6. Publishable Summary

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Electronic components and systems (ECS) are key drivers for the innovation capability of European industries, large and small, **generating economic growth and supporting meaningful jobs for citizens**. They offer solutions to some of the difficult societal challenges addressing European policies for 2020 and beyond. For both reasons, it is vital that investments are made to assure **European collaboration** and the access to the technologies, know-how and manufacturing capacities, which guarantee **growth potential and strategic independence** in the face of increased globalization.

Addressing European Policies for 2020 and beyond the "Power Semiconductor and Electronics Manufacturing 4.0" (SemI40) project responds to the urgent need of **increasing the competitiveness of the Semiconductor manufacturing industry in Europe** through establishing smart, sustainable, and integrated semiconductor manufacturing. SemI40 will further pave the way for **serving highly innovative electronic markets with products powered by microelectronics** "Made in Europe"

Future Smart Factories will be enabled by **mashing-up production technology** with novel, pervasive, and networked **information and communication infrastructures**, which are capable of sensing, collecting and processing large amounts of data in real-time to deliver production value in terms of availability, flexibility, and controllability/traceability, while at the same time ensuring security and safety of all tangible and intangible assets.

Electronic components and systems (ECS) is a domain with a worldwide fast growing market.. European enterprises have leading **global positions in key application domains like security, mobility, energy efficiency, and healthcare**, but also in the **efficient use of the limited and expensive resources**, as well as in providing **equipment and materials** for worldwide semiconductor manufacturing. The underlying technology domains are also extremely R&D intensive, with semiconductor industry investments reaching well above 20% of total revenues.

The key objective of **ECSEL** is: "Ensure the availability of ECS for key markets and for addressing societal challenges, aiming at **keeping Europe at the forefront** of the technology development, bridging the gap between research and exploitation, strengthening innovation capabilities and creating economic and **employment growth in the European Union**. The project SemI40 aims to contribute to the industrial **ambition of value creation** in Europe and **fully supports this vision** by addressing ECSEL MASP2015 key topic "Strategic Trusts": "Key applications": "Smart Production": with "Smart, sustainable and integrated production" and "Semiconductor Manufacturing"

A strong but not exclusive focus of the project SemI40 is set to enhancing the **power semiconductor manufacturing pilot lines** in the area of wafer production including various supply chain partners and different production sites. Demonstrators and full-scale testing are essential building blocks of the SemI40 project proposal meant to **stepping up Europe's innovation**

capability by efficient production operation. This will provide Europe with reinforced means to significantly **raise its competitive edge** across the economy and to address its **key societal challenges**.

Positioned as an **Innovation Action** (IA) it is the high ambition of SemI40 to implement technical solutions on TRL level 4-7 (8) into the pilot lines of the industry partners. They are complemented by challenging use cases representing real supply chains being also been assessed regarding their **technical, social and economic impact to the society**, future working conditions and skills needed.

Applying "Industry 4.0", "Big Data", and "Industrial Internet" technologies in **the electronics field** requires holistic and complex actions. The selected main objectives of SemI40 covered by the MASP2015 and their **measureable indicators are:**

- To **balance system security and production flexibility**, *by providing reference demonstrator solutions for increased safety and robustness against cyber-attacks in vintage production environment*;

- To increase **information transparency between fields and enterprise resource planning** (ERP), *by enhancing Big Data in semiconductor industry through enrichment of large-scale databases with semantic technologies*;

- To **manage critical knowledge for improved decision making and maintenance**, *by facilitating 100% data quality from sensors and measurement methods, and applying automated decision making based on extracted knowledge and rules*.

- To improve **fab digitalization and virtualization**, *by virtualizing large non-linear fab environments through improved fab simulation of the workflow at least one month in advance*;

- To enable **automation systems for flexible distributed production**, *by enabling optimized production of small lot sizes and implementing full single wafer traceability across multiple production sites*.

SemI40's well-balanced value chain oriented consortium is composed **by 37 project partners from 5 different European countries** including leading Semiconductor manufacturers, as well as value network partners, technology integrators, universities and excellent research institutes. SemI40 involves a vertical and horizontal supply chain and spans expertise and partners from raw material research, process and assembly innovation and pilot line, up to various application domains representing enhanced smart systems. Through advancing manufacturing of electronic components and systems, SemI40 contributes to **safeguard more than 20.000 jobs** of people directly **employed in the participating facilities**, and in total more than **300.000 jobs of people** employed at all industry partners' facilities worldwide.

The project SemI40 also aims to have **significant impact on smart regions**. **High tech jobs** in the area of semiconductor technologies and micro/nano electronics in general are expressed core competences of the participating partners regions in Austria, France, Germany, Italy, and Portugal,