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**Exploring Alternative Models of Localisation in
Food Supply Chains:
A Theory of Constraints Approach**

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**A thesis submitted in partial fulfilment of the requirements of
Northumbria University for the degree of Doctor of Philosophy**

**Research completed under the supervision of
Newcastle Business School**

Abstract

Local food and the localisation of food are beset by many problems in the UK. We have still yet to agree on a consensus view of the term 'local food' despite the call for an enforceable definition. The continued absence of rules around products and their relative spatial determinacy has led to the development of both fluid, and subjective interpretations around the term 'local', as well as a willingness by key actors to readily conflate 'local' with 'regional' as a pluralistic device in a market worth £4.6 billion in sales from farm shops and farmers' markets alone.

This research sets out to identify and diffuse the problems we have in defining what local food is, and presciently, what it may become. The research itself utilises a qualitative multiple case study approach, engaging with a final cohort of 23 producers of similar products, but at different scales of supply, and across a broad geographic spread of England. In encompassing areas which do not have a reputation for local food, the research mitigates against previous micro-analytical research and adds both construct and internal validity to its data, gathered by semi-structured interviews, process mapping and questionnaires. Template analysis is used as a data extraction tool in this research, which seeks to provide disambiguation around the sector and suggest a way forward which has the potential to offer greater derived benefit to current and future stakeholders.

Unlike traditional supply chain analysis, this research extends beyond supply chain metrics in both identifying and addressing problems where there are no immediate best answers, but where supply chain model constraint impacts extend to cultural, ethical and environmental outcomes. These constraints surrounding definitional issues, borne of both complexity and ambiguity, are assessed using the Theory of Constraints (Goldratt, 1984) to gain a better understanding of 'local food' and its key producer stakeholders. Across the 23 case studies, identification of the constraints at play provides an understanding of the institutional and political constraints amongst the larger partners and government bodies, whilst considering their impacts upon the

survival of local food, driven largely by its inherent value and the person values and persistence of its producers.

The key constraints are: the nature of the market; the scale and nature of products; institutional constraints; supply chain relationship constraints; policy, certification and regulatory constraints; employment and skills, as well as constraints around personal beliefs and a modern anthropomorphism.

In addition to the results that expose the constraints, the research offers an adapted Theory of Constraints, which has been specifically developed for the examination and analysis of local food and short food supply chains. The adapted theory suggests that in initial identification of the core competencies of producers in what is right, rather than focussing on the elimination of what is wrong, it is possible to derive increased benefit through supply chain management interventions which support the core competencies of the producer.

Declaration of original authorship

This thesis is my own original work; I am responsible for both its preparation and the research herein. As the sole author I am therefore wholly responsible for any errors it may contain. The thesis has not been submitted for either award or publication in any other form and has been completed in accordance with the requirements the University and within its regulations and guidelines.

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Date: 30th September 2010

Resubmitted: 10th June 2011

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It is said that a loving heart is the truest wisdom, so above all else, to my beautiful, wonderful, extraordinary wife for her unswerving support and loyalty throughout, and to my remarkable and prodigious son who stood at my office door during my darkest hour and offered to help his father rather than go to the skate park. No man could hope for or know better love. Your support allows me to follow the advice of Dickens; "reflect upon your present blessings of which every man has many, not on your past misfortunes, of which all men have some." This PhD is as every bit yours as it is mine.

Index

1	Introduction.....	1
1.1	Background	1
1.2	Rationale.....	7
1.3	Research Aims & Objectives	9
1.4	Structure of the Research	10
1.5	Document Road Map.....	12
1.6	Summary	15
2	Literature Review	16
2.1	Introduction to the literature reviews.	16
2.2	Introduction to Local Food	18
2.3	Policy Perspective.....	18
2.4	Sociological Perspectives	30
2.5	Supply Chain Perspectives in Local Food.....	42
2.6	Buyer Behaviour & Local Food	52
2.7	Anthropomorphism & Animal Welfare.....	62
2.8	Summary	64
3	The Theory of Constraints and its Philosophies.....	68
3.1	An Analysis of Previous TOC Applications.....	79
3.2	Operations Management.....	82
3.3	Supply Chain Management	92
3.4	Accounting.....	98
3.5	Limitations of TOC	98
3.6	Summary	119
4	Methodology.....	123
4.1	Introduction to the Methodology Chapter	123
4.2	Epistemology.....	126
4.2.1	Constructionism	126
4.2.2	Objectivism	127
4.2.3	Subjectivism	128
4.3	Theoretical Perspective.....	128
4.3.1	Positivism.....	129
4.3.2	Interpretivism.....	130

4.3.3	Phenomenology.....	132
4.3.4	Hermeneutics.....	134
4.3.5	Symbolic Interactionism	135
4.4	Methodology.....	137
4.4.1	Case Study.....	138
4.4.2	Previous Applications of Case Study in both TOC and Food Localisation Research	144
4.4.3	Criticisms of Case study.....	146
4.4.4	Sampling & Selection.....	147
4.5	Research Design.....	153
4.5.1	Research Management Processes	153
4.5.2	Research Position	154
4.5.3	Research Management	155
4.5.4	The Research Interview	156
4.5.5	Field Notes	158
4.5.6	Pilot Study	159
4.5.7	Prejudice.....	162
4.6	Template Analysis.....	163
4.7	Validity & Reliability of Case Study Interviews.	164
4.8	Reflexivity	168
4.9	Ethical Issues.....	168
4.10	Summary	170
5	Case Studies.....	174
5.1	Introduction to the case study partners.....	174
5.2	Case Study Partner A.....	177
5.3	Case Study Partner B.....	182
5.4	Case Study Partner C.....	187
5.5	Case Study Partner D.....	192
5.6	Case Study Partner E	196
5.7	Case Study Partner F	201
5.8	Case Study Partner G	206
5.9	Case Study Partner H.....	213
5.10	Case Study Partner I	217
5.11	Case Study partner J.....	222

5.12	Case Study Partner K.....	225
5.13	Case Study Partner L.....	229
5.14	Case Study Partner M.....	234
5.15	Case Study Partner N.....	239
5.16	Case Study Partner O.....	243
5.17	Case Study Partner P.....	249
5.18	Case Study Partner Q.....	254
5.19	Case Study Partner R.....	258
5.20	Case Study Partner S.....	263
5.21	Case Study Partner T.....	268
5.22	Case Study Partner U.....	272
5.23	Case Study Partner V.....	274
5.24	Case Study Partner W.....	277
6	Findings.....	281
6.1	Introduction to Findings.....	281
6.2	Constraints around 'local food'.....	290
6.2.1	Supplying a wider customer base.....	290
6.2.2	Levels of detour.....	291
6.2.3	Farmers' Markets.....	291
6.2.4	Scale and products.....	292
6.3	Constraints recorded as perception.....	293
6.3.1	Concepts of local food.....	293
6.3.2	Concepts of the market.....	294
6.3.3	Concepts of the customer.....	295
6.3.4	Concepts around skills and jobs.....	296
6.4	Institutional Constraints.....	297
6.4.1	Resource efficiency.....	297
6.4.2	Business model.....	298
6.5	Commercial Operations & Logistics.....	299
6.5.1	Development of customer base.....	299
6.5.2	Perceived lack of complexity.....	299
6.5.3	Business to business sustainability.....	299
6.5.4	External business targets.....	300
6.5.5	Homogeneity of products.....	300

6.5.6	Operational growth.....	301
6.5.7	Development within scale	301
6.5.8	Business to business elasticity.....	302
6.6	Collaboration	303
6.6.1	Informal collaboration ~ logistics.....	303
6.6.2	Formal collaboration ~ logistics.....	303
6.6.3	Formal collaboration ~ purchasing	304
6.6.4	Formal collaboration ~ wholesale & distribution	305
6.7	Policy.....	306
6.7.1	Development of alternative accreditation & compliance schemes (SALSA / LEAF / HEFF Standard) & provenance of goods.....	306
6.7.2	Compliance with legislature throughout the chain.....	306
6.7.3	Food miles	307
6.7.4	Government funded business support initiatives other than the RDPE programmes	307
6.7.5	The Rural Development Plan for England 2000-2006 & 2007-2013 schemes.....	307
6.7.6	Regional Food Groups	308
6.7.7	Regional Development Agencies.....	309
6.8	Localisation	311
6.8.1	Employment & skills.....	311
6.8.2	Perceptions and market devices around 'local'	312
6.8.3	Local / localisation	312
6.8.4	Altruism / education.....	313
6.9	Animal Welfare & Anthropomorphisms.....	314
6.9.1	Personal perspective of producers	314
6.9.2	Business perspective of producers.....	315
6.9.3	Abattoir issues	316
6.9.4	Distances travelled by live and dead stock	316
6.10	Example of TOC Drawn from the Case Study Partners.....	317
6.11	Summary	318
7	Discussion	319
7.1.1	Introduction.....	319
7.2	Discussion of the findings and their relationships to the themes which have emerged during the reviews of the relevant literature domains.	319

7.3	Discussion of an adapted TOC framework and its potential benefits	332
7.4	The case of Case O, a Regional Development Agency and the Rural Development Plan for England.	337
	Expanding family farm egged on to succeed.....	337
8	Conclusions.....	341
8.1	Comment and advice to policy makers, practitioners and managers	342
8.2	Contributions to the current body of knowledge	352
8.3	Limitations	354
8.4	Suggestions for further research.....	355
8.5	Reflections.....	356
9	References	358
10	Appendix.....	379
10.1	The template of analysis	379
10.2	Example of Consent Form	399
10.3	Example of Organisational Consent Form	403
10.4	Example of Questionnaire from Pilot Study (Sausage Production).....	407
10.5	Example of Questionnaire from Main Study (Sausage Production).....	416

List of Figures

Figure 1 Model of local food interpreted from DEFRA (2003).....	19
Figure 2 Framework of internal & external supply chain issues in local food	52
Figure 3 Buyer behaviour model adapted from Blackwell, Menard & Engel (2006) .	54
Figure 4 Traditional accounting causal loop diagram	71
Figure 5 Porter's Value Chain (in Svensson, 2003, p. 391)	106
Figure 6 VSM's Integrated Materials Value Pipeline. (Hines, 1993, p.14)	111
Figure 7 Research methodology.....	124
Figure 8 Model of analysing using Verstehen. Source: Gill & Johnson (2010)	131
Figure 9 Taxonomy of field roles. Source: Gill & Johnson (2010)	154
Figure 10 Research risk management tool	155
Figure 11 Case Study Partner map.....	175
Figure 12 Supply chain / process maps colour coding guide.....	176
Figure 13 Case A: Manufacturing & distribution.....	180
Figure 14 Case B: Manufacturing & distribution.....	185
Figure 15 Case C: Process flow	190
Figure 16 Case D: Manufacturing & distribution	194
Figure 17 Case E: Abattoir process flow	198
Figure 18 Case E: Loin process flow	199
Figure 19 Case F: Selection & rearing process flow	204
Figure 20 Case F: Poultry processing flow	204
Figure 21 Case G: Current distribution map (April 2008)	210
Figure 22 Case G: Proposed distribution map (July 2008).....	211
Figure 23 Case H: Process flow for fishcake core manufacturing.....	215
Figure 24 Case I: Milk production & distribution process flow	220
Figure 25 Supply relationships between Cases J, T, U & V	223
Figure 26 Case J: Pig rearing process	223
Figure 27 Case K: Sausage manufacturing process	227
Figure 28 Case L: Manufacturing & distribution	232
Figure 29 Case M: Manufacturing & distribution	237
Figure 30 Case N: Operational process flow	241
Figure 31 Case O: Rearing, laying & egg distribution process	247
Figure 32 Case P: Manufacturing & distribution.....	252
Figure 33 Case Q: Manufacturing & distribution	256
Figure 34 Case R: Farming, butchering, manufacturing & distribution.....	261
Figure 35 Case S: Farming, butchering & distribution	266
Figure 36 Case T: Sausage manufacturing at the farm shop	270
Figure 37 Case U: Typical flow for feed mill operations.....	272
Figure 38 Case V: Abattoir process for pigs	275
Figure 39 Case W: Contractor poultry rearing process.....	279
Figure 40 Case study partners by scale	287
Figure 41 Primary / secondary activity split.....	287
Figure 42 Rural / urban split of case studies.....	288
Figure 43 On farm activity across case studies.....	288

Figure 44 Non-farming activity across case studies	289
Figure 45 Sectors serviced by case study partners	289
Figure 46 A proposed 4 stage model for small business development.....	335

List of Tables

Table 1 Differences between conventional & alternative food supply systems (adapted from Ilbery & Maye, 2005).....	32
Table 2 SERIO classifications for purchasing local & regional food (2008).....	58
Table 3 A theoretical framework of embeddedness & supply chain imperatives.....	67
Table 4 Thought Process instruments & their applications	76
Table 5 Porter's & Hines' models contrasted. (Lysons & Farrington, 2006, p. 105).....	116
Table 6 Six sources of evidence in case study (Yin, 2003)	143
Table 7 Evidence of case study in the research of TOC.....	145
Table 8 Evidence of case study in the research of local food & food localisation... ..	145
Table 9 Case study tactics for 4 design tests. Source: Yin / COSMOS (2003).....	166
Table 10 Key principles of research ethics. Source: Easterby-Smith <i>et al.</i> (2008).....	169
Table 11 Case Study Partners listed alphabetically	284
Table 12 Case Study Partners grouped by size of enterprise: micro, small, medium & large.....	284
Table 13 Case Study Partners grouped by geographic location: rural / urban.....	285
Table 14 Case Study Partners grouped by primary or secondary activity	285
Table 15 Case Study Partners grouped by type of activity.....	286
Table 16 Case Study Partners grouped by sector	286
Table 17 Key themes summary table: actual constraints	293
Table 18 Key themes summary table: perceived constraints.....	296
Table 19 Key themes summary table: institutional constraints	298
Table 20 Key themes summary table: commercial operations & logistics	302
Table 21 key themes summary table: collaboration	305
Table 22 Key themes summary table: policy	310
Table 23 Key themes summary table: localisation	314
Table 24 Key themes summary table: animal welfare & anthropomorphism	317
Table 25 A proposed adaptation of TOC for the 'local food' producer sector.....	333

List of General Acronyms

AOC	Appellation D'origine Contrôlée
BSE	Bovine Spongiform Encephalopathy
BRC	British Retail Consortium
CAP	Common Agricultural Policy
CDP	Consumer Decision Process
CLAS	Campden Laboratory Accreditation Scheme
CSA	Community Supported Agriculture
CXD	Cadillac Express Delivery
DEFRA	Department for Environment, Food & Rural Affairs
DRP	Distribution Resource Planning
EDI	Electronic Data Interchange
EFFSIS	European Food Standard Inspection service
ERP	Enterprise Resource Planning
FARMA	National Farmers Retail & Markets Association
FMD	Foot & Mouth Disease
FYM	Farm Yard Manure
GATT	General Agreement on Trade & Tariffs
HACCP	Hazard Analysis & Critical Control Points
HDPE	High Density Polyethylene
HEFF	Heart of England Fine Foods
IGD	The institute of Grocery Distribution
IMVP	Integrated Materials Value Pipeline
IPPC	Integrated Pollution Prevention & Control
JIT	Just in Time
LAG	See foot notes on page for full explanation
LEAF	Linking Environment & Farming Scheme

LEADER	See footnotes on page for full explanation
LCA	Life Cycle Assessment
MAFF	Ministry for Agriculture, Farming & Fishing
MRP	Material Resource Planning
PDO	Protected Designation of Origin
PET	Polyethylene Terephthalate
PLA	Poly Lactic Acid
PMG	Processing & Marketing Grant
POD	Proof of Delivery Notes
PSFPI	Public Sector Food Procurement Initiative
RES	Rural Enterprise Scheme
RDA	Regional Development Agency
RDC	Regional Distribution Centre
RDPE	The England Rural Development Plan
RFG	Regional Food Groups
SALSA	Safe & Local Supplier Scheme
SERIO	Socio-Economic Intelligence & Research Observatory
SFSC	Short Food Supply Chains
SMED	Single Minute Exchange of Die
SCM	Supply Chain Management
SKU	Stock Keeping Unit
TPK	Theory of Profound Knowledge
UCC	Urban Consolidation Centre
VC	Value Chains
VCA	Value Chain Analysis
VS	Value Streams
VSM	Value Stream Mapping

VCJD	Variant Creutzfeldt Jakob Disease
3PL	Third party Logistics
4PL	Fourth Party Logistics

List of Theory of Constraints Acronyms

TOC	Theory of Constraints
TOCTP	Theory of Constraints Thinking Processes
CRT	Current Reality Tree
CCRT	Communications Current Reality Tree
CRB	Current Reality Branch
DBR	Drum-Buffer-Rope
EC	Evaporating Cloud
FRT	Future Reality Tree
FRB	Future Reality Branch
GEC	Generic Evaporating Cloud
I	Inventory
NBR	Negative Branch Reservation
OE	Operating Expense
PRT	Prerequisite Tree
SDBR	Simplified Drum-Buffer-Rope
T	Throughput
TP	Thinking Processes
TT	Transition Tree
UDE	Undesirable Effects

1 Introduction

1.1 Background

During the last half century we have witnessed manifest and striking changes in the ways that food is produced, distributed and consumed in the UK. This evolving history of post-war agricultural development has been directly influenced by the concurrent changes in customer behaviour, itself directly shaped by the introduction and development of multiple retailers, who now account for more than 90% of the UK market. The attendant move towards industrial agriculture did not occur in isolation, nor was it unforeseen, with Polanyi (1957) identifying the emergence of disembedded markets as the heterogeneity of local markets and their requirements became subsumed in a model of homogeneity underpinned by standardisation, repeatability and technology along with the blurring and removal of geographic boundaries.

The development of industrialised agricultural systems and 'top down' supply contracts which align farms to large customers, has through a gradual process of elicitation on behalf of the customer, led to the evolution of farms which have specialised in the production of specific crops and animals. This in turn has promoted a position whereby crop and animal monofunctionality strengthens the position of large customers, in their ability to manage specifications and conformance criteria, whilst also tying in these farms' systems with the agro-industry companies which supply farm inputs in the form of seeds, pesticides, chemicals and so forth. As a production-focussed paradigm developed, it has marshalled in an inevitable decline of farm pluralisation in those engaging with these systems, and weakened traditional ties with the customer in the race to scale-driven production of crops and animals for food consumption.

It is undeniable that as a concomitance to monofunctionality in the UK farming sector, The Common Agricultural Policy (CAP) also shaped the decision processes of farmers since the 1973 ascension to EU membership. With its ability through federal intervention to maintain commodity prices across its member states, CAP offered a mechanism which paid subsidies for crops, imposed import levies to increase the price of imports up to an EU-

devised market price, import quotas, and perhaps most contentiously of all, intervention price instruments which guaranteed centralised purchasing of products in the event of downwards movement below the internal market price.

CAP production quotas were introduced to control the flow of goods to the internal market in the wake of the food mountain and drinks lakes scandals, when purposeful overproduction occurred specifically to draw in subsidies for some food types, where those subsidy prices were considerably in excess of the true market price. The consequent introduction of 'set-aside' payments to further control overproduction was not as successful as had been hoped. These payments were introduced partly as a result of General Agreement on Trade and Tariffs (GATT) and CAP reforms, which were driven by the then Commissioner for Agriculture, Ray MacSharry, aimed at farm output limitation and a steady reduction of support for commodity production, in addition to the removal of trade barriers, which had principally arisen out of interventions in the EU and USA. At a local level across member states, it became common practice for farmers to purposefully 'set-aside' the land that they had lower yields from and where topography made farming generally more difficult than on other parts of the farm. The historical model of CAP has favoured larger farms in that the more the farm produced, the more subsidies it attracted, whilst outside of the member states of the EU a general consensus emerged in that CAP was considered to be interventionist and against a neo-liberal, monetarist free market.

During 1998, a farming crisis emerged when the then Minister for Health proclaimed that most of the UK eggs produced under intensive farming systems were infected with salmonella, leading to wholesale removal of eggs from the food chain and the slaughter of more than two million birds in contaminated flocks. A short term mass irradiation programme for eggs was introduced to rebuild public confidence, and in the longer term, the Salmonella National Control Programme has passed down in to law¹.

¹ Salmonella still remains a major issue, at the time of writing this introductory chapter, the USA has recalled half a billion eggs suspected of being infected with the bacteria. The eggs themselves all originate from a few 'mega producer' companies.

Between the MacSharry reforms and the introduction of a major reform of CAP under the 2003 Single Farm Payment Scheme, British Farming has faced two further crises which have impacted upon the market, incumbent governments and the already distanced retail customer's perceptions of farming in the UK.

Although first diagnosed in 1986, bovine spongiform encephalopathy (BSE) would take a further 10 years to fully enter the collective public consciousness when the then government acknowledged cross-species contamination to humans in the form of Variant Creutzfeldt Jakob Disease (VCJD). At the height of the crisis, a worldwide ban was placed on beef and beef product exports from the UK. Nearer to home people had begun to question the provenance of the meat they ate when a 20 year old vegetarian died as a result of VCJD, his coroner recording that it had been as a result of this young man eating beef burgers as a child. As events unfolded, it became clearer to the mass populous not only what went into our processed meat products, but also what we put into those animals as feed; ruminant derived protein, cows being fed to cows as food fit for human consumption, managed under intensive farming programmes. The tragedy of 'reaping what you sow' made even more ironic by systems and feed regimes designed to maximise unit efficiency on these very farms. It is estimated that the BSE crisis cost the UK economy £11 billion and led to the slaughter of three million cattle, of which 180,802 cattle were confirmed as having BSE. The Phillips Enquiry lambasted the Ministry for Agriculture, Farming and Fishing (MAFF) for systemic failures which ultimately allowed BSE cattle to enter the human food chain; it is believed that the findings of the enquiry sounded the death knell for MAFF, to be replaced with DEFRA.

In February 2001, 27 pigs were reported as having highly suspicious signs of Foot and Mouth Disease (FMD.) Such was the effect of the outbreak, traced back to a pig farm at Heddon-on-the-Wall in Northumberland and the feeding of untreated food to those pigs, that a general election was delayed, 3,750,222 animals were slaughtered on an industrial scale, of such magnitude that it required the assistance of the army, and the cost to tourism and local businesses alone topped £250 million. In 2001, a policy

commission on the future of farming and food was constituted, reporting the following year, the Curry Commission laid out the future of sustainable farming and food for England. Whilst many authors readily cite the Commission as a roadmap for the nascent re-emergence of local food systems, it is often overlooked that it considered the effects and root causes of FMD, identifying not only the high levels of journeys taken by livestock, but that the outbreak “*showed that the English countryside – overwhelmingly a farmed landscape – is vital for more businesses than farming.*” (DEFRA, 2002, p. 14) The report as a device sought to:

Advise the government on how we can create a sustainable, competitive and diverse farming and food sector which contributes to a thriving and sustainable rural economy, advances environmental, economic, health and animal welfare goals and is consistent with the Government’s aims for CAP reform and increased trade liberalisation.

(DEFRA, 2002, p. 5)

When the Curry Commission reported in February 2002, it called for urgent reform of CAP to support rural development, an end to price supports and direct payments, the decoupling of subsidies from specific crops and a progressive move to Pillar II² of CAP to fund social schemes, environmentally sustainable farming and rural development. The report also called for a rationalisation of compliance schemes and the mainstreaming of locality marketing to be undertaken by Regional Food Groups (RFG), as well as the creation of a Food Chain Centre under the management of the Institute of Grocery Distribution (IGD). The Curry Report sought not only to reconnect farming to the population, but to call for the creation of devices to increase farm margins by direct and shortened supply chain sales, the potential niching of certain products to mitigate against lower cost imports, a wider recognition of land management and the benefits of developing tourism and leisure activities in rural settings.

² CAP is made up of two distinct pillars; Pillar I manages direct subsidies and internal market support across member states, Pillar II manages rural development. Under the second phase of the Rural Development Plan for England 2007-2013, Pillar I funding is €301.1 billion whilst Pillar II funding is €88.8 billion.

