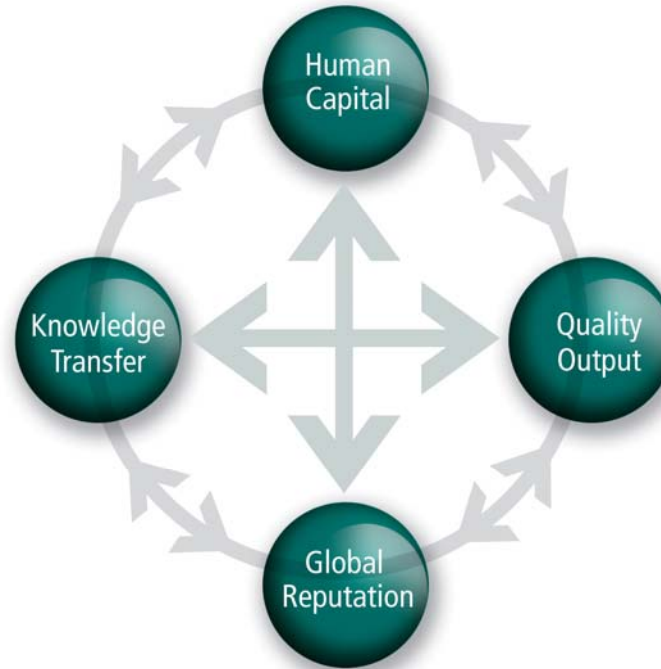


# Food Innovation – Driving the Knowledge Bio-economy



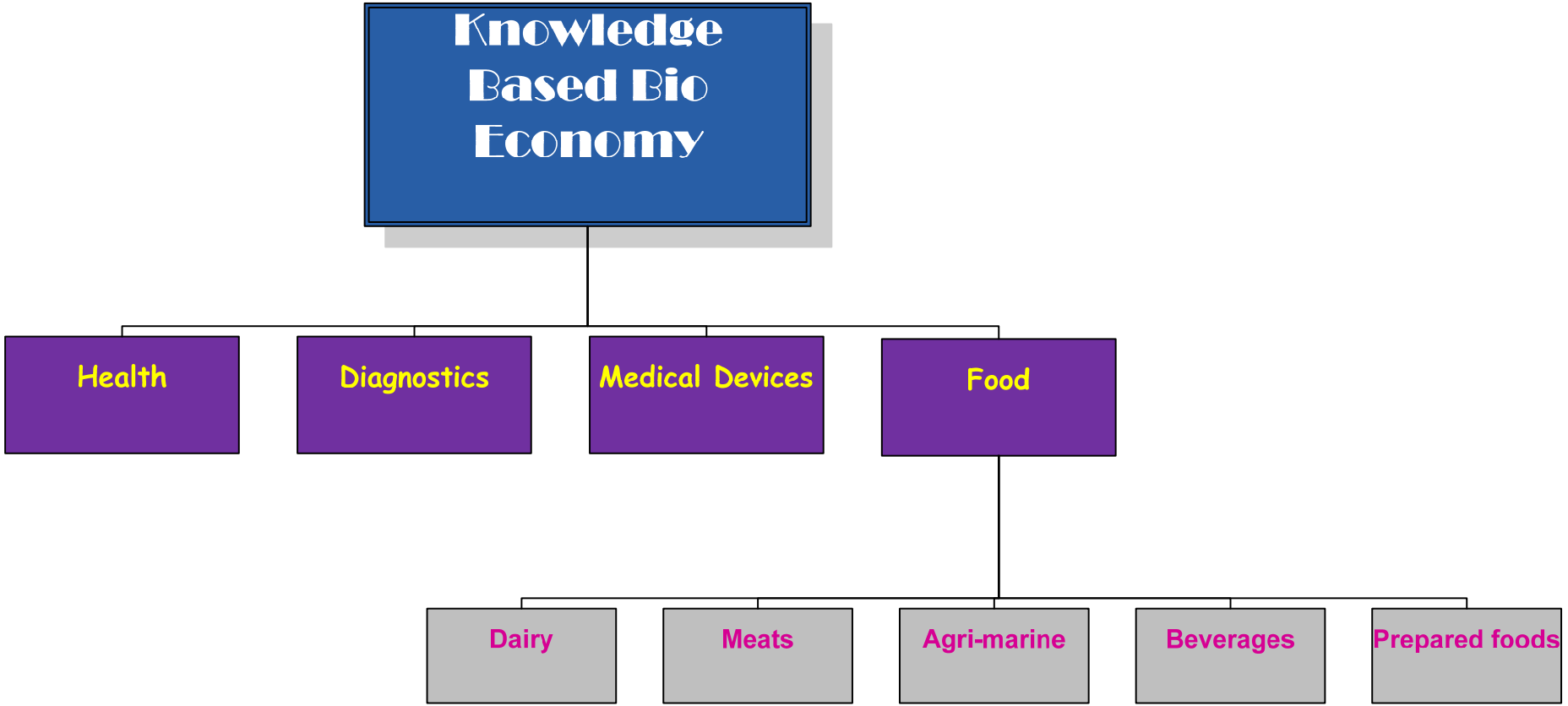
science foundation ireland  
fondúireacht eolaíochta éireann

