

LEADING FOOD 4.0

GROWING UNIVERSITY-BUSINESS
COLLABORATION FOR THE UK'S
FOOD ECONOMY

EXECUTIVE SUMMARY

TASK FORCE CHAIRS

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Why Does The Food Economy Matter?¹

UK consumers spent £196bn on food, drink and catering in 2012. The sector contributed over £103bn to the economy, £19bn in exports, and 3.7 million jobs in close to 200,000 firms. It encompasses seemingly disparate businesses such as farms and fisheries, high-tech manufacturers, mass-market retailers and industrial caterers. It is intimately bound up in competition for the use of land and water, in the management of climate change, and in the nation's health and well-being. As the food related riots of 2007-8, in countries such as Egypt, Bangladesh, and Haiti demonstrated food shortages and spikes in prices can quickly escalate into food revolts with wide political ramifications. Food supply clearly has national and international geo-political significance.

Recognising the vital national importance of this sector, the National Centre for Universities and Business (NCUB) convened a Task Force to make recommendations about business-university collaborations to increase the number and quality of talented and skilful graduates entering the industry, and meet its innovation and research needs. The steering group, led by Justin King, then CEO of Sainsbury's, and Quintin McKellar, Vice-Chancellor of the University of Hertfordshire, and former Principal of the Royal Veterinary College, stressed that the Task Force must encompass the whole industry from lab to landfill. Second, the industrial context is rapidly changing. We are entering Food 4.0. Food 1.0 was simple cultivation; food 2.0 was built on mechanisation and manufacturing; and 3.0 was the product of advanced technology, processing and genetics.

In Food 4.0, nine billion people around the world must be fed safely, sustainably, affordably and securely. This revolution is likely to be knowledge-intensive, collaborative and integrative. It may be built on big data, nano-technologies, genomics, and communications technologies. Or it may be the product of renewables, ecological policies, better consumer education and environmental literacy. In all likelihood, it will be birthed by all of these. However it emerges, the UK's food sector wants to be a leader in this new world and business-university collaboration will be a vital underpinning to this success.

¹ This is a summary version of the full report which can be found at www.ncub.co.uk/foodeconomy

One Plan / One Vision For The Food Economy

Administrations across the UK have strengthened their focus on food. The UK government has established an Agri-Tech Leadership Council to ensure that the country becomes 'a world leader in agricultural technology, innovation and sustainability.' Scotland, Wales and Northern Ireland have put Green Industries and integrated agri-food supply chains at the heart of their industrial strategies. Finally, as English devolution unfolds, rural regions will inevitably focus on food.

The Task Force welcomes these strategies, but emphasises a coherent approach to skills, talent development and, innovation and research; these must be integrated across the whole food economy, from lab to landfill. The sector is characterised by seemingly disparate businesses such as the big global agri-businesses, small farms and fisheries, tens of thousands of manufacturing firms, massive caterers, big and boutique retailers, and recycling and landfill. These must be taken together if the UK is to lead in Food 4.0. To develop its conclusions and recommendations about ways in which this might be achieved, the Steering Group commissioned research projects on talent and skills, innovation and research, and sustainable land use.

Talent, Talent, Talent

To be successful in Food 4.0, businesses need graduates capable of leadership and vision, and with commercial acumen and entrepreneurial instincts. However, although there are global firms in the sector, 98% are small companies that employ 40% of the employees and so the industry may appear disjointed, fragmented and disconnected to undergraduates. To understand this perception problem, we commissioned a survey² of five hundred first and second year undergraduates, and one hundred and fifty four recent entrants to the sector, across the full range of sub-sectors and roles. The good news is that graduate employees in the industry think that it is a really good career, with lots of potential, and that they would recommend it to others.

² www.ncub.co.uk/foodsurvey

“The agricultural sector has a direct impact on the health and wellbeing of the UK (sometimes even world) population. Agriculture also faces its greatest challenge with a rising world population, water and (fertile) land scarcity and a changing climate. Thus, working in the agricultural sector is both altruistic and also intellectually challenging.”

