



PRIORITY AREA M

PROCESSING TECHNOLOGIES AND NOVEL MATERIALS ACTION PLAN

JULY 2013

Processing Technologies and Novel Materials (Priority Area M)

Context

The manufacturing industry plays a vital role in the development of the Irish economy by making significant contributions in terms of employment and productivity. The Irish based manufacturing industry employs approximately 205,700 people directly and also a significant number of people in indirect areas such as financial services, infrastructure development and maintenance. Key national manufacturing sectors include: ICT; Life Sciences; Food and Drink; Engineering (Precision Engineering, Tanks & Vessels, Agricultural Machinery, Manual Handling, Plastics) and Electronics coupled with newer industries developing in the Clean Tech and Renewable Energy Sector.

According to the Community Innovation Survey 2008, of the seven categories in this survey, the manufacturing category was second in terms of reported process and product innovations carried out by companies. According to the Business Expenditure on Research and Development (BERD) Report 2009/10, published by the Central Statistics Office (CSO) and Forfás, manufacturing accounted for almost 40% (€743 million) of total BERD expenditure. According to the same report, manufacturing accounted for 39% (6,088) of the total number of researcher personnel (15,773) employed in business.

A Changing Industry

The manufacturing industry in today's world is changing due to a number of factors driving significant change, such as; globalisation and intensified competition; shifting consumer trends; environmental concerns; and advancement in science and technology. As a result of these drivers, the reality is that manufacturing is changing and companies will need to develop and adapt new technologies to compete.

The Challenge

In order to grow and sustain the Irish based manufacturing industry, Ireland must have the technological capacity and capabilities required for next generation manufacturing. The next generation of manufacturing industries will require continual and radical innovation focused on processing technologies and the utilisation of new materials. Successful implementation of this research priority area will result in the technological upgrade of the Irish based manufacturing companies; assist in attracting and retaining foreign owned companies; and, contribute to the creation of a workforce with the capabilities required for next generation manufacturing.

Publicly Funded Research Landscape

Research in process technologies and novel materials is more focussed on the specific aspects of manufacturing processes and technologies and materials, whereas the action plan for Manufacturing Competiveness focuses on the horizontal factor level aspects. Significant public research funding is invested in research areas of potential relevance to this priority area. According to information gathered by Forfás for input into the

National Research Prioritisation Exercise (NRPE), approximately 36% of active public research funding is invested in research areas of potential relevance to this opportunity area, albeit biased towards nanotechnology and materials. According to a bibliometric study carried out for this exercise, materials and food technologies rank above world average in terms of citation impact. Industrial biotechnology and bio-processing fall just below world average in terms of their respective citation impact. A number of research centres have been established to support materials research and processing technologies. These research centres all have strong industrial links, with their industrial partners being dominated by the foreign subsidiaries based in Ireland. The nanotechnology, materials and processing (NMP) Framework Programme 7 (FP7) thematic area aligns most closely with this priority area. An analysis of Ireland's performance within FP7 shows that Ireland is above EU average in terms of the success rate of applications and also in relation to the funding granted to successful applicants.

Pre-Requisite Actions

The following three reports contain recommendations that are critical for Ireland to be able to address the challenges facing today's evolving Irish based manufacturing industry.

1. The Manufacturing 2020 Strategy: Making it in Ireland, published by Forfás in April 2013.
2. The report on manufacturing skills undertaken by the Expert Group on Future Skill Needs, published in April 2013.
3. Food Harvest 2020 published by DAFM.

Processing Technologies and Novel Materials

Vision/opportunity: To further enhance the innovative capacity of the manufacturing base (for increased competitiveness and productivity) by harnessing new knowledge to underpin this industry with the core competencies required to be energy and resource efficient, ICT enabled, and a leader in quality. By 2020 Ireland will be:

- Creating more resource efficient and effective manufacturing systems;
- Securing manufacturing technologies against scarcity of energy and other resources;
- Creating innovative products and processes by embracing leading edge technologies;
- Developing new agile, more cost effective manufacturing processes and technologies; and

- An internationally recognised hub for “quality” in manufacturing.

Objective 1	To fund research to meet the strategic needs of the manufacturing industry for increased competitiveness.
Objective 2	To ensure the availability of appropriately skilled researchers to meet the needs of industry and to ensure that a critical mass of researchers is in place to deliver on the vision.
Objective 3	To create an environment to bring together the necessary disciplines from enterprise and academia, and also drawing on the relevant State functions (e.g. regulators), to work collectively on opportunities in the manufacturing competitiveness area at both early stage and applied research.
Objective 4	To ensure that research is focused on: identifying potential impacts on the environment and human health; informing regulatory processes; and developing solutions to support compliance with both the regulatory environment and industrial standards.

