Grower Summary

CP 131

Sources of Innovation in the Fresh Produce Industry

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Date project completed (or expected completion date):	April 2017

GROWER SUMMARY

Headline

The nature of innovation in the UK fresh produce industry is complex, but an intensely competitive marketplace, coupled with a pronounced entrepreneurialism and increasingly globalised innovation network, ensures strong innovation capability.

Background

The UK Fresh Produce Industry faces a number of challenges: exotic pests and diseases, input prices for oil, foreign competition, limitations in water abstraction, and restrictions on seasonal labour from overseas (National Horticultural Forum, 2011). Innovation, technological and non-technological change, has been promoted to help meet these challenges. However, there are a range of barriers across the fresh produce value chain, both personal and institutional, that slow or prevent new knowledge and innovations from making impact.

The aim of this project is to identify sources of innovation in the fresh produce industry – where it comes from, where it goes and how it is adapted, and the barriers that exist to its creation, spread and implementation. To do this, an initial study was undertaken to interview industry experts and a more in-depth case study is planned for the coming summer.

By the completion of the project, we will have a better understanding of innovation in the fresh produce industry; it will be possible to provide recommendations to improve innovative capacity, and relevant knowledge generation and exchange. In turn, this will provide industry with more timely and relevant interventions and foster a more innovative sector.

Summary

This project aims to identify the sources of innovation in the UK fresh produce industry, determine which factors contribute or impede successful innovation and identify how we might build innovative capacity in the industry.

Methods

Initially, an extensive literature review was undertaken to scope the wide range of topics relevant to the project. In addition to consulting published literature, horticultural data was compiled using Defra's Horticultural Statistics publications from 1945/6 to 2011, taking account of area under cultivation, gross output and subsequent productivity.

Following the initial literature review, a further review was conducted examining the comparability of agricultural research and medical research, with specific focus on translational research and implementation. The conclusions of this work were presented at the Knowledge Transfer for Innovation conference in Staffordshire in 2015.

The first stage of primary data collection involved a series of semi-structured interviews with industry experts. Interviewees were selected based on purposive sampling and co-nomination sampling (asking interviewees who else should be interviewed in their opinion, also called 'snowballing'). In general, the interviews were conducted at the interviewee's place of work, though several were conducted at Warwick Crop Centre.

The interviews were recorded via Dictaphone, transcribed and 'coded' through *Framework Analysis*, a qualitative research methodology increasingly used in medical and health research (Gale, Heath, Cameron, Rashid, & Redwood, 2013). Computer Assisted Qualitative Data Analysis Software (CAQDAS) *Nvivo* was used to organise the data for analysis. Questions concerned five topics, each with a set of sub questions:

1. Innovation in the FPI
2. Barriers and Facilitation of innovation in the FPI
3. Contribution to innovation in the FPI
4. Representation in the FPI
5. Challenges for the FPI

Findings

With the post-war consensus on increasing yield through agricultural science largely achieved, and with agricultural research now primarily organised along demand-driven lines, new problems have emerged with regards to the role of research within agriculture; sometimes called 'knowledge mobilisation' and how this connects to innovation. The study of innovation is not only concerned with formal research, however, there is a growing recognition of the importance of private enterprise, non-governmental organisations and producer organisations which has shifted government and academic focus to these actors.

At the time of writing, 30 semi-structured interviews have been undertaken, in most parts of the UK with a range of people across all levels of the fresh produce sector. In total, ~60 emails were sent to prospective interviewees indicating a 50 per cent positive response rate (with several of those still representing possibilities for interviewing).

Although the transcription, coding and analysis of interviews is on-going (and as such the categorisation and interpretation of themes may change), several descriptive categories are emerging:

1. Nature of fresh produce industry
2. Drivers of change
3. Nature of innovation and examples from the industry
4. Sources of innovation
5. Enabling & disabling factors for innovation
6. Forms of communication, organisation & collaboration
7. Responsibility
8. Challenges
9. Comparisons with the past
10. Areas for future innovation

The first five of these topics are discussed in more detail in this report with evidence from interviews and existing literature used to highlight key themes. However, **analysis of current categories is on-going** and as such the descriptive accounts of these themes given here are subject to change. Many of the categories have overlapping components; for instance, the competitive nature of the industry is assumed to be a *driver* of innovation, and something that *disables* innovation. Further analysis is required to interpret linkages in the data and explain phenomena within these descriptive categories.