# Powering the Knowledge Economy



- Strategy emphasis on linkages between scientific excellence and economic impact.
- SFI's programmes are focused more directly on developing and sustaining the underpinning components of the 'Smart Economy'
- Smart Economy – driving innovation in indigenous sectors which will the greatest strategic value to Ireland's long-term competitiveness and development.

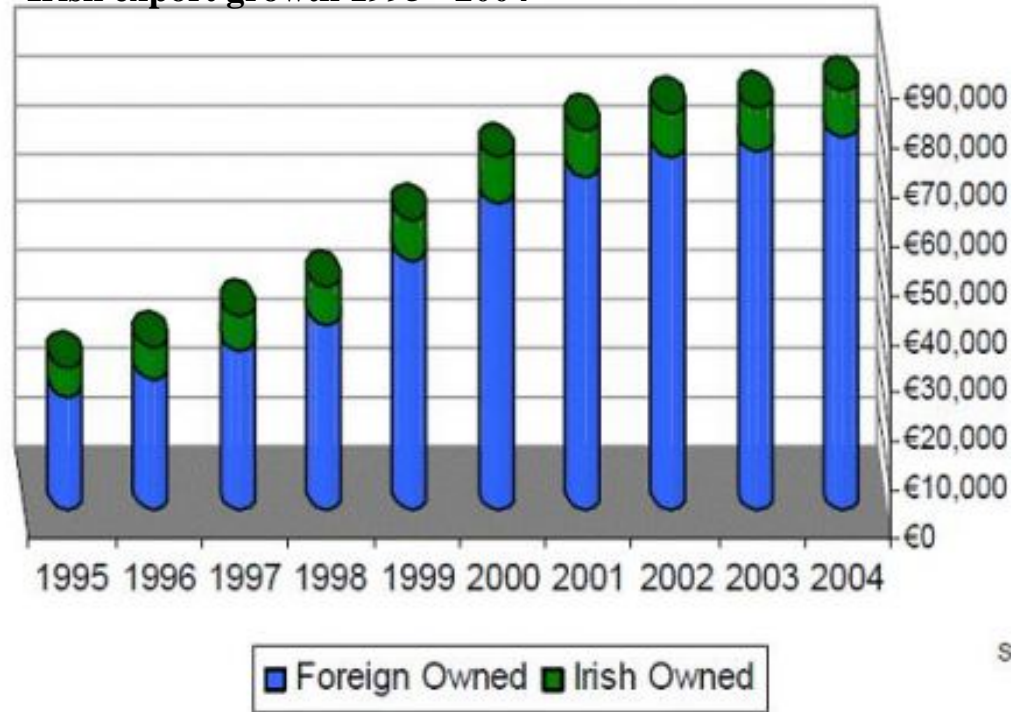
# Food - an indigenously grown industry



# Irish Food & Drinks Sector

- Most important manufacturing sector
- Single most important category of consumer spending
- Ireland consumes €7 billion worth of indigenously produced food and drink products annually
- Export to 170 countries - €8.6 billion
- Gross output from this sector is € 18 billion
- Exports – UK: 42%  
Continental Europe: 31%  
International: 27%
- Accounts for 8.1% of employment – 51, 600 directly and 60,000 in distribution and other services
- Comprises of 700 companies, 10% foreign owned
- Approximately 10% of GDP

