

EPSRC'S Response to the recommendations of the Theme Day on Manufacturing October 2010

Introduction

The Theme Day took place in April 2010 when a panel of international academics and key UK industrialists looked at a snapshot of the UK academic portfolio of manufacturing research. The objectives of the theme day were to:

- Internationally benchmark the strength of EPSRC academic manufacturing research.
- Assess the user-led and knowledge exchange aspects of the funding and indicate how well these are contributing towards economic impact.
- Assess and identify any limitations in the current funding landscape and approach, highlight gaps and provide recommendations to maximise outcomes.

This Theme Day was part of broader evidence-gathering regarding the EPSRC Manufacturing portfolio and the findings are one of a number of important inputs to the development of EPSRC's future Delivery Plan that will set out how EPSRC will achieve the goals set out in the EPSRC Strategic Plan published in March 2010. It was also a key input into the scoping of the 2010 call for EPSRC Centres for Innovative Manufacturing.

Response to recommendations

The Theme Day Panel made 10 recommendations. Our responses to those recommendations are given below, although implementation will depend in part on the EPSRC's budget for the next four years and any constraints associated with the Government's Comprehensive Spending Review.

EPSRC Action Plan in Response to the Manufacturing Research Theme Day

1. The over-arching recommendation is that as Manufacturing research is an inherently collaborative and multidisciplinary activity, it is necessary to ensure

that the research groups have the right mix of expertise to be able to tackle the research challenges.

Response

EPSRC fully supports this recommendation.

Our approach is to foster “best-with-best” collaboration in order to create world-leading multidisciplinary groups. For example, the new EPSRC Centres for Innovative Manufacturing involve significant multi-institutional and multi-departmental consortia. These new Centres will provide capability to address major research challenges and operate collectively as a national asset. EPSRC will maintain this focus on collaboration and critical mass over the next Delivery Plan. We will also work with other research sponsors where appropriate, to foster multidisciplinary communities and networks, for example the ESRC, BBSRC and TSB.

2. EPSRC should look at different models for assessing and funding adventurous research.

Response

EPSRC agrees.

Transformative Research is central to EPSRC strategy, and this will continue for the foreseeable future. For example, in the current Delivery Plan we have developed a number of different models to encourage Transformative Research (e.g. the Big Pitch, IDEAS Factory.) In the next Delivery Plan we envisage a major focus around “Frontier Manufacturing”, in order to develop the novel, creative and disruptive approaches that are likely to underpin future industrial competitiveness.

Some of the specific ideas that we will explore for manufacturing;

- Greater focus on horizon scanning and competitor analysis in order to track global developments and the emergence of new approaches
- Further development of the Big Pitch concept and more widespread use of stage-gating to progress breakthrough research.
- Deeper dialogue with industry and Strategic Partners about future challenges
- Interactive and multidisciplinary approaches to ideas generation, through extension of the IDEAS Factory Sandpits.

Please also see the response to point 6.

3. Manufacturing operations management research is a key component for successful portfolio in Manufacturing Research; however, this area needs attention to ensure that it is delivering.

Response

EPSRC acknowledges the concerns of the Panel about the strength of operations management research. This aligns with evidence from other sources, for example peer review outcomes.

EPSRC believes the academic community in this field has an obligation to articulate its unique contribution – both in scholastic and economic terms. The significance of research in this area is dependent upon translation (i.e. the effective application of research by users) as well as academic esteem (through new insights, approaches and methodologies). EPSRC will also engage with the academic community, in order to identify those research challenges that will drive the long term future of the subject.

4. Innovation is required in the creation of new business models in many areas where manufacturing technologies and designs are being developed, if these are to succeed in creating new market opportunities. It is vital that this work is carried out concurrently in simulation and design and in systems and operations modelling if the UK is to maximise its return on investment in engineering (management) research. To do this, EPSRC & the manufacturing community need to build even stronger links with leading business schools that have a focus and capability in engineering and technology.

Response

EPSRC recognises that innovation requires collaboration with many disciplines including the social and economic sciences.

We accept that the manufacturing research community need to do more to build the necessary links with other potential research communities, including the relevant expertise within Business Schools. EPSRC will continue to work with other stakeholders to foster innovation within the manufacturing sector; this could include ESRC, BBSRC and the TSB.

5. The EPSRC portfolio should include a balance of projects of different sizes and scopes, and develop appropriate associated metrics.

Response

EPSRC accepts the need for a balanced portfolio.