Sixteen months after (June, 2003) the publication of the Curry Report, the largest, and most fundamental reform of CAP was introduced in the form of the Single Farm Payment Scheme. Under the scheme the farmer receives payment per hectare of managed, cultivatable land, where the decision around crop planting is informed by the requirements of the market, and not on the subsidy that the crop traditionally attracted. Uncoupling formed only part of the scheme; farmers were now urged to farm to the demands of the market, and would also be required to 'cross comply' under the new system of payments. Cross compliance requires that farmers also comply with statutory standards covering good farm practice, environmental stewardship, food safety, crop health and animal welfare standards, as well as setting aside 8% of their land under managed conditions and developing field perimeter zones. Where evidence of non-compliance or lax management arises, payments may be reduced on a scale from 5% minor infringements to complete withholding for intentional non-compliance.

In consideration of the recommendations of the Curry Report and the fact the wheels of change are slow to change, especially when those wheels are on a farm trailer travelling across the 27 member states of the EU, I have frequently pondered upon the chicken and egg scenario and to the extent that the commission report was influenced by much of that which was going to occur the following year regardless.

Nevertheless, farming now finds itself in a trichotomic position, much of it controlled by 'top down' structures, whilst having to operate under a quasi post productivist paradigm in order to attract payments, and consider long term strategies informed by DEFRA's (2010) thinking on future food security and sustainability, as seen in the Food 2030 strategy paper.

The Food Chain Centre called for by the Curry Commission was subsequently set up and is managed by the IGD. In 2007 it reported on research led by Prof Dan Jones of Cardiff Business School, one of the leading exponents on 'Lean Thinking' in supply chains. The research has produced case study evidence and advice for dairy, poultry, red meat, cereals and fresh produce operations from a supply chain perspective (IGD,

2007). The case studies have looked to develop 'lean thinking' strategies developed from car and component manufacturing. The key findings from across the sectors suggested that although the techniques originated from other areas, they were transferrable to this sector, but that significant challenges remained in the sharing of customer information and collaboration. By identifying that the greatest consequential benefits lay within performance measurements and data sharing, there is a level of supposition that all of the actors, regardless of size or complexity of operation, are able to commit resources to undertake these exercises. The introduction of 'lean thinking', value chain analysis and value stream mapping in food supply networks is addressed at greater depth in the second part of the literature review also.

We should not think that farming stands alone as it attempts to manage cross compliance and develop local markets, although it is recognised that the development of products for local supply and those local supply chains themselves, are largely governed by the same regulatory compliances required of larger enterprises in relation to Health & Safety, food hygiene, packaging, batch traceability, transport etc. Yet even as small producers look to move their goods to market, there are numerous best practice programmes with freely accessible information and tools to aid efficiencies, from environmental best practice programmes through to the most recent Van Best Practice Programme (Business Link, 2010), which also allows access to routing, mapping and fleet efficiency software.

Since its inception, DEFRA is responsible for the management of research projects which are specifically commissioned to both underpin the formulation of policy and further development of existing policy. There are 40 themes under which this research occurs, from agriculture and climate change, through to wildlife management.

Project FO0104: 'Investigating the Practicalities and Benefits of Local Food Production and Identifying any Unintended Effects and Trade-offs', was commissioned under the theme of resource efficient and resilient food

chains, against a background of opposing views on food supply, with calls for localisation to decrease environmental burden (Pretty, 2001; Pretty *et al.*, 2005) and opposing views that resource utilisation in efficient farming systems had less impact. This was typified by the research of Saunders *et al.* (2006) who indicated that importing meat from New Zealand had a lower environmental impact than raising it in the UK, whereby each camp came to question the methods and validity of the other's findings. Project FO0104 was awarded to Newcastle Business School and commenced in 2007, with the report being submitted in July 2009. The aims of the research were to conduct investigations which would allow for policy development, which in turn would allow quicker access to developing markets, particularly those which could be open to local and regional foods. The overarching objective of the research project was to uncover difficulties and practicalities in the sector and to reveal if there were any unintended impacts of local food production from environmental, economic or social perspectives.

1.2 Rationale

Before entering academia I held a senior supply chain management role with an international dairy company. During my 11 years with this company I was frequently seconded to address local production and supply issues across the 14 UK production sites, this was in addition to my group purchasing and supply chain management responsibilities and regional management of the stores operations at the four northern dairies. This wide-ranging remit presented opportunities to undertake significant operational reviews, enabling me to develop innovative strategies and practices which added value in internal supply chains, overcame operational constraints, improved cycle times, reduced stock levels, enhanced work environments and introduced new systems that strengthened relationships with and performance of suppliers.

I had no explicit supply chain knowledge before I joined this company, indeed I joined as a production maintenance engineer. I am a Millwright by trade, but found myself almost serendipitously of being 'in the right place, at the right time' when, after constantly complaining about the lack of critical

spare parts i.e. those that stopped production lines running if they were not in stock when needed, or were not readily available through the local supply network, I was asked to undertake a review of the engineering stores operation. The review revealed what I would come to identify as classic signs of deficient management in supply chains: poor data integrity, poorer supplier management, lack of accountability, training and reporting systems, poor layout and fractured internal supply relationships. What struck me most of all was how relatively simple it was to stand back from the operational coal face and identify where the problems lay rather than 'fire fight' them on a daily basis. After the success of this project I was asked to undertake further reviews, and was introduced to the Theory of Constraints by a training manager and a book by Eliyahu M Goldratt; 'What is this thing the Theory of Constraints and how should it be implemented?' My first implementation of the Theory of Constraints was a study of a filling line, identifying the slowest piece of machinery on that line and analysing line performance data which revealed the slowest machine on the line was only running at 64% efficiency. By engaging with production line colleagues, and undertaking procedure and line modifications both upstream and downstream of the filler³, the efficiency of the filling machine rose to 93% and was subsequently maintained at about this level as a line performance measurement. My role developed into that I had at the time I volunteered for redundancy rather than relocate my family 150 miles south following the 2005 closure of the local production facility, itself a victim to scaling up and centralisation.

Fast forward to the autumn of 2007 and the commencement of the field work for FO0104, I began to notice constraints being placed upon case study partners which defied objective analysis, missed opportunities to increase resource efficiency and restricted operational capabilities, particularly in the case of the smaller partners. I became both an intrigued and at times

³ These included altering conveyor speeds, sensor positions and delay times, reconfiguring poly bottle trailer loads and the creation of a daily pick list of labels and caps delivered to the line at the start of the day and then at intervals of two hours, cross training of staff to support tooling changeovers and developing better working relationships with colleagues from the Quality Control, Stores & Despatch Departments.

frustrated observer, the frustration inevitably informed by my own world view but ultimately inspiring me to focus my PhD research and resolve to comprehend 'what is going on?' This became even more so in consideration of the observation by Edwards-Jones *et al.* after the pilot study that:

However, social scientists may not be surprised that reductionist natural science cannot resolve the local food debate, as for many consumers the attractions of local food do not relate to measurable differences in its embodied energy of nutrient status, but rather relate to a sense of place, trust and experience. .
(Edwards-Jones *et al.*, 2008, p272).

1.3 Research Aims & Objectives

As a result, the research aims and objectives began to meld in my observations for FO0104, discussions with the Principal Investigator, prior operational experiences, and a desire to unveil the processes which lay behind the decisions case study partners made, and how they impacted upon their operations, or indeed benefitted their operations. This leap was not without precedent, Eisenhardt (1989) proposes:

Thus if a new data collection opportunity arises or if a new line of thinking emerges during the research, it makes sense to take advantage by altering data collection, if such an alteration is likely to better ground the theory, or to provide new theoretical insight. This flexibility is not a license to be unsystematic. Rather, this flexibility is controlled opportunism in which researchers take advantage of the uniqueness of a specific case and the emergence of new theme to improve resultant theory. (Eisenhardt, 1989, p. 539)

The influences previously discussed then framed the research programme and the development of the research aim:

Exploring Alternative Models of Localisation in Food Supply Chains: A Theory of Constraints Approach

In which the objectives would be to develop understandings of the observed phenomena, and to further comprehend the extent to which these phenomena impacted upon operational efficiency. Furthermore, in categorising these constraints as personal perception or actual devices around the marketplace, the research hoped to reveal where system development could lead to alternative behaviours and models which would improve local food supply chains.

1.4 Structure of the Research

Both Gummesson (2000) and Easterby Smith *et al.* (2008) identify the impact of the researcher's own world views on their choice of research methods. To this end, and no doubt shaped by my age and life experiences, I consider my own world view to be aligned with social constructionism "*where the focus includes the collective generation and transmission of meaning*" (Crotty, 2003, p. 58). This worldview and the early field work in FO0104 led me to believe that a methodological approach, which collected qualitative primary data that would allow me to undertake an analysis of perceived and actual constraint phenomena, which are observable, identifiable and recordable, whilst allowing me to remain expressly uncritical, would allow a position from which Yin (2003) suggests that new interpretations and meanings may emerge.

My chosen approach of multiple case studies does allow me to, at least within this case study cohort, examine across a substantial scope of operational activity, from a small company owned and operated by two people, through to vertically integrated businesses and a contractor supplying that business.

There is considerable evidence of research in to 'local food' in England (Murdoch *et al.*, 2000; Morris & Buller, 2003; Tregear & Ness, 2005; Wetherell *et al.*, 2003; Winter, 2003; Kirwan, 2004; Ilbery & Maye, 2005; Ilbery & Maye, 2006; Khan & Prior, 2010) but the focus of these researches has tended towards definitions and alternativeness, which Ricketts-Hein *et al.* commented upon those researches occurring prior to their own paper;

“such research is often determinedly micro analytical and ethnographic in its investigation of place-based and socially embedded alternative food practices” (Ricketts-Hein *et al.*, 2005, p. 290). This research wanted to specifically address the lack of justification for selection of particular geographic areas in prior research, by establishing as far as possible, a broader geographic representativeness of case study partners, thereby overcoming any of the dangers of skewing the research, which would have emerged by restricting the research to a geographic area with a strong local food tradition, Shropshire for example. Whilst Tyne & Wear is not renowned for its local food, it is there, alongside large food processors in an urban conurbation.

By adoption of this multiple case study approach to obtain insight across degrees of scale and localisation of food, I realise that there will be an inevitable question about generalisability of any findings linked to criticisms of case study. However, I believe that a certain degree of appeasement is allowable in the breadth and structure of the study to allow construct, internal and external validity as well as reliability in its findings.

In seeking to understand the effect of my own epistemological and philosophical stance upon the research, and the influences upon these by my subject knowledge and life experiences, I have remained reflexive throughout the research process, as much to inform upon from a quality perspective as to ensure that I can extend the work from: “what would I have done?” to “what did they do and why?” and to confirm that the template analysis exercise went beyond mechanistic coding.

Having adopted the epistemological, ontological and methodological positions of the research, I developed a research strategy that would focus on multiple case study partners, methods for collecting data, methods for both the analysis and dissemination of the data and a communication plan. The pilot study of different organisations in a specific supply chain (pork) allowed valuable lessons to be learnt, which led to the redesign of the field research approach and its tools. The research has involved the gathering of large amounts of contextual, case-specific primary data across the case

study cohort, as well as more general data from each partner. This allows each narrative to follow broadly similar flows in their layout whilst presenting case particular information. The fieldwork commenced during the autumn of 2007 and was completed during early spring 2009.

The data analysis occurred both concurrent with the fieldwork and subsequent to it. This allowed both a 'real time' analysis of the narratives by the case study partners and the emergence of data which could be categorised and mulled upon as part of my reflexivity and further discussed during the supervision processes.

1.5 Document Road Map

The remainder of this research is covered in the six following chapters:

Chapter 2 Literature Review – Local Food presents a broad review of 'local food' drawn principally from the English / UK focussed literature. The chapter considers the re-emergence of local food into a more mainstream marketplace, its different connotations and how it is viewed from policy, sociological, supply chain and buyer perspectives. Again, the current 'state of play' is assessed and reveals a general willingness by the vast majority of actors to readily conflate 'local food' with 'regional food,' which itself is perpetuated by a lack of definition around the term of 'local food', further suggesting that benefits may only be short term in a restricted market. This potentially precludes emerging interpretations of local food, as well as the opportunity to develop new supply chains and customer bases, which would bring additionality to the market sector whilst protecting many of the price margin benefits associated with short chain food supply. Thus, another significant gap in the knowledge base emerges. In consideration of the views of customers and producers, significantly different interpretations of embeddedness emerge, which transgress broadly held perceptions around this term, quite notably from a supply chain aspect.

Chapter 3 Literature Review – The Theory of Constrains is an in-depth review of the Theory of Constraints from its original development through to the present day. The chapter establishes the present state of Theory of

Constraints knowledge, revealing its different manifestations and applications recorded across a range of literature, from research papers through to business books. The chapter reveals how the focus of the literature has developed from its early years at the dawn of the 1980's, where the majority of the focus occurred around application of theory, through to the present day, which has revealed that a steady change of cynosure towards theoretical development and model testing has occurred, against the background of a mid to long-term view, that there remains insufficient empirical research of theory application in businesses beyond the anecdotal. Hence, an important gap appears not only in the knowledge base, but in the application of the Theory of Constraints across different sectors. The review comments upon and brings forwards the literature which tracks the development of the theory, whilst contemplating upon the current 'state of play' with the theory and its possible future application across different domains. Further to this, due consideration is given to the development and introduction of three other management tools: Value Chain Analysis, Value Stream Mapping and Value Stream Management, as alternatives to the Theory of Constraints, as well as their prior application and development within agri-food chains.

Chapter 4 – Methodology commences with a review of the principal research philosophies and methodology examining the concepts and perspectives employed in this research; of an epistemological position of constructionism, an ontological stance addressed through interpretivism and phenomenology, which in turn is underpinned by a qualitative, multiple case study strategy using interviews, questionnaires and supply chain mapping as methods. The chapter recognises Crotty (2003) as a seminal text which has frequently been pertinent to this research. It further explains the reasons behind the selection of both the methodology and the methods, from their original designs, through to limitations which became apparent in the pilot study, the important lessons learned from the pilot study, as well as the further development of questionnaires and the reasons behind these developments, before the modified tools were redeployed for further field work. It also identifies and discusses the highly iterative nature of template

analysis and the longitudinal process of reflexivity which spanned the research.

Chapter 5 – Case Studies in which the case studies partners are introduced and the narratives and supply chain / process flow maps are presented. The first map in this chapter displays the locations of the case study partners, each of which represents a different degree of localisation in their products. Each of the case study narratives has been reviewed and agreed by the case study partners as an accurate reflection of their operations, or the scope of operation which impacts upon this research. The narratives have been developed to follow a common structure which starts with an overview of the company history.

Chapter 6 – Findings introduces a brief recap of template analysis, identifies the *a priori* codes used, and explains how the template evolves through a process of constant iteration. This iterative process allows the researcher to revisit previous analysis in the template, as second and third order codes emerge during the analysis of other case study partners in the research, applying a law of diminishing returns to indicate when the template analysis is sufficient in terms of this research. The chapter then presents summaries and summary tables extracted from the template, which appears in the appendix due to its size and layout.

Chapter 7 – Discussion & Conclusion draws together those findings which emerged from the template analysis of the primary data as strands of information and understanding, which are then spliced together with other strands which have emerged as themes, questions and controvertible interpretations contained within the relevant bodies of literature. The splicing of the different strands into a virtual rope allows the research conclusions and an adapted Theory of Constraints to be introduced indicating the contribution that this research makes to the body of knowledge in the subject areas. The chapter commences with a consideration of the research findings in relation to the evidence existing in the subject area knowledge bases, before introducing and discussing a potential adaptation of the Theory of Constraints. The chapter then takes a personal perspective in consideration

of one of the case study partners, a Regional Development Agency and the Rural Development Plan for England 2007-2013. It then concludes and presents its reasoning behind its claim as a contribution to the current body of knowledge, before finally discussing the limits of the research, possible avenues of further research and a personal reflection.

1.6 Summary

Chapter 1 has described key events which have shaped and informed much of the farming in the UK as well as identifying the major crises which led to an undermining of public confidence. The chapter also recorded the Curry Commission report and its themes of reconnection between farming and the wider community, the research remit of DEFRA, and the emergence of research projects to cast further light on contentious issues, which had themselves become the focus of debate between different academic camps of thought and the wider public. It then addressed the rationale behind this research, development of the research question, and the structure of the research before presenting a road map for the following chapters.

2 Literature Review

2.1 Introduction to the literature reviews.

The literature review is divided into two separate chapters so that sufficient reviews of the food localisation agenda and the development of the Theory of Constraints can be considered satisfactorily. The Local Food chapter appears before the Theory of Constraints chapter in context to the wider aspects of the thesis. This Theory of Constraints chapter also sets out to discuss alternative models and theories that may be relevant e.g. Value Chain Analysis, but which are set aside in favour of the Theory of Constraints as a preferred option, given the multi-dimensional and qualitative nature of the constraints faced by local food producers. The researcher then enfolded the separate literature reviews at the point of synthesis, to both reveal gaps in the bodies of literature, whilst further identifying alternative applications around the accepted literature definitions.

As the researcher has undertaken these literature reviews, categorisations of the extant knowledge lead themselves inevitably to counter argument and debate. However, the researcher realises that this inevitably leads to broader questions of an arbitrary, subjective nature, which will be addressed by due consideration of the blurring of these borders and labels. This has further influenced examination of inter-disciplinary boundary synthesis and the emergence of alternative interpretations of 'local' and 'constraint', which are addressed in chapters six, seven and eight.

The first chapter of the literature review undertakes a review surrounding the milieu of 'local food' and the localisation of food, from the perspectives of policy, geography, sociological interpretation, supply chain management, buyer behaviour and emerging interpretations of anthropomorphism, which were prevalent in the behaviours of two of the case study partners.

The second chapter of the essay is a review of the literature around the Theory of Constraints by considering the works of Eliyahu M. Goldratt, the theory's originator and principle protagonist to date, as well as the literature which has emerged as a result of multifarious applications of the theory from its original philosophies, through to the development of Theory of Constraints

Thought Processes. These are followed by an analysis of the Theory of Constraints applications in operations and supply chain management.

Structure of the first chapter of the literature review:

- Local food: a policy perspective
- Local food: a geographical perspective
- Local food: a sociological perspective
- Supply chain issues in local food
- Buyer behaviour and the marketplace
- Anthropomorphism
- Summary: knowledge drawn from the literature: its strengths and weaknesses and the identified gaps.

Structure of the second chapter of the literature review:

- A history of the Theory of Constraints and its philosophies
- Analysis of previous Theory of Constraints applications
- The relative positioning of the Theory of Constraints within 'lean and agile'
- Limitations
- Alternatives to the Theory of Constraints; Value Chain Analysis, Value Stream Mapping & Value Stream Management
- Summary: knowledge drawn from the literature: its strengths and weaknesses and the identified gaps.
- A literature synthesis in consideration of the research questions

2.2 Introduction to Local Food

In evaluation of the extant local food literature, the focus of this review will primarily be framed within the broad geographic parameters of the research cohort i.e. UK local food. Literature drawn from wider domains will be considered and introduced at appropriate junctures. Failure to acknowledge the broader sphere of 'local food' extant literature, particularly that derived from research conducted within 'western' European countries (Askegaard & Madsen, 1998; Sundkvist *et al.*, 2001; Arie & Parrot, 2003; Tellstrom *et al.*, 2005) and North America (Bellows & Hamm, 2000; Hinrichs, 2000; Guptill & Wilkins, 2001; Hinrichs, 2003; Selfa & Qazi, 2004; Schindler & Francis, 2005; Darby *et al.*, 2008; Mariola, 2008; Berlin *et al.*, 2009; Freedman, 2009) would deny meaningful insight. Nevertheless, it is recognised that different legislative frameworks are at play in different markets, and that producers are supplying into local food markets which may differ in clientele from the traditionally perceived customer base of UK local food customers, driven by other factors and beliefs such as the growing American trend of 'locavores'. The USA has also witnessed a doubling in the number of farmers' markets between 1998 and 2008, as well as significant growth in Community Supported Agriculture (CSA), whereby farmers supply a proportion of the outputs to CSA organisations (Thilmany *et al.*, 2008).

2.3 Policy Perspective

In 2002 the Curry Commission Report recommended that:

DEFRA, the Food Standards Agency and the FFB will need to devise an enforceable definition of 'local'. We think that this may be a necessary first step for the full benefits of 'local' branding to be realised. (DEFRA, 2002, p. 11)

Following on from this, DEFRA issued an evaluation report which further defined 'local' food as: "Food produced and sold within the same relatively

limited area, without necessarily having any distinctive quality.” (DEFRA, 2005, p. 2)

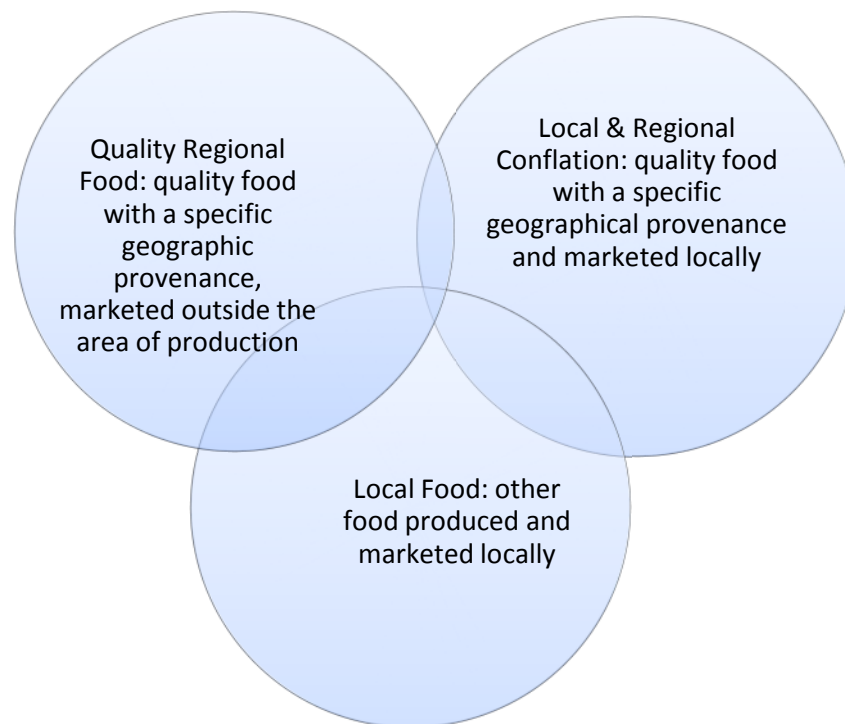


Figure 1 Model of local food interpreted from DEFRA (2003)

Although DEFRA did not quantify what that area should be, the paper called for “the feasibility of producing guidelines on the use of the term ‘local’ in marketing (p. 8)”. Recognition of the overlapping nature of many of the characteristics of ‘local’ and ‘regional’ was duly made, (Fig. 3) and subsequently posited in later research (SERIO, 2008). This recognition of similarities was further developed by stating that many of the support measures in place for regional food which had also sold into multi-regional, national and international streams, could also be applied to local food: “*The wide definition employed should thus allow many local food producers to benefit from these support measures.*” (p. 1) The lack of funding at a smaller scale for ‘pump priming’ was considered a barrier to sector development, however, the paper identified both the Rural Enterprise Scheme (RES) and the Processing and Marketing Grant (PMG) funds to help overcome this

barrier (p. 5), although subsequent research (Ilbery *et al.*, 2009) casts serious doubt over their effectiveness in doing so.

Both reports contained an implicit message that there was a need for a greater degree of direct marketing by upstream parties. Without this definition and opportunity to brand 'local food', thereby increasing its marketness, it is difficult for the wider purchasing public to differentiate. Evidence suggests that urban consumers, potentially the most significant market opportunity, often misunderstand the term or conflate local food with the separate entities of organic and regional foods (Khan & Prior, 2010).

