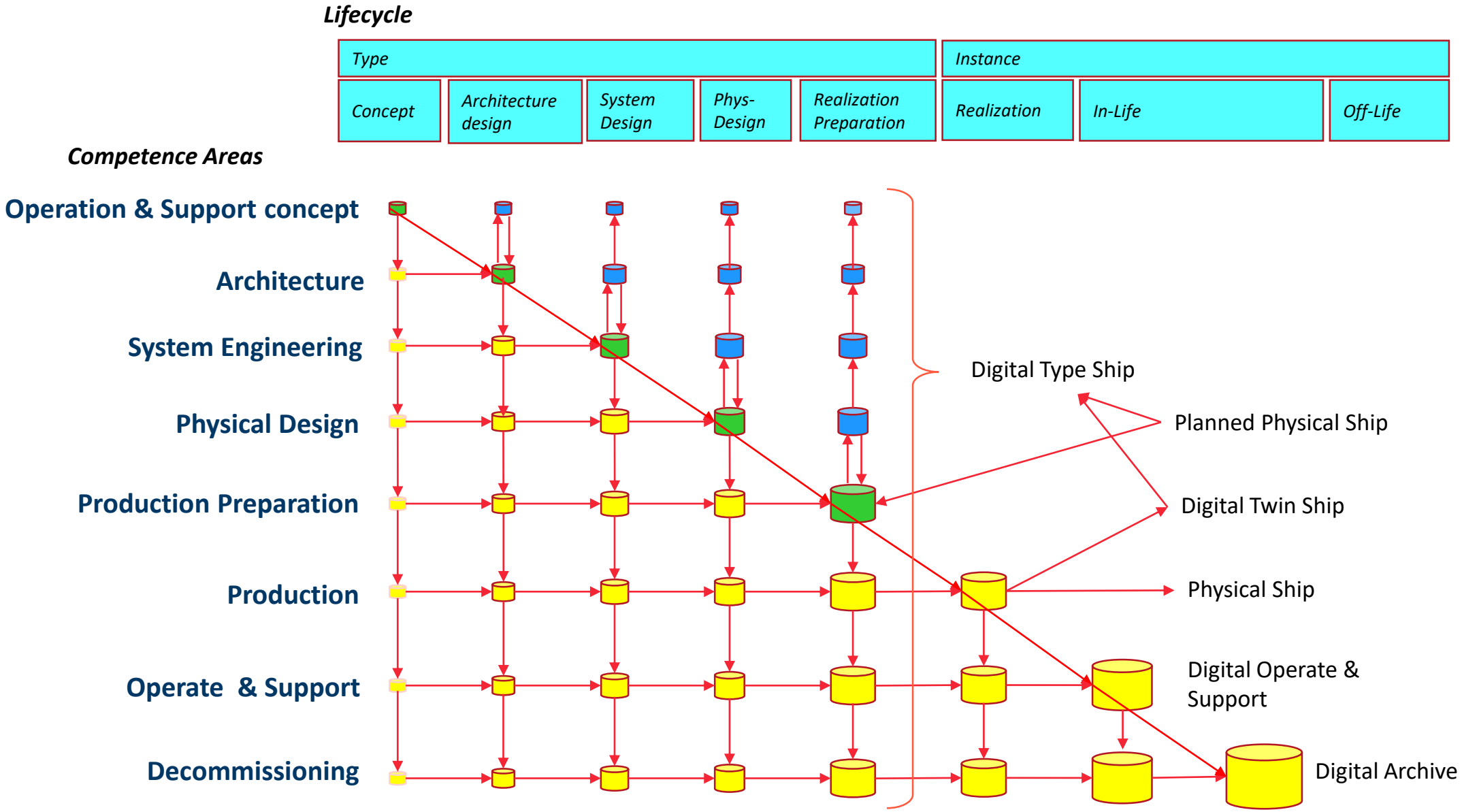
HMS Artemis Physical Twin

Kockums Product Language (Semantic model)

“Locked-in” information about the same thing?



