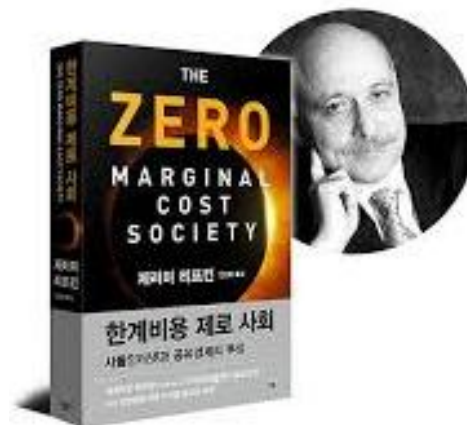
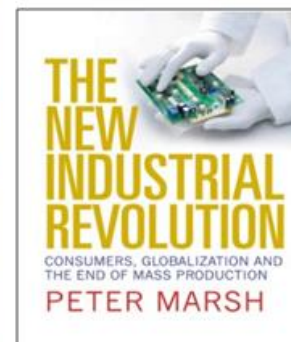
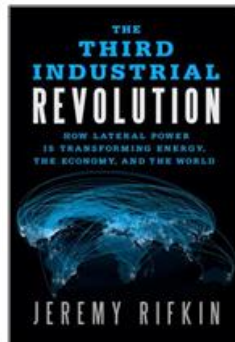


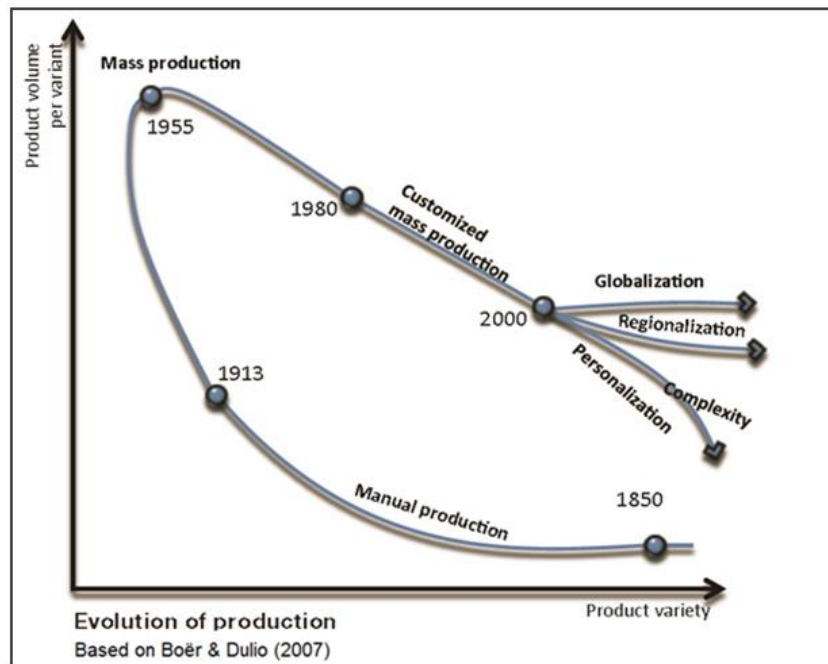
Industria 4.0

La Industria 4.0: Seguridad y nuevos
perfiles profesionales

¿La cuarta revolución industrial ?

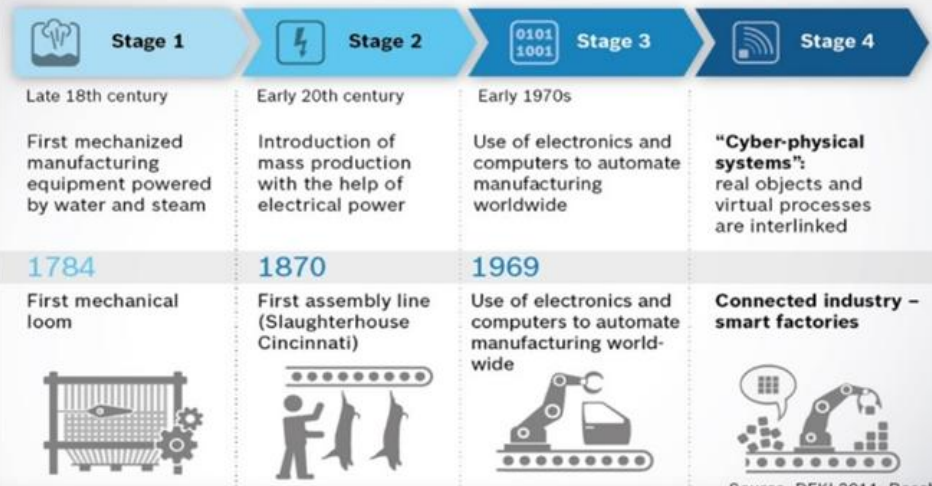


¿La cuarta revolución industrial ?



The four stages of the industrial revolution

Connected industry is to a large extent self-organizing. The lubricant of a smart factory is information, which tells the machinery how it should organize itself in order to complete a certain job.



Source: DFKI 2011, Bosch

Caso de estudio: Nobilia

Maximum data transparency in kitchen manufacturing through PC-based control technology

Nobilis: Series production with lot-size-1 flexibility demonstrates the true potential of Industry 4.0

Nobilis manufactures an enormous number of kitchens per year, with over 580,000 produced in the two manufacturing plants located in Verl in East Westphalia, Germany. That may be series production in the truest sense of the words, but the real specialty here is the customization that is implemented at the same time. PC-based control from Beckhoff offers the ideal foundation for universal transparency of the parts and production data, allowing individual kitchens to be supplied flexibly and efficiently in a lot size of 1 – entirely in keeping with the ideals of Industry 4.0.



Fuente: Beckhoff

Caso de estudio: Rexroth (Planta de Homburg)