## Irish export growth 1995 - 2004

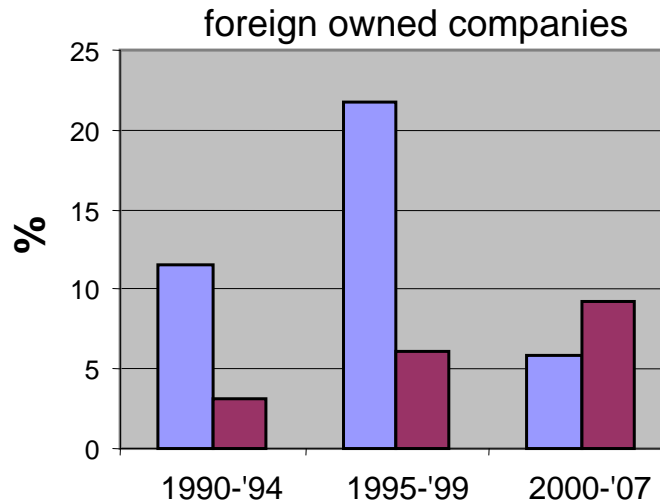
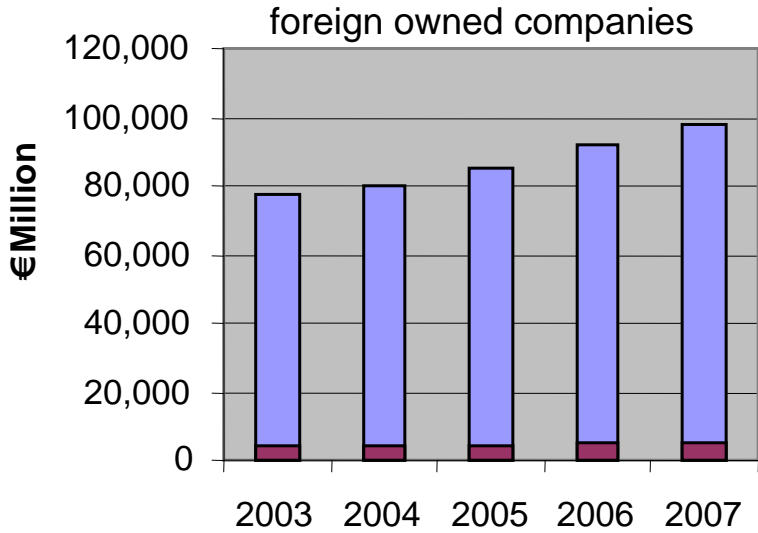


- In developing country growth phases, foreign-owned companies typically lead the export surge.
- What is striking about Ireland is that foreign-owned firms, mainly American, remain responsible for about 90 per cent of total exports.
- Approximately 65 % of exports from indigenous firms are in the food and drink sectors (*Forfás*)
- Markets are static – UK remains our main export market (almost 50%)

# Indigenous companies – are they performing?

Irish exports – Food/Drink/Tobacco as a proportion of total exports

Irish exports – % Per Annum Change



## Investment into Food Research in Ireland

- Total food research investment in Ireland for 2003-2008 was ~€200 million
- €157m investment into PRO's
- €44m investment directly into the food industry to support in company R&D
- Equivalent to ~€30 million/per investment