Both the Policy Commission on Farming and Food (DEFRA, 2002) and the report on food miles three years later (DEFRA, 2005) find that as part of a longer term sustainability policy, farmers should look to develop and undertake more 'face to face' interactions with the wider body of public consumers, citing economic⁴, social and environmental benefits of local consumption. Thereby further indicating that there would be a willingness to pay extra for food products which were perceived as having a greater degree of localness, and therefore, a unique marketness to them, adding more proportion value at the point of sale, as result of increased margins per unit of produce to the farmer or small producer in shortened supply chains. Nevertheless, these increased margins are entirely contingent upon initial development and repeatability of sales. Wetherell *et al.* (2003) identified that in order to achieve this level of localness, branding and audit-ability of 'local' foods, particularly in relation to supermarket sales, would require comprehensive "*more explicit and independent mechanisms to monitor and certify production and distribution practices for local foods.*" (2003, p.242) Although it is noted here that this would inevitably invoke the food miles debate, as local food took long and circuitous routes to market in the more resource efficient supply chains of multiple retailers, of which Tregear & Ness

⁴ As well as a higher proportion of the sales price remaining with the producer, evidence suggests that more money is likely to remain in rural economies (DEFRA, 2003, p.2. Utilising LM3 tool <http://www.neweconomics.org>)

(2005) comment upon by warning *"that such usage must avoid compromising the 'short chain' associations that consumers have of local foods."* (2005, p.31)

Eight years hence, there are still no mechanisms in place. Whilst some compliance schemes have emerged, such as the SALSA and LEAF⁵ initiatives, evidence contained within this research suggests that as some Regional Food Groups continue to support such schemes, other Regional Food Groups are developing their own compliance schemes whilst parallel programmes are also currently being developed by food service companies. This proliferation of schemes leaves smaller, local producers with bewildering choices and a future possibility that they may have to become members of more than one scheme to satisfy their customer base. It is also recorded that the existence of these schemes is dependent upon repeating membership fees and new members.

At the time of writing, June 2010, the incumbent UK government is planning a long term austerity programme, which would suggest that the continued absence of these mechanisms is more likely than not. Further to this, considerations of the cost benefit analysis of a formalised system of local certification would have to evaluate the potential growth in the market against initial and ongoing costs.

Lack of definition and openness to interpretation of 'local food' inevitably impacts upon the ability to accurately compute the fiscal worth of local food, its market share or growth. Leading market research company Mintel (2008) recognise this in their assessment of the UK local food market. Nevertheless, they report an increase in local food sales from £3.54 billion to £4.6 billion over the preceding four years, which they mainly attribute to farm shops and farmers' markets. This should however, be considered within the contexts of the whole UK food market worth of £172 billion (DEFRA, 2008). An increase

⁵ SALSA: Safe and Local Supplier Scheme & LEAF Marque: Linking Environment & Farming. These schemes have been introduced as alternatives to ISO series certification, to enable small food producers to provide evidence of good practice and regulatory compliance.

of 30% still only equates to a little less than 2.7% of the whole market. The Institute of Grocery Distribution reported on the profile of local food sales (IGD, 2005; IGD, 2006) as being dominated by vegetables and fruit, followed by red meats, poultry, eggs, bakery products and milk. The same research records that more than 60% of local food is sold through the supermarket channels, additionally suggesting that there should not be a 'one size fits all' marketing perspective, but that promotion and marketing of local food depends upon the "*consumers' level of familiarity with a product and its overall position in the marketplace.*" (IGD, 2006, p. 29)

In the continued absence of official guidelines, and continuing spatial indeterminacy, producers, organisations and retailers have developed their own disparate interpretations of local food, which tend to be variations on a theme of distance between where a product is produced/processed and where it is sold to the end consumer. For example, the National Farmers' Retail and Markets Association (FARMA) which requires all of its market stallholders to be 'local', defines this as "*residency within a 50 mile radius of a market location [though 30 miles is preferred], or within a county or National Park boundary*" where the distance is similar. Additionally, primary products are expected to have been grown/reared on the stallholder's farm (minimum 50% of the lifecycle is specified), whilst processed products should contain "*as much local ingredients as possible*". Murdoch *et al.* (2000) believed that the 'commoditisation' of local could occur with more explicit branding, citing the *Appellation d'origine contrôlée* (AOC) system of controlled designation of origin as an example, cautioning however, "*that the development of quality categories such as AOC's is highly uneven across space; while these have long existed in certain countries, they are almost completely absent in others.*" (p. 111) Ilbery & Maye (2005) also identify the Protected Designation of Origin⁶ (PDO) scheme as potentially useful, but note that their true ability to capture the 'local' element is readily lost once it

⁶ Both of these schemes are currently managed for DEFRA by ADAS (<http://www.adas.co.uk>) which is a large, privately owned company specialising in environmental, rural development and policy consultancy.

is applied global brands owned by transnational corporations, citing the example of Newcastle Brown Ale of a spatially extended product⁷ (p. 825). It is noteworthy that the FARMA definition of local, because of the nature of the retail environment being certified, also includes the notion of direct (indeed, face to face) producer-consumer exchanges. This 'spatial qualifier' inexorably works against the market when we consider a 50 mile radius of London against a 50 mile radius of Carlisle. Holt (2005) suggests that it is discriminatory and unrealistic to only interpret local as a distance, indicating that upland hill farmers are disadvantaged by a market framework that could potentially be of most advantage to them, whilst Hinrichs & Allen (2008) record that:

The denotative understanding of "local" may be spatial, "local" in practice labours under additional vague connotations that result in simplification concerning the expected consequences of a "local" food system

(Hinrichs & Allen, 2008, p. 342)

Evidence gathered during this research indicates that some small scale producers themselves consider the farmers' markets to be a barrier to trade, with local markets and supplies being manipulated by some stall holders. Indeed, Morris & Buller (2003) identified the emergence of a new model of competitive localism as a significant portent to sustainable growth where:

New forms of local food sector activity, such as farmers' markets and other forms of direct retailing organised by producers, had negatively impacted on the availability of more established local retailers to source local supplies.

(Morris & Buller, 2003, p. 565)

The Soil Association's definition of 'local,' first published in 1999 and which remains unchanged, represents an early example of conflation of disparate

⁷ Other examples of spatially extended products are Scotch whisky, Herefordshire cider, Craster kippers, Melton Mowbray pork pies etc.

elements of food supply, alloying together local, sustainable and organic in their description of a local food economy as:

Producing, processing and trading, primarily organic and sustainable forms of food production, where the physical and economic activity is largely contained and controlled within the locality or region where it was produced.

(Soil Association, 2010)

Multiple retailers also have differing interpretations of 'local'. Of these, only Waitrose currently operate a strict definition via its 'locally produced' range, which requires the relevant producers to be located within a 30 mile radius of a store (Waitrose 2010). Smaller suppliers are engaged to supply local stores and are supported by a small producers' charter contained within the Waitrose Local Producers programme. By creating direct links between product-specific buyers and local food suppliers, the programme helps to overcome some of the diseconomies of small scale production and supply. Evidence suggests (Oglethorpe & Heron, 2009; Spence & Bourlakis, 2009) that this has helped Waitrose become a customer of choice for small scale local producers.

At a regional scale of multiple retailers, E.H. Booth has 26 supermarkets across the North-West of England, with a well established local sourcing procurement strategy within its region of operation (Booths 2010). Beyond this, supermarkets tend to conflate DEFRA's definitions of 'local' and 'regional', and also use their understanding of consumer perceptions as a yardstick. Evidence suggests (Ilbery & Maye, 2005; SERIO, 2008) that trade buyers in some larger organisations conflate these terms, but in the main, rely upon mileage indicators. In some cases, produce which is simply from the UK is promoted as 'local', as long as it is felt these accords with consumer perceptions. In other examples produce which is implicitly identified and retailed as geographically 'local' may have taken a circuitous route to market; examples exist of goods which may have originated within a few miles of a store, but have had to undertake a journey of many hundreds of miles prior to delivery. Whilst Tesco have committed to increasing sales of local produce by 1%, they have issued neither clear definition of 'local' nor

scale of producer. Further to this, they admit of their current strategy on local food: *“we know, because our customers and suppliers tell us, that we can do more.”* (Tesco 2010) The flexible interpretation of ‘local food’ therefore suggests that provisioning under the banner of ‘local food’ acts as a market device, rather than a longer term, sustainable market solution. Further to this, anecdotal evidence gathered by this research suggests conflicts of interest emerging between regional food groups and a major multiple in the creation of a local food hub for the North East, which does not serve in the best interests of the whole market.

Regional Food Groups such as Northumbria Larder and Heart of England Fine Foods exist to help their members develop new markets for their food. However, across the eight established English Regional food groups, evidence exists of the blurring of boundaries between local and regional food, partly because of their geographical coverage coinciding with regional and country boundaries, and partly because their remits are often focused on promoting high value speciality products, which is much like DEFRA’s definition of regional food: *“quality food (i.e. exceeding the legal minimum requirements in some aspect of production) with a specific geographical provenance, that may be distributed anywhere.”* (DEFRA 2003) Some, but not all, schemes do specify criteria for membership, such as the minimum content of ingredients in a product to come from specific area. However, criteria from scheme to scheme are variable, as are their underpinning business models, which are informed by individual Regional Development Agencies. It is no wonder therefore, given their market and supply chain complexities that producers and suppliers encounter considerable constraints, and that despite what may be considered a disproportionate amount of advocacy, Ilbery & Maye (2006, p.354) find it remains fragmented, *“small scale and on the margins”* and that:

This advocacy has probably played a part in making a definition and analysis of the local food sector problematic, with most institutions (Regional Development Agencies) muddling the debate because of their specific political interests and situational contexts. (ibid)

This is further alluded to in the research of Ricketts Hein *et al.* (2006), which intimates that subtleties occur in local food systems from area to area, where the ability to promote and trade is impacted upon by a lack of marketing opportunities (p. 299). Although Holt (2005) believes that these problems are historically entrenched in the make-up of RDAs, claiming the Regional Development Act (1998) allows for an emphasis on export of regional foods (spatially extended) over the development of local food systems for local consumption.

The England Rural Development Plan 2000-2006 (DEFRA, 2000) was an instrument introduced by DEFRA, which allowed the department to execute rural development commitments in line with its EU obligations contained within Common Agricultural Policy (CAP) EU Council Regulation 1257/1999 on rural development. Described by DEFRA as a programme to support “*Sustainable Farming and Food by helping farmers and foresters to respond better to consumer requirements and become more competitive, diverse, flexible and environmentally responsible,*” (DEFRA, 2000) the programme also aimed to support rural business and communities, including enterprise, processing and marketing initiative. The two schemes specific to this research are the Rural Enterprise Scheme (RES) and the Processing and Marketing Group (PMG). Of the £1.6 billion of grant aid issued over its seven years of life, it was identified (Ward & Lowe, 2004) that more than 80% of the grants were made to specific agri-environment schemes, leaving approximately £45 million per year for all of the other programmes. A classic ‘Catch 22’ of both schemes was an ability to award grants of up to 50% to non-profit and low-profit applications, yet it is highly probable that these potential applicants would be least likely to raise the other part of the funding in the first place.

In their retrospective analysis of PMG and RES by food entrepreneurs in the West Midlands and South West, Ilbery *et al.* (2010) identified numerous flaws which acted as barriers to adoption by those who would most benefit from grants as well as: “*prime facie evidence for the existence of a number of well networked ‘serial adopters.’*” The research suggests that prior knowledge

and familiarity with public funding mechanisms tends to lead to re-award of monies:

Prior experience with similar processes begins to suggest the existence of 'serial adopters': people who make repeated use of public funds and, through their connections and experience, greatly increase their chances of learning about and making successful grant applications.

(Ilbery *et al.*, 2010, p. 687)

Although it may be reasoned by this researcher that there is nothing invidious about these repeated actions, and that they merely represent examples of social capital and scale.

A key barrier to adoption was a minimum projected cost per application of £70,000, of which the researchers note the likelihood of these individual projects going ahead, regardless of PMG or RES funding availability, this implicitly suggests a loss of additionality in the awarding of these grants. Complexity of the application process, lack of publicity about the program and peculiarities such as the insistence that capital equipment purchases had to be 'brand new' were also stated as barriers. It may be argued that this requirement to purchase only 'brand new' equipment significantly devalued grants. By placing the grants in what could be described as safer and bigger hands, regional awarding panels have disengaged many smaller actors who may have gained greater benefit, and which may have given the additionality sought, whilst simultaneously protecting themselves from the possibility of scheme failure at the lower end of investment.

In conclusion, Ilbery *et al.* (2010) record "*that neither the PMG or the RES was particularly effective in funding enterprises beyond the farm gate*". As such, these schemes were dominated and ultimately compromised by more active farmers. This dominance and lack of accessibility undoubtedly impacted upon:

Schemes which would have helped to bring forward projects that were more likely to deliver on public priorities, such as higher levels of additionality and the development of local food supply chains.

(Ilbery *et al.*, (2010, p. 688)

In 2007, the Rural Development Plan for England 2007-2013 was introduced as the successor programme, which had been modified and revised to provide better indicators of effectiveness. Although more funding would be available, (£3.9 billion) once again, the lion's share would be directly targeted at agri-environment schemes. Whilst DEFRA have introduced a bottom-up fund access LEADER⁸ scheme driven by LAGs (Local Action Groups)⁹, it remains to be seen whether the LAGs are little more than regional collectives of 'more active' farmers - a new manifestation of serial adopters.

Funding drawn down from the Big Lottery Fund has allowed for the introduction of a five year long project aimed at reconnecting the wider populous with their food and its origins, through the development of community food enterprises. Making Local Food Work (<http://www.makinglocalfoodwork.co.uk>) is a consortium of seven organisations [The Campaign to Protect of Rural England, The Soil Association, The Plunkett Foundation, FARMA, Co-operatives UK and Country Markets Ltd.]. The project provides dedicated support to aid the development of farmers' markets, Community Supported Agriculture,

⁸ LEADER GROUPS are implemented through Local Action Groups (LAGs), which should represent public and private partners and local interest groups. Local Action Groups can be existing partnerships set up under previous LEADER programs; existing partnerships set up for another purpose but which follow the Leader principles; or be a completely new partnership. The Local Action Groups should be broad, covering all sectors of the local society and economy. The Leader delivery approach can be aligned with other initiatives, such as Local Area Agreements. (DEFRA 2007)

⁹ LAGS develop and submit Local Development Strategies which will set out their plans for their areas, including selection criteria for local projects. The Selection Panels for LAGs will include representatives from the Regional Development Agencies, which are responsible for the overall management of the delivery of the LEADER approach, Natural England and the Forestry Commission. Once the groups are selected, they are responsible for delivering against their Local Development Strategy; selecting and funding projects which best meet the priorities for their area and support the delivery of their Strategy.

Country Markets, food co-operatives, local food hubs and locally owned shops.

Box schemes deliver a weekly supply of seasonal fruit and vegetables either to the door, or a collection point. In its infancy, box schemes were usually controlled by a single grower or a small co-operative, although this model has significantly developed to encompass wider networks of growers, wholesalers and much larger co-operatives. The Soil Association report that there are a little over 600 box schemes operating in the UK, mostly supplied from organic farming systems, generating upwards of £100 million in annual sales. Pretty (2001) argues that box schemes go beyond the advantages of shorter supply chains and more profit per product, claiming that there is an underlying intention to accentuate notions of trust and identity, whilst proposing that the customer is not just paying for the contents of the box per se, but is paying toward the upkeep of the farm itself. As the schemes have developed, so has the range of products, with many schemes now also offering bakery products and drinks. Perhaps the most well developed and known of the box schemes is Riverford Organics (<http://www.riverford.co.uk>) which has developed into nationwide box scheme, supplied via five regional farm-based hubs¹⁰, offering 'fresh from the field' produce, although the whereabouts of those fields is a point of some conjecture. As the business has grown, so has its requirement to import more than 20% of their produce (Riverford, 2010). Local is classified by postcode recognition and alignment with one of the five hubs, providing a good example of spatial conceptualisation of the market as well as a willingness to conflate local and organic.

Community Supported Agriculture (CSA) is a recent phenomenon within the UK although many of its proponents claim direct antecedents with the 'Dig for Victory' campaigns of WWII. Adapted from the USA model where individual,

¹⁰ As an example of confluences occurring between local and organic, an internet enquiry returned Home Farm, Kirkby Wiske, and Northallerton, as this researcher's local supply farm. An order placed here would require a round trip of 124 miles for fulfilment.

and more commonly, collectives of consumers directly purchase a share of a farm's output, Pretty (2001) argues that CSAs:

Encourage social responsibility, increases understanding of farming amongst consumers, and increases the diversity of crops grown by farmers in response to customer demand

(Pretty, 2001, p. 2)

The benefits of CSA schemes extend beyond the sociological aspects, as both the farmers and scheme members gain greater value from their food pounds in shortened supply chains. Models of CSA vary in the UK, where there are currently 65 schemes, the majority of which are based in Yorkshire and the South West (The Soil Association, 2010). Some of these schemes only go as far as renting allotment land from farmers, whilst others are of limited viability to the food basket - sponsoring of apple trees and organic vineyard vine rental, for example.

2.4 Sociological Perspectives

In consideration of both life cycle assessment and whole life cycle costing, this research acknowledges that the socio-environmental landscape of local food also includes downstream post-consumer activities entailing composting, recycling, waste streaming and waste management.

This researcher also believes it is important to recall that local food markets had not been driven by customer type or perception historically. They had always been here in the UK, indeed they had been the backbone of the pre-democratic agrarian economy of the UK until it succumbed to the forces of a socially engineered and unregulated 'free market' of 1830's United Kingdom. Our understanding of the necessary relocation of large sections of rural communities to urban habitats, as labour for the industrial economy, often overlooks the manifest changes required in the provisioning of food for the new urban masses. The universal development of covered urban food

markets which were under local authority management, was not viewed as pre-cursor to the wider commoditisation of food, but as a tool to conduce to the good of the public; socially structured institutions aiming to infuse cultural norms of exchange.

Hinrichs (2000) asserts that the perceived embeddedness of local food as a reason to purchase, within the context of monetary exchange and behavioural process, is steeped in the antecedents of social economics, citing the far earlier work of Polanyi (1957) as seminal, in that "*the human economy... is embedded and enmeshed in institutions, economic and non economic. The inclusion of the non economic is vital*" (p. 250). Further to this, she calls of the work of community nutritionist Gail Feenstra (1997) who describes local food systems as transcending business models, marketing and regionality factors to be:

Rooted in particular places, aims to be economically viable for farmers and consumers, uses ecologically sound production and distribution practices and enhance social equity and democracy to all members of the community.

(Feenstra, 1997, p. 27)

Systems of which Hinrichs believes are supported by a consumer who not only looks to gain more information about the food they chose to purchases, but extends to the development and sustaining of personal relationships with the retailers. Nevertheless, she strikes a more cautionary note in her contemporary position (2000, p.296) that "*social embeddedness has become convenient shorthand for social ties, assumed to modify and enhance human economic transactions.*"

A table of discernable and perceived differences between conventional and alternative food supply systems appears on the next page, it has been adapted from the work of Ilbery & Maye (2005).

Conventional	Alternative
Agrochemical	Organic, sustainable farming
Costs externalised	Costs internalised
Disembedded	Embedded
Fast	Slow
Homogenous	Regional and local palate preference
Intensive	Extensive
Long supply chains	Short food supply chains
Manufactured or processed	Natural and fresh
Mass production	Craft or artisanal small scale production
Modern	Postmodern
Monoculture	Biodiversity
Multiple retailers	Local shops and markets
Non-renewable	Renewable
Quantity	Quality
Rationalised	Traditional
Standardised	Diversified and different

Table 1 Differences between conventional & alternative food supply systems (adapted from Ilbery & Maye, 2005)

Morris & Buller's (2003) interpretation in analysis of the local food sector in Gloucestershire characterises local food as originating within a closed or bounded system:

Where food is produced, processed and retailed within a geographically circumscribed area. Typically, though not exclusively, this entails the development of mechanisms and systems that are in some ways alternative to conventional channels.

(Morris & Buller, 2003, p. 559)

That retailing still occurs, albeit in alternative channels, belies the exigent economic tool of exchange required for the 'local food' market to work. Ilbery & Maye (2005) believe that this economic behaviour is further engendered by aspects of trust and ties as well as social interaction "*which may take the form of acknowledgement, attention, respect, friendship, or sociability, all of which can be subsumed within the concept of 'regard'*" (p. 827) to be vital in the construction of embeddedness, of which they conclude that their research revealed businesses in the local food sector which were "committed beyond a purely economic imperative." (p. 842)

The role of the farmers' market in juxtaposition to the role of the multiple retailer as a point of exchange, is further considered by Hinrichs from the perspectives of mutual appreciation, familiarity and proximity, which prompts her to ask that beyond the food commodity market conventions of disadvantage working against upstream actors:

How embedded actually are farmers' markets? Are they most fundamentally social institutions based on community and trust or are they markets like any other, but with the gloss of gemeinschaft¹¹ ?

(Hinrichs, 2000, p.298)

By invoking the argument that instrumentalism may only occur to serve the needs of the farmer, Hinrichs is able to focus upon the action of exchange, noting that both the consumer and farmer are likely to have their interests

¹¹ *Gemeinschaft*: A sociological categorization first introduced by Ferdinand Tönnies in 1887 to describe groups of individuals generally holding the same behaviours, value and beliefs, orientating themselves toward a larger association under a 'unity of will.' *Gesellschaft* is the opposite of *gemeinschaft*, it is used to describe individuals driven by self interest, and the reasons for being members of larger associations, work imperatives for example.

tempered by instrumentalism and marketness, irrespective of either party's view of embeddedness. Notably she believes that the conceptual nuances of embeddedness could potentially be improved if they are alloyed with considerations of instrumentalism and marketness believing "*together, they offer important correctives to simplistic or overly sanguine reading of social embeddedness.*" (p. 301). In conclusion of embeddedness and the future of farmers' markets, she states:

Sentimental assumptions about face to face ties must be tempered. Social ties, personal connections, and community goodwill are often appropriately seasoned by self interest and a clear view of prices. It is true that too much instrumentalism and marketness can sour the embedded market. But a dash of instrumentalism and marketness might well ensure a more substantial, nourishing meal.

(Hinrichs, 2000, p.301)

Murdoch *et al.* (2000) contemplate upon embeddedness from a historical perspective, indicating that embeddedness in food systems may be greater in areas and farms that have not fully engaged with the agri-industrial complex, and are therefore better placed to respond to "*questions about the provenance of food commodities and the relations of production that surround these commodities*" (p. 115). The caveats sounded by Hinrichs are also recognised, albeit at a more global scale:

Before we celebrate the virtues of such local embeddedness... There is a feeling that the countervailing movement against globalisation simply pales into insignificance in comparison to the huge global flows that now characterise the contemporary food sector. This is obviously a serious issue, for it is clear that too much embeddedness can curtail the market reach of alternative food supply chains.

(Murdoch *et al.*, 2000, p. 217)

In identifying a need to consider imperatives acting upon the less immediate, but still local and regional markets, they ascertain that a combination of both

embeddedness and disembeddedness is required “*in rather complicated ways*” (p. 219) to protect local food products from sinking under the weight of their own ecological worthiness, whilst fully realising that far travelled, fully disembedded products “*risk carrying a set of criteria that can all too easily fall out of favour with ecologically concerned customers*” (*ibid*). In summation they record that:

We should not be fooled into thinking of localness, naturalness, and embeddedness as sufficient in themselves; rather we must show how these qualities come to be asserted and negotiated in food supply chains.

(Murdoch *et al.*, 2000, p. 122)

Born & Purcell (2006) warn against common characteristic associations of local food and embeddedness, in that there is no empirical evidence base to support many of the assumptions of spatial scales of food systems, particularly local food systems, and their associative characteristics of product quality, enhanced social relations and changes in buyer behaviour, or indeed, that face to face interaction with producers leads to enhanced social capital, social justice or better whole chain information. In identifying an alternative of targeted purchasing engagement with more distant foreign producers, engaged in socially and ethically-just production systems, which extend beyond the farm or processing plant to encompass community development at the source of production, they give recourse to an option beyond a spatial conceptualisation as ‘good’. Further doubt is cast upon distribution of monetary gain in rural communities as a result of the development of local food schemes, indicating that whilst a greater proportion of the sale price goes to the producer, it has little impact upon the overall socio-economic inequalities in rural areas (please refer to footnote 19), only serving to perpetuate wealth distribution imbalance in those communities, particularly when it occurs in an area of established prosperity. This reflects the earlier observation of Jones *et al.* (2004) warning against the aggrandisement of a constructed rural idyll underpinned by traditional farming and local food systems, which would not “*sit well with the reality for*

low wage levels and deprivation that has long been the lot of many working class rural and agricultural communities.” (p. 332)

Further, they identify the emergence of a ‘reflexive’ and more discerning consumer base, drawing parallels with analysis of Canadian consumers of local food, which Smithers *et al.* (2008) describe as having ‘*a desire to decouple from the industrial agro-food complex*’ (p. 339), of which Wetherell *et al.* (2003) opines upon the emergence of more concerned consumer with:

Heightened awareness and concerns about conventional industrialised systems and their associated impacts on the environment, animal welfare, small scale producers etc, leading them to buy local foods or engage in alternative food systems.