The Drive & Control Company

Rexroth
Bosch Group



Rexroth Plant, Homburg: Networking of machinery and products

First Connected Industry line on-stream in daily production

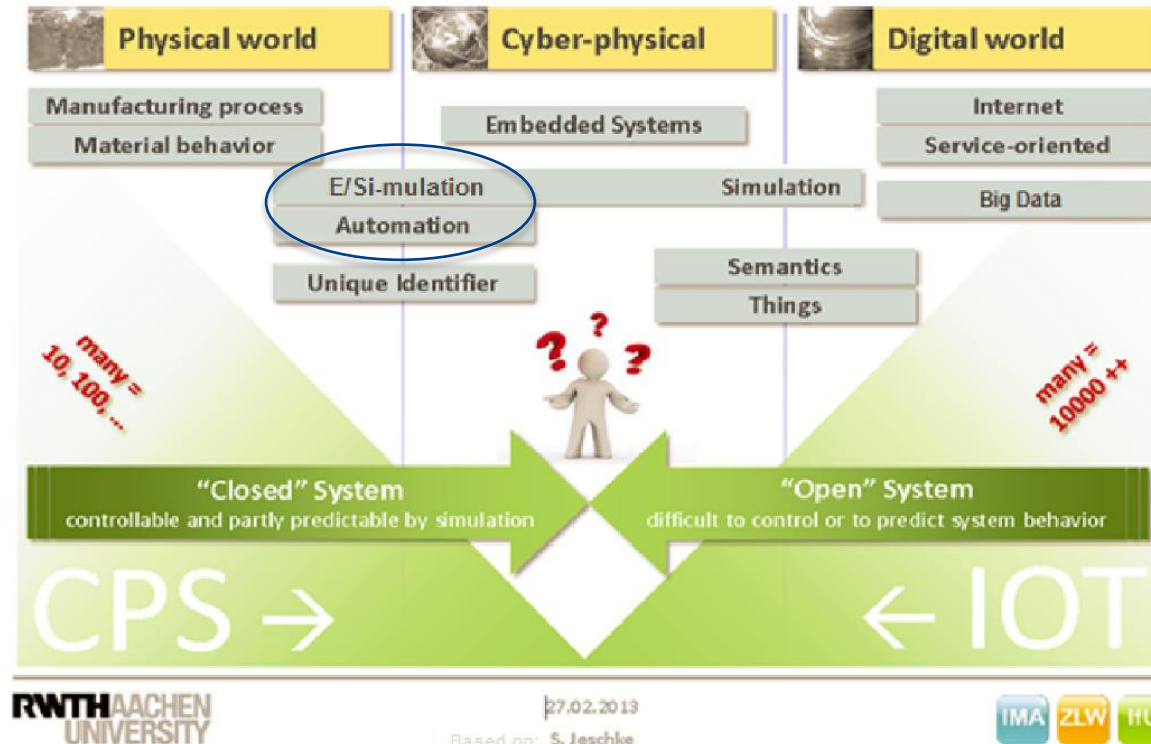
Tough application

Production of individual products in a semi-automatic process which enables short throughput time and ultimate quality down to a batch size of 1.

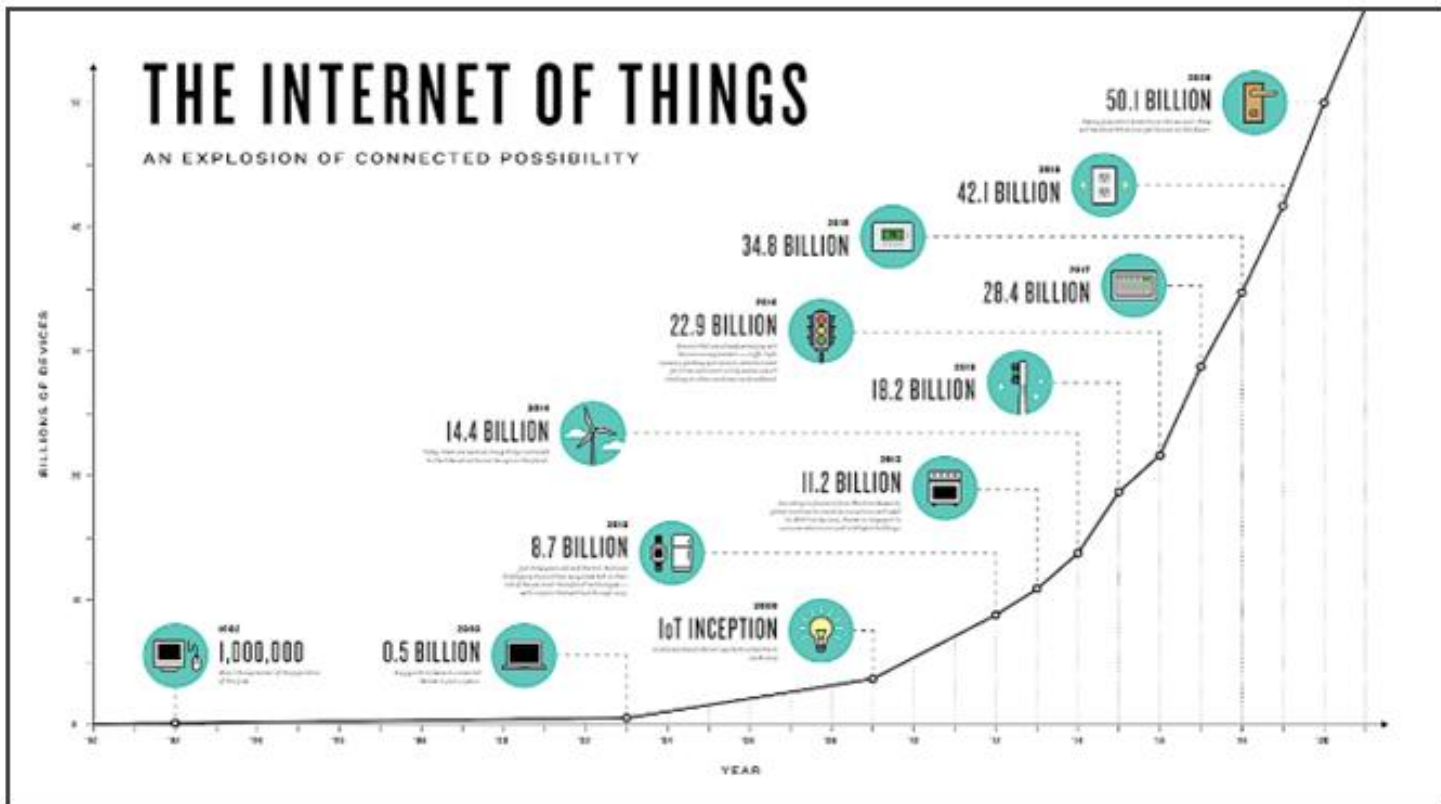
Dos pilares de la 4a revolución industrial