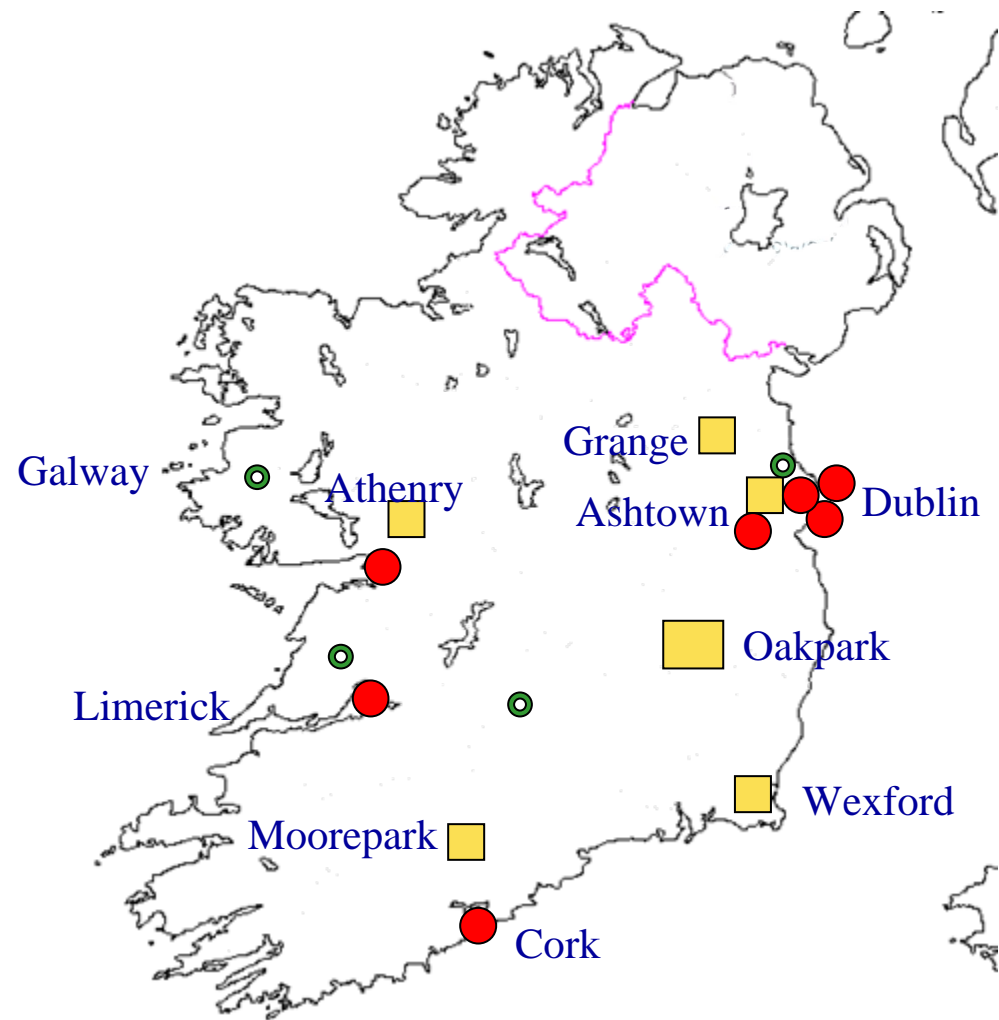
Funding body	€millions	%
<b>EI</b>	<b>74</b>	<b>36.7</b>
<b>DAFF</b>	<b>72.5</b>	<b>36</b>
<b>SFI</b>	<b>30</b>	<b>15</b>
<b>EU</b>	<b>18</b>	<b>9</b>
<b>MI</b>	<b>5.5</b>	<b>2.8</b>
<b>HRB</b>	<b>1</b>	<b>0.5</b>
<b>Total</b>	<b>201</b>	<b>100</b>

# Teagasc

- *State Body for Research, Advice & Education*
- Research spans whole food chain
  - Animals
  - Crops
  - Food
  - Biotech
  - Environment
  - rural economy
- **7 Universities and 14 Institutes of Technology**
  - University College Dublin
  - University College Cork

Teagasc Food Research Directorate total costs in 2009: €19m

- Grant-in-aid - €8.8m
- Public research funding agencies - €6.6m
- Industry - €3.6m



## Teagasc and University Centres

- Teagasc Research Centre
- Teagasc Research Station
- University



**GOVERNMENTS  
DIRECT  
INVESTMENT INTO  
'CLUSTERED' FOOD  
INNOVATION**



# FHI - Food for Health Ireland

- Enterprise Ireland funded National Functional Foods Research Centre
- Unique partnership between four of Ireland's major dairy processing companies and four public research organizations
- Determine how milk ingredients can be extracted and used to deliver health benefits for consumers



# APC - Alimentary Pharmabiotic Centre

- SFI supported centre for the study of intestinal bacterias influence health and disease
- Developing new therapies for gastrointestinal diseases
- Explore commercial opportunities in both the pharma and functional food sector
- To actively promote communication with government, Irish and international industry and the public on issues such as gastrointestinal disorders, probiotics and functional foods



*Procter & Gamble*

## Examples of SFI funded research projects in Food R&I



<b>NAME</b>	<b>RB</b>	<b>RESEARCH PROGRAMME</b>
Prof. Lothar Steidler	UCD	Study of elements controlling human interleukin-10 expression and secretion in the probiotic <i>Lactobacillus salivarius</i> UCC118 and pre-clinical evaluation in inflammatory bowel disease.
Prof. Daniel Bradley	TCD	Mammalian Population Genomics and Selection: Detection of Loci with Functionally Significant Variation in the Bovine Genome.
Dr. Christine Loscher	DCU	A role for dietary fatty acids in modulating Th1-mediated disease
Dr. James Wilson	TCD	Stable isotope analysis of trophic niche width and modelling of the Dublin Bay food web
Dr. Fiona Doohan	UCD	Functional genomics of plant-mycotoxin interactions



