The value of control

Zoran Marinšek, Head of the Competence Centre for Advanced Control Technologies, provides his perspective on how the European CT industry needs to develop…

Control technology (CT) can be understood as a synergy of the knowledge and skills, tools and building blocks for engineering control systems. It is a truly ubiquitous technology that guarantees functionality and reliable operation of devices, machines, vehicles, industrial processes, plants, etc. As such, it is one of the key enabling technologies for generating new solutions and products for the market.

Technologies in the final product

Being truly ubiquitous, it is often 'hidden' in the final product, process or device. Thus, the end-user market for its products is relatively small.

However, this leads to CT's main impact – which is its contribution to the final product in conjunction with other technologies that take part in its development – generically termed the 'process technologies'. Thus, it is the one necessary part of a meaningful concept of smart specialisation.

Competences

The competences relevant for CT are on the one hand the competences required in basic knowledge of control technology, and on the other those involved in specific areas of processes – problem domains or application fields. The person who best understands a specific process technology, after the process specialist, is the control technology specialist; some would say that in certain cases the order is reversed.

Where problem domains are concerned, the market comes into picture, and with it the life cycle of development and exploitation – or product 'value chain'. The competences in a value chain have to be segmented into:

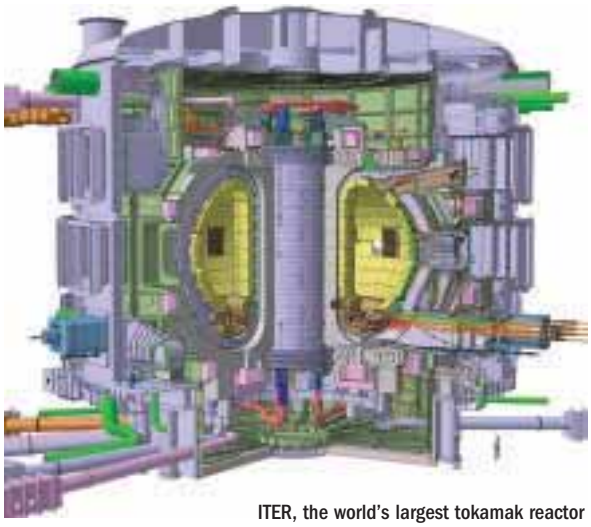
- Basic research;
- Applied/industrial research and development;
- Introduction to the market (including business innovations); and
- Exploitation.

Capacities

Capacities signify a generic representation for a union, in each of the segments in the value chain, of: critical mass, the career goals of people involved, and business goals and acumen of organisations – especially companies, as they are the carriers of the market activities for the products. Tradition is a necessary 'infrastructural' ingredient in this mix.

A cabin view of an adaptive autopilot system

Here it is important to note that, while in the front end of the life cycle, capacities are separated for each technology, the life cycle segments closer to the product and market have to be progressively more integrated or 'bundled'. This bundling becomes critical in the phase of introduction of new solutions to the market; the carriers are either established larger technology and innovation oriented companies, or clusters of smaller companies, technology centres, and competence centres, which represent favourable conditions for enhancing the mixing and bundling processes.



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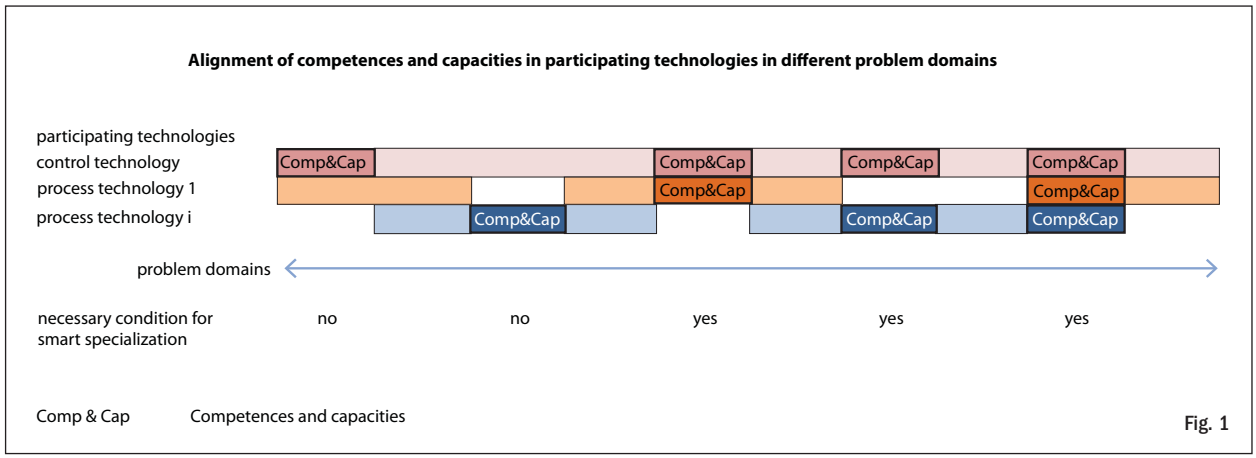