(Wetherell *et al.*, 2003, p. 242)

Morris & Buller (2003) believe that this emanation of the new UK consumer type may be seen as a reaction against the onset of:

Standardised and mass produced food products of the globalised food economy, typically associated with trans-national food processing and retail companies, in which ever greater distances (and disconnection) have been created between production and consumption of food.

(Morris & Buller, 2003, p. 560)

Kirwan (2004) believes that the reflexivity of these customers and their purchasing behaviour at farmers’ markets is, in the main, driven by political engagement with the otherness or alterity offered at these markets, where relationships between the consumer and producer are underpinned by ongoing ‘face to face’ relationships “*contingent upon the previous interaction between the participants*” (p. 403). Albeit this amounts to what could be argued as a decision to buy based on the pulchritude and personality of the seller rather than the pulchritude of the products.

In developing the original proposition laid out by The Curry Commission, (2002) Marsden & Smith (2005) identify a requirement for:

New innovations in the mechanisms for distributing value among producers and processors at the local level; new types of entrepreneurial activity which is socio-ecological in the sense that it is based upon distinctly different types of networks and activities.

(Marsden & Smith, 2005, p. 441)

This call for an alternative system was rooted in a more prosaic dilemma of supply and demand, which their study concludes was met by collaboration in newly created supply chains.

However well meaning the new consumer intends to be, there is a counter argument that their behaviour is both parochial and recidivist, harking back to a 'golden age' whilst conveniently overlooking or simply ignoring:

Issues that are important, the greenhouse gasses of highly subsidised first world agriculture, the trade imbalances that affect both developed and developing countries from realising the mutual benefits of freer trade, bio fuels subsidies and third world poverty.

(Desrochers & Shimzu, 2008, p. 3)

Bell *et al.* (2004) had previously arrived at a similar conclusion in their consideration of the scale of local food production, indicating that derived benefit of food localisation in the UK "*may have deleterious consequences for food producers in the less developed world.*" (p. 330)

Hinrichs & Allen's (2008) perspective of attitudinal inclination agrees with the earlier research of Holloway & Kneafsey (2000), Winter (2003) and DuPuis & Goodman (2005) who were all in broad agreement in identifying protectionism and a desire to safeguard or enhance individual interests on behalf of the various producers, rather than the furthering of social justice or strengthening of social capital sought by the end customers:

In their construction of threats, intended beneficiaries, products to be avoided, and those to be preferentially selected, historical selective patronage campaigns have emphasised social justice need and concerns for designated groups, but in ways that have to varying degrees excluded other disadvantaged groups from consideration.

(Hinrichs & Allen, 2008, p. 331)

Edwards-Jones *et al.* (2008) further identify that preferential purchasing of local food may occur in direct support of local economy, the farmers and producers supplying into it and the status quo, noting of consumers who wish to do so “*simultaneously, they are implicitly deciding not to support farmers, regions and political systems beyond their locality*” (p. 272). Prior to this, the IGD provided another example of defensive localism in the UK by stating that “*there is a clear social responsibility argument for stocking local foods*” (2006, p. 20). This research does not record such actions as right or wrong; when protectionism occurs at national levels, it is inevitable that there will be trickledown effect, of which Oglethorpe & Heron (2009) state that:

Overall, there is no reason why actors pursuing a localisation agenda should behave more altruistically than those that do not. Inequitable relationships and power plays between actors exist as much at the local level as the non-local.

(Oglethorpe & Heron, 2009, p. 19)

Within the sociological perspective, consequential consideration should be made of the qualitative nature of fund and grant application, particularly in contemplation of ‘additionality’ and sustainability sought by both English Rural Development Programmes. Ilbery *et al.* (2010) indicate that scheme fund allocation is compromised by displacement strategies, where funding elsewhere ceases as your funding commences. This ‘on-off’ funding overlooks or simply ignores that of which it leaves behind or its maintainable legacy. In calling upon the earlier work of Jackson (2001), there is further recognition that:

Quantitative evaluations of the economy and efficiency of specific measures often ignore or under-play the importance of conditional contingent factors, thereby yielding results remote from the socio-economic context in which schemes operate.

(Ilbery *et al.*, 2010, p. 684)

Given the broadly accepted profile of those more likely to be engaged in local food (older, more affluent, better educated and / or living in a rural location), which is identified and deliberated upon in the Buyer Behaviour section at greater depth, due consideration must also be paid to the societal and sociological factors acting upon low income households and what 'local food' may mean to them¹². Local food is more likely to be associated with targeted community projects, aimed at low income families, with specific aims of knowledge acquisition, skill development and cooperative activity to access healthier food more economically.

The latest government data of Households Below Average Income (HBAI) reported by the Child Poverty Action Group (2010) indicates that 13.4 million people in the UK (22%) are income poor. Of those 13.4 million people:

- 53% are in households which include at least one child;
- 32% are in households of people of working age without children;
- 15% are in pensioner households.

The vast majority (11,546,000) of these citizens reside in England. Dowler & Caraher (2003) plot the rise of targeted local food schemes, whilst generally cautious about these schemes, proposing that they are a state-sponsored 'new philanthropy' delivered in piecemeal form, further arguing that they do

¹² This research fully acknowledges the existence of socio-economic inequalities in rural England. High priority rural areas are those with high levels of disadvantage and high inequality in disadvantage, such as the North- East & South-West. (RELU, 2009). Disadvantage is characterised as: Income deprivation, low mean incomes, low employment, fuel poverty, barriers to housing and educational disadvantage. In relation to this research, the literature reviewed indicated that it is more likely that rural poor will have ready access to 'local food', stronger cultural ties in their community, and be more likely to engage with 'local food' supply streams.

little to address the latent issues and realities of a low income life. Noting that they are often quick fixes, often at the discretion of local political agendas, addressing the needs of local and health authorities, they concede that:

In some instances, local food projects have empowered some members of hitherto excluded communities to speak for themselves over issues of retail siting and management, food provision of all kinds in schools, and usage of locally produced food for public procurement.

(Dowler & Caraher, 2003, p. 57)

By linking food choice to food availability, food access and relative cost differences between healthier options and their full fat / sugar etc. content, their research discusses issues surrounding access to local food such as cost, location and accessibility, in recognition that these factors are governed by decision making processes in which very few of us are involved. This few in number decreases exponentially in areas of social deprivation, providing even less of a concerned voice against a hegemony of market forces and multiple retailers. Further consequential deliberation is required to deliberate upon economic factors also; it would be of little benefit to simply commence supply to a market which may not be able to financially re-engage. Donkin *et al.* (1999) suggest that the issue of supply cannot be either considered or addressed sufficiently when the costs of a healthy diet would account for more than half of the financial benefits of those unfortunate enough to be in receipt of Income Support.

Evidence of poor access to planned local food events and farmers' markets in the North East of England (Heron, 2010) indicates that many of these markets are targeted at more affluent areas, are sporadic in execution, impacting upon logistics and supply chain mechanisms, as well as negatively influencing upon a repeatable and sustainable customer base. Other planned local food markets occur in collaboration with folk and art festivals, which may also have the effect of further marginalisation of potential customer bases. The very nature of farmers' markets is highly itinerant, which indicates a perceived embeddedness on behalf of the consumer, perhaps harking

back to a 'golden era' of neighbourhoods supplied by independent greengrocers and fruiterers.

Sen's (1997) essay on inequalities and food has particular resonance to the urban poor citizens of England and indeed the wider UK. Whilst arguing for an unequivocal right of access to wholesome, healthy, safe food, the argument is positioned within the reality that food is a commoditised asset, it is at the mercy of market imperatives. Sen further elucidates that it is the lack of access to wholesome, healthy and safe food, rather than its general availability to the populous which drives food poverty choices. This inevitably links to many of the positive outcomes desired by local food projects aimed at the urban poor, particularly that cooperative activities lead to greater access. There are currently 109 recognised food cooperative schemes in operation throughout England, a quarter of which are located in London (Sustain 2010). But herein lays the dichotomous nature of the situation summed fairly, if laconically by Dowler & Caraher, thus:

We don't expect rich people to get up at 4:30a.m. to buy vegetables for forty five families for a week, and spend all morning weighing and bagging them up, unpaid: why should poor people have to do it every week?

(Dowler & Caraher, 2003, p. 63)

Prior examination in this review of the effectiveness of fund allocation for rural development evinces dominance of the scheme by more active farmers as serial adopters (Ilbery *et al.*, 2010). But in light of the sociological perspectives of the urban poor and their lack of access to local food, the question is raised whether a relatively small proportion of that funding could be used as a conduit, not to de-commoditise local food, but to give greater value and additionality along the supply chain, by improving access to it by those who would gain disproportionate advantage, but who are the least advantaged.

The 'Slow Food' movement established in 1986 hails itself as a broadly apolitical movement, which seeks to view food in a non-commoditised,

cultural perspective, where regional distinctiveness of cuisine underpins the cultural heritage of 'being' (Miele & Murdoch, 2002). Contrary to popular perception, the organisers were not concerned about the threat to restaurants typically frequented by the more affluent members of urban society, but the threat posed to the local trattorie and osterie. These long established eateries were historically and inexorably linked to local food systems, their protection required that local food systems received the same levels of protection and promotion *per se*. Whilst a review of Slow Food UK suggests small scale protection of local food heritage (five projects, Slow Food UK, 2010) it appears that a lacuna between the original philosophy and local imperatives have emerged to such a degree that the words of Amin & Cohendet (1999) as cited by Murdoch *et al.* (2000, p. 117) take on a particular resonance:

The discovery of embeddedness - especially as it relates to issues of spatial proximity – can lead to fetishising of localness and a downplaying of the more universal factors that are necessary for the acquisition of competitive advantage.

(Amin & Cohendet, 1999, p.90)

2.5 Supply Chain Perspectives in Local Food

It is difficult to argue against the comparative advantage of globalised and rationalised food supply chains, yet it is equally difficult to argue against the dichotomous bifurcations in unevenness of benefit distribution in many of these supply chains. Trans-national corporations drive global sourcing, derived economies of scale and scope reduce price per unit, of which some of the saving is realised by the customers, who in turn, bolster and ameliorate competitive advantage and profits, yet even the most fervent

proponents of scale economies cannot contend that outputs deliver optimal social reward along the supply chain.

As well as the actions of multiple retailers, centralisation and attendant economies of scale and scope have led to foodservice companies dominating much of the wholesale market, offering a 'one stop shop' to retailers. Resultantly, an imperturbable erosion occurs against the ongoing viability of both processors and suppliers operating at a smaller scale. Given the advantages of scale it is apposite to recognise that de-scaling leads to smaller, less resource efficient processing systems and diseconomies of scale which will unavoidably be passed on to the customer (Ilbery & Maye, 2006; Oglethorpe & Heron, 2009). Notwithstanding these facts, it is still critical to perceive how supply chain mechanisms are viewed in 'local food' systems, and how they are positioned as an alternative choice to what Ricketts Hein *et al.* (2006, p.290) refer to as our 'placeless foodscape'. Whilst we the customer are largely serviced by the placeless foodscape, we need to consider the requirements of demand planning from a supply chain perspective, it would be a foolish farmer who chose to diversify crops without indication of the market requirement, even more so in consideration of fruit crops, which may take up to seven years for a new orchard to bear harvest. Whilst farmers and rural towns bemoan the closure of many small abattoirs, indicating that it restricts choice and increases travel, the alternative options would place considerable price burdens upon deadstock, which are unlikely to be absorbed downstream. Excess capacity drives centralisation, where economies of scale and scope offset costs incurred by regulatory compliance.

Kirwan's research (2004) introduces an important concept of reverse scale, both as a perceived and actual barrier on behalf of smaller producers, who argue that structural incompatibilities of scale between multiple retailers and their own scale / operational ethos denies them access to the wider market (p. 401). Although this research was fundamentally focussed on the otherness or alterity offered by farmers' markets within the abstract concept of embeddedness, it offered important insights to the structure of these farmers' markets, by arguing that the very structure and profile of these

markets distorts the profile of local food in the eye of the beholder and restricts the range of sellers to the detriment of 'local food' (p. 407). However, the research did conclude:

For their part, the producers' engagement with the alterity of farmers' markets was certainly commercially inclined, and yet clearly indicative of an intention to support an alternative system that facilitates human level interaction, individual responsibility and mutual endeavour: or in other words goes beyond simply commodity exchange.

(Kirwan, 2004, p. 411)

In addition to this are the realities of seasonality acting upon local food supply chains in England. The consumer has become positively conditioned to the year-round ready availability of produce supplied through global supply chains, and it would seem highly unlikely that whatever the arguments around national food self sufficiency, (Cowell & Parkinson, 2003) that we could be persuaded *en masse* to forego bananas, pineapples and kiwi fruit, whilst simultaneously increasing seasonal vegetable consumption relative to protein derived from meat consumption. Seasonality, however, is considered to be a potentially useful marketing device which will drive demand due to relative scarcity and exclusivity, which in turn may well allow price premiums to be applied in similar ways to regional food (SERIO, 2008).

Another facet of seasonality is addressed by the research of Edwards-Jones *et al.* (2008) in their analysis of the assertion that 'local is best', citing the example of UK apples consumed just after harvest, and apples from the same orchard harvest entering deep storage prior to consumption 10 months later. Whilst the transport element of environmental impact under life cycle assessment¹³ (LCA) will be less for a UK apple, straightforward analysis against an imported apple harvested and shipped in the same season is

¹³ Life Cycle Assessment considers the environmental impacts of production, however there are current anomalies in the current methodologies, linked to spatially specific system boundaries and what is actually included in the calculations, for example cradle to farm gate, or cradle to grave, which will also measure post consumer activity.

clouded by seasonality and LCA factors. Another challenge countered against the perceptions of freshness and nutrition alluded to in the sociological and buyer behaviour literature, is the consideration of the time from farm to fork offered by local food, which may be matched by imports from parts of Africa, arriving as air freight, on scheduled flights which would have flown regardless, where it is the inherent trait of the supply chain that is the determining feature, rather than the distance to market (p. 271). The research concludes that differing interpretations of 'local' impact upon precise analysis to such a degree, that it is currently difficult to categorically measure and position local food supply chains in terms of environmental impact.

The analysis of the economic and environmental cost of the average UK shopping basket by Pretty *et al.* (2005) finds lower environmental burdens and lower costs to the consumer under local production systems, but again does not fully consider the seasonality issue, or the burden of extended availability of products inter-seasonally as a result of deep storage strategies. The environmental impacts of food imports are not fully considered, despite them accounting for 40% of the UK requirement (Food & Drink Federation, 2009). Nor is the balance or profiles of these imports duly deliberated upon, within the scenario of having to almost double the UK food production and processing capacities.

One of the key concepts and defining conceptual characteristics of 'local food' is the short food supply chain (-SFSC), which draws upon perceived embeddedness as much as it does from the physically shorter routes to market, and the reduction in the number of nodes in the supply chain where:

Foods which reach the final consumer have been transmitted through a supply chain that is 'embedded' with value-laden information concerning the mode of production, provenance, and distinctive quality assets of the product.

(Ilbery & Maye, 2005, p. 826)

Thus, within the supply chain context, SFSCs gain their value in their information laden characteristics, which extend beyond bills of materials,

batch traceability, product location and dynamic stock evaluation, to embedded information of which Ricketts Hein *et al.* (2006) believes “*enables the customer to connections and associations with the place of production.*” Meanwhile, Holt (2005) deliberates upon the characteristics of SFSCs as “*information embedded within the product and market outlet*” as a tool to address the imbalances of capital exchange in farms engaged with larger distribution systems supplying multiple retailers and wholesalers (p. 2).

Ilbery *et al.* (2006) in a mapping exercise of local foods in the West Midlands and South West regions of England, believe that it is the very foodstuffs which may be important to the future development of SFSCs, postulating that the products offered to the market must still be readily identifiable and easily linked back to their place of origin, something to which Kirwan (2004) had alluded to in his interrogation of farmers’ markets, when he identified that complex and processed foods may serve to disconnect customers who may readily purchase these foods in a wider marketplace. Their research also found that many of the producers readily sold into larger, conventional food supply chains, contemplating further that “if many producers sell into both chains, what makes the *alternative* food economy alternative?” (Ilbery *et al.*, 2006, p.223).

However, the accepted idealised SFSC omits both upstream actors and order fulfilment strategies which both rely upon conventional supply chain mechanisms. Evidence suggests (Ilbery & May, 2005; Oglethorpe & Heron, 2009) that ‘local food’ producers readily engage with non-local, national and international suppliers for primary and secondary product inputs, such as flavourings, stabilisers, cultures, primary packaging, transport packaging etc. In addition, the same evidence base also suggests that inelasticity in established local supply arrangements will also lead to producers ‘dipping’ into more conventional, larger supply chains for their requirements.

Further consideration of order fulfilment strategies of spatially extended sales is also required, as it seems highly unlikely that a small scale local producer who had the entrepreneurial foresight to establish a web presence for their products would be able to viably deliver customer orders beyond their locale

without resorting to the use of third party logistics carrier companies. This requirement and apparent willingness to engage in pluralistic activity across supply chains further clouds the issue of what is local, (Ilbery & May, 2005; Oglethorpe & Heron, 2009) and supports the previous findings of Murdoch *et al.* (2000, p219) of a need to adopt a complex strategy of embedding and disembedding, in which a flexible localism occurs. In consideration of Morris & Buller's observation: "*local food is a means to an end, rather than the end itself*" (2003, p. 565), the line between strategy and stratagem becomes increasingly blurred, supporting the notions of hybridity and heterogeneity (Murdoch, 2000; Ilbery & Maye, 2005, Ilbery & May, 2006; Oglethorpe & Heron, 2009) for effective supply chain management techniques.

Of the literature reviewed, there is only a limited range of research which explicitly identifies the opportunity to enhance resource capability through collaboration and supply chain development of local food. Within the broader horizon of UK food retail logistics, Bourlakis & Bourlakis (2005) identify how longer collaboration terms can lead to enhanced levels of trust, co-ordination, standardisation and repeatability, whilst reducing the likelihood of opportunistic behaviour (p. 89). The creation of regional food hubs for multiple retailers (IGD, 2006) remains a contentious issue, which some of the case study partners within this research believe is anti-competitive and works against the open market for local food.

Alternative views of embeddedness as a supply chain phenomenon emerge, albeit as an indicator that here it remains a social construct where interpretation varies in accordance with context, business need and perception, but is not driven by a holistic need for effectiveness along the supply chain. The research of Jones *et al.* (2004) in their analysis of local food routes to market, report on small scale local food businesses being 'embedded' with other local businesses for supplies, as do Morris & Buller (2003); Tregear & Ness (2005); Marsden & Smith (2005); Ilbery & Maye (2005 and 2006) and Oglethorpe & Heron (2009). Therefore, in consideration of the analogous state of the food supply chains of this research's case study partners, whereby the 'local food' element of production is as niche as the market it serves, they are mostly operating in

parallel with the need of the producer to serve a much wider market. A market which is controlled and managed by standardisation, system intensification, sophisticated and vertically integrated supply chain instruments, centralisation of plants, lean paradigms and the lure of future contracts, which alleviate insecurity amongst upstream actors. Thus, it is improbable that historical market devices described by Harvey (2004, p. 72) as: *“supported by an intangible and informal web of networks and established reputations, which generated considerable trust and integrity in the system as a whole,”* which were recorded as observed phenomena with six case studies, can continue to act as a ‘stand alone’ sustainable mechanism with which the market may be further developed, and of which Bellows & Hamm (2000) note: *“a food system cannot operate in an independent local vacuum, but is integrated within global systems”* (p. 272) and that of which Morris & Buller (2003, p. 561) caution against formalisation, believing a definable sector of ‘local food’ to be *“empirically contestable and spatially indeterminate, other than in a relatively arbitrary sense.”*

In the rush to identify and develop alternative strategies and SFSCs, the role of the long established small shops and specialist retailers / delicatessens is often overlooked. This may be as a result of those retailers themselves conflating the notions of local and locality, as well as a ready willingness to source non-local products from wholesalers, when they feel they are superior or more saleable than the local produce (Ilbery & Maye, 2006). It may be argued that this stance is contrary to the notion of local, but invokes alternative interpretations of embeddedness beyond the product, nonetheless linked to the location and history of the enterprise, which itself may have encountered problems with local supply inelasticity, (Oglethorpe & Heron, 2009) and starvation of product as it is directed to farmers’ markets (Morris & Buller, 2003). Criticisms of recently developed SFSCs by these traditional independent retailers, and indeed, longer established farm shops, are recorded in the work of Ilbery & Maye (2005) as encroachments acting upon local trade, where for example, local butchers questioned:

The assurances of quality promoted by local producers because of what they perceive as insufficient food hygiene / food safety standards and limited knowledge of butchering and meat preparation.

(Ilbery & Maye, 2006, p. 357)

This argument was linked back by many of the respondents to the funds available through the Processing and Marketing Grant scheme (see pages 63-64) where rural development policy has led to the development of peculiar incongruities which distort the supply chain, deleteriously impacting upon the small and traditional independent retailer.

The research of Holt (2005) considered strategies to help develop the UK local food sector further, by overcoming barriers occurring in SFSCs typically linked to supply inconsistencies and saturation of markets, which she believed were constrained by infrequency, positioning in terms of the end customers, and location, stating that “*SFSCs are likely to be appreciated but will not necessarily be utilised unless they avoid additional stress*” (p. 11). Holt believed that the future development of local food lay within the public sector, citing the introduction of the Public Sector Food Procurement Initiative (PSFPI) (DEFRA 2003). This initiative was launched to support the earlier Sustainable Food and Farming Strategy and contained six priority objectives of which three were most prescient given the local food context of both initiatives, these were:

- Increase tenders from small and local producers, and their ability to do business with the public sector;
- Increase cooperation amongst buyers, producers and along the supply chain;
- Improve the sustainability and efficiency of food procurement and catering.

However, Holt’s vision for this strategy has not been reflected in the findings of the auditors Deloitte (2009) in their evaluation of the initiative, which found that any evidence of success was isolated, and that the evaluation “has found little evidence of widespread take up of the initiative” (p. 22) of which they believe there are five main reasons: (*ibid*)

1. PSFPI is not embedded across the public sector;
2. Buyers do not have the skills required to implement the initiative;
3. The initiative relies upon enthusiastic individuals for success;
4. There is a perceived cost barrier; and
5. The initiative would benefit from more political weight.

PSFPI was suspended in 2009 and replaced with the Healthier Foodmark scheme launched in December 2009, which aims for healthier and more sustainable food procurement across the public sector, although this scheme has already drawn the ire of Sustain, the farming and food alliance which observe of the new initiative that:

There is still no indication of how government thinks this voluntary scheme will be any more successful than previous failed attempts, and there appears to be no more extra money on offer.

(Sustain, 2010, p. 22)

The Institute of Grocery Distribution's (IGD) research on local food (IGD 2005; IGD, 2006) displays many similarities between both sets of research, although the latter research has its primary focus upon local, rather than regional and local. Whilst there had been a small change in consumer behaviour, it is not clear whether this is a result of engaging with different geographic sample areas. The reports indicate that the primary channel for access to the majority of local food (60% +) remains to the multiple retailers (IGD, 2005, p. 27), whilst the main barriers are price, availability and access, (IGD, 2006, p. 24), which they believe may stymie further growth if they are not addressed to allow more regular purchasing beyond the occasional basis.

