



FOR IMMEDIATE RELEASE:

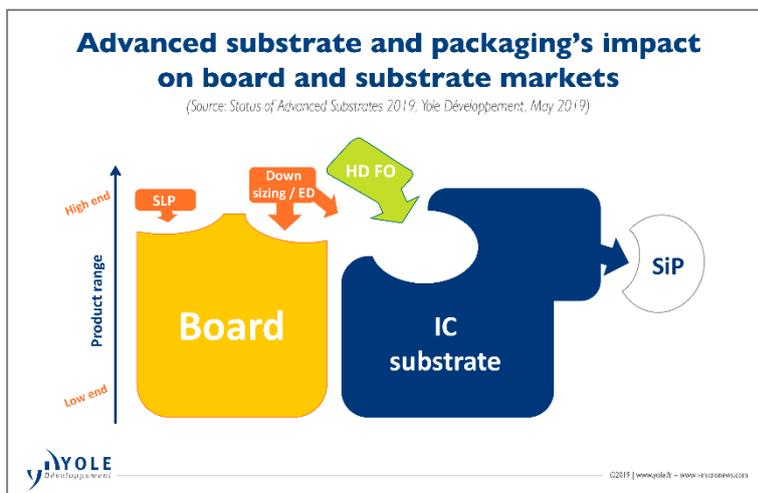
Advanced substrates: the wind of change

Extracted from: Status of Advanced Substrates report, Yole Développement, 2019 edition | Intel's Embedded Multi-Die Interconnect Bridge (EMIB), System Plus Consulting, 2018 edition.



Webcast on July 2 at 5:00 PM CET: The Sleeping Substrate Giants are Awakening powered by Yole Développement & System Plus Consulting - [REGISTER](#)

LYON, France – June 12, 2019: Historically, the IC¹ substrate and board industry has assumed a passive role, especially when it comes to innovation. However, in the past few years, things have changed. The dedicated landscape welcomed innovative solutions and new players. “Today, we are facing an increasingly competitive ecosystem and players are looking to differentiate from each other’s” asserts **Mario Ibrahim, Technology & Market Analyst at Yole Développement (Yole)**. “As the mobile segment matures with saturating growth, the value creation efforts are shifting towards emerging products, especially in Telecom & infrastructure (datacenters, 5G) and automotive.”



Substrate & PCB² global market will record a modest CAGR³ of around 4% between 2018 and 2024. But, if we only consider advanced substrate technologies as SLP⁴ and ED⁵ technology for example, the market exhibits a much higher growth rate, up to 49% CAGR for ED over the same period...

These figures are part of the new technology & market report, “[Status of advanced substrates](#)” published by Yole. Under this

dynamic context, this report points out the actual trends and their impact on the substrate manufacturing. This new edition is analyzing FC BGA and FS CSP substrate capacity. It also includes new SLP applications⁶ and highlights the latest adoption of embedded die package. Two other trends are also analyzed in this report: substrate manufacturers are today switching to mSAP and the Chinese industry is also consolidating its substrate manufacturing ecosystem...

¹ IC : Integrated Circuit

² PCB : Printed Circuit Board

³ CAGR : Compound Annual Growth Rate

⁴ SLP : Substrate Like PCB

⁵ ED : Embedded Die

⁶ Others than smartphone applications, already analyzed in this report.

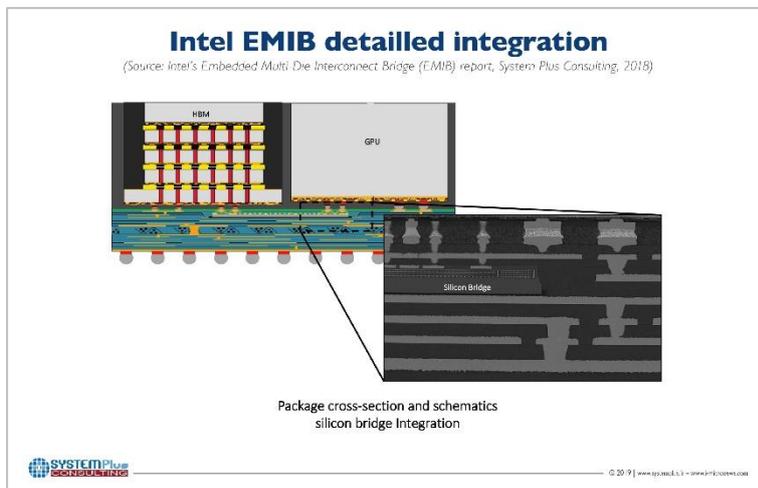


Yole Développement and [System Plus Consulting](#), both parts of Yole Group of Companies announce a dedicated online event on July 2. Titled, [The Sleeping Substrate Giants are Awakening](#), **Mario Ibrahim from Yole and Stéphane Elisabeth, Expert Cost Analyst, RF, Sensors & Adv. Packaging, System Plus Consulting**, propose this engaged webcast to present their vision, from technology to market, on the past, present, and future of advanced substrates. The advanced substrate industry has started to innovate to keep up with advanced packaging trends. Make sure to get a deep understanding of the market drivers and key challenges and [register today!](#)

Mega trends are pushing the packaging technologies to the extreme in order to answer their stringent requirements with smaller footprint, higher performances and lower power consumption. Substrate makers are working since few years to improve their technology portfolio and innovate in order to follow these trends.

