

Nanosciences, Nanotechnologies, Materials and new Production Technologies

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ManuFuture conference 2006: Implementing the ManuFuture strategy



The fourth ManuFuture conference, held in Tampere, Finland, on 9-10 October 2006, marked the transition from planning to practical implementation of the ManuFuture Strategic Research Agenda, which sets out the measures considered necessary to secure a competitive and sustainable future for manufacturing in the EU.

An audience of around 400 delegates from the European industrial and academic communities heard about the steps that have been taken to prepare the way for turning the recommendations of the ManuFuture Strategic Research Agenda (SRA) into concrete actions for implementation - under the Seventh RTD Framework Programme (FP7); plus other initiatives at EU, national and regional level; and through the participation of the private sector.

in the globalised economy.

The ManuFuture initiative was officially launched by the European Commission in December 2003 at a conference held in Milan, Italy, with the stated aim of helping to catalyse dialogue on scientific, technological, organisational and industrial issues related to manufacturing. It was triggered by a widespread concern at the intense and growing pressure from overseas competitors. In high-tech fields, especially, other developed economies pose the greatest threat. At the same time, manufacturing in more traditional areas is increasingly migrating to low-wage countries such as China and India. And these, too, are rapidly modernising their production methods and enhancing their technological capabilities.

From ideas to actions

Progress towards appropriate solutions evolved from the publication of an initial document, 'ManuFuture - a vision for 2020' in 2004. This was followed a year later by the first edition of the SRA, which was presented as a basis for stakeholder consultation and comment over a period up to mid-February 2006. The final SRA, incorporating the received observations and suggestions, was issued in Tampere.

Meanwhile, following the completion of consultation on the original version, the ManuFuture High Level Group (HLG), aided by institutions from across Europe, had launched a series of surveys to determine the research priorities as perceived by individual manufacturing sectors, and to consolidate these into an overall roadmap for future implementation. The results of these studies formed the backbone of the Tampere conference.

Organised under the auspices of the Finnish Presidency of the EU, the event opened with an introduction to the Tampere region and the objectives of ManuFuture, with a video contribution from Mauri Pekkarinen, Finland's Ministry of Trade and Industry - plus presentations from Nicholas Hartley, Acting Director of the EC Directorate G, Industrial Technologies; Jarl-Thure Eriksson, Rector of Tampere University of Technology; and Dr Erkki Leppvuori, CEO and President, VTT Technical Research Centre of Finland.

Factory of the Future

Dr Risto Kuivainen, VTT's Vice President, R&D, offered a vision of the Factory of the Future, from a Finnish perspective.

Although globalisation is widely regarded as having only negative connotations for European manufacturing industry, he said, it can in fact offer positive benefits to those prepared to seize the opportunities and action is necessary to secure the future of our industry.

The best way of keeping a manufacturing sector in Europe will be to specialise in production requiring special skills, where the price of the workforce is not a key factor. This is easiest with products that are highly innovative.

Trend to networking

While the transformation of manufacturing requires differing approaches in different areas of the EU, there will be a general trend away from brand owners' self-contained factories towards networks, in which SMEs will play key roles. They will be able to make strategic choices between being a system supplier, a specialised member of a network, or both of these in several networks.

The factory of the future will be a network that extends from countries where salaries are low, to countries where levels of competence are high, and to expanding market areas. The phasing of work will be planned to match the level of production, controlled automatically with the help of purpose-developed operational management software.

The planning of production systems will employ simulation and three-dimensional modelling, making optimal use of the available skills through participative methods and the technologies of virtual reality. The functionality of systems will be tested using animation and simulation well before starting the actual installation phase, thus avoiding the expensive correction of errors and reducing ramp-up times. High levels of automation will permit rapid and flexible production, with partial unmanned operation allowing maximum utilisation of the costly equipment.

Attracting a new generation

Today, however, while work in manufacturing has little appeal to the young, the ageing of the European population makes it vital to attract new employees. In fact, the coming generations of workers will be highly skilled professionals. Factories will therefore need to be more office-like: clean, quiet and safe, with pleasant interior spaces, ergonomic tools and modern IT facilities. The work tasks should be interesting, challenging and knowledge-based, carried out in organisations with low hierarchical structures and good opportunities for self-development.

We need to do hard development work in our industry, and ManuFuture points the way, Dr Kuivainen concluded.

Companies can progress rapidly through large scale-co-operation. It has been shown that growth is twice as fast for businesses within networks, compared with stand-alone enterprises. With the right customer-oriented business models, manufacturing can still be a vital element in creating community welfare.