“The individual development is good, there are opportunities to move around and learn new skills and gain new experiences. It is fast paced, challenging and overall a significant sector to be in.”

The more challenging news is that food is not seen as an exciting career option for students who know little about it. No food company made it into the top twenty of a recent survey of engineering graduates' perceptions of the top hundred companies to work for in the UK, and only a handful made the list at all.³ And in general, as the NCUB's Student Employability Index demonstrates, undergraduates rate the attractiveness of food production well below that of health or the media.

Figure 7

Undergraduates
Perception of the
Attractiveness of
Sectors

Five Point Scale	
Agriculture / Forestry / Fishing	2.2
Education	4.1
Health Sector / Medicine / Pharmaceuticals / Veterinary	3.8
Media / Broadcasting / Publishing	3.6

Source: NCUB Student Employability Index.

Changing the perception of undergraduates begins in schools and the Task Force supports all such initiatives whilst stressing the need for more integration and cooperation to maximise impact. It also looks to the industry's own marketing experts to develop campaigns that address the negative perception that school children and students have of careers in food.

³ NCUB Student Employability Index, www.ncub.co.uk/sei

Innovation Challenges

Trusted Brokerage, Intelligent Networks

The fundamental driver of innovation in Food 4.0 is the need to increase production whilst minimising negative environmental impacts. Innovative responses to this can take many forms, including new manufacturing technologies, changing consumer behaviour, more effective recycling, improving seed yield, landscape-level land use and integrated retail. In our study⁴ of this issue we drew on semi-structured interviews with thirty technical directors, innovation managers, CEOs and managing directors from twenty six companies. The following quotes sum up one of the challenges of knowing what research exists and how to access it:

“The problem is that you know that there is a university out there that will have the expertise that you need to access but we certainly wouldn’t have known which university to approach and short of emailing them all or asking them all one-by-one I don’t know how to get the information out.”

Large Manufacturer

“Most of our communication tends to be because there’s relationships... somebody went there, or somebody’s worked with them in the past. It’s not because we have a good communication system that tells me x or y research institute is up to this or that. There doesn’t seem to be a nice forum for finding information, it tends to be experience and personal contacts.”

Horticultural Producer

Our respondents often used intermediary organisations to help them find an academic partner and this reliance on others to broker a relationship demonstrates that even this knowledgeable group struggled to find the right researcher or research teams. Indeed of all potential government interventions, this group most often cited the need for improved information provision.

4 www.ncub.co.uk/SandT

The industry needs an innovation forum where businesses and universities can share long term industrial challenges, access to a digital brokerage platform, shared online spaces for discussion and review, trained intermediaries with the ability to navigate between both communities, and more effective access to innovation funding such as the Innovate UK and Research Council UK programmes.

