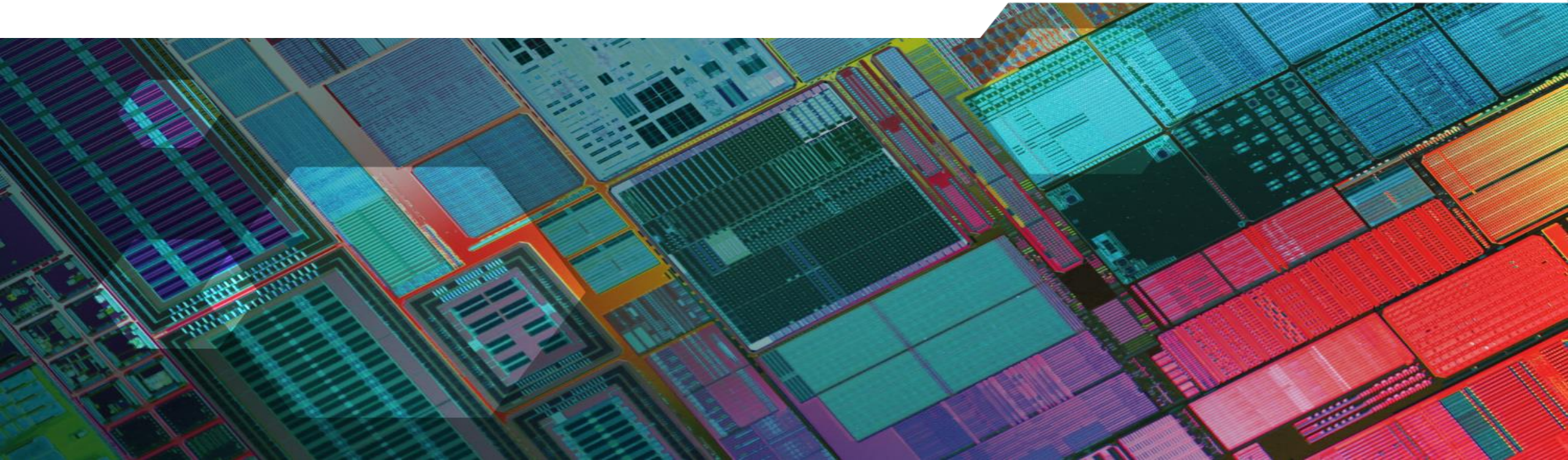




Relevance of Electronics in the Energy Domain

September 4, 2017

Emir Demircan, SEMI Europe

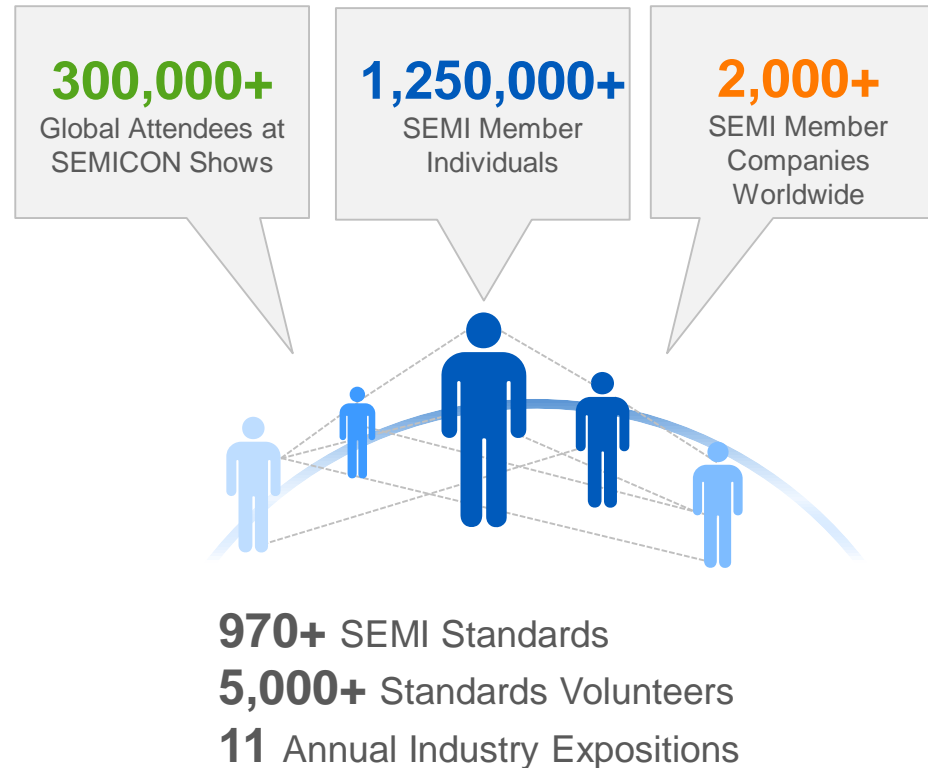


SEMI Connects

SEMI is the global not-for-profit association connecting and representing the worldwide electronics manufacturing supply chain.