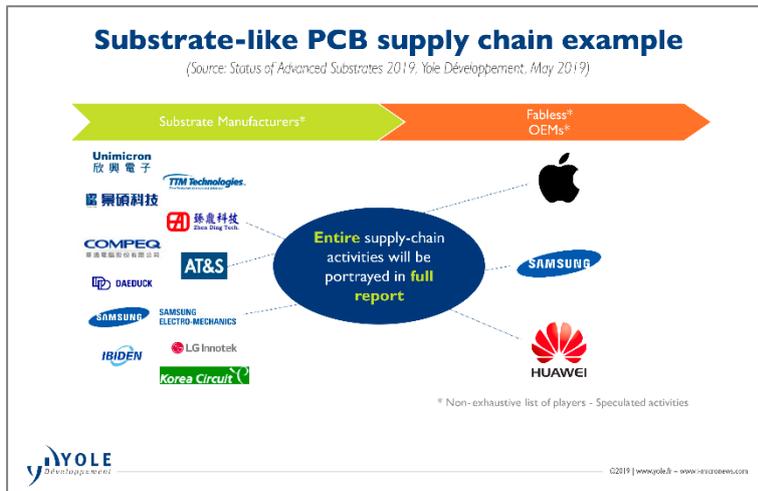
Industry players are looking to differentiate from each other's... The advanced substrate industry is now following the advanced packaging trends. Miniaturization, greater integration and higher performance are becoming mainstream in this industry. Huge investments by several players are ongoing for ED and SLP⁷, showing the increased interest in such technologies.

As an example, Infineon Technologies and Schweizer Electronic have recently announced a co-developed solution for the mild-hybridization of cars: chip embedding for Power MOSFETs...With chip embedding, the Power MOSFETs are no longer soldered onto a circuit board but integrated within. *"The resulting thermal benefits allow a higher power density and board integration enables further improvements in system reliability"* said **Dr. Frank Findeis, who is heading Infineon's automotive MOSFET business**. *"These advantages result in higher power or more cost effective 48 V systems."* Click [I-micronews](#) to read the full press announcement.



Flip Chip, SLP and ED are gaining market share from the conventional board and IC substrate markets. That's especially true for SLP and ED, which have the capability to either reduce the board/substrate footprint, or to increase the number of dies. *"Indeed, with technology like Embedded Multi-die Interconnect Bridge (EMIB), Intel, if they decide to license the technology to*

⁷ SLP : Substrate-Like Printed Circuit Board



external players, will be capable to compete with Interposer based packaging technology from suppliers like TSMC announces **Stéphane Elisabeth, Cost Analyst at System Plus Consulting**. Undoubtedly, these technologies can address the integrational needs of this new digital age applications, but bring complexity and request innovation before adoption takes place. In addition, such technology bring huge value into the market.

Hence it is not surprising they are expected to fetch a higher ASP⁸ and revenue.

“Increased SLP adoption by leading OEMs is driving market growth significantly”, announces **Favier Shoo, Technology & Market Analyst at Yole**. “The global SLP market is valued at US\$987 million in 2018 and is expected to grow through to 2024, driven by the global cell-phone market.”

Presently, the SLP market is still heavily dependent on high end smartphone growth, particularly Apple iPhones and Samsung Galaxies. Moving forward, Huawei is expected to release high-end products with SLP technology in 2019. “Huawei started to produce this type of substrate for the Premium phone “P30 Pro” release in March 2019”, said **Stéphane Elisabeth from System Plus Consulting**. “As Apple and Samsung, Huawei uses SLP to support the RF area”. Furthermore, cell-phone-producing OEMs are planning to use SLP in other consumer electronic products like smartwatches and tablets. SLP will become more mainstream than ever before.

Currently, SLP manufacturers from Taiwan, South Korea and Japan are dominating production activities. Players like Japan-headquartered Meiko and Taiwan-headquartered ZD Tech are expanding new SLP production lines in Vietnam and China for more than one smartphone customer. Certainly, China will gain SLP technical know-how progressively with technology transfer from the major players...

The full collection of advanced packaging reports is available on i-micronews.com, [advanced packaging reports section](#).