Marsden & Smith (2005) contemplate upon the development of less intensive, specialised organic meat supply chains in Mid Wales and the Herefordshire / Shropshire border, which as a model they refer to as "ecological entrepreneurship", but could easily be framed within the paradigms of post-productivist or neo-productivist / environmentally sustainable agriculture. The need to collaborate was not ideologically driven, but as the result of a more basic, archetypical market position where demand

outstripped supply of organic meat. By establishing relationships with other organic farms to ensure supply to the market, the original farm was able to formalise the group of like-minded producers, becoming a central point for marketing, and latterly, (Graig Producers, 2010) as a farm input scheme with 350 members. This group coverage now extends into the West Country and Scottish Borders, and is principally involved in the supply of organic meats to the major supermarkets. Whilst this collaboration has undoubtedly helped members to be protected from a supermarket-driven rush to the base price through collectivisation, it does inevitably solicit further questions about the precipitous nature of term 'local food', whilst simultaneously introducing a key of fundamental supply chain management, the decoupling point. Here we see the original farm now acting as the most upstream information decoupling point, which Christopher & Towill (2000, p. 206) state "*in effect, it is the furthest point to which information on real final demand penetrates.*"

Within the supply chain perspective and as previously discussed, it cannot not be overlooked that buyers and retailers readily conflate terms around 'local'. Farm shops and traditional independent retailers / rural shops frequently stock products that pertain more to 'locality' than 'local', and to achieve this, they freely engage with national supply chains and large specialist wholesalers. Therefore, ability and a willingness to be able to distinguish between and appreciate local production and local supply are critically important to understanding the supply chain mechanisms at work, (Murdoch *et al.*, 2000, Morris & Buller, 2003; Ilbery & Maye, 2005; Oglethorpe & Heron, 2009), which in turn invokes further debate around spatial proximity of goods and market within the context of SFSCs and their ability to supply that local market.

Research by SERIO (2008) suggests that backwards economic linkages from independent 'for profit' food service sector actors (free hold pubs, restaurants and cafes) exist for local food, driven specifically by consumer knowledge and demand for local food. The research further suggests that decisions to purchase local and regional products by food service companies and trade buyers were driven by price, availability, provenance and quality compliance. Nevertheless, purchasing decisions taken by these trade

buyers are ultimately constrained by individual business models and the attendant agility of food supply chains to be able to proactively plan for menu changes.

Although Kirwan (2004, p. 408) discusses the pressures placed upon farmers' markets to retain an element of 'otherness' in the relationship between customer and producer, the researcher suggests that this is a constraint in itself. Based upon the literature review, Fig 2 has been developed to better represent the internal and external supply chain issues, which impact upon 'local food' in its current state and possible future development at sector level, and at individual producer level as they seek to develop markets for their products.

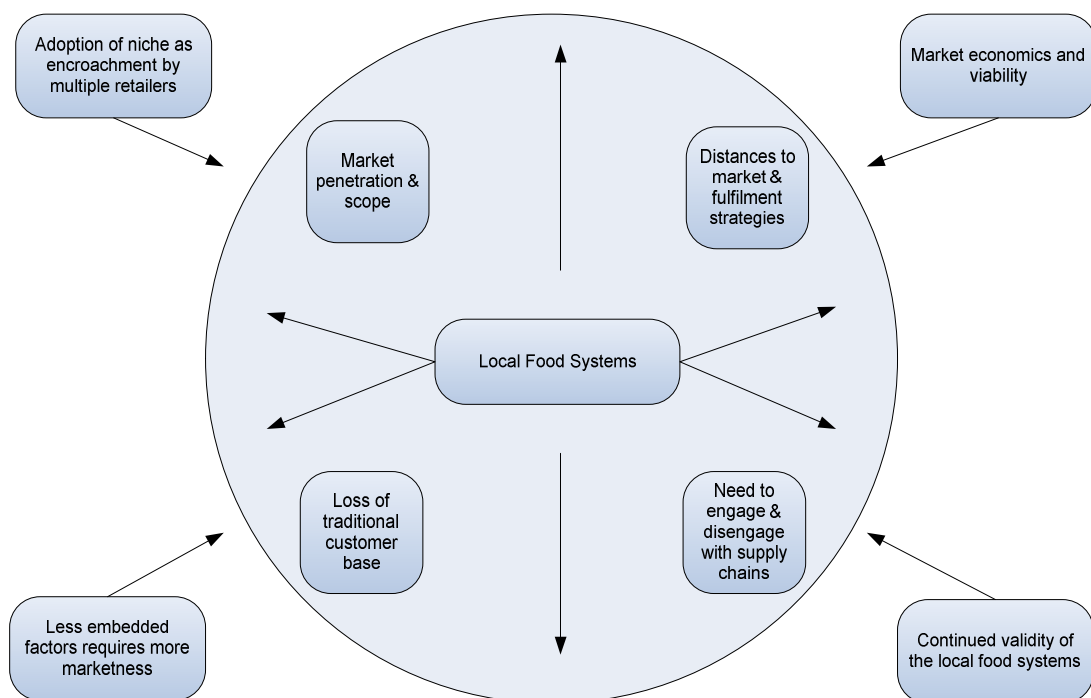


Figure 2 Framework of internal & external supply chain issues in local food

2.6 Buyer Behaviour & Local Food

To many of us, food remains a price-led commodity, and time a precious personal commodity. Individual circumstance, work and family commitments

can easily frame our decision process to wholly source our food requirements as a 'one stop shop' scenario at a multiple retailer¹⁴. Although these commonly held precepts are a matter of some conjecture as to whether they are evolving psychosocial constructs, held to be true by the individual, or as a result of a lifetime of exposure to marketing manipulation and perceived edification. Whilst a marketing strategy may indeed suggest that 'Busy mums shop at Asda', they are far from alone in a store that started out as a small diary cooperative and now holds 17.6% of the current market share (TNS 2009).

As we accept food as a commodity borne of a globalised system of production, under the control of transnational corporations, we also accept that it is as prone to market forces as other commodities; it is likely at times to be over produced, over consumed and indeed, under produced to increase desirability and artificially maintained price hikes.

Purchase decision making by the consumer engaging with this sector does not stand alone from the ways in which other purchasing decisions are made. The extrinsic and intrinsic factors described in the sociological perspective review can also be readily delineated as salient and determinant attributes found in customer behaviour theory and decision process modelling. Blackwell *et al.* (2006) identify the most important salient attributes as "*price, reliability and factors that probably vary little between similar types of products,*" whereas determinant attributes are more subtle and inform consumer decisions about brand or store (pp. 80-81). Their seven stage model of consumer decision processes (CDP) broadly determines the 'road map' taken in consumer purchasing decisions. Understanding CDP should allow the sector to react positively by addressing factors (for example, price, availability, location, and provenance) which can act upon the consumer and influence habitual repeat decision making.

¹⁴ Although outside the remit of this research, it is acknowledged that customers of the major multiples are unlikely to renounce their relationships with these companies and their access to globally procured foods out of season. Convenience, proximity, range, price and supplies of basic commodities beyond the capabilities of local food supply chains will undoubtedly continue to shape the majority of the purchasing landscape in this country.

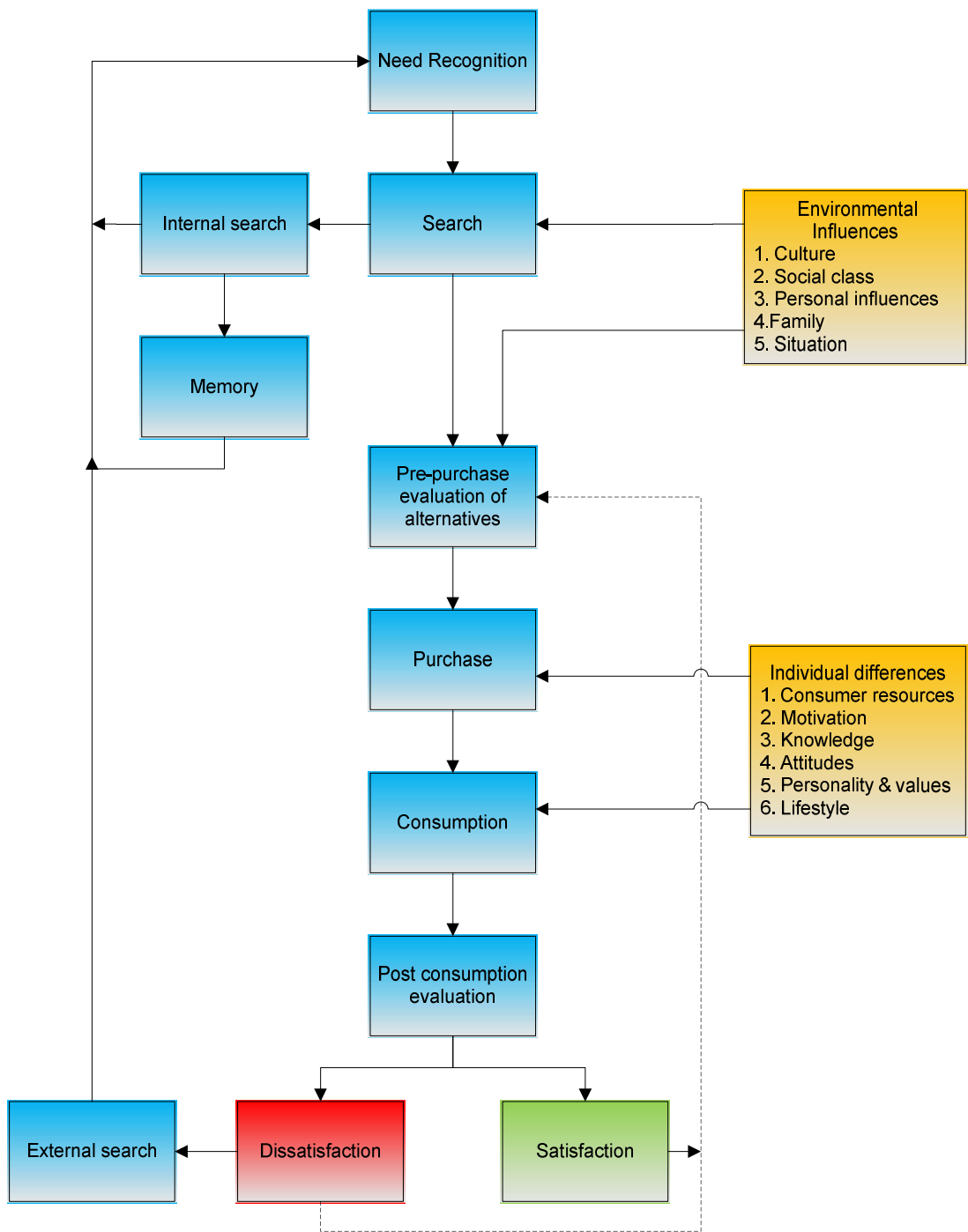


Figure 3 Buyer behaviour model adapted from Blackwell, Menard & Engel (2006)

In their analysis of public perceptions of food, farming and buying local. Wetherell *et al.* (2003) importantly identify the division of previous academic work on local food between rural sociology / geography and buyer behaviour, recognising the focus of the former being upon production, whilst the cynosure of the latter is directed toward customer purchasing decisions. Their work draws upon the earlier findings of Sheperd (1989) and Grunert (1997) as classic frameworks for food purchasing behaviour:

Food choices are the result of intrinsic (e.g. colour, texture, taste) and extrinsic (e.g. retail environment) factors, moderated by the demographic and socio-economic characteristics of the consumer.

(Wetherell *et al.*, 2003, p. 234)

In linking these factors, they argue that abstract benefits are more likely to be derived by both producer and buyer, but that trade-offs do occur between the desire to purchase and the more commonplace realities of convenience, price and accessibility in the perception of the buyer.

Hinrichs (2000) perceives the extrinsic factors within the realms of embeddedness, marketness and instrumentalism, believing that as the marketness of a product decreases, other factors linked to embeddedness are at play:

If marketness expresses the relevance of price in the transaction, instrumentalism captures the nature of individual motivation. High instrumentalism occurs when actors prioritise economic goals and engage in opportunistic behaviour to achieve them. In contrast, low instrumentalism reflects prioritisation of non-economic goals and concerns.

(Hinrichs, 2000, p. 297)

The research of Wetherell *et al.* (2003) additionally revealed greater levels of sophistication and understanding of food supply and provisioning amongst the rural participants, linked to the likelihood that awareness and understanding was linked to geographic proximity of the rural participants. Supermarkets were recorded as the most suitable primary point for access to

local food, which both reinforces and conflates proposals linked to availability, access and demand upon personal time, inferring that:

Buying local does not equate with engaging in a wholly different exchange relationship with producers, rather, local foods are expected to accord with normal shopping habits, retail outlets and end-product formats, at least if they are to play a regular part in the food choice repertoire.

(Wetherell *et al.*, 2003, p. 241)

Whilst this may be at odds with the sociological perspectives reviewed earlier, it serves as an important reminder that, in the main, the underlying economic instrument of exchange for consumption is unchanged:

Thus, although fair levels of awareness and concern for wider food related issues may exist within the population, which would 'push' consumers towards local foods, in practice many will only act upon these concerns if the offerings meet their normal, food-intrinsic and practical needs. (ibid)

In discussion of the role of farmers' markets, Tropp (2008) calls on the research of Thilmany *et al.*, which found both an opportunity for further development of belief differentiated sales and a lack of true understanding on behalf of the retailer:

One third of surveyed produce shoppers - largely heterogeneous with respect to demographics and income - are motivated to purchase local food products directly from growers because of perceived superiority in food safety and quality (even in comparison to organically labelled food). (Tropp, 2008, p. 1310)

There are multifarious reasons why more consumers do not engage with local food in the UK, many of which extend beyond the boundaries of this

research, but are identified and succinctly encapsulated in the research of SERIO¹⁵ (2008) for DEFRA, which chronicles key factors as:

- Age and gender demographics; those surveyed under the age of 25, regardless of income, social class or location, were least likely to purchase local food. Exponential growth occurs with age (IGD, 2005; IGD, 2006 also), gender and rurality. The research also suggests that younger educated consumers will engage in the future;
- Perceptions of price as a whole, and availability, particularly in urban markets, were cited as reasons not to engage with local food beyond the recorded positive attitudes;
- Socio-demographics indicate that younger, poorer, urban consumers are least likely to source local food, although this also raises latent perceptions about the urban poor held by the producers and market alike. It is also recorded that single consumers are less likely to harbour intentions to purchase, identifying barriers firstly.

A classification of behaviours based upon the research respondents and their influences allowed SERIO to categorise the local and regional food market customer base, which although recording significant dissimilarities between the purchasing behaviours of urban and rural dweller, categories the market as: Persisters (25%), Devotees (23%), Abstainers (36%) and Cynics (16%). The key members of each group are identified in the following table.

The SERIO classifications laid out in Table 2 appears on the next page.

¹⁵ It is noted that the SERIO research: Understanding of Consumer Attitudes & Actual Purchasing Behaviour with Reference to Local & Regional Foods (2008) does cover both regional and local foods. Particular focus is given to the local food findings contained in the report as they are encapsulated and replicated in the broader literature review.

Devotees (23%)	Persisters (25%)
<ul style="list-style-type: none"> * More females * More aged 45+ * More rural dwellers * Fewer in London, SW, EA & Y/H * More married * More degrees & A levels 	<ul style="list-style-type: none"> * More males * More aged 55+ * More rural dwellers * Fewer aged 35-44 * Fewer in London * More in SW & EA * More earning £15-25,000 * Fewer C1s * Fewer degrees
Abstainers (36%)	Cynics (16%)
<ul style="list-style-type: none"> * More females * More aged 18-44 * More urban dwellers * More in London, SE & NW * More single persons * More inner city & town centre * More earning £30-50,000 * More C1s 	<ul style="list-style-type: none"> * More males * More 55+ & 35-44 * More urban / inner city dwellers * Fewer in SW * More GCSEs

Table 2 SERIO classifications for purchasing local & regional food (2008)

The earlier research of Lobb *et al.* (2006) had considered factors acting upon a willingness to pay for local, national or imported foods. In terms of local food, the findings corroborate the general consensus of this literature review, registering broadly positive attitudes towards purchasing local food. The majority of the research group were older, educated British females, which undoubtedly skewed the research, but whose behaviours were informed by perceptions of seasonality, price and ease of access to local food. The socio-demographic analysis indicated a greater propensity towards local food by those respondents who lived in rural areas and those with higher income.

Another factor acting upon the intention and will to buy local is identified in the research of Megicks *et al.* (2008) who record a difference in behaviour between the main weekly shop and a 'top up' shop. It is less likely that the concerned consumer will invest the time to buy local goods, and where time becomes even more prescient in relation to convenience, range and price. Given the predominance of supermarkets in the supply of local food, (IGD, 2005) and the most popular local foods being fruit and vegetables, it would be beneficial to identify which are the most common products purchased at 'top up' visits. This predominance may also act as a constraint against local food if there is insufficient range, availability and product information,

whereby incongruent layouts and lack of 'sign posting' could also act against the customer's willingness to purchase (Memery *et al.*, 2005), as well as inviting further discourse about perceived proclivity to conflate between local and regional foods as customer choice or retailer imperative.

In analysis of urban consumer behaviour regarding the sourcing of local food in Birmingham and Wolverhampton, Khan and Prior (2010) find many similarities between their own data and that of SERIO two years earlier, although they do interestingly document a lack of interest in supporting rural communities as reason to purchase. This may be in part due to the wholly urban focus of the respondents and also in consideration of the spatial conceptualisation of their research's interpretation of 'local', which covered an area from North Staffordshire to South West Herefordshire, a road distance of some 123 miles, considerably larger than any accepted interpretation of 'local' within the UK, and at odds with the findings of Padbury (2006) whose study revealed a predominance of concern by consumers about the distance travelled by local food, and its inherent distinguishability of being less travelled. In conclusion of their work, the authors indicated that access to information via local media, and guaranteed availability 'are the biggest challenges to urban consumers in buying local food' (2010, p 168).

A qualitative study of buyer behaviour in relation to local, national and imported foods revealed by Chambers *et al.* (2007) functions as a precursor to the work of Khan and Prior (2010) in that it too records the main barriers as price, availability and convenience, finding:

Unexpectedly, there were no major differences in how participants in low and high socio-economic groups viewed local foods, even with regards to price. For participants in higher socio-economic groups, price still tended to be the deciding factor when making purchasing decisions regarding food.

(Chambers *et al.*, 2007, p. 210)

Their research does, however, identify ethnocentricity in purchasing behaviour. It is worth reminding ourselves here, of socio-spatial

conceptualisation and of the collective unconscious id of identity in relation to the effectiveness of local food distribution. From a supply chain perspective, food originating in North West France and sold in Kent and Sussex, being transported and distributed in a resource-efficient system, will be considerably more local and bear a lower environmental impact of food from Lydney purchased in Biddulph, but still classed as local food by Khan & Prior (2010). It may be argued that local food, producers and the profile of the currently accepted customer base may be construed as ethnocentricity in microcosm.

The perception of price as a barrier to the purchase of local food is a recurring theme, although evidence indicates that preconceived notions and perceptions of price are misplaced by potential consumers. Recently published (May 2010) independent research supported earlier research by Farmers Weekly (2008) and Localfoodshop.com (2008, now Big Barn). This latest research (Regional Food Group for Yorkshire & Humber (RFGYH), 2010) indicates that in the same area covered by the food group, cabbage, cauliflowers, leeks, onions, tomatoes and potatoes were less expensive at farm shops than they were in major supermarkets, yet purchasing behaviours remain prevalent, where the intentions to buy local food are not always executed (Wetherell *et al.*, 2003; IGD, 2005; IGD, 2006; SERIO, 2008).

The research of Tregear & Ness (2005, pp. 22-23) considers consumer interests surrounding the purchasing of local food. Their findings are broadly consistent with the work of other authors, reporting that: "attitudinal factors were found to be better discriminators of behaviour than demographic factors." The authors suggest that the relationship between concern around the issues of food localisation and actual purchasing behaviour is weak, and that conflation of local with organic and fairly traded foods occurs. Their results generally supported five hypothesised notions around local food:

1. Interest is associated with wider concerns about intensive farming systems, food miles and the future sustainability of smaller retailers and producers.

2. Sympathetic and more positive attitudes towards the farming community stimulate further interest in local foods. [This author notes that their research occurred in the recent wake of the foot and mouth epidemic.]
3. Notions of local food transcend pragmatic issues of availability and intrinsic issues of brand, packaging and appearance.
4. Increased levels of local food interest are associated with those consumers in rural locations, juxtaposed to farming activity.
5. Socio-economic background informs levels of interest in local food.

The findings of their research are also supported by the contemporaneous research of North West England Farm Outlets by Youngs (2003) and the later research of SERIO (2008) recording the only significant discriminating demographic variable as age, implying that interest in local food is acquired with age.

Morris & Buller's investigation of the local food sector in Gloucestershire (2003) examined local food supply chains within the county and reflected upon the possibility of adding value to all of the actors in these chains, finding further evidence of connotations: "*increased attention to localness is often associated, indeed in many cases conflated, with 'speciality', 'traditional' and/or 'quality' foods*" (Morris & Buller, 2003, p.560). Due recognition of the hidden factors in direct sales of local food are distinguished, as are the relevant perceptions and trade-offs cited by farmers, in which they acknowledge the lower unit price offered by the larger customer, but frame this against the certainties of volume in contractually obligated sales and the variability, repeatability and seasonality factors in farmers' markets.

The unsung but important role of the long established, 'traditional' food retailer is also recognised by the authors in their research:

Their role in maintaining the local food sector is highly significant though at least as much for the overall profile it gives to local produce as for the volumes actually sold.

(Morris & Buller, 2003, p. 564)

Whilst Holt (2005) is of the opinion that the overriding factor is that of practicality, recognising wider socio-political imperatives and beliefs of some consumers, support is driven by lifestyle constraints, which in the context of this research, suggests that answers for future development lay elsewhere. By further reminding ourselves that over 60% of current local food sales occur in supermarkets, a short term answer may be to simply serve the perceptions and willingness to conflate local and regional products of which IGD note that “*merchandising in this way is not only convenient for shoppers but helps stimulate impulse purchases as groups of products are more able to attract shoppers attention*” (2005, p.28). Although, it is the belief of this researcher that a ‘knee jerk’ market response driven by short term opportunity is not sustainable.

2.7 Anthropomorphism and Animal Welfare

The concept of anthropomorphism and the animal welfare debates arising from it is very briefly reviewed here, as the relative stance adopted by two of the case study partners in particular (Cases J and S) in relation to their pork production are diametrically opposite. The fact that anthropomorphism occurs is difficult for many of us to explain within paradigms of logical analysis. However, that it does occur is undeniable, as is the argument that it is a human problem, not a livestock problem, and that majority views may vary according to where you stand in the supply chain.

In calling on the earlier work of Sørensen *et al.* (2001) who ascertains that “what is good for animal welfare... is not always economical,” Hubbard *et al.* (2007) researched the issues surrounding the animal welfare debate from the perspective of pig farmers. Most of the farmers questioned were members of welfare compliance schemes, whose decision to become a member of the various schemes was not driven by altruism, but either by contractual obligation or a view that membership of at least one of the schemes increased the saleability of their animals, and in the case of organic farmers, to increase the price of the animal. The majority agreed that the health and welfare of their animals helped the performance of their farms,

linking good welfare to finished animal value. However, there was a general consensus that the public at large remained mostly uninformed and ultimately led by price at the counter of the supermarkets, of whom it was considered derived most benefit from welfare schemes in their portrayal as caring retailers. This lends itself to a dichotomous situation where a retailer may be selling imported meat alongside British meat, which may have been reared under considerably higher welfare standards, thereby invoking arguments of insincerity and double standards. Whilst the farmers link good standards of welfare to market advantage, nearly all agreed that scheme membership “was an economic necessity rather than a choice.” (p. 928)

Marsden & Smith (2005) note that the underlying production principles of the ‘less intensive farming’ organisations they researched as the:

Regard for manufactured (produced) capital is, in this case, demonstrated through compassionate livestock rearing practices. By recognising the intrinsic rights of non-human species to a shared existence with mankind, organic farming also contributes to ecological sustainability in agriculture.