No	Action	Deliverable	Benefit	Lead	Support	Timeline
Objective 1	To fund research to meet the strategic needs of the manufacturing industry for increased competitiveness.					
M 1.1	Adopt a coordinated approach to funding and measuring success in manufacturing research across all relevant funding agencies.	A coordinated approach to funding and measuring success in manufacturing research across all	Co-ordination across the relevant funding agencies.	SFI EI DAFM EPA	DJEI (through TI)	Q3, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
		relevant funding agencies.				
M 1.2a	<p>Update and maintain intelligence on the research needs of industry.</p> <p>Within this context, attention should be given to targeting engagement with the engineering / industrial products cohort which is currently under represented in terms of R&D activity.</p> <p>Information generated during the NRPE and other relevant available sources of information such as the Manufacturing Strategy, Food Research Ireland and other PAG Action Plans should be utilised.</p>	Up-to-date knowledge of the research needs underpinning the manufacturing industry across funding agencies.	<p>Better understanding of the needs of the manufacturing industry.</p> <p>Better able to position the public research system as a partner to industry.</p>	EI IDA	DAFM SFI	Q1, 2014
M 1.2b	Update and maintain intelligence on research activity and research strengths relevant to this area across	Up-to-date knowledge of the research landscape relevant to	Better able to position the public research system as a partner to	SFI EI	DAFM EPA IDA	Q1, 2014

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	the higher education sector. Information generated during the NRPE and other relevant available sources of information such as the Manufacturing Strategy should be utilised.	manufacturing.	industry.			
M 1.2c	Based on 1.2a and 1.2b, identify research gap and address gaps by utilising existing instruments.	Addressing research gaps required for delivering on the research needs of the manufacturing industry.	Better able to position the public research system as a partner to industry.	SFI	EI EPA DAFM	Q1, 2014
M 1.3	Maintain and grow Ireland's participation in EU and other international collaborative research. Within this context ensure active strategic participation in relevant research policy initiatives / funding vehicles.	Leveraging of Irish funding to access international funding. Establishment of valuable knowledge networks.	Leveraging of Irish funding to access international funding. Establishment of valuable knowledge networks.	EI	SFI EPA DAFM	Q4, 2012
M 1.4a	The relevant funders to develop a medium term vision	A coordinated vision for	A shared vision with the required	EI	DJEI (through TI)	Q3, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	(with required actions) for optimising collaboration across publicly funded research groups and centres (existing and new).	optimising collaboration across publicly funded research groups and centres.	actions for optimising collaboration across publicly funded research groups and centres (existing and new).	IDA SFI DAFM EPA		
M 1.4b	<p>In the short term, continue to utilise the current and evolving research centre landscape to increase industrial collaboration with the higher education sector for manufacturing research.</p> <p>In the medium to long term, assess if an infrastructure deficit exists in the applied research space (for testing, prototyping etc.). Based on defined infrastructural research needs of industry and proven industrial demand:</p> <ul style="list-style-type: none"> Explore if the extension of the R&D remit of the SFI research centres can 	Understanding of the infrastructure requirements for manufacturing research.	Establish if an infrastructure deficit exists for manufacturing research and how best to address.	EI	DJEI (through TI)	Q3, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	<p>address this need; or</p> <ul style="list-style-type: none"> Carry out a feasibility study to investigate if the RTO (research and technology organisations) as described in the ACSTI study “Sustainability of Research Centre” presents as a potential applied research infrastructure for manufacturing. 					
M 1.5	<p>Draw lessons from the experience gained in the pilot initiative on branding and marketing undertaken by Technology Ireland in the context of the Therapeutics Action Plan.</p>	<p>A marketing tool to help industry understand what research capability is available in Ireland and how it can meet their needs.</p> <p>An influencing tool to encourage existing and new research centres/individuals</p>	<p>Create a sense of critical mass in research in this area through consolidation of brands without requirement for radical increase in spend or immediate consolidation of centres.</p> <p>Unified and</p>	DJEI (through TI)		Q2, 2014

