Nanoelectronics

PPP TO DEVELOP KEY-TECHNOLOGIES

The delay of Europe regarding nanoelectronics is worrying. In response, the EU created ENIAC and ECSL[1], public-private partnerships (PPP) which contribute to merge all efforts and capacities into projects of European interest.

Using nanotechnologies to produce smaller and more powerful electronic components (chips) represents a strategic challenge in all domains: telecommunications and telephony market, electronic payment, networks management, industrial process, transports, defence, space, etc. The international competition is intense and nowadays dominated by few large groups, the investment and the innovation being drawn by Intel (USA), Samsung (South Korea) and NTC (Taiwan). The nanoelectronics firms based in Europe, which represented 10,2% of the worldwide market shares in 2001, receded to 5,7% in 2012. This decrease that begun before the crisis is now moving Europe away from the critical mass needed for research-innovation and commercializing of electronic chips. That is why Nelly Kroes, vice-president of the European Commission, declared in May 2013: *"I want to double the European production of chips to around 20% of the global production"*.

14 Pilot Lines

The common firm ENIAC has been created[2] at the end of 2007 to reinforce European efforts in this sector. Community body with legal personality, ENIAC is set up as a public-private partnership, bringing together the European Commission and European Member and Associated States with AENEAS, the association representing the R&D actors in nanoelectronics (Corporate, SME's, research institutes and universities) in Europe. Its budget for 2008-2017 was initially set up at 3 billion Euros (0.45 coming from the European Commission, 0.80 from the Member States and 1.75 from the private sector).

> ***"Without cutting-edge technology infrastructure for informatics chips, Europe will remain dependant on imports"***

The activity of ENIAC is organized in 14 "pilot lines": in each of them, R&D cooperative projects between industrial representatives and research labs are, after calls for proposals and selection, supported by national authorities and by ENIAC. The total cost is estimated at 1.79 billion Euros with 265 millions of national repayment and 267 millions of ENIAC repayment.

This approach offers numerous advantages:

- It has combined a strong impulsion given by the political level (EU and Member States) with a large association of different research actors, public and private, solicited to present projects for each pilot line.
- It has generated an ecosystem favorable to the diversity of the players and it has avoided a polarization of some actors. On 616 organisms which participated to the pilot lines between 2008 and 2013, 145 (24%) are large industrial firms, 278 (45%) are SMEs, and 192 (31%) are universities and research institutes. It is likely that the relations established around the studied projects will continue and further develop in a sustainable way this ecosystem, thanks to the consolidation of efforts and capacities around projects of European interest.
- The adhesion of three countries that are not in the EU (Israel, Norway and Turkey) has confirmed the merits of the system, while opening new partnership possibilities.

A new common firm

The common firm ECSEL, created[3] in 2014 for ten years, is also a community body with legal personality, functioning as a public-private partnership. Its activities cover those previously managed by ENIAC (chips), ARTEMIS[4] (embedded computing system) and EPoSS (European platform for the system integration).

This new combination results from several observations. Without cutting-edge technology infrastructures for informatics chips, Europe will remain dependant on imports. Without the features managed by the embedded software on used equipment, the chips will not be used. And finally, without integration of the components in intelligent systems, we cannot use any application.

ECSEL is part of the Horizon 2020 strategy. It aims at:

- Supporting the European research and production activity, the implication of SMEs and the creation of new clusters.
- Securing the offer of key technologies in every large sector of the economy, to ensure the independence of Europe in the field of components and electronic systems.
- Harmonizing the strategies of the Member States to avoid duplication in the use of public funds, and to attract private funds.
- Bringing the industry to define a long-term strategy program for research and innovation.

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1) Alain Turc based its article on the syntheses of Confrontations Europe's "task force", which organized a meeting on May 27th 2014 on the topic "Valorization of long-term investments projects: let's give the floor to the economic and social actors". During this session, six actors from four sensitive sectors took the floor (sustainable mobility, airports and transports, new technologies, digital revolution).
2) By regulation n°72/2008 from the Council, 20th December 2007
3) ECSEL has been established by the European Council regulation of May 26th 2014.
4) ARTEMIS has been established by the European Council regulation of December 20th 2014.