Short- and long-term needs

Three senior architects of the ManuFuture Platform - Professors Heinrich Flegel (DaimlerChrysler, and HLG Chairman), Francesco Jovane (ITIA-CNR) and Engelbert Westkmpfer (FhG-IPA) - reiterated the economic importance of manufacturing to the EU and traced the path from the SRA to the current recommendations for implementation.

In addition to the breakthroughs envisaged under FP7, they noted that there would be a need to transform traditional industries and technologies as a short-term strategy for survival. This, they pointed out, would require more than the lean production model of just-in-time delivery, zero errors and continuous improvement, as pioneered by Toyota. Although an effective means of minimising waste, this does not address the need for customisation of products, which will be a fundamental requirement in the factories of tomorrow. It is now necessary to 'think beyond lean', by undertaking urgent research into the paradigms and tools defined in the SRA.

Another key point was that strong standards and open architectures for production systems and ICT would be crucial to Europe's continuing competitiveness.

Roadmaps delivered

Professor Westkmpfer went on to describe the sterling work accomplished by the ManuFuture Support Group, aided by research institutes from around Europe, in preparing the roadmaps linking research priorities to the timeframe of the programme.

In an EU-funded project entitled LEADERSHIP, they began by studying 27 major industrial sectors and drawing up individual roadmaps for each. These were then cross-referenced to the main components of ManuFuture - new business models, industrial engineering, emergent technologies and ICT for manufacturing - in order to compile relevant trans-sectoral roadmaps.

As a result of this valuable exercise, it has been possible to clarify the opportunities for interaction between ManuFuture and other thematic programmes, and to set an agenda for the broad communication and diffusion of its principles throughout the whole of manufacturing industry.

Proposals require careful preparation

Christos Tokamanis, Head of Unit G2 (responsible of ManuFuture) in the EC's Research DG, underlined the need for organisations seeking support under FP7 to take due regard of the boundary criteria and the roadmapping priorities in framing their proposals. Projects must be able to deliver real added value, and to cater specifically for education and training, he added.

Noting that the programme will commit nearly 48 billion of taxpayers' money over its seven-year duration, Tokamanis cited the ManVis, LEADERSHIP, IPROMS, EuMech-pro, Sapient and IPMMAN studies as useful sources of guidance. He also highlighted the ERANET and ERANET+ schemes as specific FP7 instruments for the development of national and regional collaborations.

Moreover, he warned that the timetable of FP7 is such that its selected first-call projects will not realistically get underway until the start of 2008. For more immediate research, private investments and alternative funding instruments would need to be sought.

Paths to implementation

During the course of the day, several speakers outlined further steps being taken to move the platform towards its implementation phase:

National and regional platforms

At the time of the Tampere conference, ManuFuture platforms had been set up or were under development in the majority of Member States and a number of other associated countries.

Registered 30 MF NTP

- Advanced 10
- In develop. 6
- Started 6

• Signalled 8

Efforts to stimulate the creation of more related technology platforms at national and regional level (NRTPs) were summarised by Professor Edward Chlebus, from Wroclaw University of Technology, Poland.

A series of international meetings and contacts throughout 2006 established a first cross-platform initiative with the textile sector, presented the ManuFuture concepts to the New Member States and to many regional authorities and agencies, and established a mission and criteria for the operation of NRTPs

The objective is to mobilise all possible funding sources national, regional, private, EU Framework Programmes, Structural Funds, the European Investment Bank, EUREKA, etc. in support of such platforms. This entails ensuring political and industrial awareness, and promoting a full exchange of information between the European and national/regional levels.

To harmonise the process, a group set up specifically to represent the national/regional initiatives created a catalogue detailing each NRTP in terms of:

- technical objectives;
- relevance to the national economy;
- sectors concerned;
- ManuFuture pillars involved;
- RTD activities at national and EU level;
- stakeholder groups;
- geographical representation;
- interactions with other NRTPs;
- special national programmes, funding instruments, etc

The group also proposed a number of vertical and horizontal pilot actions whereby sectors and NRTPs can be encouraged to collaborate in the context of FP7.

Co-operation with ETPs

Daniel Richet, Director for International Development, CETIM, France, reported on the relationships being built up between ManuFuture and other European Technology Platforms (ETPs) with overlapping areas of interest.

The first step was to analyse the vision documents and SRAs of as many potential partner ETPs as possible. The Platforms were then classified into sector-, technology-, materials- or environment-oriented categories, and mapped into a matrix grouping those with common strategic goals and technologies.