No	Action	Deliverable	Benefit	Lead	Support	Timeline
		to collaborate and co-market their capability.	coherent marketing message around Ireland's research strengths in this area. Facilitate easier and faster access by industry to knowledge & expertise to meet specific research challenges.			
M 1.6	Coordinate and support industry co-funded programmes to enhance resource efficiency across all business sectors in-line with EU priority actions.	Improved practices within individual companies which will also serve as templates for similar actions across an entire sector.	Reduced operating costs and environmental impact through control of product/process inputs and proactive management of waste arising.	EPA	EI, SFI, + any other relevant agency	Q4, 2012
M 1.7	Continue to fund research in underpinning platform	Mechanism for allocating research	The underpinning research	SFI, EI	SFI	Q1, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	technologies and sciences of relevance to manufacturing competitiveness through bottom up calls.	funds for underpinning platform technologies and sciences.	requirements of manufacturing are addressed.		DAFM + any other relevant agency	
Objective 2		To ensure the availability of appropriately skilled researchers to meet the needs of industry and to ensure that a critical mass of researchers is in place to deliver on the vision.				
M 2.1	Ensure the availability of appropriately skilled researchers to meet the needs of industry and to ensure that a critical mass of researchers is in place to deliver on the vision. (see EGFSN Report on Manufacturing Skills to identify the required skills for manufacturing)	An increase in the number of industrially relevant researchers at the appropriate skills level with capability to support an innovative manufacturing ecosystem.	An increase in the number of industrially relevant researchers at the appropriate skills level with capability to support an innovative manufacturing ecosystem.	See EGFSN Report on Manufacturing Skills		Q3, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
M 2.2	Launch the employment based postgraduate research programme.	Critical mass of graduates with skills required by industry.	Skills to drive innovation in the manufacturing industry.	Irish Research Council		Q3, 2013
Objective 3	To create an environment to bring together the necessary disciplines from enterprise and academia, and also drawing on the relevant State functions (e.g. regulators), to work collectively on opportunities in the manufacturing competitiveness area at both early stage and applied research.					
M 3.1	Engage key enterprises (both indigenous and FDI) with strengths in the manufacturing field to discuss research opportunities arising from action 1.2.	Company awareness of the opportunities in the manufacturing research area is enhanced.	Enterprise will have the opportunity to utilise manufacturing research.	EI, IDA, HEA	DAFM	Q4, 2013
M 3.2	Ensure appropriate funding mechanisms are made available to facilitate the identified enterprises collaborating with the relevant research expertise on both early stage and applied research on an on-going basis.	Focused enterprise and research collaboration.	Key capabilities are supported to work together to realise the commercial potential in the research areas.	EI, SFI, HEA	DAFM	Q1, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
Objective 4		To ensure that research is focused on: identifying potential impacts on the environment and human health; informing regulatory processes; and developing solutions to support compliance with the regulatory environment and industrial standards.				
M 4.1	Develop a suite of funding instruments (new, existing or modifications of existing) across all relevant departments and agencies which will include a programme of research to understanding the toxicological properties and environmental fate of new materials through their life cycle.	<p>Reports to manufacturers, health & environmental policy makers on emerging issues.</p> <p>Development of capacity/ expertise necessary to respond to next generation products and process requirements for manufacturing. This can yield competitive advantage for a company in the market place.</p> <p>Strong interaction between Regulators, the industry base and</p>	<p>New business opportunities in clean tech</p> <p>Improved certainty for industry on regulatory processes.</p> <p>Societal benefits in terms of a safer workplace and cleaner environment.</p> <p>Consumer confidence in emerging areas such as nanomaterials.</p>	EPA	SFI, DAFM, Industry; regulatory bodies standards bodies; and any other relevant industry.	Q3, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
		Irish research base.				
Cross Referencing	Therapeutics Action Plan Objective 3: To leverage investment in academic research on therapeutics manufacturing to help ensure continuation of Ireland's reputation for strong supportive responsive regulatory environment for the therapeutics development and manufacturing sector					
G 3.1	To promote increased linkages between the academic research base and the IMB to assist the IMB in maintaining the knowledge and expertise to respond to next generation processes for Therapeutics manufacturing. Particular focus on linking regulators with academic opinion leaders with unbiased expertise in novel processes or analytical methods	Continued strong, supportive and responsive regulatory environment for Therapeutics sector Strong interaction between Regulators, the industry base and Irish research base.	Sustained attractiveness of Ireland as a location for development and deployment of novel processes for innovative and complex Therapeutics (e.g. drug-device combinations, bio-similars, bio-betters and next gen therapies like stem cells/RNAi).	IMB	EI, IDA, PCI, SFI	Q4, 2012

Forfás



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