

Manufacture 2009 – Implementation of a sustainable European manufacturing industry

Gothenburg, Sweden, 20 November – 1 December 2009

The Manufacture 2009 conference, held in Gothenburg, Sweden, on 30 November-1 December, is the seventh in a series charting progress since the formal launch of the European manufacturing industry platform in 2003. Focussing on sustainability as an economic imperative, this year's event culminated in the headline announcement that Manufacture is 'going global'.

Held under the auspices of the Swedish Presidency of the European Commission, [Manufacture 2009](#)¹ was the largest to date in this seven-year conference series, with an audience of around 500 delegates. In a welcoming address, Charlotte Brogren, Director General of the national Governmental Agency for Innovation Systems (VINNOVA) outlined the challenges posed by current economic turmoil, climate change and an ageing population, and underlined the need for sustainability in manufacturing as an essential part of the solution.

Sustainability has been described by Manufacture Vice-Chairman Professor Francesco Jovane as having three inter-related dimensions: economic, ecological and social, all of which were explored in the ensuing two days of plenary sessions and workshops.



The economy: preparing for upturn

Heinrich Flegel, Chairman of the Manufacture High Level Group and Member of the Daimler Supervisory Board, maintained that the crisis caused by the sudden deflation of the global economic bubble places

¹ Link to: <http://www.manufacture2009.eu/template.asp>

new emphasis on manufacturing as the real basis of eventual recovery. While acknowledging the necessity for urgent actions such as cost-cutting and the securing of liquidity, he insists that these should not be allowed to result in a loss of the key skills that will be necessary to underpin the longer-term emergence of Europe as a strong player on the world stage.

Figures published recently by Eurostat for the EU-27 show that manufacturing in 2005 was directly responsible for 34.6 million jobs (27.3% of the workforce) and gave rise to 70 million more in related services. Total turnover from these activities was €6.3 billion (51% of EU gross domestic product), largely in six key sectors: transport, electrical/optical equipment, food/beverages, chemicals, basic metals/metal products, and machinery/equipment. Manufacturing also produced the greatest added value, at over €1.6 billion.

However, after a sustained period of growth up to 2008, many companies have now seen massive downturns and are fighting for survival. With emerging indicators that the bottom has been reached, Flegel urges that the rebuilding must commence as quickly as possible.

Competitive sustainable manufacturing (CSM) is capable of generating wealth, jobs and a better quality of life. It is also important to the environment, to the development of healthy SMEs and to the strength of the service economy. But success in this field will depend on focusing available resources on Europe's strengths, and on taking timely actions to pave the way for a prosperous future.

Strong foundation

Europe still has a leading position in world manufacturing, which must be strengthened and enlarged. In the face of global competition from both low-wage and high-tech rivals, transformation of EU industry can only be achieved through knowledge-based approaches integrating advanced technologies and new business models to deliver products and services of higher added value. Equally vital is to educate and the nurture new talent capable of sustaining the momentum.

“As Charles Darwin said: ‘It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change’.”

Heinrich Flegel, Daimler

In its Strategic Research Agenda and Vision 2020, Manufacture has already shown the way. Its [‘Factories of the Future’ \(FoF\)²](#) public-private partnership (PPP) initiative, announced in 2008 as part of the [Commission’s economic recovery plan³](#), represents another major step forward in Europe-wide cooperation.

SME stimulation is vital

“The Manufacture platform is the cornerstone of the Factories of the Future PPP response to economic crisis,” declares Javier Eguren, Managing Director of Spanish SME milling machinery manufacture CorreaAnayac and Vice-president of CECIMO (the association of European machine tool manufacturers).

² Link to: http://ec.europa.eu/research/industrial_technologies/pdf/ppp-factories-of-the-future-strategic-multiannual-roadmap-info-day.pdf

³ Link to: http://ec.europa.eu/commission_barroso/president/pdf/Comm_20081126.pdf

“The challenge for Europe lies in simultaneously addressing competitiveness, profitability and economic sustainability. This will only be achieved through innovation, which can no longer be restricted to the introduction of new technologies if it is also to meet the social and environmental criteria for sustainability.