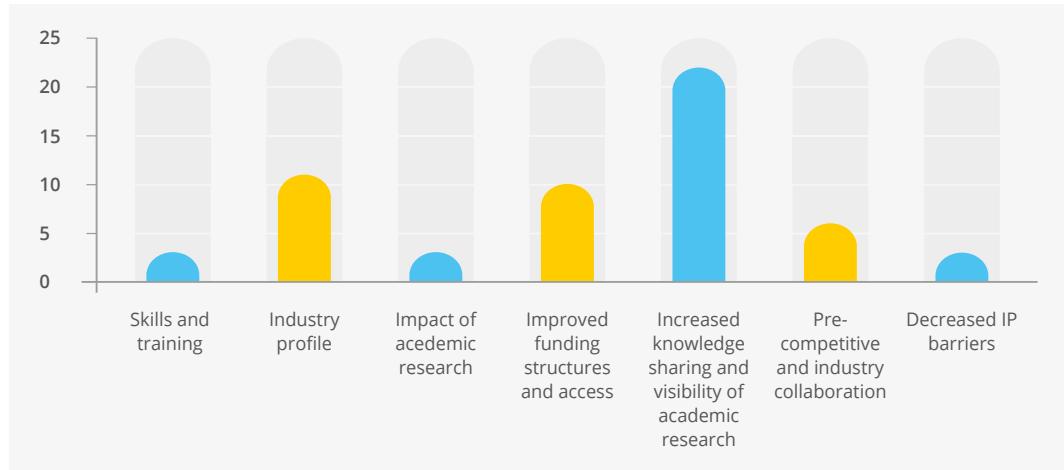


Figure 11

Areas of Recommendation for Government Intervention

Signals From The Landscape

Collaborating to Unlock Business Value and Ensure Sustainability

There is a specific aspect of sustainability that current government policy is insufficiently focussed on, which the market on its own is not currently resolving, and where collaboration is key – namely, management of the landscape. We thought this sufficiently pressing to develop some key recommendations about it based on interviews with key players.⁵

Farmers and growers need to make a profit to remain in business, and they are at the base of the agricultural food chain. But the production of food competes with other industries for

⁵ www.ncub.co.uk/landscapecollaboration

land, water and energy, and impacts on the environment in many ways, such as the emission of greenhouse gases, the amount and quality of water it uses, its impact on biodiversity in the countryside, and its effect on human health. Furthermore, agricultural landscapes have significant cultural, amenity and recreational value, and provide habitats for biodiversity. These services often arise not from management of single fields or farms but from all land management in an area. For example, downstream flood risk may depend on all upstream farms, and pollinators cross many farms. We call this the landscape perspective.

Our interviews with retailers confirmed their desire to reduce the risk to their supply chain, and to enhance their reputation and goodwill by engaging at a landscape level. Furthermore retailers compete for strong farmer relationships and their biodiversity, water use and waste management are part of their marketed points of difference. Despite this, unrealised business opportunities exist for coordinated action between growers supplying different product categories. Collectively, they can address production challenges and achieve sustainable UK-wide intensification of agricultural output.

“As a retailer we spend a considerable amount of time with our suppliers, farmers and growers working on our specific supply chains. The addition of landscape scale activities will unlock more value and resilience for everyone involved.”

Head of Sustainable and Ethical Sourcing, Major Retailer

The landscape-level approach could optimise decisions by whole groups of farmers, and along the supply chain. It could also address shared production risks from landscape signals such as pest infestations, pollinator loss, soil management, water availability and biodiversity. Our analysis of existing landscape initiatives shows that landscape signals foster collaboration. In Food 4.0 the food sector needs to be better at this kind of collaboration, while universities and research organisations can be strategic delivery partners in developing collaborative solutions for business and government.

Researchers are used to examining complex information and data sets, and can play a key role in identifying, capturing and interpreting landscape signals. Furthermore, the complexity of the landscape approach requires different ways of collaborating. The ability to keep diverse interests working together constructively is not straightforward, and the role of an effective, often independent, facilitator is essential to success. Universities must work with businesses to grow the knowledge, skills and experiences required to develop the landscape approach, and government must play a more integrative and promotional role in developing landscape research.

Conclusions & Recommendations

The Task Force had Ten Conclusions which Led to Six Recommendations

Conclusions

01

Despite its demonstrable success, the UK's food industry is fragmented, with a long value and supply chain and hundreds of thousands of small companies, including farms and fisheries.

02

Food lacks the unified voice with which to address government, research funders, universities and the education system that other sectors – such as automotive or pharma – have developed.

03

The problems of a fragmented sector contribute to the generally weak links between businesses and universities. They must be improved through effective collaboration and research.

04

There is enormous value to legislators, universities, colleges, schools, and the public in growing the value of the food sector. Universities and colleges will benefit from more research and better graduate employment prospects. Business will have access to greater inventiveness and more tailored graduate talent. And government will have a growing and strategically vital industry, alongside evidence to support policies that deliver sustainability. It would be a major strategic error to miss the opportunities created by the next food revolution.