We have received feedback from various advisory bodies and stakeholders concerning the overall balance within the manufacturing portfolio not only in terms of size and scope but also in terms of our support within our remit across the value chain. Over the next Delivery Plan we will maintain a balance of support for core capabilities, for “Frontier Manufacturing”, and for challenge-led and business-inspired research. We will also invest at different scales – for example in centres, projects and people. We will give particular attention to manufacturing leadership – both in support of current research leaders, but also to develop those with potential as future leaders.

EPSRC Centres will be required to balance their own portfolio (eg between speculative, user-led and translational activity), and secure funding from a number of sponsors in order to ensure “pathways to impact”. Metrics and review will be appropriate to each Centre and reflect achievement across the value chain from discovery through to impact.

We will regularly assess our portfolio and strategies to ensure these are appropriate to our mission.

6. The portfolio needed to include more work on disruptive technologies that were high risk but could potentially have high pay-back.

Response

EPSRC accepts this point.

Adventurous and creative research will be an essential part of the next EPSRC Delivery Plan. High risk, high payback research was specifically highlighted in the recent call for EPSRC Centres for Innovative Manufacturing.

We will give priority to Frontier Manufacturing - new approaches which will deliver transformative technologies (potentially, but not necessarily disruptive). We will also make greater use of horizon scanning and also cross-sectoral exchange of technologies (for example Warwick Manufacturing Group tacking technologies from automotive into healthcare or Loughborough University additive manufacturing applied to construction.

7. EPSRC needs to look at addressing issues around demographics of the community to support the research leaders of tomorrow.

Response

EPSRC agrees with this point.

“Developing Leaders” is one of the goals of the new EPSRC Strategic Plan and a major strand of its manufacturing strategy.

We note the support from the International Panel for both Challenging Engineering, which seeks to enable future leaders of research to develop a

research group that will undertake creative research and develop innovative solutions to some of the challenges facing society, and Engineering Doctorates, the alternative to the traditional PhD for students who want a career in industry. Through our support for individuals at a number of career stages, we will seek to develop the people, who have the potential and the necessary skills to become successful leaders in manufacturing research and industry.

We also observe that many of the current leading researchers in the Manufacturing community have extensive experience of working in industry, with the attendant benefits this gives. We see considerable value from mobility and interchange between industry and academia at all stages of the research career.

8. Areas for EPSRC to look at for the future included; Green Technologies, Convergent Technologies, Internet & the Real World, Whole Systems Process Modelling.

Response

EPSRC notes the areas suggested are indeed important. However, the onus for taking these areas forward lies as much with the community as EPSRC.

The need for a sustainable, resource efficient and low carbon economy is highlighted within the EPSRC Delivery Plan and will be reflected in future manufacturing strategies.

9. There were also issues about how EPSRC presents and describes its portfolio to help industry understand who does what in academia

Response

EPSRC accepts there are issues to be addressed; we require the capability to describe our portfolio to a range of stakeholders

The EPSRC strategic goal of delivering impact depends in part on improved industrial knowledge and access to the UK research base. Our future Communication Strategy will involve improvements to the capture, dissemination and promotion of the outcomes of our investment.

We have adopted the value chain model (from 'discovery to integration') to help present and communicate our manufacturing strategies (see point 10 below). EPSRC researchers, not least the IMRCs in this area, have significant expertise and experience that could be used. We have also started to ask our key collaborators about the information (and format) they want from EPSRC.

10. Manufacturing research should be clearly articulated as encompassing the breath of the value chain from

'discovery to integration'; EPSRC only plays into part of this chain and needs to better articulate who are the various key stakeholders at each stage and how they are integrated.

Response

EPSRC recognises the need to be clear about its role within the national innovation system, working with other stakeholders and agencies as appropriate.

We have been articulating our position in the 'discovery to integration' chain for some years now. Recently we published our Position Statement for Manufacturing to help illustrate this point.

Looking to the future, we will need to focus our own investment into core activities, whilst highlighting the importance of working with other stakeholders in a joined-up fashion. We will actively seek to map other stakeholders to clarify where EPSRC fits, to establish buy-in from other stakeholders for EPSRC's role and the value of it to them. We would welcome the development of a National Strategy for Manufacturing to enable joined-up thinking across the value chain, although there are other agencies that are better placed to coordinate such a strategy.

We have been actively encouraging the academic community, strategic partners and other stakeholders to engage politically to articulate the importance of the EPSRC's role in manufacturing.

We will also look at how other countries support manufacturing and look for lessons we can learn.

Conclusions

Manufacturing is a key priority area for EPSRC and so we will be taking these recommendations forward in the development and implementation of our manufacturing strategy. However, the academic community also needs to consider how they can address these recommendations either as a community or by working together with ourselves and other stakeholders.