The way so far and beyond
Two Worlds coming together

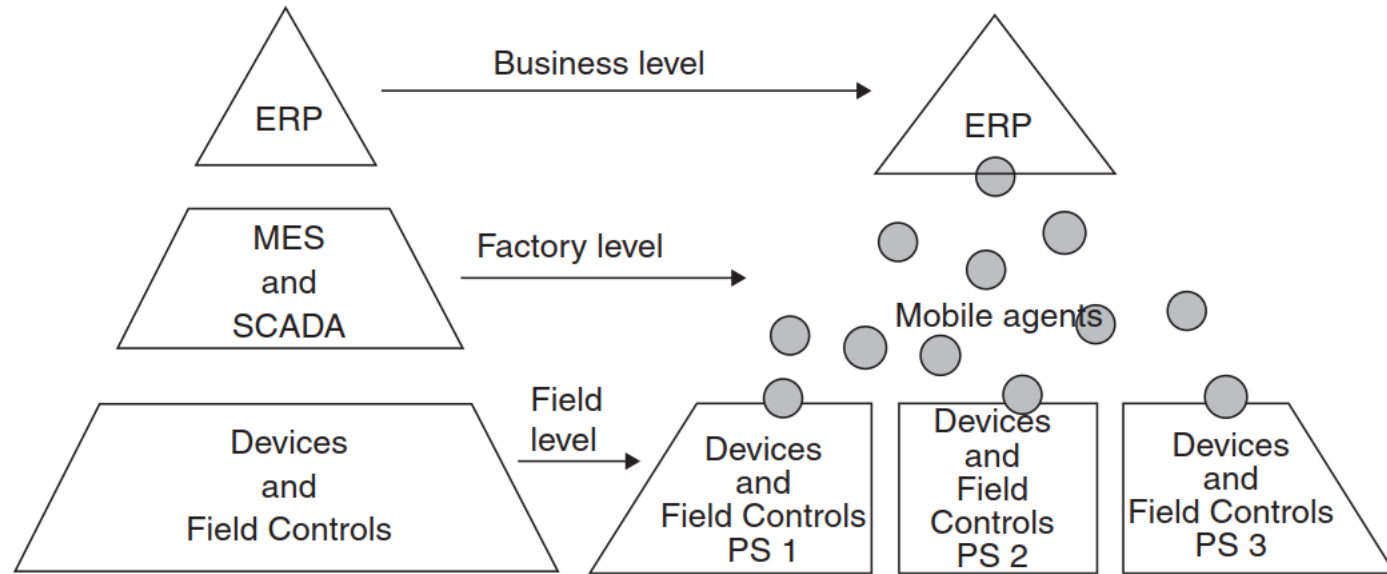
27



Dos pilares de la 4a revolución industrial



Agent-Based Computing (Holonc Manufacturing)



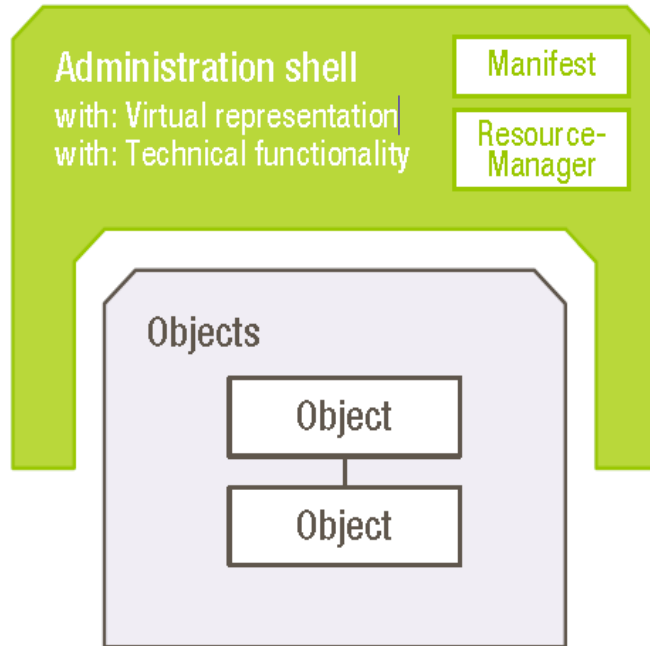
Transition of information and communication from rigid to reconfigurable systems

Fuente: Klostermeyer (2005)

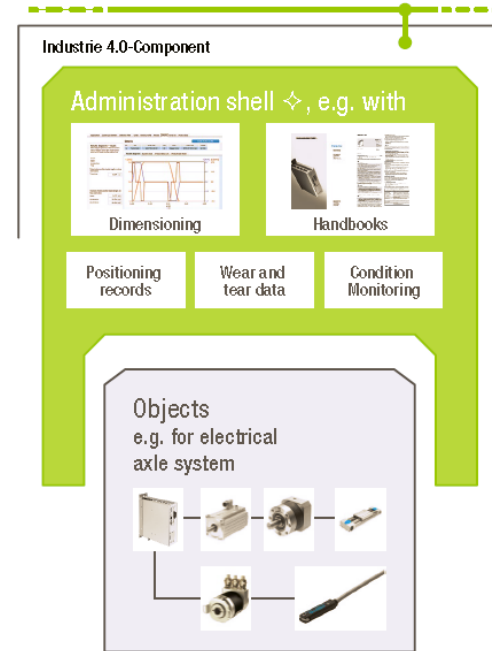
Arthur Koestler (1968): "Beyond Atomism and Holism - the concept of the holon"

RAMI 4.0: I4.0 Component (DIN 91345 / IEC 63088)

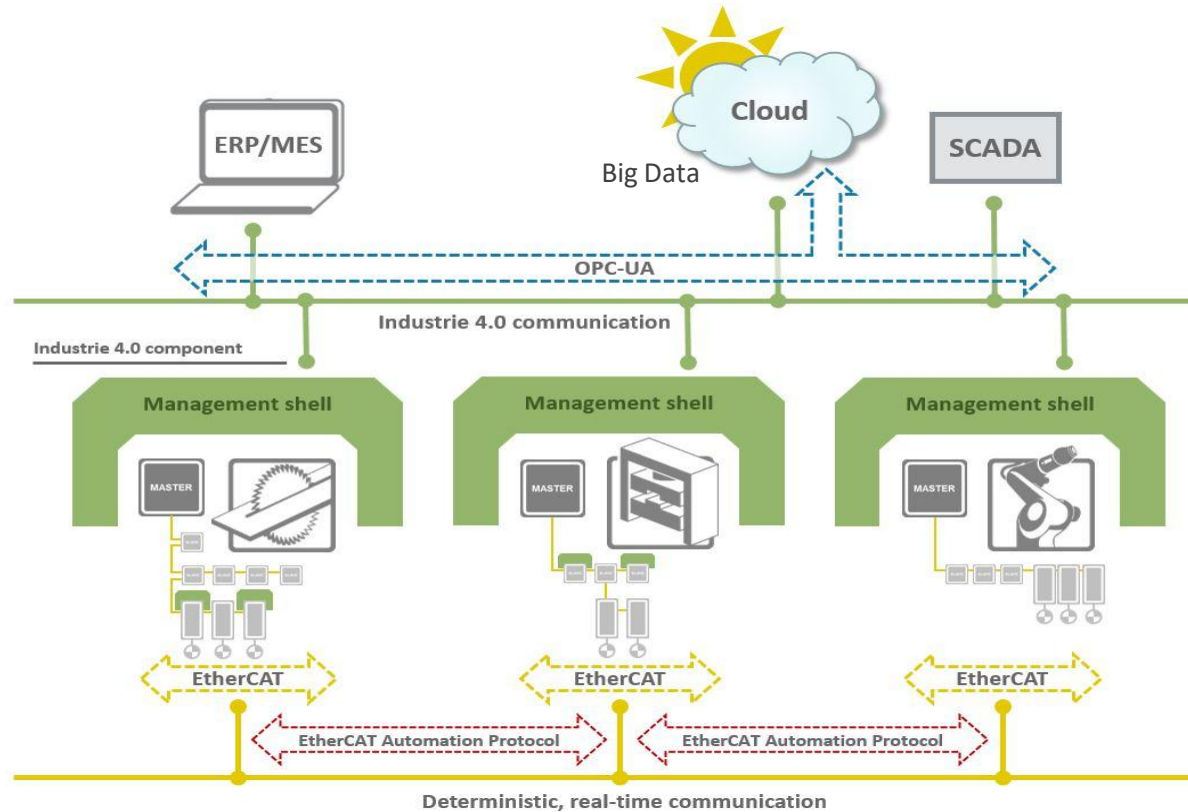
Industrie 4.0-Component



Industrie 4.0 correct communication



Modularidad en red (comunicaciones)



OPC-UA: ¿El pegamento de la Industria 4.0?



