ManuFuture© Platform

STRATEGIC RESEARCH AGENDA

assuring the future of manufacturing in Europe

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Abstract:
This is the document prepared by the Manufuture Platform which outlines the European strategic manufacturing industrial response to the foreseen global industrial revolution. Such response is based on research and innovation and requires moving collectively towards the European knowledge economy. This strategy is related to the Manufuture Initiative report “A Vision for 2020” published in November 2004.

Note:
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Manu*Future* Platform

STRATEGIC RESEARCH AGENDA

Assuring the future of manufacturing in Europe

HIGH LEVEL GROUP AND SUPPORT GROUP

with the collaboration of
EPP Lab (ITIA-CNR)

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PREFACE

Following the launch of the Manu*future* European Technology Platform in December 2004 in Enschede, Manu*future* took onboard the task of elaborating the Manu*future* vision document towards a Strategic Research Agenda (SRA).

As the Manu*future* vision took a holistic approach towards transforming the European manufacturing industry, by necessity, the SRA in its complete form will be a multifaceted and sizeable document. The present document represents the first iteration of such an SRA, presenting a new manufacturing paradigm, a high level roadmap for industrial transformation and its principal technology, business and framework drivers.

Subsequent versions of the SRA shall be providing more detailed roadmaps of the prioritised technology and research areas together with estimates of required investments and implementation plans for private and public initiatives/activities.

EXECUTIVE SUMMARY

The Manu*future* Technology Platform was launched at the second Manu*future* conference, held in Enschede, The Netherlands, in December 2004. On this occasion, the document Manu*future* – *a Vision for 2020* was published as the basis for development of a Strategic Research Agenda (SRA) underpinning a transformation of European manufacturing industry into a knowledge-based sector capable of competing successfully in the globalised marketplace.

The economic importance of sustaining a strong manufacturing base in Europe is indicated by the fact that it provides jobs for around 27 million people, and produces an added value exceeding €1 300 billion from 230 000 enterprises with 20 and more employees (2001). Some 70% of this total derives from six main areas – automotive engineering, electrical and optical equipment, foodstuffs, chemicals, basic and fabricated metal products, and mechanical engineering.

Although European manufacturing has huge potential for generating wealth, jobs and a better quality of life, it faces intense and growing competitive pressure on two fronts. In the high-tech sector, especially, other developed economies pose the greatest threat. On the other hand, manufacturing in more traditional sectors (mature sectors) 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.

A step further

A number of 'vertical' action plans and Technology Platforms have already been established, or are in the course of preparation, to tackle these issues in various technology- or sector-specific contexts. Manu*future* goes a step further by addressing underlying 'horizontal' approaches applicable across a broad spectrum of industries.

The initiative advocates a response based on an industrial transformation which will strengthen Europe's ability to compete in terms of high value, since purely cost-based competition is not compatible with the goal of maintaining the Community's social and sustainability standards. The initiative fosters also the transformation of R&D and Education infrastructure for high value manufacturing for a more and more "efficient" generation, distribution and use of knowledge in Europe and, specifically, in its regions.

Concentrations of such efforts will *attract* high value manufacturing industry as well as the other fundamental actors such as universities and research centres even from outside Europe.

In this SRA, the priorities for maximising added value are distilled in a strategic perspective linking the principal drivers of change with a series of 'pillars' of activity spanning activities across the short- to long-term timeframe.

The drivers are identified as:
- competition, especially from emerging economies;
- the shortening life cycle of enabling technologies;
- environmental and sustainability issues;
- socio-economic environment;
- regulatory climate; and,
- values and public acceptance

The competitive and sustainable reaction to these challenges is seen in terms of five pillars and their associated new enabling technologies for the industrial transformation of:

- new, added-value products and services
- new business models
- new advanced industrial engineering
- new emerging manufacturing science and technologies
- transformation of existing R&D and education infrastructure to support world-class manufacturing

Role for collective research

Collective research will evidently have a central part to play in realising the transformation. Attaining the objectives of the Lisbon and Barcelona Councils will only be possible by involving the largest possible number of stakeholders.

The existing and proposed Technology Platforms, whether applied at EU or national/regional level, therefore represent an extremely important conduit for sharing the Manu*future* concepts and results.

Another stakeholder group of outstanding importance is the innovative SMEs and other independent enterprises, which figure largely in the structure of all manufacturing sectors. Their participation in the integration activities of engineering platforms will engage them in partnerships across Europe, reinforcing the ability of the manufacturing infrastructure to achieve rapid, reliable progress from research results towards marketable products.

Traditionally, European products are associated with high quality, appealing design and cutting-edge technology The effectiveness of the Manu*future* research agenda in transforming industry will depend upon manufacturers' readiness to leverage these strengths, while adapting continuously to change in an open, fast-moving global industrial environment.

New products from new technologies

Developments in enabling technologies, such as innovative materials, nanotechnologies, ICT and mechatronics give almost limitless possibilities to develop new products or add functionality to existing product concepts. European industry must have access to these technologies and to the tools for incorporating them into product designs.

From products to product/services

The market increasingly demands products that are customised, yet available with short delivery times. It is essential that European companies be able to understand and satisfy the needs of customers, regardless of their geographical location. Consequently, the business focus must increasingly shift from designing and selling physical products, to supplying a system of products and services ('product/services' or 'extended products') that are jointly capable of fulfilling users' demands.

Product/services will offer greater satisfaction of customers' needs, reduce total life-cycle costs and environmental impacts, and avoid problems associated with the conventional buy-use-dispose products.

Innovating production

A fundamental concept of the Manu*future* vision is that of 'innovating production', which embraces new business models, new modes of industrial 'manufacturing engineering' and an ability to profit from ground-breaking manufacturing sciences and technologies.

Even the factories themselves are regarded as complex, long-lived products, operating with the latest technologies and adapting continuously to take account of customers' and market requirements. The 'virtual factory' of the future will manufacture in adaptable networks linking OEMs with value-chain partners (often SMEs) and suppliers of factory equipment/services selected according to needs at a given time. Its composition will not be limited by the presumption of physical co-location, nor by a need to maintain rigid long-term relationships.

In such a dynamic environment, entrepreneurial sprit will be a vital commodity. This has to be fostered by RTD and educational infrastructures that promote the exchange of ideas, the mobility of researchers, the shift towards multidisciplinary and the lifelong learning that will be essential to tomorrow's 'knowledge workers'.

Favourable climate

Reaching these objectives will depend on the implantation of supportive fiscal and legislative framework conditions at EU market scale. The realisation of such a favourable boundary relates to conditions developed at national and regional level.

A consensus of support for the Manu*future* vision will naturally enable the creation of a European Manufacturing Innovation and Research Area (EMIRA) as an integral part of the European Research Area. It will promote the interests of European manufacturing industry, take account of regional and national needs, promote participation to European Programmes (Framework Programmes, Eureka and other initiatives) and recognise Europe's wider role in the global RTDI network.