05

The UK government's industrial strategy is primarily focussed on agricultural technology development. Its remit needs to be broadened to include the entire end-to-end value chain from lab to landfill. Scotland, Wales, and Northern Ireland share many

of the collaboration challenges faced by England, but have developed more integrated strategies to deal with them. These could be broadened and shared across the UK to increase innovation and produce a better educated workforce for the sector.

06

Only a few universities have a clear sense of the research, innovation and educational needs of the food economy. And few partner with universities across Europe on the challenges of the food economy. Conversely many, if not most, food businesses do not have a strategic and long-term relationship with universities. This is not uncommon for sectors dominated by small and mid-sized businesses.

07

There are too few high-quality collaborative mechanisms that join up the food industry with universities and the publicly-funded innovation system. And there are not enough translators able to work across industry, universities, and research institutes.

08

The sector fails to present a coherent, consistent, and visible message to school children, their parents, and their teachers, which can attract them into food-related courses at university and college, or from higher education into food economy jobs.

09

The production of food requires access to land, water, and energy, and it impacts on the environment in many ways. These include the emission of greenhouse gases, the amount and quality of water use, biodiversity, and human health via nutrition. The food industry, therefore, is inherently connected to other sectors. This interdependence needs to be recognised and navigated.

10

Agricultural landscapes supply fresh water, have a role in flood prevention, offer significant cultural, amenity and recreational value, and provide habitats for biodiversity. These services often arise not from the management of single fields or farms, but from all land management in an area. For example, downstream flood risk may depend on all upstream farms. We call this approach the landscape perspective. The market is not currently incentivising approaches that unite business, government, universities, and the publicly-funded innovation system to promote farm management.

Recommendations

01

UK government⁶ to work with devolved administrations to produce a UK-wide plan for the education, skills, and innovation needs of the food economy. The Agri-Tech Leadership Council's remit and membership should be broadened to include the entire end-to-end value chain from lab to landfill. A UK minister should take the lead on the food economy and its education, skills, research, and innovation needs. Similarly the devolved administrations should ensure a single ministerial overview.

02

The Agri-Tech Leadership Council and the NCUB to work with food businesses and universities to create new collaboration programmes and forums. These would grow and promote the talent, skills, educational, research, and innovation pipelines of the food economy.

03

NCUB to create a trusted information, advice, and guidance portal for food businesses looking to grow the value of their relationship with universities, and for universities wishing to discover the research needs of businesses.

04

The food economy research, impact, and innovation agenda should be more strongly promoted by all administrations in the UK and by the research funding bodies, and should be more coordinated at ministerial level.

05

Devolved administrations will wish to create policies and structures appropriate for their own unique systems, but there should be coordination and knowledge-sharing between them to create more shared value.

06

Universities, businesses, and government must collaborate to deliver sustainable land use at the landscape level. Agri-businesses must address the challenge that farm management poses for landscape level outcomes. For example, no single farmer may be responsible for the loss of bees from a landscape, but collectively their actions may ensure it. The Department for Environment, Food and Rural Affairs (DEFRA) and the devolved administrations must ensure that the regulatory instruments for which they are responsible are aligned with this objective and provide signals which encourage collaborative action.

⁶ When we speak of the UK Government, the primary departments are Business, Innovation and Skills (BIS), and the Department of Environment, Food and Rural Affairs. However, our argument throughout is that a successful food sector requires engagement from and coordination with other departments, such as Education and Health.

If the measures we have advocated are adopted we believe that the UK can be a global leader in Food 4.0 and meet the twin goals of increasing the competitiveness of UK Food Plc whilst at the same time reducing its environmental impact. Not to do so will be to risk food insecurity and the decline of a sector that is one of the UK's great success stories.



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