“Innovation must be driven throughout whole organisations by new business models embracing value proposals, management methods, organisational structures that unleash employees’ contributions, and supply chain management. The regulatory authorities at both national and European levels must also innovate to adjust to the needs of the manufacturing companies – including access to finance and credit, especially for SMEs; free trade agreements; and protection of intellectual property rights.”

To help its customers develop by achieving maximum added value, the Nicholas Correa Group decided to adopt environmental innovation as its product differentiation strategy, taking the first steps in eco-design in 2002. Its aim was to provide energy- and materials-saving machines, manufactured using clean and non-polluting processes. At the same time, these should allow users to generate lower quantities of hazardous waste, consume smaller quantities of oil and coolants, and give operators a healthy, noise- and emissions-free environment.

In 2005, the company assumed the lead of a four-year research project on eco-machines, part of the Spanish CENIT initiative on advanced technologies for manufacturing equipment and processes. A first application of the findings to selected machines resulted in operating energy savings of 15-20%, as well as making it possible to meet a number of the other objectives. Certification under the [International EPD system](#)⁴ gave independent verification of these results, bringing recognition through national and regional design awards in 2006.

“Now we are extending eco-design across our whole range,” says Eguren. “We are also seeing more opportunities for environmental improvements through new energy consumption models, new materials, greener processes and the replacement of mechanical components by electronics or software.

“Traditionally, our customer companies need to reach 80% of their capacity before they can afford to invest in new equipment to provide additional capacity. In the present circumstances, this could take too long to achieve.

“Closer cooperation between research and industry is evidently crucial in finding a solution to the problems, but this can be particularly difficult for SMEs. European programmes must be made more attractive and open to them, by simplifying the rules, increasing awareness and stimulating smaller-scale SME projects. This would allow the small businesses that are the main actors in European industrial production and employment to prepare for a strong resurgence.”

Social and human sustainability

Swedish commercial vehicle constructor Scania provides an outstanding example of adaptation to the global changes now taking place. President and Chief Executive Officer Leif Östling confirms the importance of learning lessons from the past and remaining open to new ideas.

“It is important to realise that a company consists of people, and that our customers are also individual people, each with a personal perception of what they expect from us and our products,” he said. “It is the interaction between these two groups – employees and customers – that creates those products

⁴ Link to: <http://www.environdec.com/pageld.asp>

and the perceived value of the services we provide. People management is therefore probably the most important aspect of sustainability.

“Within a manufacturing business, there is a flow of activities from raw materials through to finished products and the associated services. How you organise those activities, monitor them and get people to work around them is critical to the success of the organisation and the motivation of those involved.

Traditional management in the 1950s and 60s involved top-down decisions communicated via a hierarchical structure to the shop floor, with a distinct distance between the planners and the doers. Adding more ICT systems to manage the managers simply resulted in even greater chaos.”

Management by teaching

Östling admits that Scania had such a ‘management by results’ orientation until the early ‘90’s, and that it resulted in much wastage and high absenteeism among the workforce. Then, learning from Toyota, he turned to a more holistic leadership style, which entails making use of information gathered from across the work flow to set protocols that are understood by those actually involved in interpreting and reacting to it.

This ‘management by teaching’ method concentrates strongly on the elimination of waste. While some non-value-adding activities may be necessary, Östling estimates that as much as 70% of the effort expended in Scania was once wasted in terms of what the customer was actually paying for.

Waiting time between stations in the work-flow was the major culprit in this respect. Making personnel from the lowest levels aware of the broader picture has done much to improve the efficiency. Since 1996, standardised production processes have been installed, training has assumed a much higher priority, and regular workplace meetings enable the workforce to contribute their own ideas for improvement. Throughout all, the key message is that the customer must be seen as the top priority.

