

SAME RESULTS AT THE INTEGRATED PROJECT OF THE MANUFACTURING VISIONS

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Abstract: *The ManVis project solved as sixth framework programme is giving an point of view to the concepts and fore-view to the European Economy. National partners from 22 Europeans nations will support the survey in their countries*

1. INTRODUCTION

Faculty of Mechanical Engineering of the Slovak University of Technology is participating in the project, which is solved as sixth framework programmed. In order to become the most competitive economy of the world the Lisbon documents have determinate strategies. In accord with these strategies the European commission have accept the ManVis project. The Department of the Manufacturing Systems, Faculty of Mechanical Engineering, Slovak University of Technology in Bratislava, is the national partner for the Slovak Republic

The aim of this paper is to give information about international project no. 507139 "Manufacturing Visions. Integrating perspectives into Pan-European Foresight (ManVis). Its aim was to accompany the ongoing policy process of enhancing European competitiveness in manufacturing industries and to include views of European manufacturing experts collected through a Delphi-survey in 22 countries as well as views of stakeholders and overseas experts collected at workshops and in interviews..

The project is creating a database of 3112 experts from 22 countries and top-ranking research institutes from all around the world. These database is forming and "virtual R&S institute". It is supposed that 70 Slovak experts are going to participate at the "virtual institute".

The results and their impacts on industry and policy making were discussed on the ManVis Final Conference "European Manufacturing – Quo Vadis?" which took place October 24th/25th, 2005 in Bled/Slovenia.

The project coordinator is the Fraunhofer Institute Systems and Innovation Research. The Lead Partners are:

- Ascamm Foundation
- Fundación Observatorio De Prospectiva Tecnología Industrial
- University of Lodz, Department of Entrepreneurship and Industrial Policy
- University of Cambridge, Institute for Manufacturing

- Institute for Prospective Technological Studies Industrial Research and Development Corporation
- Institute for Strategy Technology and Policy STB

For every sector of the economy were specified statements of development. Research had been executed to determinate the statements.

There have been defined 101 vision statements in 11 sections.

2. MANVIS REPORTS

ManVis Report No. 1:

The status of the project, questions and issues which may arise from ManVis for the Manufuture process, July 2004

ManVis Report No. 2:

Preliminary Results from the 1st Round of the ManVis Delphi Survey, April 2005

ManVis Report No. 3:

Delphi-Interpretation Report, October 2005

ManVis Report No. 4:

Overseas views: International perspectives on the future of manufacturing, December 2005

ManVis Report No. 5

Scenario-Report, September 2005

3. AIM OF THE MANVIS PROJECT

The project was launched in response to the following factors:

- Results from previous foresight activities and empirical survey indicated that
- manufacturing in Europe needs to strengthen its innovation capacity and to get
- into a more proactive position in the face of the increasing pace of product innovation
- Increasing debate on relocation of manufacturing outside Europe
- Commission activities in support of manufacturing (Manufacturing Action Plan MATAP)
- Need to define research priorities for NMP in FP7.

Powerful visions do neither appear all of a sudden nor can they be declared by state authorities. They cannot be based on single perspectives or specialised approaches. However, industry, government, and other stakeholders need a strong vision on the future of the European economy based on an assessment of possible alternatives in order to develop their strategies. For this reason, a new knowledge community had to be created which is concerned with the future of manufacturing and includes as many actors and stakeholders as possible from Europe and all over the world.

As a tool for initiating future-oriented thinking and to promote the involvement of diverse perspectives, a pan-European Delphi survey dealing with manufacturing issues was launched. The Delphi methodology is a long-established tool for forecasting future technological (and other) developments. Foresight activities are a systematic effort of supporting policy by setting priorities in science and technology policy thereby stimulating

the communication between actors in innovation systems. Delphi studies have often been used as a tool to collect a wide range of opinions as a base for further panel debates (e.g. in the U.K. Foresight programme or the German Delphi Survey 1998). The advantage of the approach is its ability to collect a large amount of information in a structured form.