# Examples of SFI funded research projects in Food R&I.....



<b>NAME</b>	<b>RB</b>	<b>RESEARCH PROGRAMME</b>
Dr. Nora O'Brien	UCC	Development of a rapid, transepithelial in vitro model that can be applied to monitor bioavailability of phytochemicals in biotechnologically enhanced, novel, functional and conventional foods.
Dr Helen Roche	UCD	The role of macrophage accumulation in adipose tissue in the development of obesity induced insulin resistance – insights into mechanisms and nutrient based therapies using a nutrigenomics approach
Dr Paul O'Toole	UCC	Functional genomics of two commensal lactobacilli from humans and animals
Dr Vincent Kelly	TCD	Q-base; an essential nutrient for tyrosine biosynthesis. Implications for the disease phenylketonuria and transfers RNA biology
Dr. Trudee Fair	UCD	Role of the Major Histocompatibility Class I Complex during mammalian preimplantation embryo development



# Examples of SFI funded research projects in Food R&I.....



<b>NAME</b>	<b>RB</b>	<b>RESEARCH PROGRAMME</b>
Prof. James Roche & Prof. Maurice Boland	UCD	Discovery of key functional genes regulating early pregnancy
Dr James Martin	UCC	Mucosal immunity in allergic disease; influence of probiotics
Dr Paul O'Toole	UCC	Multi-replicon genome architecture of <i>Lactobacillus salivarius</i>
Dr Jakki Cooney	UL	The role of bacterial proteases in gut health and disease.
Dr Cormac Gahan	UCC	Development of signature-tagged mutagenesis for functional genetic analysis of <i>Listeria monocytogenes</i> infection of the GI tract



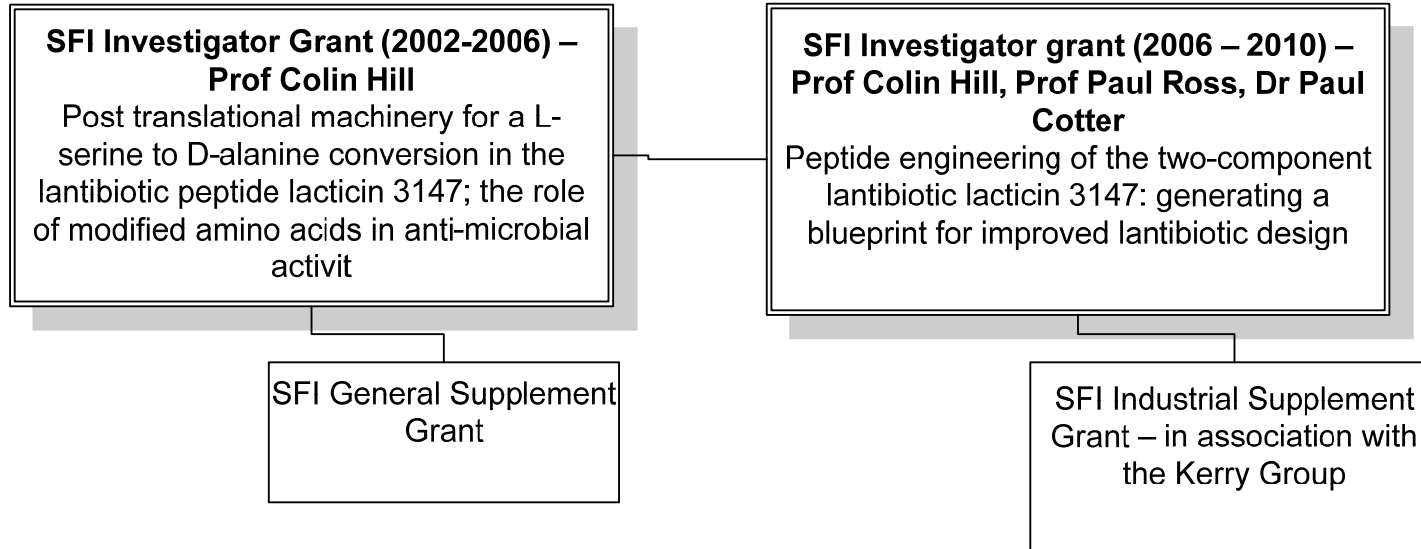
# Examples of SFI funded research projects in Food R&I.....



