Role of Standards & Consortia as key drivers in smart manufacturing journey

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Chair ISO TC 184
Chair IEC SC65E
A major shift toward data-driven services:

By **2022**, more than **60%** of global GDP will be digitized (WEF).
We provide energy and automation digital solutions for efficiency and sustainability.
Digital is our daily business:
~50% of revenue from IoT related products, solutions, services

Key figures for 2021

5% of revenues devoted to R&D

€29 billion

2020 revenues

41% of revenues in new economies

128,500+ Employees in over 100 countries

A well-balanced global presence

Revenues breakdown

<table>
<thead>
<tr>
<th>Region</th>
<th>Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>29%</td>
</tr>
<tr>
<td>Western Europe</td>
<td>26%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>30%</td>
</tr>
<tr>
<td>Rest of World</td>
<td>15%</td>
</tr>
</tbody>
</table>

Two business:

<table>
<thead>
<tr>
<th>Business</th>
<th>Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial automation</td>
<td>€6.7 billion</td>
</tr>
<tr>
<td>Energy management</td>
<td>€22.2 billion</td>
</tr>
</tbody>
</table>
Digital innovation is thriving at breakneck speed

- **IoT**: 35% of 5G apps in the manufacturing and utilities sectors (GSMA 2019)
- **Big Data**: > 5x generated data from 33 ZBs today to 175 ZBs by 2025 (IDC, 2018)
- **AI**: 6x worldwide spending on cognitive and AI systems btw 2017 & 2022 (International Data Corporation)
Data, data everywhere

Nearly 10x more connected things than connected people in the world.
Accelerated sustainability journey continues

**Score reached 3.92/10 in Q4 2021**

**CLIMATE**
SSI #3 - Reduce CO₂ emissions from top 1000 suppliers’ operations by 50%
1000+ Suppliers joined The Zero Carbon Project and now ready to drastically reduce their carbon emissions

**RESOURCES**
SSI #4 - Increase green material content in our products to 50%
11% First company in the industry to offer Home Energy solutions made from upcycled ocean plastic, and with 100% recycled packaging

**EQUAL**
SSI #9 - Provide access to green electricity to 50M people
4.2M+ Schneider Electric solutions helped 4 million people to get access to safe, clean and reliable electricity in 2021

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1. 2021 baseline 3/10, 2025 target 10/10
Leading the digital transformation of energy management and automation at more than 500,000 sites with ...
Why standards are Key and ... Requested by our customers

**Interoperability**
- Communication
  - Plug and Play
  - Harmonized network
- Data
  - Consistent data model(s)
  - Native exchange between tools
  - Vertical integration from device to cloud

**Regulation**
- Cyber Security
  - Horizontal standards
  - Adapted integration (with Profiles)
- Environment
  - Circular Economy
  - Eco Design
  - European Green Deal

**Sustainability / New techno**
- Artificial Intelligence
  - Security
  - Data Access
  - Autonomous system
- Digital Twin
  - Compatibility between providers during all the life Cycle
  - Synergies between domains (Energy, Building, Transportation, Manufacturing,...)

**Machine readable standards**
SMART Standards
A complex ecosystem with various expectations & Time To Market

**National Initiatives**
- Define next gen. of industry
- Created by and linked to government

**Professional Associations**
- Group of enterprises & academics
- Defining and solving together industrial issues

**Consortia of Enterprises**
- Ensure mirroring and ballot casting for Intl’ standards
- Local deployment & definition of standards

**National Bodies**
- Regulation entities help gov. entities to do legislation work
- National or Domain scope

**International Standards**
- In charge of international definition, validation and publication of standards

- ➢ Synergies between Actors / Experts are needed
# EcoStruxure for Oil & Gas

## Applications, Analytics, and Services

<table>
<thead>
<tr>
<th>Apps, Analytics, and Services</th>
<th>EcoStruxure Asset Advisor</th>
</tr>
</thead>
</table>

## Edge Control

<table>
<thead>
<tr>
<th>Connected Products</th>
<th>EcoStruxure Power Monitoring Expert</th>
</tr>
</thead>
</table>