CONTROL ENGINEERING

EUROPE

COVERING CONTROL, INSTRUMENTATION AND AUTOMATION SYSTEMS



[HOME](#)
[NEWS](#)
[FEATURES](#)
[CASE STUDIES](#)
[PRODUCTS](#)
[WHITE PAPERS](#)
[NEWSLETTERS](#)
[SITEFIND](#)
[MEDIA INFO](#)
[GUIDE 2 SUPPLIERS](#)

G+1

0

OPC UA: Industry 4.0 glue?

13 March 2017

OPC-UA technologies are developing fast! *Suzanne Gill* caught up with some automation vendors to find out more about their latest OPC-UA technology developments.

The growth of the Industrial Internet of Things (IIoT) and Industry 4.0 is driving the need for open and secure connectivity between devices. This has resulted in the OPC Foundation's Unified Architecture – OPC UA –increasing being considered as the standard for ensuring that this can take place. Rather than replacing the standards, OPC UA complements them by creating a common layer for exchanging information.

Freed from the need to run on a specific OS, the open data connectivity that OPC UA embodies can be offered on virtually any networked platform. It supports interoperability between a range of manufacturing processes and equipment, protecting legacy of investment for many companies. There are security benefits too – the OPC UA standard was designed from ground up with security in mind.



OPC-UA: Orientación a objetos y seguridad

The screenshot displays the Prosys OPC UA Java Client interface. The top bar shows the title "Prosys OPC UA Java Client" and two tabs: "Simulation Server" and "SampleConsoleServer". Below the tabs, the status "Running" is shown next to the URL "opc.tcp://localhost:52520/OPCUA/SampleConsoleServer".

The left pane shows a tree view of the OPC UA object hierarchy:

- Objects
 - MyBigNodeManager
 - MyObjects
 - MyDevice
 - MyEnumObject
 - MyLevel** (selected)
 - MyLevelAlarm
 - MyMethod
 - MySwitch
- Server
- StaticData
- Types
- Views

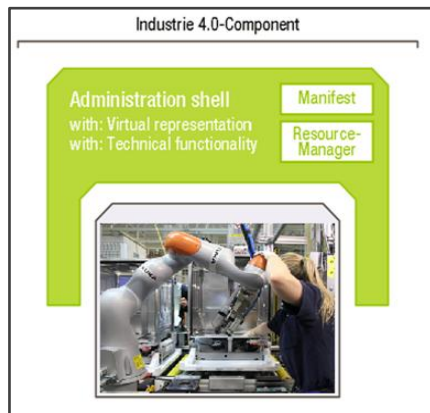
The right pane is divided into two sections. The top section, "Attributes and References", displays a table of attributes for the selected object:

Attribute	Value
NodeId	ns=2;s=MyLevel
NodeClass	Variable
BrowseName	2:MyLevel
DisplayName	(en) MyLevel
Description	null
WriteMask	NONE (0)
UserWriteMask	NONE (0)
Value	63.0
Datatype	Double
ValueRank	Scalar
ArrayDimensions	null
AccessLevel	CurrentRead, CurrentWrite, ...
UserAccessLevel	CurrentRead, CurrentWrite, ...
MinimumSamplingInterval	-1.0
Historizing	true

The bottom section, "References", displays a table of references for the selected object:

Reference	TargetDisplayName
HasTypeDefinition	MyLevelType
HasCondition	MyLevelAlarm