“We want people to keep their brains turned on throughout the working day. When well trained, these are worth more than millions of PCs.”

Leif Östling, Scania

The outcome has been that employees feel more empowered and motivated; absenteeism and the turnover of human resources have fallen dramatically, there is less waste, and quality levels are higher.

Similar principles are applied to research and development, where regular meetings track the progress of projects and identify the reasons for any bottlenecks. In the open company culture, people readily take responsibility for their own actions, making it much easier to solve any arising problems. This attitude also extends to procurement policy and to relations with suppliers, thus facilitating the move to just-in-time production.

Overall costs have been cut by 30% and productivity per employee has more than doubled (and could double again post-crisis, Östling believes).

Inevitably, Scandia has been hard hit by the financial crash; but in typically pragmatic fashion, Östling has sought to retain a strong core team of permanent employees by adjusting shift times and negotiating a four-day working week, with corresponding pay reductions for all, including himself.

Two-way process

Stefan Löfven, President of the Swedish Industrial and Metalworkers Union, is a prominent negotiator on labour relations with companies such as Scania. He considers that good working conditions for industrial production are essential to any strategy for the successful development of Europe as a world-leading region.

“How industry reacts with the rest of society is a key part of the economic/ecological/social triangle of sustainability,” Löfven believes. “Although industry today employs a smaller proportion of the total workforce, it is increasing its role in the total economy. Yet the level of interaction is often regrettably weak, even among those responsible for policy-making.”

Löfven sees no inevitable reason for a decline of the industrial sector comparable to that suffered by agriculture over the past century. Given the fact that there will always be a demand for goods, and that new markets are emerging in China, India, South America – and eventually Africa – there is enormous potential for future growth in manufacturing. European industry, especially, could thus make a big contribution to solving both the welfare and climate issues.

Although trades union have been seen in the past as obstacles to progress, this is not necessarily the case in modern times. “Bargaining is indispensable for the equitable sharing of wealth between different social groups,” Löfven observes. “Companies need employees, and the unions need companies – so we too are interested in contributing to the health and competitiveness of industry.”

“As businesses begin to adopt the Factory of the Future principles, the historic mismanagement of people is no longer acceptable. Workers must be allowed to make the most of their abilities, and the employers should invest in training and motivation to support the recruitment of new young generations to manufacturing. If we play it right, the future can be bright.”

The ecological dimension

Most aspects of research promoting CSM will have positive environmental impacts, but the greatest returns are likely to come from improvements in resource efficiency and energy efficiency. Presentations by two conference speakers showed how similar principles can be applied at markedly different scales.

Not only technology

The [Lund declaration](#)⁵ of July 2009 identifies climate change as one of the ‘Grand Challenges’ to be addressed by research in Europe, notes Peter Post, speaking on behalf of €1.7 billion p.a. automation components supplier Festo. Energy saving and the consequent reduction in greenhouse gases are constantly quoted as the most urgent actions. Technology alone does not provide all the answers, yet many readily applicable remedies remain surprisingly under-utilised.

The FoF multiannual roadmap states that up to 20% of energy costs can be cut by monitoring production equipment, resource usage and new maintenance strategies; replacing out of date equipment; configuring systems according to differentiated processing needs; buying multi-functional devices; and by simply ensuring equipment is turned off after use. Today, such elementary measures are often neglected, for quoted reasons such as lack of knowledge, lack of investment capital or a preoccupation with other priorities.

⁵ Link to: http://www.se2009.eu/polopoly_fs/1.8460!menu/standard/file/lund_declaration_final_version_9_july.pdf

With support from German national funding programmes, the family-owned Festo has itself gained considerable benefit by cutting waste in its own processes, and by developing more energy-efficient solutions for its customers.