For more than 40 years, SEMI has connected its members worldwide to achieve together what each cannot accomplish alone.

SEMI provides the platforms for the electronics manufacturing industry to connect, synchronize technology, discover new business opportunities, and change the world.



SEMI by the Numbers



Standards

970 Standards
>5,128 volunteers



1,270,000+ individual members
2,086 member companies



Expositions

322,076 attendees
7 SEMICON expos
4 other expos
4,068 exhibitors



Special Interest Groups (SIGs)

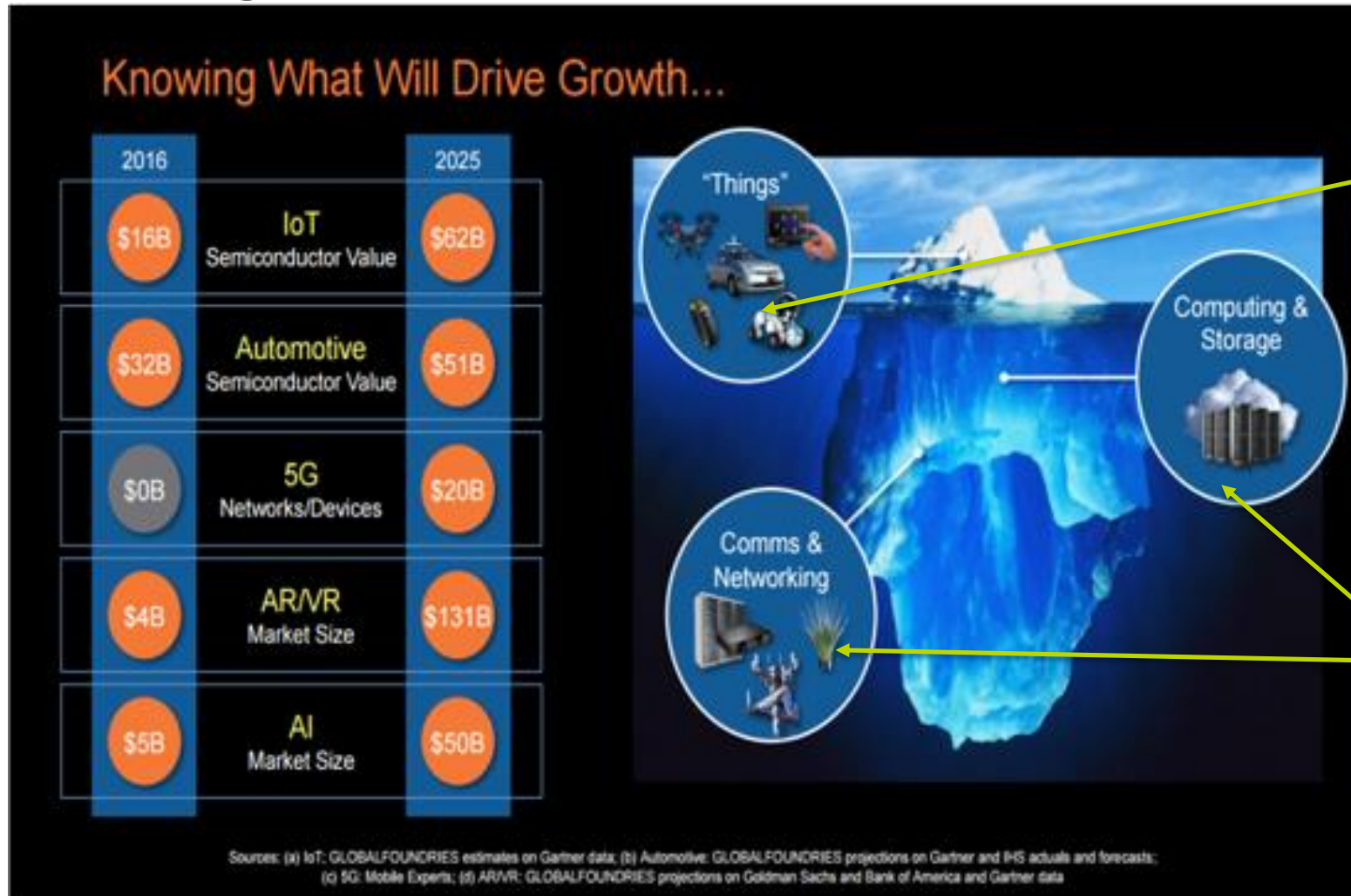
13 SIGs
>1,850 members



Programs

170 programs
>27,000 attendees
>2,300 hours

Setting the scene: evolution of electronics



Increasing amount of connected things need electrical power supply for the world of IoT, Autonomous Driving, Smart Living, AI etc.