<b>NAME</b>	<b>RB</b>	<b>RESEARCH PROGRAMME</b>
Prof. Mark Achtman	UCC	Diversity of Salmonella in Ireland
Dr Alex Evan	UCD	Reproductive Biology Research Cluster; Discovering and manipulating molecules to enhance fertility
David MacHugh & Stephen Gordon	UCD	Functional genomics and proteomics studies of bovine tuberculosis
Prof. Brian MacCraith	DCU	BDI (collaboration with Enfer in Veterinary diagnostics)



# Case study of SFI's investment into early stage Food R&I



## Use of SFI funding to leverage further funding

- IRCSET Studentship (2003 – 2007)
- IRCSET Studentship (2006 – 2010)
- DAFF Biocontrol (2005 – 2008)
- DAFF Funlac (2005 – 2008)
- DAFF MAPSAFE (2008 – 2011)
- EI Commercialisation Fund (AMPs) (2008 – 2011)
- EI Nisin (2007 – 2009)
- EI LisA (2009 – 2010)
- HRB Lacticin v Pathogens (2006 – 2010)
- Involved in establishing the APC
- Involved in many other collaborations named above

## Success stories - *Probiotic product from Cork company launches in US stores*

- Alimentary Health is behind a new product (**ALIGN**) recently launched by global consumer goods giant Procter & Gamble
- Daily dietary supplement Align contains a probiotic strain discovered by microbiologists in Cork back in the early-1990s. Since then researchers have been working with Procter & Gamble (P&G) to commercialize the find
- Being launched in supermarkets across the United States with the promise of relief for people suffering from irritable bowel syndrome
- The launch is a landmark for Alimentary Health which has been supported largely by **Enterprise Ireland** and **Science Foundation Ireland**



# International recognition – Irelands exposure at DDW



- **DDW** – Ireland is the first country to present a symposium at **Digestive Disorder Week 2009**
- Symposium entitled **‘The Host-Microbe interface – translating science to real emerging therapeutic opportunities’**
- EI booth will feature research and publications from an array of Irish GI companies showcasing innovation in probiotics, immunology, drug development etc.
  - **Alimentary Health**
  - **AGI Therapeutics**
  - **Sigmoid Pharma**
  - **Pharmatrin**
  - **Cellix**
  - **Vysera Biomedical**
- Joseph A Murray MD, Professor of Medicine, Consultant, Division of Gastroenterology and Hepatology at the Mayo Clinic – *“Ireland’s ascendancy in gastroenterology and immunology is the product of world class research, comprehensive government support and innovative, progressive thinking on the part of the Irish clinician community in Ireland, in the US and around the world”*

# Future

- **SFI's continued commitment**

- Human capital
- Unexpected output

- **Food – traditional Irish strength**

- Food for food - Developing world- GMOs??
- Food for nutrition /health
- High end quality focus
- Green agriculture
- Safety – diagnostics
- Smart fields/agriculture e.g. sensors for soil condition

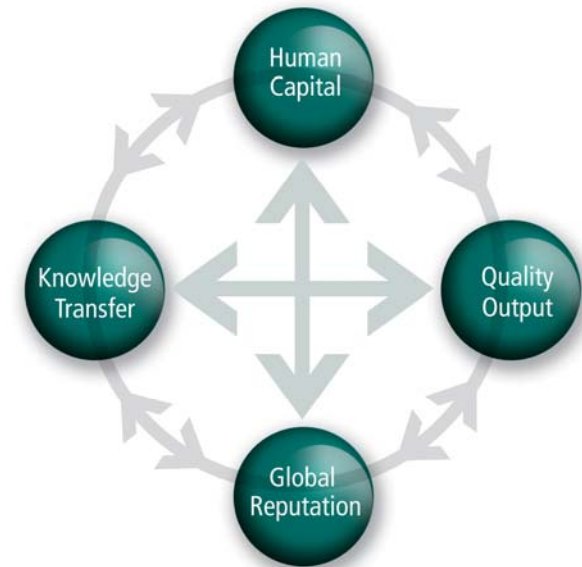
- **Have we become too siloed?**

- Teagasc – branded for Food Research etc.

- **More holistic approach from the funding agencies**

- E.g. Food innovation as a central theme with health benefits as the defined outcome.
- Food + Health + Epidemiology + Nutrition + Social Research

- **Defragmentation of research**



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# Innovation Drivers in Food R&D:

- Health/Nutrition
- Functional ingredients
- Premium/Indulgence
- Innovative flavours
- Convenience
- Quality
- Safety
- Spoilage/shelf-life