Automation users could recoup up to 20% of their investment costs per year, simply by optimising the layout of their installations with the aid of a simulation system designed by Festo. The company also produces a range of innovative bio-inspired tools that provide still more economies by combining versatility with much reduced power demand.

Leading by example, Festo has adopted an active energy-saving policy by incorporating solar power generation and combined heat/power systems in its headquarters site at Rohrbach in Germany. This has resulted in a 38% reduction in energy consumption, saving €366 000 annually and cutting CO₂ emission by 3 759 te.

Post concludes that industry does not set a high priority on ecological sustainability. He nevertheless believes that, through cooperation with academia and the public administrations in initiatives such as FoF, the lack of awareness and other underlying problems can be tackled in a way that is appropriate to the urgency of the topic.

Sustainability on a multinational scale

For bearings supplier and lubrication specialist SKF Group, a major part of its global business is based on enabling customers to use less energy by reducing frictional losses in all kinds of machinery and equipment. "Consequently, environmental matters are a central concern for us," says President and CEO Tom Johnstone. "We introduced our first environmental policy around 20 years ago, and have continued to pursue improvements since that time – setting ambitious goals in areas such as process cleanliness, solvent use, water consumption and greenhouse gas emissions.

"In 2002, we undertook to cut our CO₂ output by 5% p.a. relative to our production volumes, And, having achieved that target for five years, set the bar higher in 2006 with a commitment to 5% annual reductions in absolute terms."

This programme evolved into the more comprehensive 'SKF Care' concept, which is founded on four pillars: business care, environment care, employee care and community care. "The new description made it easier for us to explain sustainability to our employees around the world, and thus to secure their engagement," says Johnstone. "Furthermore, it was important that all four pillars should be strong, rather than focusing simply on sustainability in the environmental context."

Under the SKF Care umbrella, a strategy known as 'BeyondZero' links the business and environmental care aspects. It aims simultaneously to minimise the negative impacts of the company's operations by all possible means, and to bring customers the products, services and solutions that enable them to achieve reductions that will more than outweigh the in-house negatives.

Over the two years 2007-8, SKF reduced its emissions by 11%, at a time when production increased by the same amount. More recently, it is placing greater emphasis on life cycle analysis. This entails working closely with external partners such as raw materials suppliers, component producers and logistics contractors – as well as making customers more aware of the energy they consume and where savings can be made.

"This year, SKF was nominated as the world's top engineering company in the [Dow Jones Sustainability Indexes \(DJSI\)](#)⁶," Johnstone notes. "The quest for sustainability is an endless journey, but I hope we can be seen as instrumental in creating a climate for change."

Drawing on global experience

New phase for Manufuture

"The 2009 conference marks the start of a second phase in the life of Manufuture," announced Vice-Chairman Francesco Jovane. "Building on the solid achievements of its early years, the Platform will now move forward to work on new strategic initiatives to foster and support CSM at a global level."

CSM implies the transformation of industry to a knowledge based activity producing products/services of high added value through innovative processes and business models, and with the support of an underlying research, development and innovation (RTD&I) system, Jovane explains. Now, the RTDI system itself needs to undergo major transformation to achieve competitiveness and sustainability in the globalised market. This, in turn, necessitates wider global cooperation.

CSM is already moving towards implementation at rates that differ between the emerging and advanced countries. Members of Manufuture joined forces with the International Academy for Production Engineering (CIRP) to conduct a two-year analysis of the situation in Europe, USA, China and Japan.

The conclusions indicate a good level of commitment at national level, and suggest that there is a firm foundation for a move towards CSM globalisation. There will be a strong need for global cooperation and governance, for which current conditions are favourable to conceiving and implementing appropriate strategic responses.

CIRP has established a multi-country task force on 'Global Manufacturing Strategies', which will pursue active cooperation with the relevant national and international organisations. Manufuture will collaborate with CIRP in developing a strategic global initiative.