(Marsden & Smith, 2005, p. 444)

Murdoch *et al.* (2000) identify the use of actor network theory in deliberation of anthropomorphism, when decisions and actions are driven by perceived relationships where, for example:

Network activities or network outcomes can only be fully comprehended by taking into account the full range of interrelationships found therein. Agency is understood as the collective capacity of heterogeneous networks, in which the activities of nonhumans may count for as much, if not more, as the activities of humans.

(Murdoch *et al.*, 2000, p. 112)

Ilbery & Maye (2005, p. 838) note of the stance taken by a farmer operating a finishing operation for rare breed pork, over and above the requirement to bring the pig to a standardised and more consistent product for local

butchers: “*The contacts I have with my pig suppliers are very close. It’s very personal... they just want somewhere decent for the pigs to come.*”

2.8 Summary

This section of the literature review has provided an overview of the disparate definitions and conceptualisations of the term ‘local food.’ It has introduced conflicting debate around the ‘who’ and the ‘where’ of local food systems, as well as considering the social, economic and environmental factors at play, and discussing the possibilities of new interpretations emerging, perhaps even linking into future positive health outcomes. There is a wider range of extant literature analysing the growth and success of local food initiatives in the USA, although it is less clear that this may be a result of state legislature having more of an impact than federal legislature. This may go some way to identifying where differences occur, and if they are as a result of UK farming being both driven and controlled by the overarching federal imperatives of the Common Agricultural Policy.

There is both a requirement and business opportunity to allow greater access to local food more evenly across socio-demographics, where attitudes and accessibility may only be streets apart in urban settings.

Farmers’ markets undoubtedly allow producers to shorten and circumnavigate supply chains; they offer a direct route to market for minimal front end investment, whilst providing face to face contact with ‘customers’.

It is likely, given the structure of food supply chains and the dominance of multiple retailers, that inevitably, increases in demand for local food by the consumer will be met largely by multiple retailers. In consideration of this, further focus is required on behalf of the producers to increase collaboration and supply chain effectiveness, in order to mutually benefit from the advantages of enhanced supply chains and cooperative activity which encompasses the breadth of operations, from farm inputs to sale. Concurrent to this, we should consider challenging the *status quo* of the current farmers’ markets in terms of their location, willingness to truly reflect the profiles of locally produced food, openness and perceptions of current,

and future potential customers. A reduction of market segmentation as well as broader targeting and fulfilment strategies may act as significant approaches to overcome the constraints of socio-economic backgrounds and the willingness to sustainably engage with local food.

The literature reviewed frequently conceptualises the archetypical community actors in ways which are often stereotypical and perhaps occasionally anachronistic. In assumption that other sections of the community are required to 'fall in line' to comply with the current landscape of 'local food' we run the risk of perpetuating a policy imbalance *status quo*, as well as overlooking the fact the embeddedness is a socially constructed phenomenon, and like social capital, where you stand, and who you stand with, invariably informs your view.

Without definition, 'local food' must ultimately remain as a spatially qualified term, at least for the time being. Indeed, if we consider "local" as spatial, excluding emerging understandings of local embeddedness, we risk placing further barriers around what may be construed as potentially pejorative descriptions of "local food", its perceived market and the routes to that market.

Scale, by its very nature, remains contextually and conceptually relational, its spatial relativity driven that of which it is juxtaposed, its capricious nature inexorably invites further discourse on the 'who' and the 'what' of localisation.

Future conceptualisation of food localisation should aim to segregate the disparate elements of simply shortening the distances between producer and consumer, capitalisation of produce, reinforcement of the perceived customer base and embeddedness, actual or perceived. In tempering these ties, new meanings of 'local food' may begin to emerge, of which there is currently very little, but equally of which, there is much to recommend. In light of this, it would be interesting and potentially beneficial to revisit to the work of Ricketts Hein *et al.* (2006) to assess localisation from sociological perspectives, where the original sets of indicators of food localisation are reversed and driven from a downstream 'end actor' perspective of additionality.

As the constraints of market are removed (these may be the traditional customer base, market location and multiple retailers looking for local opportunities), they may be replaced by constraints of resource inefficiency prevalent in smaller systems, therefore collaboration or the ability to identify and let go becomes more important, so that producers may concentrate on core competencies.

The following page contains Table 3, a framework of embeddedness and supply chain imperatives based upon the literature review.

A theoretical framework of embeddedness & supply imperatives based upon the literature review.

Value	Validity	Adoption (as encroachment)
Alternative systems of food provisioning driven by beliefs and values beyond economic exchange in a free market – mutual reciprocity.	Development and sustainability of short food supply chains, offering more ‘value’ to actors in these chains, in terms of retained margin and produce characteristics.	Long established independent retailers starved of local produce, as new (subsidised) routes to market are sought by producers and growers looking to maximise commercial value of their products by circumvention of established streams.
Sustainable food systems, in which socially equitable exchanges are made, based upon notions of provenance, health, environment, spatial relevance, mutual wellbeing & intrinsic product value.	Enhanced economic viability which sustains and further develops the ‘being’ of rural communities, based upon their endogenous characteristics, and the willingness to purchase.	Willingness to engage with larger supply chains, both upstream and downstream on behalf of producers, and a ready inclination to conflate terms of locally produced and locally supplied by retailers.

Future Additional Scenarios

1: Marketness of produce to be tempered with instrumentalism, without impinging upon the inherent characteristics of the produce or the beliefs of the patrons.	1: Collaboration within scale to allow for greater resource utilisation and lower environmental impact per unit of production.	1: Trans-national & other multiple retailers seek to grow sector by incorporating ‘niche’ products, readily interpreting ‘local’ to the benefit of their own business models.
2: Retain embeddedness of the products, whilst developing economies of scope and breadth in local, alternative food systems.	2: Co-operative activity to improve fulfilment strategies, and strengthen embedded food systems.	2: Policy mechanisms to sensitively support embedded food systems from trans-national & other multiple retailers, without undue distortion of the market

Table 3 A theoretical framework of embeddedness & supply chain imperatives

3 The Theory of Constraints and its Philosophies

3.1 List of Theory of Constraints Acronyms

TOC	Theory of Constraints
TOCTP	Theory of Constraints Thinking Processes
CRT	Current Reality Tree
CCRT	Communications Current Reality Tree
CRB	Current Reality Branch
DBR	Drum-Buffer-Rope
EC	Evaporating Cloud
FRT	Future Reality Tree
FRB	Future Reality Branch
GEC	Generic Evaporating Cloud
I	Inventory
NBR	Negative Branch Reservation
OE	Operating Expense
PRT	Prerequisite Tree
SDBR	Simplified Drum-Buffer-Rope
T	Throughput
TP	Thinking Processes
TT	Transition Tree
UDE	Undesirable Effects

3.2 Introduction

The Theory of Constraints (TOC) antecedents are rooted in the development of enterprise resource planning (ERP) computer software systems. A software package was developed by Goldratt and three others during the late 1970s (Goldratt 1980). Their system was based upon dynamic analysis of proprietary algorithms, which in this case are a system of rules, steps and metrics transacted to accomplish specific goals. This software package was originally known as Optimised Production Timetables (Goldratt 1980b), but this later became Optimised Production Technology. The software is apposite to materials resource planning (MRP) and just in time (JIT) control systems software and was aimed squarely at this market sector (Aggarwal, 1985; Plenert & Best 1986). Goldratt's subsequent development of the aforementioned proprietary algorithms as a continuous improvement management philosophy, and paradigms proposed to relieve operational constraints and increase throughput, were first mooted (Goldratt 1984) with the publication of his business novel, *The Goal*, in which the central protagonist initiates business processes re-engineering programmes to save the day and the manufacturing plant.

The evolution of the Optimised Production Technology system into management philosophy has at its core, a common set of precepts as rules, which Goldratt and Cox (1986, p. 179) identify as:

- Balance flow, not capacity.
- Levels of utilisation of non-constrained parts of a system are not determined by their own potential, but by some other constraint in the system.
- Utilisation and activation of a resource are not synonymous.
- An hour lost at a constraint point, is an hour lost for the entire system.
- An hour saved at a non-constraint point is just a mirage, by improving flow at a non constrained point, you are merely increasing the amount of inventory / work in process in the system.
- Constraint points govern both throughput and inventories.

- Transfer batch sizes may not, and in many cases, should not be equal to the process batch.
- The process batch should be variable and not fixed.
- Schedules should be established by looking at all of the constraints together, lead times are the results of a schedule and cannot be predetermined.

Goldratt considers a system to be global (Goldratt & Cox, 1984) and the whole of the system to be more than the sum of its parts. In consideration of this, it can be argued that the development of the TOC management philosophy is also steeped in Wertheimer's work on Gestalt theory during the early 20th century, perhaps best encapsulated within the context of TOC thus:

'Pieces' almost always appear 'as parts' in whole processes. ... To sever a 'part' from the organized whole in which it occurs - whether it itself be a subsidiary whole or an 'element' - is a very real process usually involving alterations in that 'part'. Modifications of a part frequently involve changes elsewhere in the whole itself. Nor is the nature of these alterations arbitrary, for they too are determined by whole-conditions. (Wertheimer, 1922 in Ellis, 1938, p.14)

There are three important TOC accounting concepts which also challenge activity-based costing models where TOC is adopted. Traditional accounting systems place emphasis on optimal resource efficiency and cost minimisation at local level within a system, and focus upon management performance indicators at department and work centre levels, which Berry & Smith (2005) judge to be that:

Costs are an easy target since they are more easily controllable internally, rather than increasing throughput, an externally focussed approach. (Berry & Smith, 2005, p.86)

This permanent influence of accounting systems to use resources ‘efficiently’ frequently leads to scenarios which Reid & Koljonnén (2003) describe as:

Resources being released ahead of time in order to provide work to resources which, in turn, creates large amounts of work in progress inventory (WIP) residing throughout the production system.

(Reid & Koljonnén, 2003, p.11)

Contemporaneous to this is a requirement to holistically balance out management systems across the organisation so that order schedules may be met. This in turn leads to considerable amounts of both internal and external expediting. The presence of excessive WIP and the requirement to expedite adds further complexity to management tasks, often leading to situations where ‘the wood cannot be seen for the trees’ (see Fig 4). Here, Goldratt asserts his belief that a more basic problem of system constraint underlies these unwanted side effects and should be addressed heuristically from a collective perspective [by team work.]

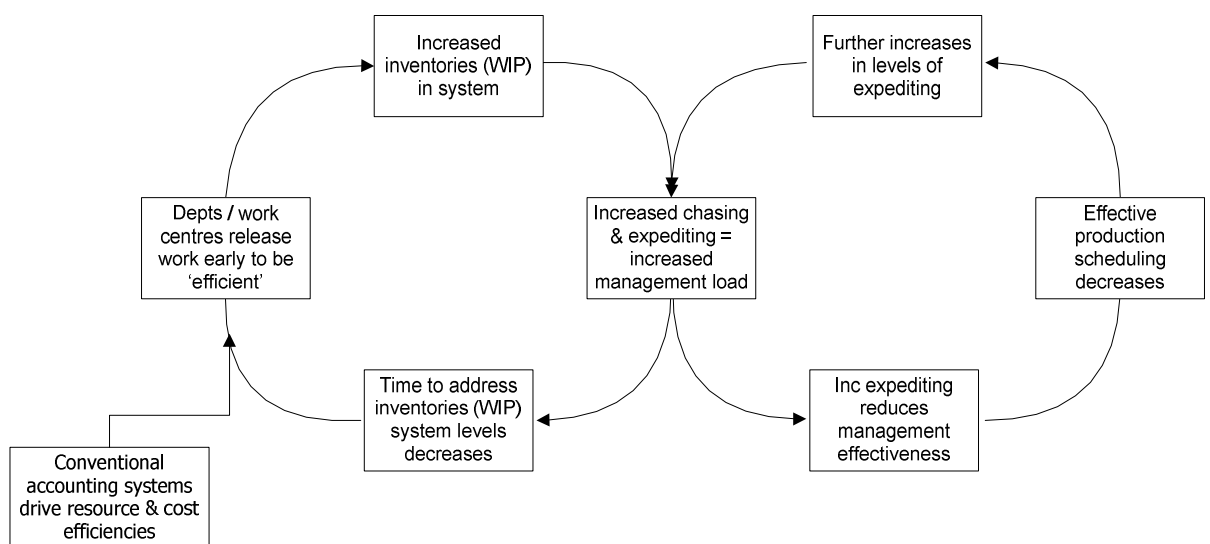


Figure 4 Traditional accounting causal loop diagram

To counter these traditional accounting techniques, Goldratt & Cox (1984, p. 54) propose the aforementioned alternative primary metrics which are:

- Throughput (T) “The rate at which the system generates money through sales.” Throughput can also be recorded as the total sales of the system minus all of the variable costs.
- Inventory (I) “The money the system spends on things it intends to sell.”
- Operating Expense (OE) “The money the system spends to turn inventory into throughput.”

In standard cost accounting terms these metrics can be expressed as:

- $T - OE = \text{Net profit}$
- $T / I = \text{Inventory turnover}$
- $T / OE = \text{Production productivity ratio}$
- $\frac{T - OE}{I} = \text{Returns on Investments}$

Goldratt & Cox (1984) maintain that imbalances are unavoidable realities in systems and processes, and that within a process or system; constraints can be identified and addressed. Goldratt’s TOC argues that systems and processes are developed for a purpose, to make money now, and to make more money in the future. The identification, addressing and removal of ‘local’ constraints positively links these actions of constraint removal to the global goals of the system. This can be achieved by using a technique called Drum-Buffer-Rope (DBR). The identified constraint becomes the drum; the operating cycle or ‘beat of the drum’ dictates the effective flow and cycle rate for the system. The buffer is the establishment and implementation of mechanisms / alternative practices which ensure that the drum is not starved of materials or resources. The rope is the establishment of a triggering and release system or practice which ensures that resources and materials are released or made available in the correct sequence at the right time. Subsequent development of DBR into Simplified DBR (SDBR) has been recorded, but this has been limited to output from the Goldratt Group,

(Schrageheim 2006) conferences (Lilly 2004; Schrageheim *et al.* 2006) and a theoretical research paper (Lee *et al.*, 2010). SDBR assumes that constraints occur in or around the middle of flows and routing. It is essentially a DBR which sits within a DBR fed constraint point and allows local cell-based decision making based upon a traffic light system, in which the buffer status considers when the order was placed, how many days have elapsed and when it is due for delivery.

In Rahman's summary (1995) of the underlying concepts of TOC throughput, he records the conflicting stance of constraints against conventional understanding, stating:

Because constraints determine the performance of a system, a gradual elevation of the system's constraints will improve its performance. (Rahman, 1998, p. 337)

Goldratt's underpinning rationale for TOC is a recognition that business operations, manufacturing, processing and production systems are built for a purpose, and that systems are constrained at one or more points in that process. The application of TOC to a specific problem requires a five stage process (Goldratt, 1990):

1. **Identify the system constraint.** In this example I have identified a possible physical constraint. However, it is vitally important to remember that these constraints could also be as a result of managerial imperatives, historical systems of order fulfilment, unchallenged working practices, procedures and policies, or historical ordering and purchasing behaviour at points further downstream in the supply chain. Here we consider a liquid filling machine which has a slower operational output than machinery upstream and downstream to it;
2. **Decide how to exploit the system's constraints.** Analysis of metrics and recorded observations will allow data to emerge which identifies actual output versus maximum potential operating output.

Goldratt (*ibid*) further proposes that when managerial constraints which may be policy or system based are exposed, that they are eliminated in favour of systems which will drive throughput at bottlenecks.

3. **Subordinate everything else to the above decision.** Place focus upon re-engineering and reconfiguring both upstream and downstream equipment and operating systems (non-constraints), as well as transfer batch¹⁶ sizes arriving at the machine for filling. Cycling at continuous levels which will allow the filling machine to operate at increased efficiency levels continuously, without being starved of products / packaging, or stopping as a result of downstream backlogs. This synchronous resource harmonisation leads to a more effective system, which in turn, leads to a greater, overall utilisation of resource when considered from a perspective of total throughputs. Where non-constraint resources are employed beyond the synchronous capacity of a balanced system, they do not increase efficiency, but merely add to work in progress (WIP) and overall inventory costs (Lockamy & Cox 1994).
4. **Elevate the system's constraints.** Within the defined operational constraints, continuous focus is placed upon sustainably increasing output and efficiency at the constraint point, thereby increasing overall line efficiency. This can often extend beyond the immediate scenario and include development of Kaizan and lean manufacturing philosophies. For example, workers who find their station operationally idle up or downstream to the constraints can partake in preventative maintenance, enhanced skill acquisition or can work at the constraint point.
5. **When the constraint has been broken, return to point 1 and start again. Do not let inertia become the next constraint.** This stage recognises that solutions are not in themselves appropriate in

¹⁶ A transfer batch is the size of the batch moved from one resource to another as part of the manufacturing process. A process batch is the amount of products manufactured at a resource between tooling and product set ups.

perpetuity, and that as organisations, products and markets change, further analysis and refining are required (Goldratt, 1990, pp. 5-6).

These five principles were further supplemented (Goldratt, 1990) by the Theory of Constraints Thinking Processes (TP), which were based on analysis of causality and cause and effect to aid decision making. They were specifically developed to encompass behavioural and institutional constraints, which were seen to arise following the removal or reduction of physical constraints associated to the operations under scrutiny. In regard to the application of TP Mabin & Balderstone (2003) state that:

The benefits could be much larger because much more fundamental assumptions are being tackled, and changes to these areas can have major impacts. Thus the TPs are often used to attack thornier issues, which can hardly be regarded as “low-hanging” fruit.

(Mabin & Balderstone, 2003, p. 589)

Dettmer (1995) opined in his own research that TP potentially offered greater possibilities to deliver enhanced system improvements, stating that the fundamental reasons for this are based on two peerless characteristics of TP. The first is the ability to address abstract manufacturing and quality management issues which have developed as a result of policy or paradigm status quo; secondly, is the capacity to reconcile interdependency of system components.

Indeed, Goldratt (1992) tacitly admits that as physical and traditional operational constraints are addressed in order to ameliorate operational performance, they can reveal unchallenged institutional and political constraints. The approach advocated by Goldratt is to ask and answer three questions:

- What to change?
- What to change to?
- How to cause the change?

The TP identifies groups of five cause and effect recording instruments, which are specific diagrams to be utilised at each stage of the process and which are summarised in the following table. Each instrument has a set of rules which must be adhered to known as categories of legitimate reservation (CLR), which are designed to retain focus during the construction and testing of valid arguments.

TP Question	Stage	TP Instrument
What is to be changed? (CRT)	Identification of core problems	Current reality tree
What is it to be changed to? (EC)	Development of pragmatic solutions	Evaporative Cloud
How will change be caused? (FRT)	Implementation of solutions	Future Reality Tree
(PRT)		Prerequisite Tree
(TT)		Transition Tree ()

Table 4 Thought Process instruments and their applications

The CRT is used to record the current status of the operation and record a number of undesirable effects (UDE), whilst the EC is used to identify and record suppositions and latent predicaments acting against change. The FRT logically plots the proposed changes and the resultant future state. Finally, the PRT and TT identify the obstacles, sequencing of the projected changes and the underlying rationale. Both Cox & Spencer (1998) and Reid & Cormier (2003) record the presence of a negative branch reservation (NBR) instrument in their TOC TP case study of a service sector company. The NBR is used to record the causal relationships between planned changes and their negative effects of those changes. Whilst the set of instruments has been conceived as a holistic tool kit to ideally be utilised in concert, Scheinkopf (1999) records multiple examples of the TP instruments being used individually to analyse and address particular situations.

Walker & Cox (2006, p. 151) propose that TP and the identification and recording of UDEs offers an alternative approach to the resolution of ill-defined and unstructured problems. They further state in their analysis of a 'white collar' case study:

Many unstructured problems can now be reclassified as structural problems with proper identification of the system, its goals and constraints. Significant data need not be collected to study every aspect of the system. Only eight to ten UDEs – drawn from different functions and levels to gain a systems perspective – are required to develop a good understanding of an organisation and of its core problems and drivers (Walker & Cox, 2006, p. 151).

Additionally, they make claim (2006, p. 139) that:

Novices, those without specific domain knowledge, can in our view make decisions comparable to experts through careful application of the TP tools (Walker & Cox, 2006, p. 139).

The research will be contending this last point at a later stage of the thesis, when it is considered from the positions of pluralism and contextual settings. In support of the researcher's arguments, evidence drawn from the literature review suggests that further development of the TP, whilst undoubtedly undertaken to add further validity to thought process decisions, increases complexity and potentially disengages the very people it is being aimed at. Burton-Houle & Houle (1998) record their development of an alternative system to produce the CRT which requires users to:

- Create a list of undesirable effects (UDEs)
- Produce three Evaporating Clouds (ECs) from the UDE list
- Compose a single generic evaporating cloud (GEC) drawn from the data in the three separate ECs
- Build a Current Reality Tree (CRT) which 'harnesses the logic and pictorial representation of the generic EC.'

TP waters are further muddied by the introduction of additional branches (CRB and FRB) to the Current Reality and Future Reality Trees, which offer alternative frameworks from the original analysis of CRT-EC-FRT to either: GEC-CRT-FRT-NBR, or with the introduction of the branches: GEC-CRB-FRB-NBR. Kim *et al.* (2008) describes the branches thus:

Defined as logic based tools for examining potential solutions before implementation. Similar to the reality trees, except it is used to test and solve problems related to a specific action or EC dilemma, and is generally a sub tree of the full tree (Kim et al., 2008, p. 164).

Lepore & Cohen's (1999) elucidation that their alloying of Deming's Theory of Profound Knowledge (TPK) and TOC into a ten-step process known as 'The Decalogue' was with the intention of "satisfying a need", although whose need is not clearly identified. One can argue that its central proposition to reduce the 14 steps of TPK and the eight steps of TOCTP is subjective.

Here again, the question is raised about the reality of successful application of theory by key stakeholders in local food supply chains. The introduction of branches and generic clouds adds further complexity, whilst the reviewed literature failed to identify a comparative analysis between the original TP system and the more convoluted versions. Indeed, in the analysis of Kim *et al.* (2008) they evince the prior findings by Button (2000) in the creation of CRTs, that:

Sometimes managers find it difficult to accept that a problem exists, especially if it is related to poor management practices.

(Kim *et al.*, 2008, p.162)

As well as acknowledging the difficulties of creating a CRT based upon its complexity and time requirements Kim *et al.* (*ibid*) further record the introduction of a Communications Current Reality Tree (CCRT) which 'demonstrates the core problem by describing the relationship between observed UDEs and the underlying core conflict' as an additional aid. However, it could be argued again that the introduction of the CCRT merely acts to add a further level of complexity beyond the reasonably expected skill levels and responsibilities of the aforementioned stakeholders. Kim *et al.* (2008) importantly record that:

In terms of making TP tools more user friendly, it is necessary to investigate whether, say, the three cloud approach outperforms the

traditional approach in building a CRT or vice versa.

(Kim *et al.*, 2008 p. 165)

3.3 An Analysis of Previous TOC Applications

To date there have been four broad reviews of the extant TOC literature drawn from both TOC and TOC TP, their philosophies, paradigms, applications and future research, covering the period 1980 – 2008 (Rahman, 1998; Mabin & Balderstone, 2000; Mabin & Balderstone, 2003; Kim *et al.*, 2008). A common trait running through these review papers is an acknowledgement that the derived empirical data could be further improved, and it is in the main drawn from a relatively restricted scope of operations management. Rahman (1998) identifies a propensity toward TOC application amongst car manufacturers and industries which were principally aligned to ‘make to order’ rather than ‘make to stock’ management operating systems. He records common precepts of inventory reduction, work in progress reduction (WIP), as well as reduced lead times and improvements in performance of delivery, recalling the achievements attained at Ford Motors (US) electronics division, which reported inventory decreases of \$100 million as a result of introducing a DBR system (Gardiner *et al.*, 1994). However, this researcher notes that prior to application of DBR, Ford was only using rudimentary Kanban systems in a complex multi-product manufacturing scenario, and argues that it would be difficult not to achieve significant reductions in inventories as a result of any applied management system given these inherited pre-cursors. Claims are also made in the same article by Gardiner (*ibid*) of significant increases in production at a General Motors factory, as well as a of \$600 million inventory reduction at Proctor & Gamble as a result of TOC implementation, although it is accepted that numerical data to support the findings has not been forthcoming. It is worth briefly mentioning here, the work of Belvedere & Grando (2005) on the transition of paints and dyes company from ‘make to stock’ to ‘make to order’, which I will consider in greater detail at a later stage of this review. In Rahman’s summary, the author identifies the theoretical bias of the work published to date by recording that:

The vast majority of the papers have concentrated on the concept and enhancement of the TOC concept

(Rahman, 1998, p. 352)

Also that:

Future research should be directed towards analysing the case studies of organisations to identify what worked, and did not work and why. Investigation of applications of the TOC philosophy in the service sector is required.