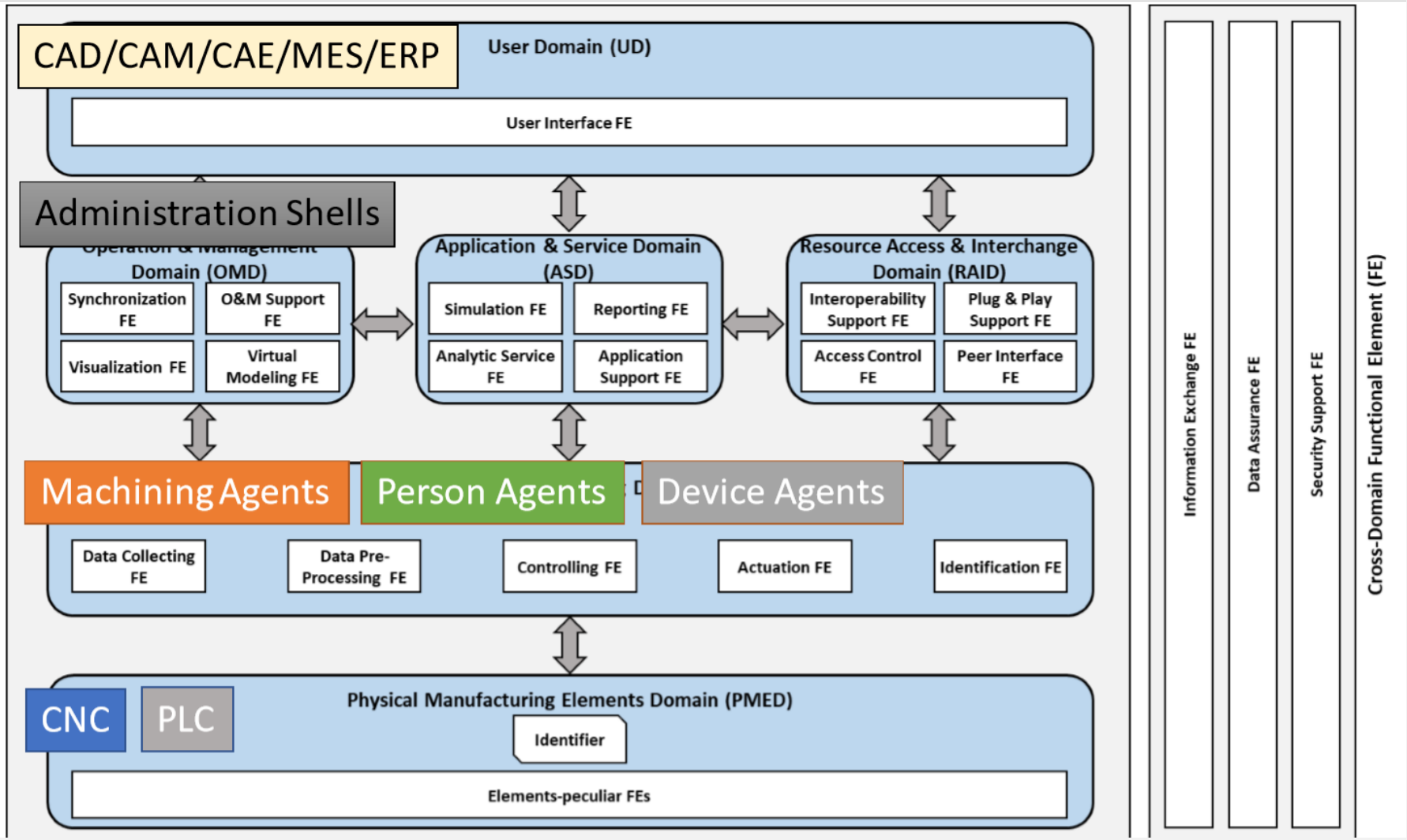
Digital and Physichal Product lifecycle



Product Life Cycle Support (PLCS) *ISO 10303-239*

Diskussion:
Ser du ett behov av en digital kopia av någon produkt/process/utrustning/annat i din verksamhet?
Vilket värde/nytta skulle denna kunna skapa i din verksamhet?

Digital Twin manufacturing framework.
AWI ISO 23247



Diskussion:
Vilka utmaningar ser du kring att införa digitala tvillingar i din verksamhet?

TACK

frågor kring smart industri och standardisering:

ann-sofie.sjoblom@sis.se