In several workshops, manufacturing experts from all over Europe and overseas contributed to the shaping of the survey. In order to avoid an isolated view of Europe's manufacturing issues, experts from overseas were also involved in the development of the statements of the Delphi questionnaire and commented on the results of the survey (cf. ManVis Report No. 4 – International Strand). Emphasising and elaborating the demand side perspective on manufacturing was an important aim of this project. Because of this, consumers and other societal groups concerned with manufacturing discussed the findings of the Delphi survey. In parallel to the Delphi activities, scenarios on the development of the demand side of manufacturing were being elaborated (cf. ManVis Report No. 5 – Stakeholder Strand, Scenario Report). A detailed description of the methodology and database is presented in the Annex.

The ManVis Delphi survey was launched in 22 European countries. A core team of researchers from eight European institutes had conceptualised and conducted the Delphi survey. All these institutes possess a solid background in research on manufacturing foresight issues, each of them focussing on particular aspects needed for a holistic view on manufacturing. National partners from 22 European nations supported the survey in their countries. With their participation in several workshops, approximately 280 manufacturing experts from Europe and overseas with backgrounds of the research community or the industry contributed to the shaping of the survey. In addition, a number of policy actors participated in the discussions (cf. ManVis Report No 1 – The Status of the Project).

As a result, the Delphi survey covered developments in all relevant aspects of manufacturing from technologies via organisational concerns to questions of the working environment. Further, enabling technologies for developments in all these areas were examined. New demands for skills and competencies were deduced from the results, while sustainability issues were a special focus throughout the whole project. Some statements in the Delphi questionnaire dealt with sector specific developments such as Transport, Machinery, or Traditional Products (the questionnaire is available in ManVis Report No. 1).

The results of the ManVis Delphi survey should be

- integrated into the long-term planning of the European research funding for manufacturing,
- included in the debate on the Manufuture Technology Platform which is currently
- being developed (www.manufuture.org), and
- published and dispersed among potential users in government, industry and the general public.

The present report presents the elaborated analysis of the ManVis Delphi survey results, thus, providing a broad basis for public discussion on the future of manufacturing in Europe. It constitutes strategic decisions and an improved self-understanding for the European Manufacturing Industry, European policy, and stakeholders from Europe and beyond.

In all of the addressed fields of interest, experts were asked to assess up to 101 statements regarding their individual importance for the European Manufacturing Industry of the future. Additionally, they provided a time frame for the realisation of each of these statements and the potential effects the statement might have as well as barriers it might be confronted with. The analysis also covers characteristics of the experts themselves,

like their self-assessment of expertise on each statement or differences in assessment by gender, age or occupation. Moreover, differences in assessment by country and by organisation (i.e. type of organisation, size) are examined systematically, in order to provide a solid foundation for informed decision-making on actions towards sustainable and competitive manufacturing in Europe, and for European manufacturing industries to learn about and face the long-term challenges of changing markets and frameworks of the future.

4. IMMINENT TECHNOLOGICAL RESEARCH NEEDS

Paving the way for new technologies in manufacturing

- roadmapping and foresight on manufacturing relevance of nano- and (white) bio-technology
- measurement, workplace safety for nano-technology and bio-technology
- applied basic research for white bio technology and nano-manufacturing

Industrialising technologies

- processing and manipulation of new materials
- incorporating smart materials into components for process technologies
- combining new materials with micro electrical mechanical systems (adaptronic)
- exploring new modelling knowledge and high power computing for simulation of product development, of material behaviour, and of virtual experiments

Exploiting technology advantages

- micro-systems in machine tools and products
- intelligent mechatronic systems for automation and robotics (e.g. self adapting components)
- new automation technologies using advanced human-machine interaction by considering diverse workers capabilities
- ICT-tools for traditional sectors

Technologies for customising products/services

- Tagging and labeling technologies
- Approaches towards product customisation via software or electronic components that allow for maximum flexibility and user integration
- Technologies and concepts facilitating user integration into innovation processes
- Technologies and concepts facilitating personalisation and build to order concepts
- SME appropriate tools for networks and logistics

5. CONCLUSION

The final project results will

- be fed into the long-term planning of the European research funding for manufacturing
- be integrated in the debate on the “Manufacturing Technology Action Plan” which is currently being developed by the European Commission (www.manufuture.org)
- be published and disseminated to potential users in government, industry and the general public
- be presented and discussed at the final “Future of Manufacturing” conference
- be made available for developing manufacturing strategies on a company, sector or national level

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