- Set Series LV/MV Switchgear
- TeSys Motor Control System
- Galaxy UPS Units

- Altivar Variable Frequency Drives
- Connectivity to another device

## Results...

- **100+** asset variables monitored by data driven services
- **24/7** asset health visibility
- **~ $1M** per day production downtime cost avoided by mitigation of catastrophic failures

## Standards & Consortia

### Interoperability
- Data: ISO 15926
- Communication: OPC UA, FiledComm Group (FCG)
- Architecture: Open Process Automation Forum (OPAF), NAMUR

### Regulation
- Cyber Security: IEC 62443, ISA99
- Environment: EN 4555x + EN50598*

### New Technologies
- Digital Identification: DIN 61406 & IEC 61406
- Distributed Control: IEC 61499

*In progress
Results …

40% Savings in energy management
• Best-in-class maintenance
• Continuous optimization during operation
• Shortened time to market

Half the footprint but double the output

Interoperability
Communication: ODVA, SERCOS, PNO
Data: STEP – ISO 10303
(3D Geometry for visualization)
Language:
PackML
MTP (NAMUR & IEC*)
Interoperability: OPC UA + Companion Specification

Regulation
Cyber Security: IEC 62443
Safety: IEC 61511
ISO 12100

Standards & Consortia Associated

Associated Interoperability
Communication: ODVA, SERCOS, PNO
Data: STEP – ISO 10303
(3D Geometry for visualization)
Language:
PackML
MTP (NAMUR & IEC*)
Interoperability: OPC UA + Companion Specification

Regulation
Cyber Security: IEC 62443
Safety: IEC 61511
ISO 12100

Life Is On
Schneider Electric
* in progress

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Implementation of Standards
example of Sustainability – Product Carbon Footprint

➢ Traceability
➢ Calculation
➢ Interoperability
➢ Digitization
➢ Data Models
➢ Asset Life Cycle

Product

Environmental impacts
Air impacts
Water impacts
Soil impacts
Biodiversity impacts

GHG impacts
Professional Associations
Consortia
Regulation
International Standards
European Standards

Sub-System
Implementation of Standards
example of Sustainability – Product Carbon Footprint
Digital Twin
TC 184 - Automation systems and integration

**SCOPE:** Standardization in the field of automation systems and their integration for design, sourcing, manufacturing, production and delivery, support, maintenance and disposal of products and their associated services. Areas of standardization include information systems, automation and control systems and integration technologies.

- **880** Published ISO Standards Related to the TC and its SCs
- **82** ISO Standards under development
- **2** Direct Working Group JWG21 & WG6
- **24** Participating members
- **21** Observing members

Chair: Patrick LAMBOLEY
Secretary: Mélissa JEAN
Automation systems and integration

ISO TC 184

SC1
Industrial cyber and physical device control

Mr Manfred Böhm

SC4
Industrial data

Mr Kenneth Swope

SC5
Interoperability, integration, & architectures for enterprise systems & automation applications

Ms Charlotta Johnsson

WG6
Asset intensive industry interoperability

Mr Alan T. Johnston

JWG21
Smart Manufacturing Reference Model(s) linked to ISO/TC 184

Prof. Fumihiko Kimura

AG2
Digital Twin

Mr Kenneth Swope
Our engagement in Smart Manufacturing Activities

**Smart Manufacturing Coordination Committee**

Composition: 16 Active ISO TC and SC Chairs
Goals (TMB Resolution 105/2016):
- To enable the sharing of information among those ISO Technical Committees involved in Smart Manufacturing;
- To identify new work or identify harmonization areas of existing standards in Smart Manufacturing;
- To facilitate communication and coordination between Technical Committees;
- To review the gap analysis and smart manufacturing definition contained in the SAG's report…..

**Smart Manufacturing Standard Map TF**

Composition: 40 members IEC TC65 / ISO TC184, TC 261, TC299
Goals (defined by TMB & SMB):
- List relevant bodies, standards, consortia for Smart Manufacturing,
- Create and Maintain a database of these standards,
- Propose graphical representations based on standard vocabulary to support the needs from market users and standard developers,
- Propose an associated Business model.
Thank you