Beyond mass customisation

With particular reference to the auto industry, Professor Jun Ni, University of Michigan, traced the progress in manufacturing from one-off craft production, through mass production to mass customisation – and on to a more recently emerging model: personalised production.

Personalised production could sustain a strong automotive sector in the US and Europe, as well as stimulating new SME industries, Ni claims. US graduates expect five times the salary of those from countries like China and India; this can only be justified by correspondingly high added value in the products they can produce.

Customers may be prepared to pay a premium for exclusivity, but the range of truly personalised products currently available is strictly limited:

- Mass production typically offers a basic platform made in large volumes, with a small number of customer-selectable fixed options (i.e. design-make-sell).

⁶ Link to: <http://www.sustainability-index.com/>

- In mass customisation, products are manufactured to order in smaller volumes, and with a wider choice of options (design-sell-make).
- With personalised production, the customer can be involved from the design stage through to final manufacture – e.g. a modular fitted kitchen supplied for DIY assembly.

In the automotive context, customer choices would be bounded by considerations of practicality and safety, but with suitably user-friendly CAD interfaces, interiors could be adapted to accommodate a variety of finishes and special purpose modules from many different suppliers to meet the demands of the mobile worker, the sportsman, the pet lover, the large family...

To reduce costs by allowing manufacturing decisions to be taken at the latest possible moment, production facilities must be designed to permit reconfigurable manufacturing with rapid and flexible response to customers' inputs. For some applications, this could be a series of carousels as used in the shoe industry, rather than the rigid serial lines of the Henry Ford era.

There are hurdles to be overcome, but this kind of factory of the future might hold the key to retaining manufacturing in the high-wage economies.

Value creation in a sustainable society

According to University of Tokyo's Professor Kanji Uedo, the value of an artefact is not determined solely by its functionality. Globalisation brings two contrasting effects: on the one hand price competition leads to a commoditisation of products; on the other, value competition favours service-oriented manufacturing. At the same time, information networking, especially via electronic channels, is changing the values and lifestyle aspirations of consumers along opposing routes of diversification and homogenisation.

Uedo defines sustainable society as one in which both the overall societal purpose and individual happiness can be achieved concurrently through decision-making among various stakeholders. In fact, today's social complexity and instability means that maintaining sustainability often creates a dilemma between the values of society as a whole and those of individuals.

An examination of the past shows that the basis for value judgements has changed through the ages. Historically, values have been studied from the philosophical, ethical, economic, psychological, and technological viewpoints: the current concern with environmental value is a newcomer dating back only 40 years.

Establishing a value creation model for sustainable products and services based on new knowledge requires a synthetic approach, realised through dynamic interaction among decision-making agents that have various goals and values. For this purpose, more attention must be paid to the social mechanisms of values, such as network externality, social dilemma, public goods, and lifestyles.

In the real world, manufacturing industries must now consider how to expand their activities into service businesses to increase the value of their products. In contrast, service industries should seek to increase their productivity, because many existing services are thought to be provided less efficiently than manufactured products. The integration of both is needed for value creation in a sustainable society.

Co-creation, whereby all stakeholders collaborate in reaching an effective solution, represents a promising concept to integrate the values of industries and those of consumers in situations where the

objective of the product/service receiver is uncertain even to him/herself, making inputs from both provider and receiver inseparable.

In parallel, the concept of Biological Manufacturing Systems (BMS) has emerged as a new generation of [Intelligent Manufacturing Systems \(IMS\)](#)⁷, aiming to deal with unpredictable changes in the external and internal environments during the whole product life cycle, based on biologically-inspired ideas such as self-recognition, self-organisation, learning and evolution.

Together, these processes could make it feasible to combine minimal manufacturing with a maximum service content, to the benefit of both citizens and society.