1. Nature of the fresh produce industry and sector trends

Many observations were made by interviewees concerning the *nature* of the FPI and the actors within it; it was not always made explicit how these observations affect innovation, but it is clear that the nature of the industry determines its institutional landscape, innovation needs and outcomes. For example, the ease with which protected cropping environments can be manipulated was seen by some as lending to the innovativeness of the industry. A strong vein of entrepreneurialism also appears to define the industry, and as such innovation is given a high priority amongst businesses that can mobilise knowledge effectively.

2. Drivers of change

The drivers of change in the industry, here defined as phenomena that encourage or force actors to innovate, were, perhaps predictably, strongly economic; many interviewees cited ‘necessity’ or ‘need’ as factors prompting innovation, due to the rigours of an intensely competitive marketplace both at the production and retail ends of the supply chain. *Regulation* was also seen as a driver of innovation, although this was often an area of considerable disagreement.

3. Nature of innovation and examples from the industry

A wide range of specific innovations and opinions on the functioning of innovation in the industry were discussed during the course of the research. A very common observation was that polytunnels had revolutionised soft-fruit growing (and were now seeing use in top/hard-fruit production), spawning subsequent innovation to better meet the needs of this 'new' growing environment.

4. Sources of innovation

While it is not possible to *rank* the contribution of different actors to innovation in the fresh produce industry, we can begin to examine the role of different organisations and sectors in pushing the industry forward, and also how the approach to research and development is changing. An 'internationalisation' of innovation appears to be underway, with organisations actively collaborating in multi-stakeholder 'innovation networks' operating in globalised contexts, helping such organisations meet the needs of their 'innovation agendas'.

5. Enabling and disabling factors for change

A wide range of 'enabling' and 'disabling' factors for change were observed during the interview stage of this research. Since the 1950s a large number of publications have sought to delineate what influences the adoption of innovation at farm level (known as *extension science*), and many of the observed determinants of change in the modern UK fresh produce industry are similar to those highlighted in extension literature over the years (particularly where the focus is on the primary producer). However, there are a number of factors seemingly unique to the industry that can influence innovation.

Discussion

The nature of innovation in the UK fresh produce industry is complex; through interviewing a range of industry experts, we have begun to provide answers for several of the project's research questions (see Appendix), as well as start to contribute to an Agricultural Innovation Systems (AIS) analysis of the sector.

The nature of the industry itself seems to determine innovation outcomes; the pressure of the marketplace, coupled with an entrepreneurialism, which other sectors of farming are accused of lacking, drives innovation. As such, innovation is seen to be ubiquitous, occurring across the value chain. A few notable sources of innovation are emerging from the data, however, with research institutes – both here and overseas – certain private businesses and producer

organisations – based in the UK and elsewhere – and even smaller growers playing a part. Further work will clarify how these innovators operate in the innovation landscape of the UK fresh produce industry.

In addition, there are a number of personal barriers to innovation – often those previously identified in extension science literature – and institutional barriers to innovation that, in the case of the fresh produce industry, result in unique challenges. One important descriptive coding category – *forms of communication, organisation and collaboration* being its working title – is yet to be interrogated in a meaningful manner, but should offer a detailed analysis of how the various actors that make up the fresh produce industry interact with regards to innovation.

The results of this exercise (and further research is planned) point towards a heterogeneous innovation 'landscape' with many contributions from many parts of the supply chain, with a similarly diverse range of barriers to innovation largely dependent on business scale and area of expertise. There do seem to be grounds for cooperation, however, and we are also witnessing an 'internationalisation' of the agricultural innovation system in fresh produce.

Financial Benefits

At this point, we cannot determine the financial benefit of a given method or policy recommendation. However, the value of improving the innovative capacity of UK Fresh Produce stands to be large. Improving best practice across the industry alone will yield a more valuable and productive sector.