Grupos de trabajo de la Comissió Indústria 4.0



Robòtica

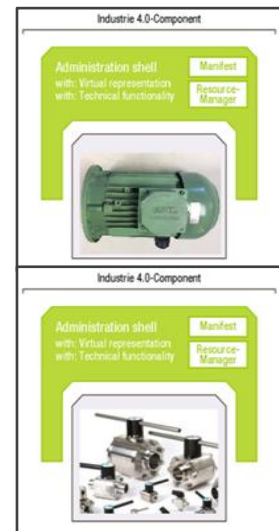


Intralogística

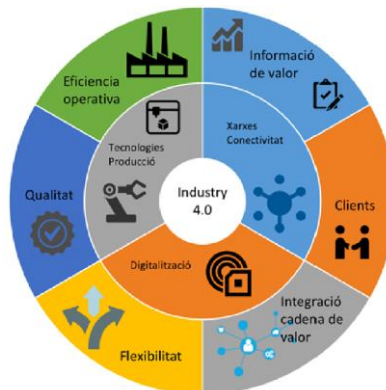


Impressió 3D i
Manufactura
avançada

Software i
integració



Embedded
Systems & IoT



Status report de la Comissió Indústria 4.0

Comissió Indústria 4.0
Enginyers de Catalunya

Enginyers
Indústria de Catalunya

informà**TIC**s
Enginyers en informàtica
de Catalunya

Telecos.cat
enginyers de telecomunicació

Indústria 4.0
STATUS REPORT

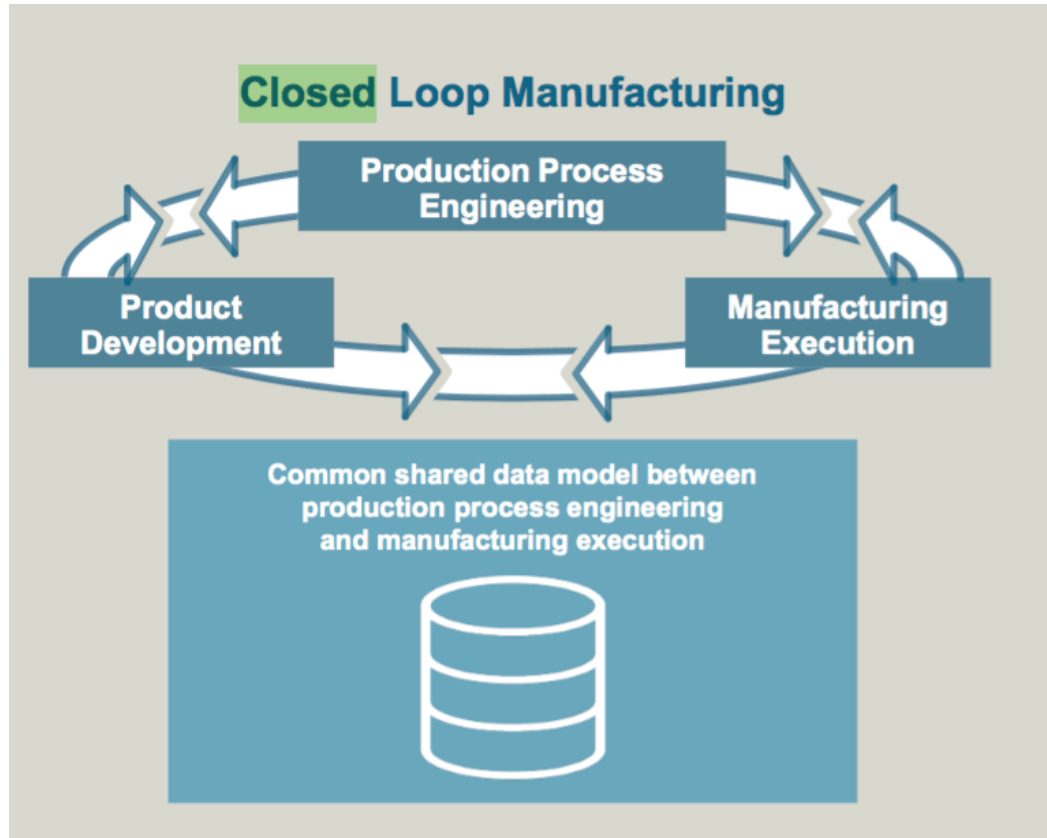
OCTUBRE 2016



Document de treball

Marc de referència sobre la Indústria 4.0

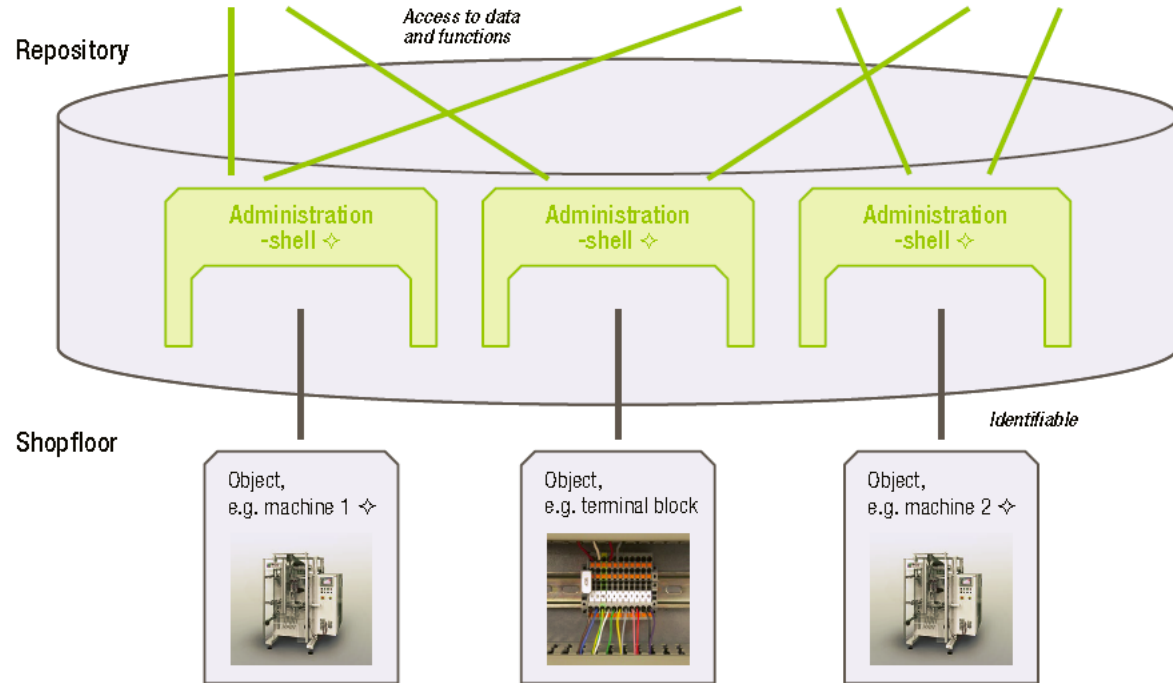
Ingeniería consistente



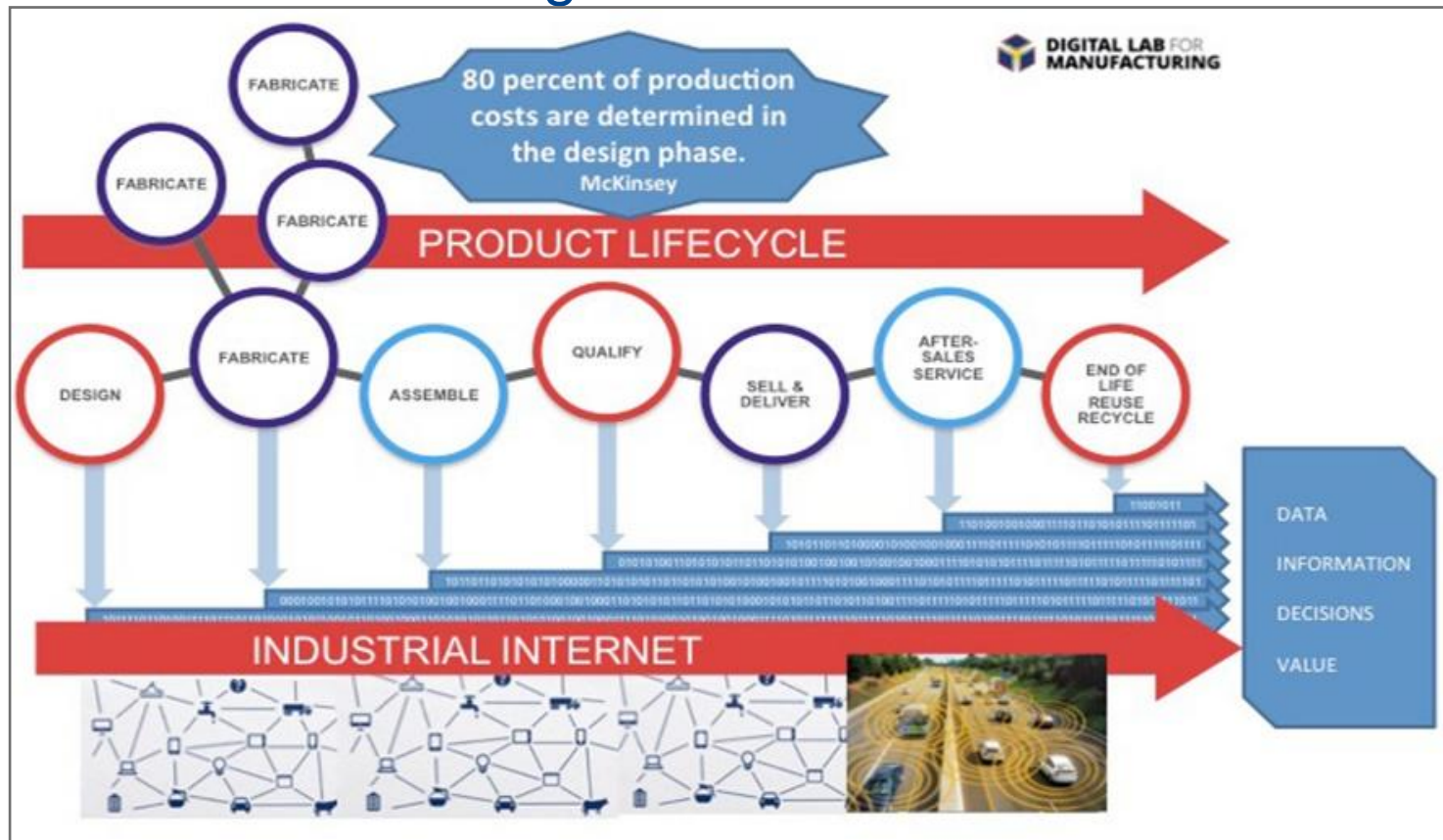
Fuente: Siemens

RAMI 4.0

Life cycle of the factory



Cadena de valor digital



Product criteria for Industrie 4.0

Industrie 4.0 Full

Target: standards, norms and research, > 5 years

Definition of
full Industrie 4.0
properties
incl. strategic
outlook

Industrie 4.0 Ready

Target: manufacturers, < 5 years

What are the minimum properties that products must have in order to participate in the Industrie 4.0 network?