⁷ Link to: <http://www.ims.org/>

Investment strategy for a changing world market

“Even in times of crisis, investment in R&D – especially for product development – is essential to remain competitive by continuing to add customer value, ” states Ronnie Leten, President and CEO of Atlas Copco, a leading worldwide supplier of industrial air compressors and gas equipment.

“Like so many companies, Atlas Copco has been battered by the downturn. Our overall turnover has declined by some 24%. For equipment sales alone, the figure is much greater, but we have been buoyed up to a large degree by our income from after-care.

“Over recent years, we have also seen significant shifts in the pattern of sales. In 2002, Europe accounted for 45% of our business, whereas today it amounts to just 36%, while 25% of sales are now to Asia. Over this period, we have seen a growth rate of 50% in Asia and North America, whereas in South America, Africa and Asia, it has exceeded 200%. And in the first ten months of 2009, China has become our largest market.

“Despite these changes, we have not cut spending on product development, which remains at 2.5% of revenue. But the shift has an effect on how we approach product development. The mature markets place an emphasis on environmental performance, life-cycle costs and reliability; whereas the developing world is less environmentally concerned and more price-conscious. Each presents its own demands, and the fact the same value proposition cannot work for both remains a challenge for us.”

The most obvious way to increase value for all customers is to look for potential savings in energy usage, which represents 70-80% of the life-cycle cost of compressors. More key questions are:

- How can the company shorten time to market, even in a period of declining demand. Should it invest in stock or capability?
- To what extent is it possible to increase flexibility by modular design, without sacrificing product differentiation?

Perhaps the most underestimated issue, according to Leten, is that of management agility. If the reaction to massive downturn is to close facilities and dismiss people, how will it be possible to restart when the economy recovers?

Product development must continue, in order to cut costs while demonstrating added value to customers, thus increasing sales and generating the capital for ongoing investment. Such development is also necessary to stay ahead of emerging trends and meet increasing regulation.

‘Atlas Copco is already actively applying the principles of CSM, as advocated by the Manufuture Platform,’ Leten declares. “Only by continuing to work together, combining the competencies of all the stakeholders – industry, academia, local governments and the European Community – in initiatives such as Factories of the Future, can we emerge from the crisis in a position of strength.”

How do we move ahead?

Implementation of sustainable factories of the future

“The last year has been an exciting time for Manufuture,” said Herbert von Bose, Director of Industrial Technologies at the EC’s Research DG. “At the time of the 2008 conference in St Etienne, France, the Commission’s economic recovery plan had just been announced. As the Commissioner remarked at

the time, the intention was not to focus solely on firefighting; but also to be looking ahead to identify fields for future R&D and innovation to make our industry fit for the period after the crisis.

“Manufacturing was chosen as an area worthy of special support, along with construction and the automotive sector, because of its importance for employment in Europe and the potential to have a ‘greening’ effect on industry. We were given access to very substantial resources: €600 million from the EU, provided that industry would be prepared to invest an equivalent amount.” (The public funding was subsequently increased by the contribution of a further €45 million from the Information Society DG (Infso).

“The immediate need was for the creation of a structure to implement this PPP, with the earliest possible start-up date. In the absence of any alternative, it was necessary to take initial action within the rules of FP7. Despite the difficulties in launching a new Call for Proposals within a short timeframe, especially when this requires cooperation between two separate DGs, this was accomplished by July 2009. The Manufuture family did sterling work by being able to speak with one voice, and by facilitating the integration of the more dispersed ICT interest groups. We must ensure this solidarity is not allowed to fragment.”

“At this time, the Call is closed, negotiations are underway, and the first projects are expected to commence in Spring 2010 – which is very rapid by European standards.”

Introducing a new structure is proving more problematic, von Bose acknowledges. The Joint Technology Initiative (JTI) format introduced at the start of FP7 proved rather difficult to implement. EC President Manuel Barroso has mandated the Research and Infso Commissioners to propose a better solution for PPP implementation. A report is due to be published by end-2009, taking full account of industry views.