To date, this study has identified and drawn up roadmaps for a large number of topical areas from embedded electronic systems and mechatronics, to materials, education and waste recycling in which it is considered that cluster formation will be advantageous for trans-platform research.

Close collaboration has already been decided with a selected number of ETPs, beginning with the formal signature of MANUTEX, a joint venture between ManuFuture and the textile sector ETP, at a meeting in Vienna in May 2006. Working groups are now exploring the possibilities for still more co-operations. These can take the form of

- information exchange on mutual SRAs;
- assistance in defining SRAs;
- participation in other ETP meetings;
- involvement in the ManuFuture SRA consultation process;
- supporting and integration as technical groups of ManuFuture;
- creation of technical coordination committees;
- contribution to the roadmapping process.

The programme for day 1 ended with group visits to Tampere's University of Technology and some of the new industries that have grown up in a city that has successfully made the transition from a declining textile-producing area into a flourishing centre of high-tech manufacture.

Workshops set priorities

On the second morning, the audience divided to attend a series of parallel thematic workshops. After short presentations by specialist speaker panels, delegates were invited to discuss their own particular interests and to consider appropriate subjects for proposal submissions to the forthcoming FP7 first round of calls.

Workshop A - New industrial models and strategies - pointed to the need to pursue several parallel avenues of research: survival strategies for traditional industries, networked production and 'factories as products', innovation in high-added-value products and services, and the development of science-based entrepreneurship in the global scenario. Delegates considered that, because business models tend to reflect the personalities and circumstances of individual organisations, research in this area should focus rather on the development of tools to guide planning and decision making.

Workshop B - Adaptive production systems - emphasised the importance of developing machines and systems combining high performance and small dimensions with reliability and energy-efficiency. Concerns included the lack of interoperability standards for mechatronics, and the need to combat obsolescence in software and embedded microcomponents. New methods should also be sought to overcome the problems faced by systems builders in managing the rapid evolution of microelectronics.

Workshop C - Networked production - saw the requirement for tools to assist organisations adapt to the complexity of networking, as well as for the formulation of standards for relevant technologies, processes and real-time management techniques. To assist with mass customisation, the development of appropriate customer models was seen as highly desirable.

Workshop D - Knowledge-based engineering - again ranked standardisation and open systems architectures highly among its priorities, along with security against copying and improved protection of intellectual property rights. Better simulation software tools are also vital to anticipate future market demand, increase the flexibility of factories and reduce time-to-market for new products and services.

Workshop E - Convergence of technologies - envisaged that the evolution of micro- and nano-technologies into complete value chains will be retarded without education to overcome companies' lack of readiness to adopt new methods. Cost reduction would be the main reason for their acceptance, generating high demand in sectors such as automotive, medical and consumer goods. Research should focus on micromaterials, microcomponents and surfaces. In the first year of FP7, efforts should be made to promote the progress of existing laboratory techniques towards industrial exploitation, and to look for new ways to combine different processes in faster, better production systems.

Workshop F - ICT for manufacturing - noted the need to think beyond FP7 and to take advantage of all available opportunities for collaborative research and innovation: via the ICT Theme, the ARTEMIS ETP, EUREKA, and national programmes, etc. Given the vanishing boundaries between ERP (enterprise resource planning), MES (manufacturing execution systems) and automation, and the importance of quickly adopting innovation in ICT to manufacturing (for instance through wireless technologies), projects must span a broad spectrum. Decreasing cost for installation, commissioning, and maintenance and increased productivity through a service-oriented manufacturing infrastructure were the main issues. Goals extend from the development of building blocks with intelligent embedded functionality, through the design of scalable, robust and reconfigurable networked production systems, to the framing of novel architectural concepts and collaborative communication and control methods for their seamless integration into the production environment.

Following this round-up, the conference closed with thanks to all of the participants - and especially to Professor Reijo Tuokko, Chairman of the Programme Committee, and his colleagues for their impeccable organisation of the event.

Professor Flegel concluded by urging everyone to do their utmost to raise awareness of ManuFuture and contribute to its success. "For European manufacturers, it is like competing in the Olympic Games," he said. "To be second is to be the first loser."

Finally a date and location were announced for a fifth ManuFuture conference, to be held in Porto, Portugal, on 3-4 December 2007.

- Magazine (PDF)
- Press room
- New on site
- Document library
- Useful links

Key data

Background

- ManuFuture
- More information is available from the ManuFuture website
- The ManuFuture Strategic Research Agenda

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