(Rahman, 1998, p. 353)

Five years later, Mabin & Balderstone (2003) find that:

There is a need for clearer reporting of which aspects of TOC (thinking, methods, tools, and techniques) were employed, if links between methods used and results achieved are to be made.

(Mabin & Balderstone, 2003, p. 591)

Further to this, they identify an underlying problem with the case study reporting itself, claiming that a lack of meaningful data sometimes reduces some of the case studies to 'case vignettes', and of the problems which may be encountered as a result of an overly benign case presented by professional TOC practitioners.

By 2008, Kim *et al.* record an emergence of service sector applications called for by Rahman ten years previously. Their paper's summary of publications records a shift in the landscape of TOC, with an even split of publications linked to theoretical/methodological and application specific studies. Their analysis also encapsulates the emergence of research driven by the introduction of Goldratt's TP, whilst still detecting "research gaps in this domain." A key concern by the authors (Kim *et al.* 2008) was the lack of whole organisational analysis using TOC (seven out of fifty seven) as well as their observation:

Many reviewed papers are essentially descriptive in nature; further empirical study would be valuable in order to verify the use of the tools

in implementation, and to provide some quantitative evidence of effectiveness.

(Kim *et al.*, 2008, p. 173)

Contained within the four review papers (Rahman, 1998; Mabin & Balderstone, 2000; Mabin & Balderstone, 2003; Kim *et al.*, 2008), is the recognition that TOC and TOCTP are primarily deployed as intervention measures, and that longitudinal studies should be employed in order to provide greater empirical evidence to underpin the hypotheses, as well as being able to record 'before and after' scenarios. Whilst Tanner & Honeycutt (1996) recorded the successful implementation of TOC during the re-engineering of sales operation, which lead to changes in customer purchasing behaviour beneficial to the company, they also tacitly inferred that the introduction of TOC was an intervention that was "problem driven".

For the remainder of the TOC section of the literature review, I have focussed upon research in which I believe business comparisons occur with my study partners, and which further encompass spheres of operation and scale wherever possible. Additionally, I have considered research emerging from the health service sector (Lubitsh *et al.*, 2005; Umble *et al.*, 2006) as they record important TOC implementation issues, which the researcher believes would similarly impact upon this research's case study cohort.

Anthony Inman *et al.* (2008) in their research of TOC applications and outcomes in relation to operational performance find that as a result of their own literature revue:

Research on TOC seems somewhat sporadic and rare when compared to other areas of interest such as JIT and TQM. Much of the work that exists is anecdotal or based on simulation. As such, there is little empirical work on which to base the type of academic research that has been developed around other management practices.

(Anthony Inman *et al.*, 2008, p. 342)

Ronen (2005) had previously suggested that this scarcity may be as a result of TOC being originally developed by practitioners; resultantly, academics have not been fully exposed to it. However, the validity of this argument remains to be tested.

Simulation modelling research comparing TOC DBR systems to JIT records favourable results for TOC under variable, unbalanced flow line conditions (Cook, 1994; Chakaravorty & Atwater, 1995; Chakaravorty & Atwater, 1996). Unsurprisingly they record that maximum outputs are achievable with depressed inventory levels which fits with TOC theory, although they do not say if this is as a result of variable batch size releases into the system. As a caveat, this research recognises simulation modelling by its very nature cannot capture nuances and realities found in live supply chains.

3.4 Operations Management

In the application of TOC to an Indian integrated poultry business, Chaudhari & Mukhopadhyay (2003) reported on a general stasis of the case study partners. This was also present in Case F within this research, an integrated poultry business based in the UK which has multifarious and significant technological advantages over its Indian counterparts. The process flows described by Chaudhari & Mukhopadhyay and the process flows mapped with Case F display high levels of commonality in terms of brooding, day old chick placement, feed distribution management, feed conversion ratios and other performance indicators. They identify 'sub optimisation', reporting that detection of intangible and 'non-physical' constraints is key, because:

Most of the physical constraints are the result of non-physical constraints. Overcoming such constraints may not involve any or major financial investments and, just by changing the relevant policies or performance measures, constraints can be removed from the business, which ultimately results in exponential improvements to bottom line indicators.

(Chaudhari & Mukhopadhyay, 2003, p. 799)

Further, they comment that as a result of established business and operational practices going unchallenged:

Wrong policies inhibit the maximisation of throughput from existing constraints and create false assumptions about sub-optimisation.

(Chaudhari & Mukhopadhyay, 2003, p. 802)

In the Indian case these were manifest, but in Case F, inefficiencies existed primarily as a result of the business model in which company owned, horizontally integrated farms were operated as cost centres. Whilst these farms operated within budgets and performance indicators, operational efficiency went unchallenged, despite overwhelming evidence that independently owned 'contractor farms' were operating more efficaciously on 'like for like' analysis.

In conclusion, Chaudhari & Mukhopadhyay report on significant process changes on sales decisions, feed conversion ratios, transport efficiencies and reduced inventory costs. Nevertheless, they warn of replicability and generalisability issues, clearly stating that adoption of their research even within the same industry sector, competitors will "immediately start making losses" (2003, p. 816) due to specific strategies within this company.

In analysis of TOC projects at a Japanese end mill cutting tool manufacturing plant, Umble *et al.* (2006) describe implementation at a plant which exhibits a classic V-plant formation. TOC literature describes three principle manufacturing layouts: V, A and T. 'V' plants are typically characterised by downstream divergence points where the variety of end products is typically larger than the range of raw materials (Umble, 1992). 'A' plant characteristics are representative of production flows which commence with many raw materials or components which converge downstream into less finished goods or sub assemblies. Indicative characteristic of 'T' plants are divergent points at final assembly of mostly common parts and sub-assemblies, which is more widely accepted as delayed final manufacturing (Umble, 1992). Although the authors describe a typical Japanese manufacturing plant, the initial analysis of the plant found that no planned preventative maintenance programme existed, data inaccuracies were

manifest, which impacted upon the ready identification of constraints, and that attitudes of “I produce, you repair” were observable between manufacturing and engineering departments. The authors also recorded many quality problems which impacted upon monthly bottom line performance by several millions of Yen:

In an attempt to sort out defective material, quality inspections costing time and money were conducted at virtually every step of the various process. Nevertheless, significant amounts of product were slipping past the inspections.

(Umble *et al.*, 2006, p.1874)

This is at odds with perceptions of what lies beneath ‘typical Japanese manufacturing’ which are commonly held to be Kaizan management philosophies, introduced in the early 1950s as Kaizan eno Yon Dankai, literally "Improvement in Four Steps" of plan, do action and check. The philosophies are underpinned by the work of Demming, Sarasohn & Protzman (Hill, 2005, pp. 395-399).

Key indicators to the success of the project were reduction in WIP and cycle times, which were both achieved; this helped to overcome long standing company issues linked to discounting or withdrawal of obsolete stock as new lines of products were introduced to the market by the company itself. Contemporaneous to the work being carried out by the TOC consultant and improvement teams, was the introduction of three key lean manufacturing tools: Kaizan as an overarching philosophy; 5S, which Hitachi called ‘My Machine My Space’ and of which Thomas-Foster (2004, p. 84) records as sequential processes introduced by manifold Japanese companies, aimed at developing ownership (Seiri), ongoing management (Seiton), cleanliness (Seiso) standardisation (Seiketsu) and discipline of the previous four steps (Shetsuke) in personal work areas. The third tool introduced helped to overcome quality and time constraint problems linked to the numerous tooling changes, which are synonymous with downstream divergence, was Single Minute Exchange of Die (SMED), which although described by Goldratt (1990, p.40) as ‘Setup Costs’ has direct antecedents to the work of

Shingo recalled in his review of the Toyota Production System (1989, p. 70) and further described (Lu, 1989, p. 60) as: *“like playing golf, where swinging is not as important as having the correct form.”* SMED involves the analysis of existing tooling changeover procedures and corrective actions to reduce waste (Muda) and uneven work flows (Mura) by the introduction of line support activities such as colour co-ordination, pre-heating, unification of die heights and use of setting pieces and jigs to shorten the changeover time of tooling to less than ten minutes, hence single minute exchange of dies.

One of the more celebrated TOC implementations chronicles the case of the Alkco Lighting Company¹⁷ (Andrews & Becker 1992), which commenced as a result of the company president reading Goldratt’s business novel: *The Goal* (Goldratt & Cox, 1984). Although it is often overlooked that on the same holiday Joe Incrocci also read books on total quality management (TQM) and lean production techniques. Alkco, a manufacturer of high quality architectural light fittings, had been bought by Luxo, a manufacturer of niche angle-poise type lights which was looking to diversify across a wider market segment. Alkco was beset by internal conflicts; sales and manufacturing departments were in discord; a push mode of production was employed which made to inventory; there were high levels of WIP and finished stock, both of which were regarded as ‘a safety blanket’; and an over dependence on sub-contractors and new product development programme, which was based on a whim that if bespoke ‘one off’ orders were successful, then that product would be added to the catalogue. An upstream reorganisation of the business was undertaken which commenced with a ‘customer first’ programme, in which the sales office was able to modify purchasing behaviour of customers, an outcome that was also recorded in the case of Moore Business Forms (Tanner & Honeycutt, 1996). By moving to a pull system where products would only be manufactured against known orders, significant reductions were made in WIP and finished inventory, which outweighed the extra tooling set costs as amortisation efficiencies were diminished as a result of more frequent tooling changes made to smaller, but

¹⁷ Alkco are now part of the multinational Philips group.

more frequent order batch sizes. WIP reduction also freed up 40% of factory floor space, which allowed for better production cell orientation work flow and DBR systems. The supplier base was also reduced by 90% however; the retained suppliers were required to hold inventory for Alkco as a condition of their increased share of business, which was readily agreed to, but led to stock outs:

We had JIT in mind, but found that we must have a certain amount of inventory, we realised that we were not GM or Ford.

(Andrews & Becker, 1992, p. 78)

Cause and effect analysis identified the underlying reasons to 'stock outs' lay with both Alkco and its suppliers, neither of which had sufficiently changed production processes and methods to reconcile the requirements of smaller batches and shorter runs. Once these issues had been addressed, Alkco reported decreases in lead times by 88% and increases in on time delivery fulfilment to 97%, but the authors warn that:

These gains can be maintained only with constant vigilance and trust regarding the factors that produced the benefits.

(Andrews & Becker, 1992, p. 93)

Pegels & Watrous's (2005) case study of an injection moulding department in a first tier supplier of vehicle lighting systems, identifies both production and sales constraints. Orders received by the plant by both the vehicle manufacturers and companies operating in the component replacement markets fluctuate from month to month. In consideration of this variability, it is important to recognise, especially within the context of 'made to order' companies like this one, where production is pulled through the system as a direct customer demand, that order acceptance should be based upon scheduled production activity within the lead time of that order. Riezebos *et al.* (2003) describe this within TOC application thus:

According to TOC demands, an accurate acceptance criterion will have to reflect more precisely, that availability capacity at capacity

constrained resources [bottlenecks]. The smaller the available slack time, the more limitations there will be in fitting orders into capacity. This means that more planning must be done when considering orders for acceptance.

(Riezebos *et al.*, 2003, p. 704)

This fluctuation places peak demand on injection moulding machines, which require strip downs and mould setting between each product. Although no change in order behaviour is recorded, significant improvement to tooling changeover times are. These improvements are driven by 'off line' initiatives developed to increase traceability of the die sets by introducing bespoke storage areas and identifying 'changeover kits', which has much in common with SMED principles. This recorded improvement in tooling availability and changeover times is an example of TOC application restricted to department level, yet invites debate around system wide improvements and harks back to Goldratt's proposition that within TOC, a system is global (Goldratt & Cox 1984) and the whole of the system to be more than the sum of its parts. In this case, it appears that concomitant TOC application in the sales office may have broadened whole system benefits.

In contrast to the research of Pegels & Watrous (2005), which considered 'back end' manufacturing constraints, the previous work of Tanner & Honeycutt (1996) is diametric in stance; deliberating upon TOC implementation in the re-engineering of a 'front end' sales operation of a business forms printing company. The development of a CRT identified key UDEs and core problems including a seven and half week invoice cycle as a result of precursory actions, commencing with the acceptance and processing of orders with incomplete or incorrect information. At the time of despatch, the original, flawed order information has generated flawed invoice information, which in turn extended the cash cycle of the order as corrections were made after consultations with the customers. At realisation of the FRT, the company had removed 33 of the 47 'hand off' points where there had been historical assumptions of participation during the expedition of orders, which they refer to as a "bureaucracy of the organisation, stifling productivity" (Tanner & Honeycutt, 1996, p.314). Relationships between key accounts

and Moore production personnel were developed which allowed direct access to information. Rationalisation of the supplier base also occurred and conduits developed which linked the restructured sales force with their suppliers. The research records significant increases in throughputs, greatly enhanced initial order data and significantly shortened cash cycles, concluding that re-engineering of processes which extend beyond mechanistic and cost imperatives can benefit from TOC TP implementation when it is supported by employee development and training.

Scoggin *et al.* (2003) researched the implementation of TOC and TOCTP in a company which could be described as operating monopolistically as a sole supplier of specialist generators to a national defence department in a one customer, one supplier market. The agreement also included future design and development undertaking requested by the defence department. The purpose of the intervention was to shorten production cycle times and increase throughput, with the aim of 'freeing up' human resources for design and development work.

Four of the TP tools were used by the team following initial analysis using the five step process: CRT, NBR, FRT, and TT. Analysis of the system using CRTs revealed several UDEs manifested with a perpetual cycle of skill and quality degradation; increasing levels of unhappiness amongst production teams led to colleagues leaving, which in turn placed pressure on workers to train new colleagues whilst endeavouring to comply with their own production targets. This ultimately impacted on quality, increased rework, missed production targets, extended cycle times, reduced throughput and increased WIP. Although initial efforts were primarily aimed at addressing these worker issues, the initial analysis had not gone beyond recording accrued levels of worker dissatisfaction. When this was addressed, it was discovered that these colleagues believed that they were exposed to constant system duress, which in this case was output requirements generated by an MRP II system. Manufacturing Resource Planning (MRP II) systems have been developed to manage all of the operational resources and financial management of a company by closing the loop of different databases through integration. Jacobs & Chase (2010) say of this system that it:

Does not work well in companies that produce a low number of units annually. Especially for companies producing complex, expensive products requiring research and design.

(Jacobs & Chase, 2010, p. 435)

The greatest criticism of MRP II systems is that they are only as stable and accurate as the input data integrity. A system audit found low data integrity, where key data attribute fields were left blank and incorrect data relating to lead times, safety stocks, suppliers, pricing structures, where discounts would lead to excessive orders, and available inventory space. Of the two major intervention points recorded on the FRT, the MRP II data integrity programme “has been met with little resistance”, whilst the other major intervention proposed to increase colleague flexibility in a unionised environment was regarded by management teams as “a flying pig”, although it was regarded by the unions as potentially reducing employee turnover, thereby addressing several of the core UDEs.

In another example of partial TOC application (Riezebos *et al.*, 2003), a cardboard packaging manufacturing company had implemented TOC in its production departments, DBR systems were successfully deployed to reduce inventory and increase throughput:

Particularly important improvements were realised on the shop floor owing to throughput thinking of operators. Whereas previously, operators concentrated on their own machine and created local optima, they now switched to other machines helping to optimise flow throughout critically constrained resources (CCR). Cross training the operators prevented specific operator skills from becoming CCRs.

(Riezebos *et al.*, 2003, p. 701)

In extending TOC, the company reviewed the actions of its sales office, specifically the incumbent practices for order acceptance and the setting of due delivery dates to the customer:

The existing procedures in this area were thought to lead to excessively large fluctuations in the daily workload for critical

capacities in the production process.

(Riezebos *et al.*, 2003, p. 703)

By moving to order acceptance procedures, which replaced criteria based upon the theoretical maximum turnover per day in monetary terms, with criteria that employed aggregate measurements of daily throughput capacity in the production department, the company were able to develop non-physical DBR systems which triggered order releases and reduced fluctuation.

A further demonstration of TOC TP application (Smith & Pretorius, 2003) confronts costing assumptions of cost centre and profit centre performance indicators and measurements. This cause and effect analysis is similar to the approach of Cox *et al.* (1998) in their consideration of TOC TP on the analysis of performance measurements in internal manufacturing departments. Whilst their research concerns a project management organisation, the concepts are identical as applied in manufacturing industries. This researcher's own experience of cost and profit centre structure attests the validity of the work of Smith & Pretorius.

- Cost centre: has operational characteristics which allow for the measurement and control of costs incurred in the manufacturing of products, but has no influence over income generation. Within an organisation this could typically be a manufacturing department or satellite facility.
- Profit centre: segments within an organisation which influence and control cost and income generation. Within an organisation this could typically be sales and key account management activities.

Conflicts primarily driven by pricing between cost and profit centres were mapped using a CRT, which revealed a core UDE of outsourcing decisions at profit centres taken on perceived lower cost. A classic 'Catch 22' decision where profit centres are seen to be maximising profit, but cost centres are unable to cover their operational costs, and seek to recover these lost opportunity costs in future transactions. Cost and profit centres are therefore perpetually beset by problems linked to internal pricing and costing decisions

made by each centre in the internal market. Cost centres look to recover all of their operational costs, whilst profit centres look to reduce these internal market costs in order to maximise profitability. However, the throughput philosophy within TOC clearly identifies that internal centre to centre financial transactions per se should not be regarded as, or indeed, constituted as a sale for the company as it detracts from the global profits of the company (Goldratt & Cox 1992). In conclusion, they find that in optimisation measurements in cost and profit centres:

The local optima created by measurement systems do not necessarily lead to a global optimum for the organisation. In the case of cost centres and profit centres, local optima decision making have a negative effect on the total organisational profit.

(Goldratt & Cox, 1992, p. 59)

The authors call for further research of TOC TP application in organisations with multiple cost centres in the expectation that decision rules can be developed which will negate local measurement criteria whilst supporting the profit goals of the organisation.

Sale & Inman's (2003) survey comparison aimed to draw on findings from companies using TOC, JIT and 'traditional' manufacturing techniques, although they do not further develop the notion of 'traditional' beyond the most brief of descriptions for the reader. The research aimed to establish whether single philosophy [TOC or JIT] implementation bore superior results to the co-existence of paradigms in manufacturing companies. Both TOC and JIT share a common emphasis on continuous improvement philosophies and inventory reduction programmes, although in the case of TOC, this is achieved by employing dissimilar transfer batch sizes, which is at conflict with the 'balanced line' concepts of JIT. In concurrence with Lockamy & Cox (1994), Sale & Inman (2003) account that:

It is a waste to expend resources to reduce variations at non-constraints, since their variations are absorbed by their excess capacity. While TOC advocates agree with the JIT philosophy that inventory is waste, this is the case only if the inventory is buffering a

non-constraint.

(Sale & Inman, 2003, p. 830)

It can be reasonably argued that their research findings may be skewed, based upon the respondent pool, which were exclusively drawn from APICS: The American Production & Inventory Control Society. Furthermore, the respondents were all members of the society's TOC special interest group, which this researcher surmises that the likelihood of 'friendly' participants becomes consequential. The majority (80%) of the 180 responses, which represented a 19% return rate from the original pool, were supplied by manufacturing and engineering personnel. In conclusion of their analysis they evince that:

Firms using TOC had significantly higher performance and significantly higher performance improvement when compared to those using JIT and traditional manufacturing.

(Sale & Inman, 2003, p. 838)

Moreover, they ponder whether this may be as a result of JIT being 'maxed out' in its application, but could concede that their findings based upon the respondent group are:

In line with the findings of Noreen et al. (1995) that those using the TOC approach exclusively, reported fewer problems and higher levels of satisfaction than those who mixed approaches.

(Sale & Inman, 2003, p. 839)

In acknowledgement of the limits of interpretation and generalisability of their study, the authors call for further research in order to substantiate whether synergies may occur as a result of alloying JIT and TOC philosophies.

3.5 Supply Chain Management

The earliest paper to consider the pertinence and assiduity for TOC from a supply chain management (SCM) perspective (Jackson & Low, 1993) focussed on the potential of the theory from the perspectives of logisticians

and warehousing, but recognising and establishing relationships between the TOC 'global' system and their own operational environment:

Logisticians are very familiar with this concept as it forms the basis for the total cost¹⁸ approach to logistics, and supply chain management, where the various components are balanced, rather than optimised, so as to provide the desired level of service at the lowest total cost.

(Jackson & Low, 1993, p. 41)

Physical constraints were considered within context as vehicle load capacities, aisle widths, mechanical handling equipment and racking systems, whilst non-physical constraints were contemplated in relation to the stochastic nature of supply chains, broadly governed by demand planning and probability, yet characterised by variability in that demand from both internal and external customers, which may lead to situations where temporary constraint points manifest themselves. The authors offer potential solutions to this possible predicament:

Some possible approaches to this problem are to build in more capacity at potential constraints, develop more flexible resources, or approach the market in such a way to reduce the variability in demand.

(Jackson & Low, 1993, p. 47)

Although, it is recognised that trying to legislate for variability may incur costs throughout the supply chain system which may be counter to operational cost effectiveness.

Introduction of TOC TP as part of group modelling exercise with specialist supply chain Masters students, both controlled and reported by Shams-ur Rahman (2002), identified that a willingness to comprehend the dynamism of

¹⁸ Total costs in logistics consider both the fixed and variable costs attributed inventory movement, warehousing, mode of transport, the processing of orders, personnel costs and administration.

supply chain phenomena, aided the development of SCM strategies. The following UDEs were agreed upon by developing CRTs which identified causal relationships. The UDEs co-incidentally mirrored key SCM performance metrics: protracted cycle times; inventory management costs; inadequate customer service; excessive distribution and total costs. Qualitative analysis of the UDEs allowed the groups to begin to develop strategies to overcome these barriers, of which Rahman tacitly acknowledges in light of most SCM research being quantitative in nature:

This research applied a qualitative approach not only to identify the critical success factors in a supply chain, but also the causal relationships between these factors.

(Rahman, 2002, p. 825)

Whilst suggesting that TOC TP can be used to map out cause and effect in SCM, there is a clear recognition that further industry based empirical studies on a much larger scale would be required.

The management of buffer stock for timely and accurate replenishment throughout the supply chain is a critical factor in SCM systems which strive to achieve right inventory / right place / right time. Buffer replenishment is driven by continuous evaluation of demand, stock, lead time and size of replenishment orders. However, dichotomous conditions can emerge by having to manage opposite imperatives of holding sufficient inventory so that the supply chain is not starved by sudden increases in demand, whilst having to manage inventory profiles to address local measures of budget control and operational compliance.

Yuan *et al.* (2003) consider the buffers of supply chain replenishment as buffers within the TOC DBR context for their theoretical research, in which they propose that the management of stock replenishment for the supply chain should occur at the point of the supply chain with the greatest level of stock integrity and data aggregation; the manufacturing plant central warehouse. They propose introduction of SDBR so that:

Aggregating the inventory and holding it at the plant warehouse not only decouples production disruption from bullwhip effect¹⁹, but also increases the reliability of the replenishment of goods to the regional warehouse, by making the replenishment time equal to the transportation time only.