Synergies with Member States and global community

The Member States and regions can also play a valuable part by participating in the [ERA-NET](#)⁸ scheme. A first manufacturing ERA-NET – MANUNET – is now drawing to a close, and a Call has been launched for its successor. A strong and coordinated representation of Manufuture at national level is highly desirable.

International cooperation with the wider world is another useful tool, which to date has been something of a ‘sleeping beauty’. Collaboration with other industrialised nations already takes place through IMS. Europe takes over the Chair of this organisation for 30 months from May 2010, and is keen to make it a success as part of the globalisation of Manufuture. The Commission has already invested in a support action to explore what might be done over the next three years and what might be the form of future collaboration.

It is up to industry to set the agenda, both in the international arena and in the PPPs, concentrating on areas that can create ‘win-win’ outcomes for everyone involved. A new JTI structure should be in place by the start of FP8, if not sooner. Together with joint calls by the Member States, this can provide the impetus for initiatives providing sustainable job creation and a competitive economy, while fulfilling Europe’s societal and environmental expectations.

⁸ Link to: http://ec.europa.eu/research/fp6/index_en.cfm?p=9_eranet

Factories of the Future – making it happen

“A year ago, the Commission’s proposal to commit public funding to a PPP on manufacturing presented the Manufature community with a great chance to participate in the European plan for recovery from the financial crisis,” recalls Massimo Mattucci, Chairman of EFFRA and Executive Vice-President, Comau Group. “We responded rapidly by creating EFFRA – the European Factories of the Future Research Association – to determine how we could best provide the private contribution to that partnership.”

EFFRA is a privately financed, non-profit organisation, led by industry and with a large industrial participation, but also open to universities, research institutions and other interested parties. Its goal is to pool the resources of the members, numbering around 100, to convince industry to invest in technology and innovation for the future of EU manufacturing.

“Because the crisis places severe restraints on investment possibilities, it was vital for us to choose where to concentrate our limited resources in order to get the best possible return on investment in terms of competitiveness and job creation,” Mattucci says. “We collected views and recommendations from around the EU to guide the framing of the First 2009 Call. I consider this to have been quite successful, but hope the second Call will be even more effective in meeting industry needs revealed by our on-going intelligence gathering.

“EFFRA will continue to work in the same spirit, with priorities based on openness, fairness and transparency. We shall also maintain a focus on enabling technologies and multi-sectoral solutions that will enable Europe to grow stronger in manufacturing, and motivate people to take up careers in our factories.

“In order to do this, we have formed an Industrial Research Advisory Group (IRAG) to pursue discussions with the public authority on the priorities to which our private funding will be allocated. In collaboration with the Commission, we have drawn up a roadmap for continuing consultation. Now we are at the stage of looking for comments and proposals, based on the roadmap, for consideration in preparing for the second Call in July 2010.”

Technological programmes cannot be cannot be expected to limit themselves to sustainability issues alone, Mattucci cautions, but these will certainly receive prominent attention. The goal is to achieve environment-friendly, economically sustainable and socially empowering production.

IRAG’s preliminary sustainable manufacturing recommendations for adoption in 2011, subject to agreement with the Commission, include:

- highly efficient and zero-emission processes;
- alternatives to energy-intensive processes;
- methodology and decision-support tools for process sustainability evaluation;
- adaptive and responsive human-machine interfaces in both the engineering and the factory environments.

“More priorities have been identified, but the constraints of the current economic climate mean that these will have to be tackled over a longer term,” Mattucci adds. “Meanwhile, I would like to thank the Commission for its excellent preparatory work, Industry is ready to invest in the partnership, which will not only allow us to gain from the injection of public money, but also to structure our own research activities in a better way. Some of our members would like to see faster progress, but we recognise that we must work within the available framework – although we shall continue to look for ways to

accelerate the process. The early results are there; the cooperation is visible; and industry is grateful for the opportunity it has been given."