Industrie 4.0 Basic

Target: customers, today

Which products are currently well prepared for Industrie 4.0?

Source: ZVEI

Anuncio en la Feria de Hannover 2016



Salida al mercado en 2017

new.abb.com/motors-generators/service/advanced-services/smart-sensor



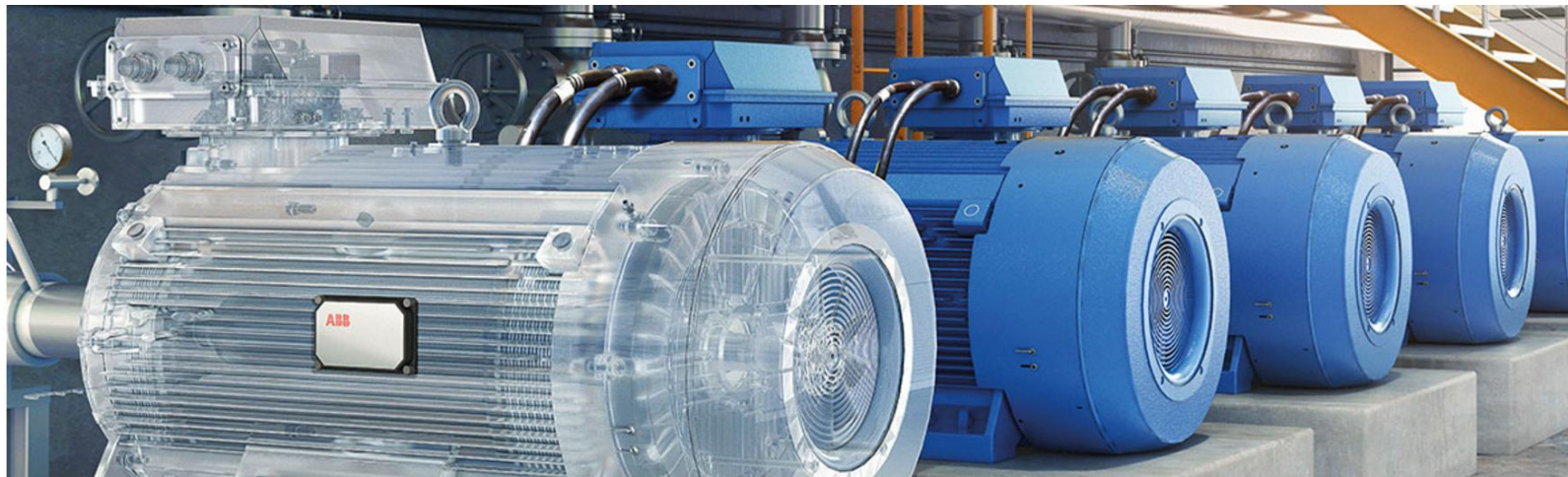
HOME → OFFERINGS → MOTORS AND GENERATORS → SERVICE → ADVANCED SERVICES → SMART SENSOR

GLOBAL SITE ▼

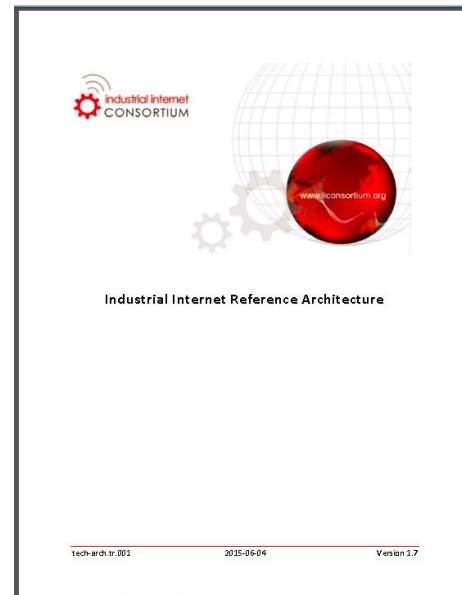
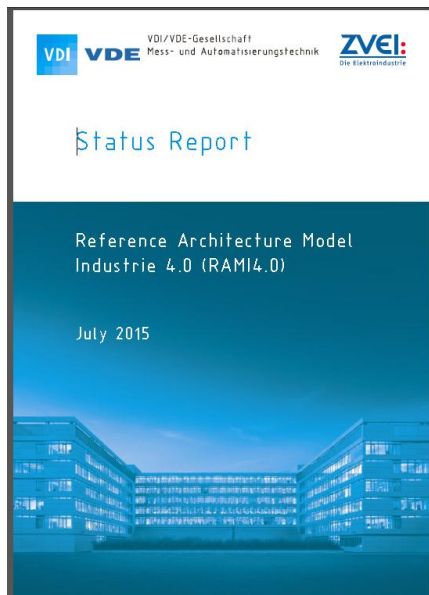
ABB's website uses cookies. By staying here you are agreeing to our use of cookies. → [Learn more](#)