Fig. 1

Smart specialisation

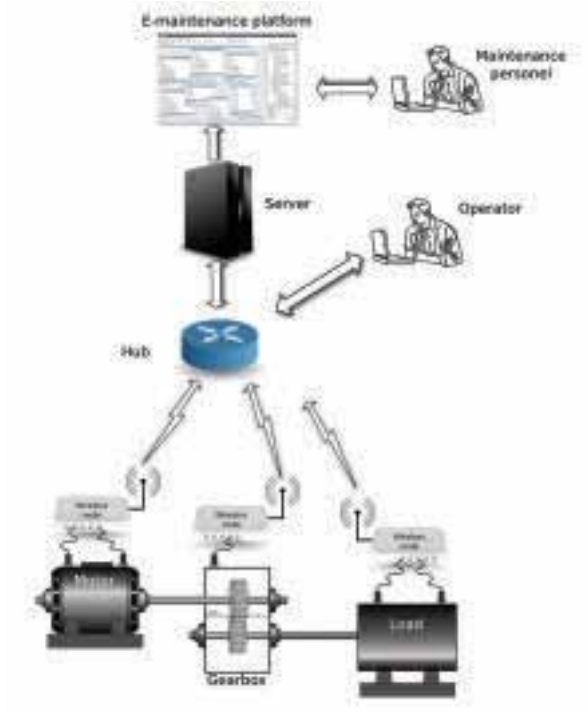
A meaningful approach to smart specialisation is to specialise in a cross-section of technologies, competences and capacities available in a certain region.

As indicated above, from the viewpoint of the product value chain, the following categories have to be taken into account:

- Technologies present in a problem domain – a cross-section between control technology and the process technology or technologies that participate;
- Competences in segments of the technology life cycle – for each technology participating;
- Capacities in each segment of the technology life cycle and for each technology.

This is a multidimensional matrix. The concept of the process is presented in Fig.1.

This is a bottom-up process. What is more, it is not wholly quantified, but to a certain extent intuitive.



Diagnostic centre for machine maintenance

In order to provide Europe-wide coherence and synergy (and joint financing), it has to be verified top down, to fit into Horizon 2020 priorities. This process would consist of:

- Identification of broader fields of application (domains);
- Integration of narrower problem domains into broader fields of application/domains on the regional or state level, where applicable or possible (these then represent the fields of smart specialisation on the regional or state level, and ensure compatibility of fields and terminology on an inter-regional level).

This approach is meaningful because it takes in its stride the changing relevance in technologies and the evolution of competences and capacities.

Indicators for competences and capacities

In order to properly track and steer this process, and especially to cater to the evolution of all three categories – technologies, competences and capacities – proper indicators for competences and capacities have to be defined. Here, it has to be openly acknowledged that the sectorial approach, which is the one easily available for top down monitoring and planning, is wrong.

The indicators have to monitor the competences and capacities, and they have to be relevant to: specific technology; segments in the life cycle of development; and the target objective – to increase the added value of the products, both specific and absolute, on the market. For small economies this generally means export markets, rather than domestic.

Such an approach is lacking in available data and is not favoured by macro economists used to dealing with large aggregates neither to bureaucracy. The challenge is to identify and accept such indicators Europe-wide. The efficiency and level of R&D investment in the next Horizon will largely depend on this issue.

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