Increasing data processing & storage (data centers) and energy demand

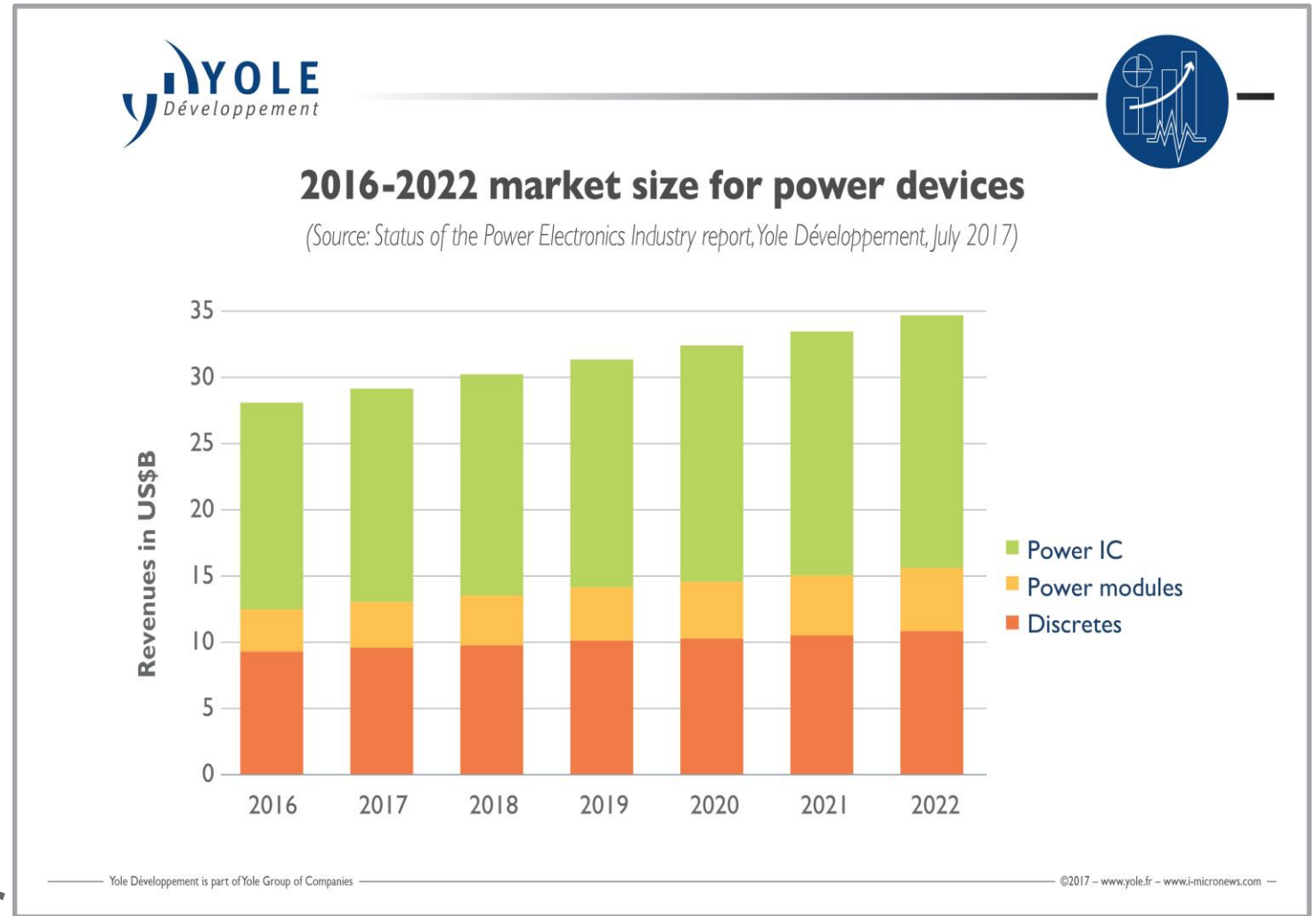


Source: Global Foundries

**Need More Electronics, More Processing Power ...
but must be Green and Cost- & Energy-Efficient**

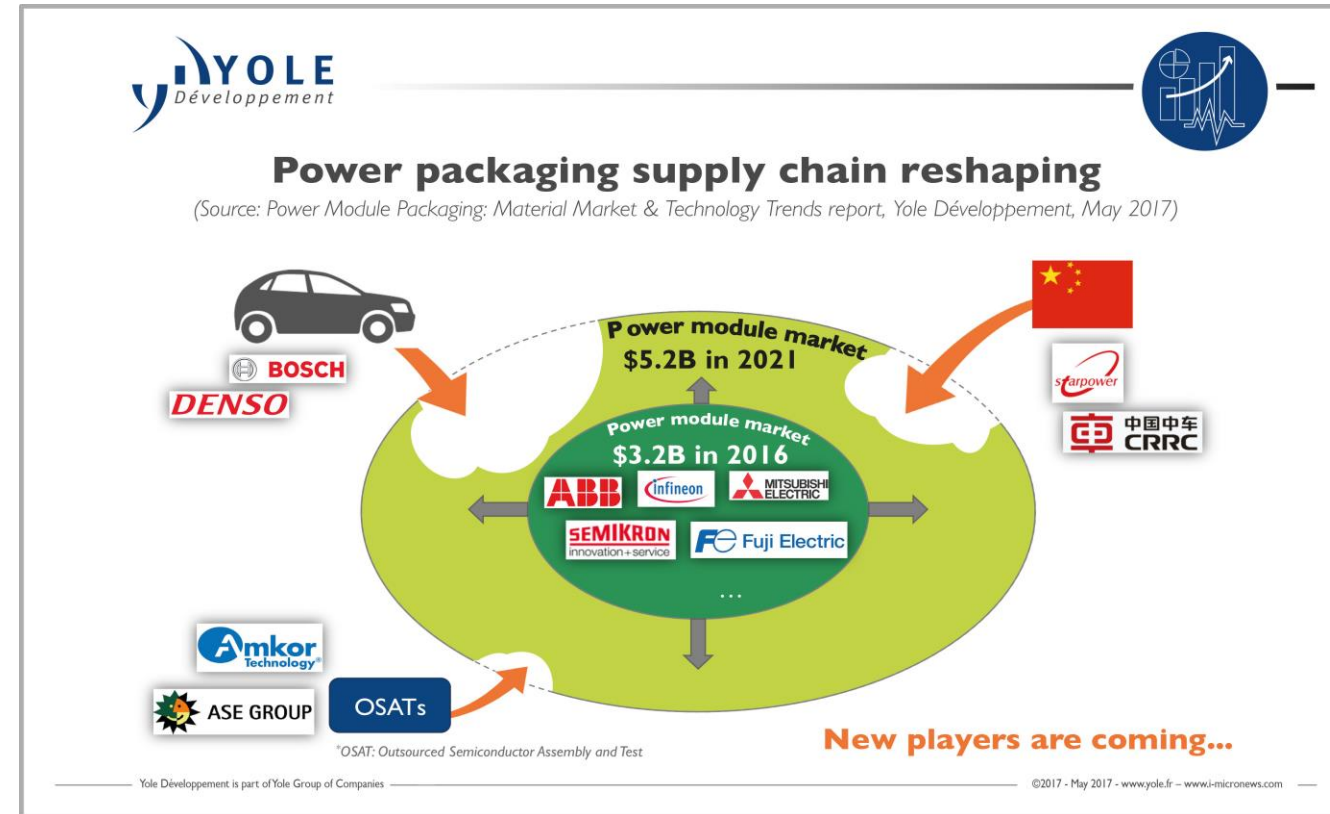
Electronics Technology & Market (I)

- **Growing market:**
 - faster, smaller, and energy-efficient components
 - for high efficiency power, DC conversions, and variable motor drives or related systems
 - key design considerations: features and functionalities, performance, security, reliability, and cost
- **New opportunities for Europe, as a strategic player**



Electronics Technology & Market (II)

- New players entering the market
- New, overarching RD and technical solutions needed:
 - **Miniaturization** to improve system efficiency at lower cost, novel **materials**, inovative **packaging** concepts for highest integration level
 - Increasing reliability, operation safety and high working temperature ($> 300^{\circ}\text{C}$)
 - Smart energy = **hardware security**
 - **Process and equipment manufacturing** for new materials on 300mm production lines at lower cost
 - Enhanced **device lifetime and reliability** with effective thermal management