I agree

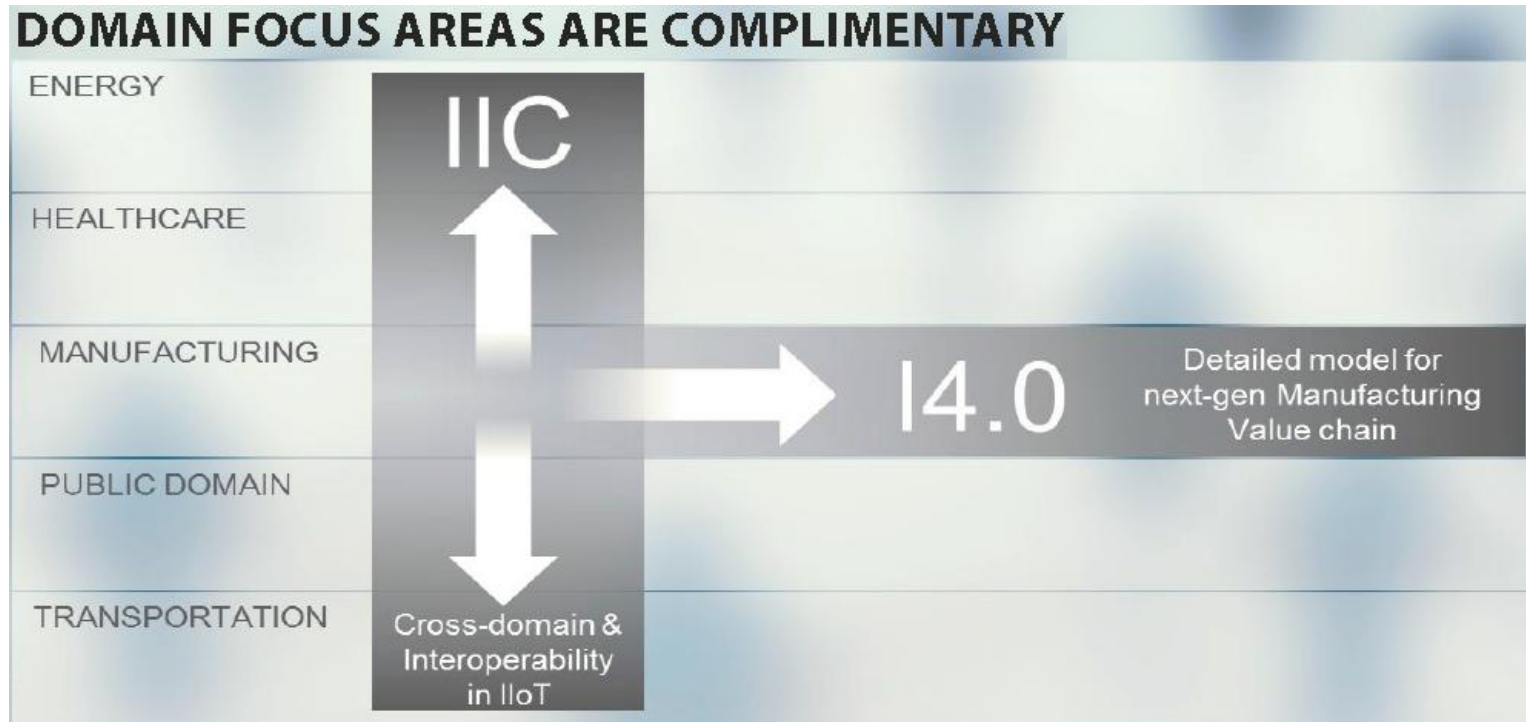
Motors that let you know when it's time for a service

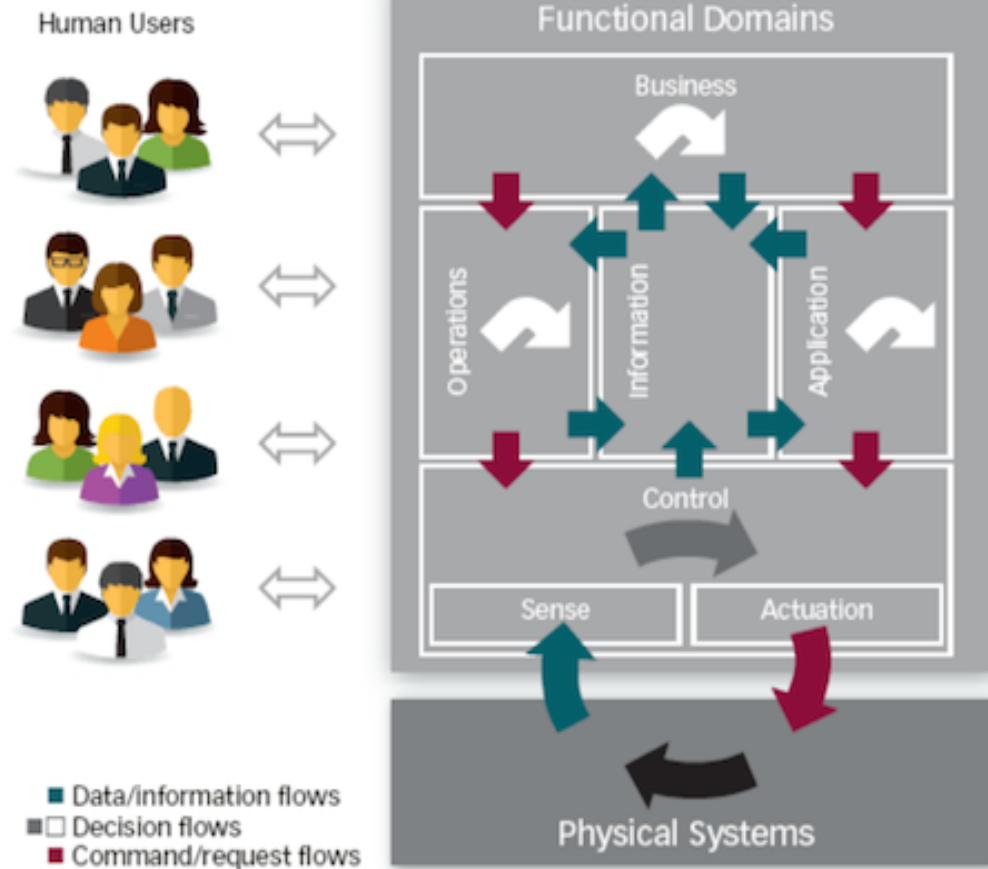


Las dos arquitecturas de referencia: RAMI 4.0 e IIRA

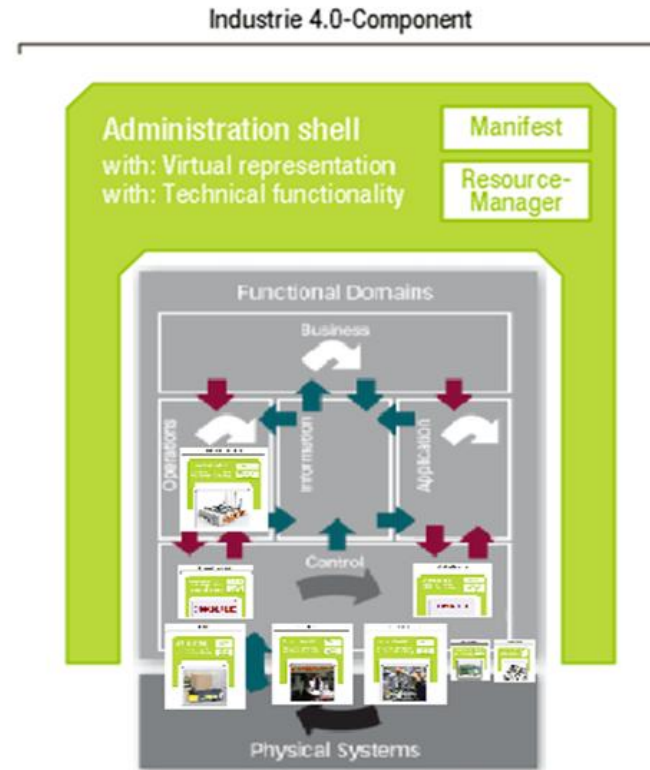
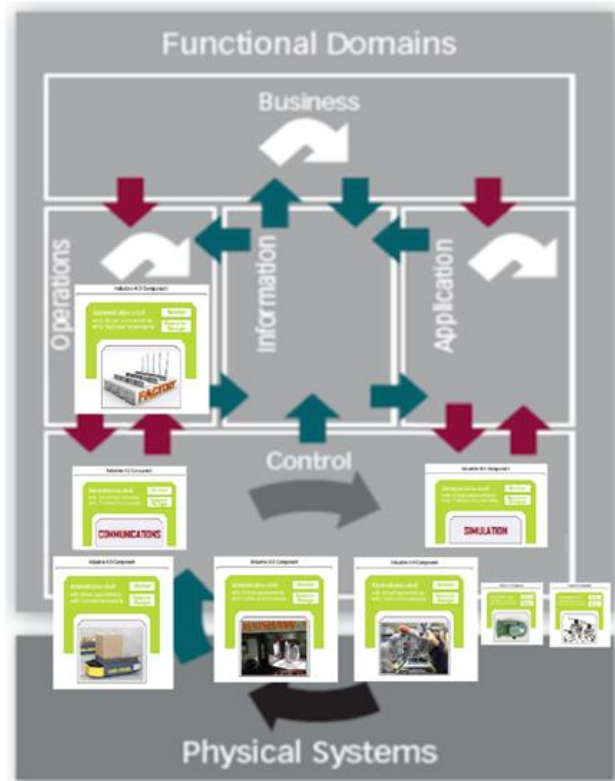