⁸ ASP : Average Selling Price

ABOUT THE REPORTS



Status of Advanced Substrates

Demands from the new digital age are waking up the sleeping substrate giants -
Produced by Yole Développement

Companies cited in the report:

Access semiconductor, AMD, Amkor, Apple, ASE, AT&S, Audi, Avago, BMW, Bosch, Career, CCTC, Celestica, Chin Poon, ChipBond, ChipMOS, CMK, Compeq, Continental, Cyntec, Daeduck, Daimler AG, Deca Technologies, Dyconex AG, Ericsson, Facebook, Fast Print, Flex, Flexium, Founder, Ford and more ...

As well as:

- [Fan-Out Packaging: Technologies and Market Trends](#) - Produced by Yole Développement
- [Status of the Advanced Packaging Industry 2018](#) - Produced by Yole Développement

Intel's Embedded Multi-Die Interconnect Bridge (EMIB)

First consumer application in the Intel Core 8th Generation i7-8809G, the world's first On-Package CPU and GPU with High Bandwidth Memory – Produced by System Plus Consulting



This report includes a complete physical analysis of the packaging process, with details of all technical choices regarding processes, equipment and materials. Also, the complete manufacturing supply chain is described, and manufacturing costs are calculated.

The report compares the Intel solution with AMD's Radeon Vega Frontier and NVIDIA's Tesla P100, highlighting the integration choices made by all companies...

More on [System Plus Consulting website](#).

About the authors:

- **Stéphane Elisabeth**, PhD has joined System Plus Consulting's team in 2016. Stéphane is Expert Cost Analyst in RF, Sensors and Advanced Packaging. He has a deep knowledge of materials characterizations and electronics systems. He holds an Engineering Degree in Electronics and Numerical Technology, and a PhD in Materials for Microelectronics.
- As a Technology & Market Analyst, Advanced Packaging, **Mario Ibrahim** is a member of the Semiconductor & Software division at Yole Développement (Yole). Mario is engaged in the development of technology & market reports as well as the production of custom consulting studies. He is also deeply involved in test activities business development within the division.
Prior to Yole, Mario was engaged in test activities development on LEDs at Aledia. He was also in charge of several R&D advanced packaging programs. During his 5 years stay, he developed strong technical & managerial expertise in different semiconductor fields.
Mario holds an Electronics Engineering Degree from Polytech' Grenoble (France). He spent 3 apprenticeship years within Imaging Division of STMicroelectronics Grenoble, where he contributed to the test benches park automation within the test & validation team.
- **Véronique Le Troadec** has joined System Plus Consulting as a laboratory engineer. Coming from Atmel Nantes, she has extensive knowledge in failure analysis of components and in deprocessing of integrated circuits.
- **Favier Shoo** is a Technology and Market Analyst in the Semiconductor & Software division at Yole Développement, part of Yole Group of Companies. Based in Singapore, Favier is engaged in the development of technology & market reports as well as the production of custom consulting.
After spending 7 years at Applied Materials as a Customer-Application-Technologist in advanced packaging marketplace, Favier had developed a deep understanding of the supply chain and core business values. Being knowledgeable in this field, Favier had given trainings and held numerous technical review sessions with industry players. In addition, he had obtained 2 patents.

Prior to that, Favier had worked at REC Solar as a Manufacturing Engineer to maximize production capacity.

Favier holds a Bachelor in Materials Engineering (Hons) and a Minor in Entrepreneurship from Nanyang Technological University (NTU) (Singapore). Favier was also the co-founder of a startup company where he formulated business goals, revenue models and marketing plans.

ABOUT YOLE GROUP OF COMPANIES



System Plus Consulting specializes in the cost analysis of electronics, from semiconductor devices to electronic systems. Created more than 20 years ago, System Plus Consulting has developed a complete range of services, costing tools and reports to deliver in-depth production cost studies and estimate the objective selling price of a product. System Plus Consulting engineers are experts in Integrated Circuits - Power Devices & Modules - MEMS & Sensors - Photonics – LED - Imaging – Display - Packaging - Electronic Boards & Systems. Through hundreds of analyses performed each year, System Plus Consulting offers deep added-value reports to help its customers understand their production processes and determine production costs. Based on System Plus Consulting's results, manufacturers are able to compare their production costs to those of competitors. System Plus Consulting is a sister company of Yole Développement. More info on www.systemplus.fr and on [LinkedIn](#) and [Twitter](#).



Founded in 1998, **Yole Développement** has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide covering MEMS and image sensors, Compound Semiconductors, RF Electronics, Solid-state lighting, Displays, software, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management. The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business. . For more information, visit www.yole.fr and follow Yole on [LinkedIn](#) and [Twitter](#).

- Consulting & Financial Services: Jean-Christophe Eloy (eloy@yole.fr)
- Reports: David Jourdan (jourdan@yole.fr)

Yole Group of Companies - Press Relations & Corporate Communication: Sandrine Leroy (leroy@yole.fr)

###