Data centres and energy demand

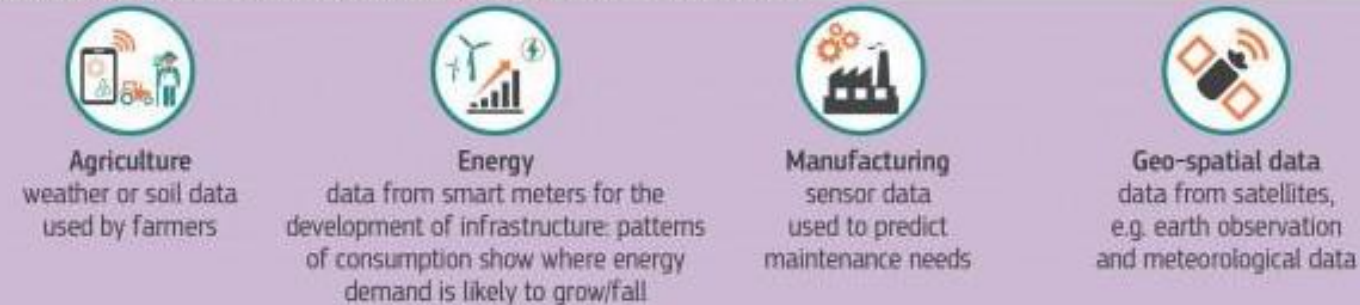
Building the European Data Economy

The digital revolution is built on data

Data is a new type of economic asset, which is rapidly becoming vital in the global economy. Most economic activity will depend on data within a few years → This provides great opportunities for all sectors, including:



Access to large and diverse datasets is a prerequisite for innovation.



"Data can be used and shared by many players at the same time, which opens up almost infinite possibilities of building new products or services..." Digital Commissioner Gabriel



Data centers and energy demand

- Data centers consume 3% of the global electricity supply and will consume 3 times as much energy in next decade
- Data centers are responsible for about 2 % of worldwide CO2 emissions
- 50%-70% of the overall power dedicated to the cooling task for current generation of data centers



Facebook data center in Sweden.

Europe's competitiveness in the global electronics industry

EUROPEAN MEMS PLAYERS RANK AMONG THE 15 TOP WORLD PLAYERS





SEMI Connects the Electronics Supply Chain

Collaboration is critical to solving issues and innovating new products

Keeping pace with Moore's Law • Industry 4.0 • Smart Manufacturing • More-than-Moore • Rise of IoT Technologies



Role of SEMI in the electronics value chain



| SEMI connects for member growth and prosperity | |
|---|--|
| Communities • Collaboration • Collective Action | |
| Standards | Interoperability, specifications, safety |
| Market Intelligence | Manufacturing data, forecasts, insight |
| Advocacy | Issues, public policy, collective action |
| Communities | Market segments, special interests |
| Programs | Technology, business, issues |
| Expositions | Business development, market access |

| Regions | Offices | Number of Members |
|----------------|------------------------------|-------------------|
| Americas | Milpitas Washington DC | 499 |
| China | Shanghai | 353 |
| Europe | Berlin Brussels, Grenoble | 274 |
| Japan | Tokyo | 325 |
| Korea | Seoul | 271 |
| India | Bangalore | 5 |
| Southeast Asia | Singapore | 47 |
| Taiwan | Hsinchu | 312 |

FY 2016, 3/31/17

2,086

Connected together, we achieve what cannot be accomplished alone



SEMI Connects Members and Communities

SEMI provides the platforms to address the pre-competitive needs and identities of specific communities – while providing opportunities for collaboration across the extended electronics supply chain.

SEMI | Corporate Members

Equipment Suppliers



Subsystems & Components



Materials & Chemicals



SEMI | Allied Members

Consortia



SEMI | Strategic Association Partner

FlexTech Alliance



SEMI | Associate Members

Device Manufacturers



OSATs



Note: Companies shown are only a sample of the 2,000+ SEMI Members

Conclusions

- Data economy translate into More Electronics, More Processing Power, but it must be Green, Cost- & Energy-Efficient
- Advances in IoT applications require advances in electronics (e.g. novel materials, equipment, new architectures....)
- EU electronics industry can play a strategic role in advancing the data economy
- SEMI, representing the global electronics industry, leverages its network and position to support its members and public authorities

Thank You!

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