Formalización y estandarización de la i4.0





Convergencia IT/OT: Perfiles profesionales híbridos



Press release



BOSCH

National IT Summit, November 18-19, Berlin
**Bosch board of management member Struth on the
IT Summit:**

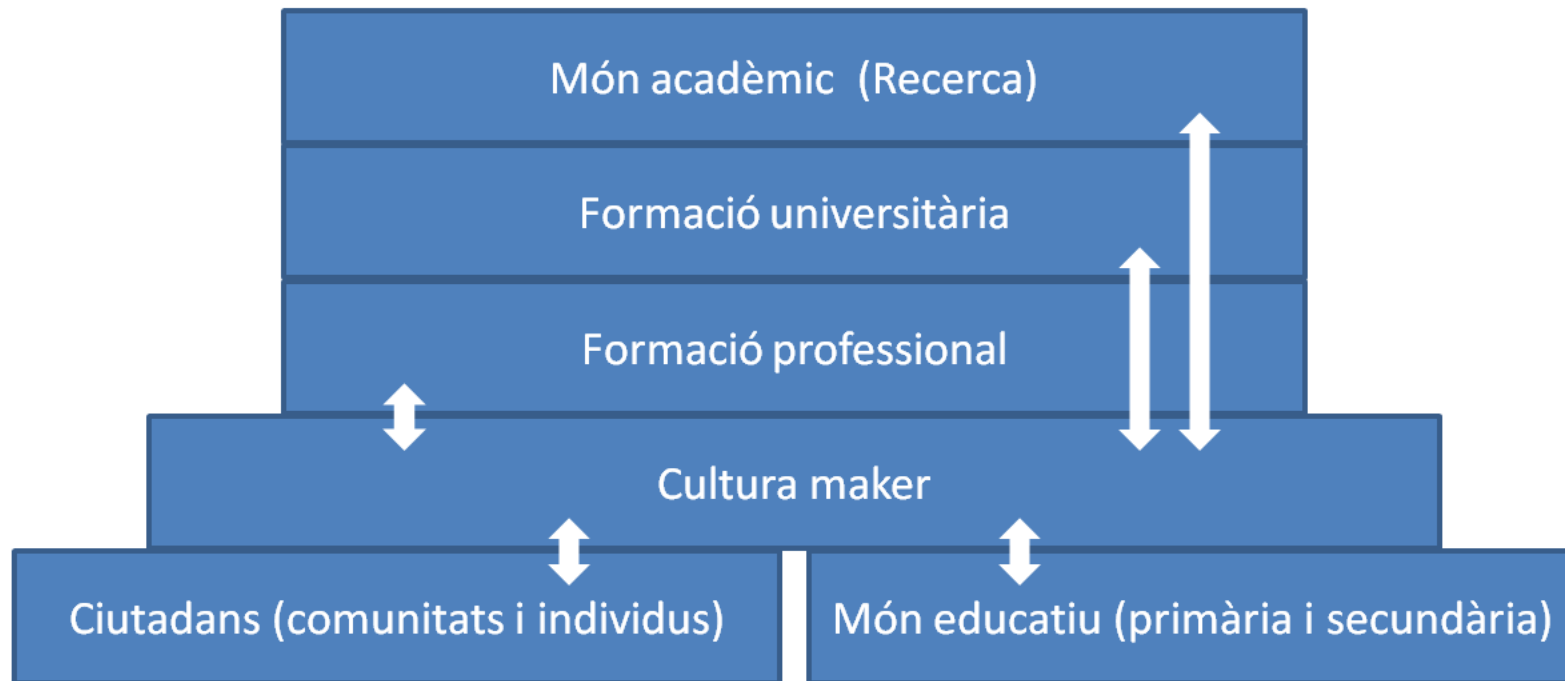
November 18, 2015

PI 9117 RB Res/Sekr

Industry 4.0 needs an education offensive
15 Bosch projects featured on new Industry 4.0 map

- ▶ Schools should be supported with better technical equipment
- ▶ Sensors enable valuable analysis of production data
- ▶ Hundreds of millions of euros can be saved annually

Espais de formació



Safety vs Security

IEC 61508 SIL LEVELS

SIL: "The Safety Integrity Level is a measure for the effectiveness of the risk reduction that each individual Safety Function is expected to provide"

Safety Integrity Level	Risk Reduction Factor	PFD _{avg} : Average Probability of Failure on Demand (Demand Mode)
SIL 4	100,000 – 10,000	$\geq 10^{-5}$ to $< 10^{-4}$
SIL 3	10,000 - 1,000	$\geq 10^{-4}$ to $< 10^{-3}$
SIL 2	1,000 - 100	$\geq 10^{-3}$ to $< 10^{-2}$
SIL 1	100 to 10	$\geq 10^{-2}$ to $< 10^{-1}$

Source: Exida

ISA 99 / IEC 62443 SECURITY LEVELS

- SL 1 – PROTECTION AGAINST CASUAL OR COINCIDENTAL VIOLATION (i.e. changing a setpoint to a value outside engineering defined conditions, interception of a password send over the network in clear text.)
- SL 2 – PROTECTION AGAINST INTENTIONAL VIOLATION USING SIMPLE MEANS (i.e. virus infection, exploiting commonly known vulnerabilities of DMZ hosts)
- SL 3 – PROTECTION AGAINST INTENTIONAL VIOLATION USING SOPHISTICATED MEANS (i.e. exploits in operating systems, protocols. Attacker requires advanced security knowledge, advanced domain knowledge, advanced knowledge of the target system. i.e. password cracking.)
- SL 4 – PROTECTION AGAINST INTENTIONAL VIOLATION USING SOPHISTICATED MEANS WITH EXTENDED RESOURCES (Similar to SAL 3 but attacker now has extended resources to their disposal. i.e. StuxNet attack)

Source: Honeywell



Gracias

Xavier Pi

Comissió Indústria 4.0 Engineers de Catalunya

xpi@engineers.net