(Yuan *et al.*, 2003, p. 727)

The validity of this proposal must be contemplated subjectively, considering the physical length of the supply chain, the complexity and shelf life of the products, lead times, customer demand and, equally importantly, customer compliance. The deterministic nature of such a proposal invites heuristic trial and error which may lead to a production facility moving from 'pull' to 'push', significantly increasing inventory to satisfy whole chain demand simultaneously. In conclusion, the authors implicitly acknowledge that even within theoretical modelling that *"the optimal amount of buffer remains undetermined."*

In consideration of the 'global system' aspect of TOC (Goldratt & Cox, 1984) and the whole of the system to be more than the sum of its parts, it is not difficult to imagine the length of a supply chain to be 'global', with each intermediary acting as a 'part of that system'. Goldratt himself has identified the transferability of TOC from manufacturing to SCM, stating that the identification and designation of buffers to enhance throughput are equally relevant in either sphere of operation. Moreover, Goldratt asserts that adoption of TOC in SCM will result in cost reductions, increased forecast and inventory accuracy, and customer satisfaction levels (Goldratt & Cox, 1984). Simatupang *et al.* (2004) argue that a supply chain TOC perspective requires a new perspective:

The traditional rule that says "each member gets sales from the other chain members" needs to be altered to "the chain members get paid when they sell products to end customers".

(Simatupang *et al.*, 2004, p. 63)

¹⁹ Bullwhip Effect: Where variations of demand in forecast driven supply chains amplify as they work their way back up the supply chain;

Additionally:

A traditional approach that assumes each link can be managed as a single entity fails to maximise the benefits of collaboration. Alternatively, the constraint based approach can be adopted by the chain members to help them focus on managing constraints in order to optimise supply chain profitability and subordinating other considerations to this global goal.

(Simatupang *et al.*, 2004, p. 61)

Goldratt argues that this incentivisation of the supply chain has a focussing effect throughout the supply chain. The payment method triggered by the final sale from retailer to the customer, acts upon individual parts of the system to become more aligned in order to increase throughput and therefore, profitability. This logic is reasoned, cogent and convincing, recognising that supply chain collaboration does occur, but in positioning of theory as 'desired behaviour', it overlooks the obvious conflicts which will arise as a result of individual company imperatives, relative sizes of actors in the chain, and the inevitable economies of scale and scope skewing more benefit toward the 'major players'. Mentzer *et al.* (2000) record this disparity in SCM by identifying that the 'win-win' outcomes required for the participating supply chain members often display significant disparity between potential benefit and practice reality. Munson *et al.* (1999) identify the advantages of size and relative position in the supply chain as leverage tools to exert, and in many cases, abuse power. It is also important to bear in mind the consequential nature of SCM and its reliance upon the retailer to deliver in terms of sales, otherwise much of that which has occurred in the supply chain is lost; increased throughput to an under-performing market or retailer bears significant risk of negative bullwhip.

In comparison of TOC to Distribution Resource Planning (DRP²⁰), Watson and Polito (2003) created comparison models based on data supplied by a multi echelon US company with a diverse product range, which had vertically integrated many parts of its own supply chain, including retail outlets. Their research suggests that the simulation models were able to achieve potential cost savings in inventory and increase levels of customer service by reconfiguration of the physical supply chain. This was achieved by the introduction of buffer stocks between primary production and distribution points, with the simulation further indicating that TOC application would generate congruent improved financial performance. In acceptance of the limitations of their simulation, the authors call for more research of TOC in distribution environments, “*given the heuristic and pragmatic nature of TOC methods*”.

The research of Fugate *et al.* (2009) reviewed the environmental operational factors acting upon supply chains, applying TOC to identify the constraint points and developing practices to increase operational throughput and collaboration. Scrutiny of their framework and its theoretical model reveals that thematic analysis was employed to allow key themes to emerge, which were then applied to identify and exploit the resource constraints within the environmental system, which were principally: driver availability, driver turnover, volatile fuel prices, dock availability and turn-around times at delivery or collection of materials. These constraints in themselves manifest further, depending upon the nature and extent of proposed inter-organisational collaboration at different points in the supply chain, which they identify as “contextual variables”, concluding that “further empirical verification and greater generalisability are needed” (Fugate *et al.*, 2009, p.440), further accepting that recommendations for constraint relief are beyond the immediate potential reach of all supply chain actors.

²⁰ DRP is a system based upon the demand process logic of MRP systems, it controls the flow of materials between manufacturers, warehouses, distribution centres, retailer stocking centres and retailers. Full visibility of inventory in the chain allows make and ship decisions to meet demand and reduce inventory.

In respect of inter-organisational supply chain collaboration and its importance, it must be deliberated upon whether the application of TOC could positively impact on the current reality of SCM, in which there is clear evidence of collaboration issues (Min *et al.* 2005), whilst Wittman (2007) records inordinately high instability and failure rates of collaborative activity.

3.6 Accounting

As has previously been identified in the literature review, TOC throughput philosophy calls for transition from traditional cost accounting to throughput accounting. Although the researcher believes this particular sphere of application does not overtly impact upon the research questions:

RQ1. Does a continuing lack of regulation and definition around the term 'local food' stymie both sustainability and enhancement of local food supply chains?

RQ2. How might our understanding of the Theory of Constraints allow for the evolvment of local food supply chains?

RQ3. Do potential markets and scenarios exist in addition to established channels, for the distribution of 'local food'?

It would be remiss to not consider the work of Noreen *et al.* (1995) whose book recorded 20 case studies of US-based companies which had adopted TOC to overcome complex production management processes and the implication of TOC adoption on management accounting measures. Whilst roughly half of the companies reported employing TOC in tandem with other production and accounting systems, the remainder reported fewer problems and increased levels of internal and customer satisfaction attributed in the main to a sole TOC approach.

3.7 Limitations of TOC

Reid & Koljonen (2003) record what they perceive to be a major drawback and significant hurdle in organisation acculturation of TOC, principally that:

There is one major drawback of TOC/TP, namely, its inability to capture the dynamic of today's manufacturing environment.

(Reid & Koljonen, 2003, p. 11)

They further state in their argument:

In short, the relationships depicted in the TP logic trees often appear to be linear and relatively static and, as such, do not fully represent the dynamic complexity that is inherent in most modern manufacturing organisations.

(*ibid*)

Lee (1999) identified examples of the scheduling procedures of TOC which were inefficient when compared to other LP models within JIT/MRP as well as difficulties in application where multiple V-A-T production and assembly configurations may exist within the same manufacturing plant.

In a 40 month longitudinal study which considered reductions in waiting time and patient throughput (Lubitsh *et al.*, 2005) of three departments within an NHS trust, the authors analysed monthly measure point data extracted from the management system both before and after the TOC interventions. Although the authors record that TOC implementation "can have a beneficial impact on bottom line indicators," they also state that:

Main findings of the study indicate some support for the hypothesised impact of TOC. These results would appear to demonstrate an 'effect' in the predicted direction, rather than a dramatic process change.

(Lubitsh *et al.*, 2005, p. 124)

Additionally:

Measures that were predicted to increase went up; measures that were predicted to decrease went down simultaneously. Although in

most cases the effect of TOC was non-significant and effect sizes were modest.

(Lubitsh et al., 2005, p. 125)

Their own literature review reported a paucity of TOC research in areas of health care but the research ultimately identifies contextually critical and rational perspectives around successful TOC implementations:

Exposure to operational disturbances will influence variability, for instance, staff turnover or sickness; disruption to elective work as a result in a surge in emergencies; budget cuts; and the extent of other operational problems.

(Lubitsh et al., 2005, p. 126)

Further, that:

The differences in the service settings appear to have influenced the ease with which TOC can be applied. The closer that the work of a department resembles the relative predictability of a production process, the more straightforward applying TOC will become.

(Lubitsh, *ibid*)

This research intends to evince that these problems are also readily identifiable within the contexts of this research's own case study partners.

Berry & Smith's (2005) investigation of companies which have accredited operation improvements to the adoption and enculturation of TOC serves as a timely reminder 13 years after the research of Andres & Becker, that a logical focus upon systems can often reveal that only a few items in the system may need addressing in order to achieve system wide improvements:

The Theory of Constraints contains components of predecessor theories of management. Key areas captured by TOC are (1) system theory; (2) performance measurement and; (3) culture based change management. By taking a systemic view, an organisation will identify the relationships that are important to its success both internally and

externally.

(Berry & Smith, 2005, p. 93)

Comparative analysis by Dettmer between TOC and TQM (1995) recognises that TQM identifies systems by their discrete component parts, seeking to address and improve quality at each stage. Conversely, TOC improves performance throughput by focussing on bottlenecks in the system. It is important to remember that quality management at the constraint point must maintain its same level of adherence to control. Increasing throughput by removal or slackening of quality standards will ultimately deprive the system.

It is important to consider cultural factors in the historical application of TOC. It may be argued that, based upon analysis of published works, (Rahman, 1998; Mabin & Balderstone, 2000; Mabin & Balderstone, 2003; Kim *et al.*, 2008), the culture of the country may impact upon the acculturation of TOC at an organisational system level. During this literature review it became apparent that the majority of case study applications of TOC recorded to date have occurred in Western cultures, the preponderance of which have occurred in the USA. Further to this, an examination of the companies that have applied TOC and have agreed to the publication of headline results, which are catalogued on the umbrella TOC Goldratt website, lends further weight to this proposition. Over 70% of these companies were US-based, whilst the majority of the other 'partners' are Western or have an embedded and Western culture. Umble *et al.*, (2006) identify a significant cultural barrier to successful implementation of TOC to be as a result of Japanese workers being 'conditioned' to earning 'production value' through release of materials into the system from their work centres which, under the institutional accounting and management indicators, recorded attainment of goals and earned production value, but ultimately increasing WIP in the system long after the constraint had been identified and a DBR operating system developed:

Years of experience conditioned them to resist operating rules that would reduce earned production value. You can ask workers to do the right things for the good of the company, but you should not ask

them to cut their throats to do it.

(Umble *et al.*, 2006, p. 1872)

Andrews & Becker's (1992) longitudinal case study of TOC implementation noted that upon returning to the case study partner one year on, productivity schemes had been abandoned:

With no training programmes in place for problem recognition and problem solving, it was not surprising to find things much the same as they were one year earlier.

(Andrews & Becker, 1992, p. 71)

Further to this they summarise that:

There is evidence that such gains [TOC] may be tenuous or short term, without all employees' longer-term commitment usually engendered by training and engaging them in problem solving and continuous improvement.

(Andrews & Becker, 1992, p. 93)

Watson and Polito (2003) record a significant failure of TOC in SCM. General Motors had asked Goldratt to design a new distribution system specifically aimed at reducing order fulfilment times for customers. The new system; Cadillac Xpress Delivery (CXD), stocked popular ranges of vehicles at regional holding centres, which would deliver to garages within 24 hours of an order being placed, allowing holding centre stock to be cycled every 10 days. The basic premise being that by having popular and standard lines available as buffer, the production factories were better positioned to react to customer requirements for special order vehicles, reducing waiting time from 60 days to 3 weeks. CXD became beset with problems and was suspended as it was unable to cope with rapid change against forecast, local marketing optima and lack of aggregations of products [at commissioning, CXD was restricted to only two models from the Cadillac range.] Stock outs in turn placed pressure on factories to respond to customer orders for standard lines, which in turn, pushed out delivery dates for special order vehicles.

In consideration of optimum product mixes²¹ introduced to relieve constraint upon a bottleneck, Linhares (2009) demonstrates that if the optimum product profile for that mix includes low profit products with low throughput cycle time at the constraint point, then paradigms and heuristics of both TOC and margin undergo simultaneous violation. This is found to be particularly pertinent in the case of integer batches, where the batch is 'whole' and complete in itself. He further argues against the use of proprietary algorithms under these circumstances, debating instead upon combinatorial complexity and the 'knapsack problem'²² and introduces 'facts' which challenge prevailing concepts of TOC:

1. There are cases in which the TOC derived heuristic fails even with a single bottleneck.
2. There are cases in which the TOC derived heuristic fails to obtain a higher profit than a traditional margin heuristic.
3. There are cases in which the optimum product mix includes products with the lowest margin and the lowest ratio of throughput per constraint time, violating both the traditional heuristic and the TOC derived heuristic.
4. There are strong reasons to believe that an efficient and optimum heuristic is simply impossible (Linhares, 2009, p. 122).

At conclusion, Linhares identifies a need for further research of TOC application in cases of combinatorial complexity as well as the intricacy and complexity of product mix decisions stating: "*After all, we do not want to turn the product mix decision itself into a bottleneck*" (2009, p. 128). He finally alludes that his research should not be interpreted as criticism of TOC philosophy, which is also true of this literature review.

²¹ Product mix: A concept which extends beyond the inventory of a company and its products, to include factors relating to profitability per line, prioritisation of higher value products and the dynamic realities of shifts in customer requirements linked to volume and due dates.

²² The knapsack problem is a term given to the consideration of the combinatorial complexity of a range of items of varying weight or value, where the total weight or value is as close to the allowed limit as possible, thereby maximising profit: how many useful things can you fit into the knapsack to make it as full as possible?

3.8 Alternatives to TOC: Value Chain Analysis, Value Stream Mapping & Value Stream Management

Whilst this research has taken a TOC approach to its analysis of food supply chains amongst the Case Study Partners, the researcher acknowledges the existence and prior application of other tools in the analysis of food supply chains, of which Value Chain Analysis (VCA), Value Stream Mapping (VSM) and Value Stream Management will now be considered.

Lysons & Farrington believe that supply chains and value chains are largely synonymous with each other, stating that value chains represent:

A linear map of the way in which value is added by means of a process from raw materials to finished delivered product, including service after delivery.

(Lysons & Farrington, 2006, p.101)

Thompson *et al.* (2010) identify the concept of a value chain in terms of its ability to address the underlying intent of a company to create value, which is not dissimilar from Goldratt's belief discussed earlier in the literature review, that systems and processes are developed for a purpose, to make money now, and to make more money in the future. Russell & Taylor (2005) suggest that it is the summation of all of the operational activities in the creation of services or products to a customer, although prior to this, Lysons had developed particular notions around the procurement activities, indicating that it was a key role in itself as a creator of added value as well as its role with the other eight functions of the value chain:

That procurement which interacts... with the external environment, e.g. suppliers, has tremendous potential to contribute to the competitiveness of the business unit.

(Lysons, 1996, p.5)

It was also further indicated that the procurement objectives extended to supply chain security, strategic procurement, knowledge sharing, collaboration, ethicality of purchasing decisions and improvements to the

available working capital of a company. Porter (2001) recognised the importance of emerging 'e commerce' in this strategic role, to allow for innovations to meld together the physical and virtual activities in the value chain to add further worth and pecuniary advantage to the company.

Porter (1985) first proposed the value chain from the perspective of American manufacturing companies, in which he determined that companies operating in the same sector, offering similar products²³, can display significant differences in performance of both the company and its products. Porter suggests that these differences lie within determinant factors of those companies. His value chain identifies two separate types of value laden activity; primary and secondary activities. Each of these is sub-divided into further processes, which add value to the customer. Crucially, as well as adding value, recognition must be given to the fact that all of the activities identified in the value chain model also generate cost attributes which consume resources and limit assets. These cost attributes are referred to as 'rents' by Kaplinsky (2000; 2004) who used value chain analysis (VCA) as a tool to understand un-equalisation in trans-continental food supply chains from a socio-economic perspective.

Value is added both in terms of the product and its attendant services from a materials management perspective, which in turn, is elevated to a strategic role. To many, Porter's original value chain is regarded as seminal as it represents a significant change in which the customer is considered within the supply chain, rather than being at the receiving end of it. By this process of structuring, it becomes easier to allocate cost measures to the individual parts of the value chain. However, it is argued that traditional cost-based accounting models can impact upon operational efficiencies, as these individual parts of the primary and secondary activities compete to be as efficient as possible at a work centre level (Goldratt & Cox, 1984; Reid & Koljonen, 2003; Berry & Smith, 2005). This dilemma has been previously

²³ Kaplinsky (2000; 2004) indicates that Porter did not develop the concept of VCA, but that its antecedents lie within the analysis of market path development in developing mineral exporting economies during the 1960s & 1970s reported within the research of Girvan (1987).

discussed at the start of chapter three within the TOC paradigm (see also Fig 4: traditional accounting causal loop diagram.) It is posited that value chain analysis provides a quantitative tool, which allows for an analysis of costs and points of differentiation in a multi-faceted company; so that its competitive position relative to its market can be assessed and then improved upon.

The five primary activities of the value chain are:

- Inbound logistics
- Operations
- Outbound logistics
- Marketing and sales
- Service

The four support activities which occur in the value chain are:

- Firm infrastructure
- Human resource management
- Technology development
- Procurement

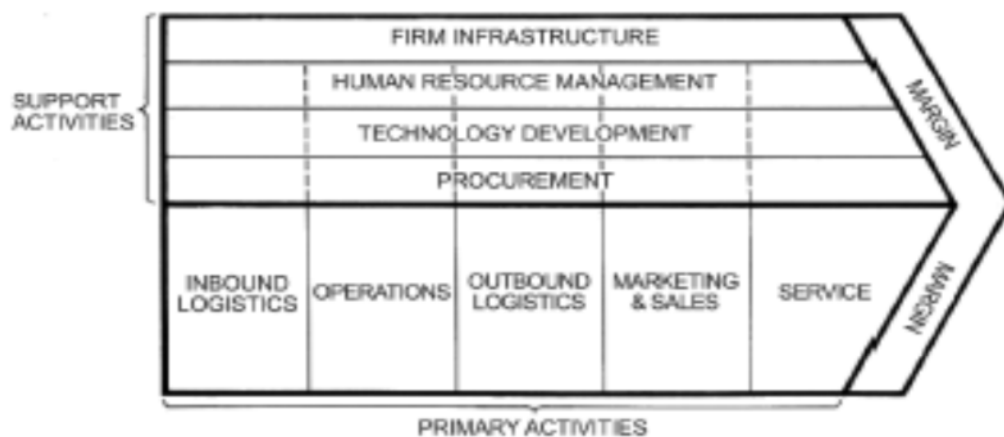


Figure 5 Porter's Value Chain (in Svensson, 2003, p. 391)

As an example of this drawn from the Case Study Partners, if we consider Case B, a micro-sized manufacturer of ready prepared meals, their primary activities can be attributed to actions around the receipt, handling and storage of ingredients, packaging and other consumables, manufacturing

and quality control to transform the input elements into ready prepared meals, control of the finished products in terms of storage and delivery, sales / marketing activity and services linked to delivery flexibility and communication. The support activities of Case B can be classed as general business administration of costs and assets, recruiting, developing and retaining colleagues with the correct skill sets, the development of new products and, the purchasing of ingredients, packaging, fuel, utilities and general consumable from suppliers.

Ultimately, it is important to recognise that the constitutional make up of primary and secondary activities can deviate and vary from Porter's model due to a company's relative operations, sector and scale (Thompson *et al.*, 2010). An example of this would be different value chains for companies in the same sector / product market, where the level of vertical integration differed significantly between those companies.

Another important factor to consider, particularly in relation to this research, extends beyond scale or vertical integration, but recognises the relative breadth of the food sector, where products can be aimed at different ends of the same sector, i.e. the differences between local and regional food, which as the research indicates in the first part of the literature review, are readily conflated by many of the key actors. In further consideration of the role of multiple retailers, their value chain will look significantly different from a local supplier, especially in terms of distribution and operating efficiencies, as well as the price they are willing to pay a supplier (Kaplinsky, 2000; 2004).

That a company's value chain is inexorably linked and embedded to other value chains as they proceed towards customers, supports the synonymised synergies suggested previously by Lysons & Farrington (2006). Further to this, Thompson *et al.* record that:

Suppliers' value chains are relevant because suppliers perform activities and incur costs in creating and delivering the purchased inputs used in a company's own value creating activities. The costs, performance features, and quality of these inputs influence a

company's own costs and product differentiation capabilities.

(Thompson *et al.*, 2010, p.119)

By considering these impacts, the researcher believes that the case for collaboration, particularly amongst smaller enterprises becomes even more relevant, so that they may mitigate some of the cost factors arising in both their suppliers' value chains, and those which occur downstream, as they seek to move their goods to market. Consequently, it can be argued that a full understanding of a company's competitiveness also requires that company to not only know its own value chain, but also those of the others in their supply chain.

The concept of a 'food value chain analysis' (FVCA) methodology was first mooted a derivation of lean thinking, VCA & VSM. A key attribute of FVCA is that the four-stage model is supported by further determinant attributers such as time and quality (Zokaei & Simons, 2006). However, there is evidence of a purely VCA analysis occurring of agri-food chains after the introduction of FVCA from within the same school (Taylor, 2005.) Taylor suggests in his case study of fresh pork products from the farmer, via the processor, to the supermarket, that value lies in the appreciation of operational realities which extend beyond metrics "*as this sets the context as to what might realistically be achievable in terms of supply chain development*" (Taylor, 2005, p. 754). In identifying a 'push' model of supply, poor communication and excessive stock across boundaries, the research suggest that greater collaboration across the three companies was required, linked to the development of specifications, more dynamic flows of information along the supply chain and adoption of lean flow systems. Crucially, in consideration of the relative position and scale companies occupy in food supply chains, the research records that "*farms however, present a different environment where it is less clear how to apply some of the lean analysis and improvement techniques*" (Taylor, 2005, p. 759) and further that "*it is less clear what constitutes value adding and non value adding time and how, if at all, lean concepts can impact that process*" (*ibid.*) Ultimately, it records that whilst some of the VCA improvements were adopted by the processor and retailer, "*the farm company did little to progress with lean or VCA initiatives*" (2005, p. 760).

The research of Zokaei & Simons (2006) further develops the FVCA model, identifying where FVCA analysis can help in transforming efficient systems into effective systems through realignment of those systems in a dead weight supply chain linking the abattoir with the point of consumption. It may be argued that the exclusion of the farm production elements shortens the food value chain and its analysis by removing the key attribute to dead weight, the previously live weight of the animals in question. Their research records that the single most significant efficiency improvement, the introduction of EDI, did not occur *“since the remaining length of the contract [between the two companies] did not cover the payback period of the required investment”* (Zokaei & Simons, 2006, p.153). Whilst improvements were made, they were primarily low cost and low time investment. In view of this, the researcher is inevitably drawn to its congruity with TOC in its ability to remove ‘low hanging fruit’ (Mabin & Balderstone, 2004, p. 589).

It is notable to record that macro FVCA research has occurred. An example of this is the analysis of the UK beef foodservice sector and their sources from UK producer farms and Argentinean producer farms, (Francis *et al.*, 2008) which made for sobering reading in its identification of far more efficient systems in Argentina, questioning *“the viability of an unreconstructed UK beef industry in the face of such competition”* (2008, p. 90). A further example of macro analysis of value chains by Vieira & Traill (2008) in relation to Brazilian beef processing posits that the analysis stimulated knowledge transfer and best practice transferability to improve product specification, quality and safety. By evincing that these improvements were resultant of trust development between the different entities of the supply chain, the research concludes that:

These relationships tend to be hierarchical but are changing. Local companies have to take advantage of this to gather market information and to upgrade practices. This would make them better able to negotiate commercial terms, emphasising the interdependence between buyers and suppliers

(Vieira & Trail, 2008, p. 471)

Hines (1993) acknowledged the significance of Porter's VCA model but identified three issues which he believed to be significant flaws in VCA (1993, p.14):

- The VCA model focuses on a company's margin, not customer satisfaction;
- VCA presents a divided network, both at individual company and inter-organisational levels;
- A belief by Hines that there is an incorrect focus on the importance of certain functions within the primary and secondary activities.

Whilst Hines believed that the situational focus of Porter's VCA around American manufacturing companies lay at the centre of these flaws, it is often overlooked that in his introduction of an alternative, the integrated materials value pipeline (IMVP), Hines' focus was solely upon original equipment manufacturing for motor vehicle production, its aim to support the adoption of Japanese motor manufacturing best practices amongst members of the Society of Motor Manufacturers and Traders. In contemplation of this, the researcher suggests that the nucleus of early VSM lay within a particular type of manufacturing plant typified by high volumes of a relatively constricted family of products, of which there is a commonality in the core materials being processed / manufactured. Notwithstanding this, the IMVP model differs from Porter's model in that:

- The focus of the value chain flows in the opposite direction, which clearly indicates a realignment of the value chain in its integrative processes and objectives;
- The chain in direction, denotes a move from 'push' production models to 'pull' production models dependent upon customer orders and satisfaction;
- It allows greater integration, with the removal of 'arms length' relationships and a focus on collaboration, rather than competition.

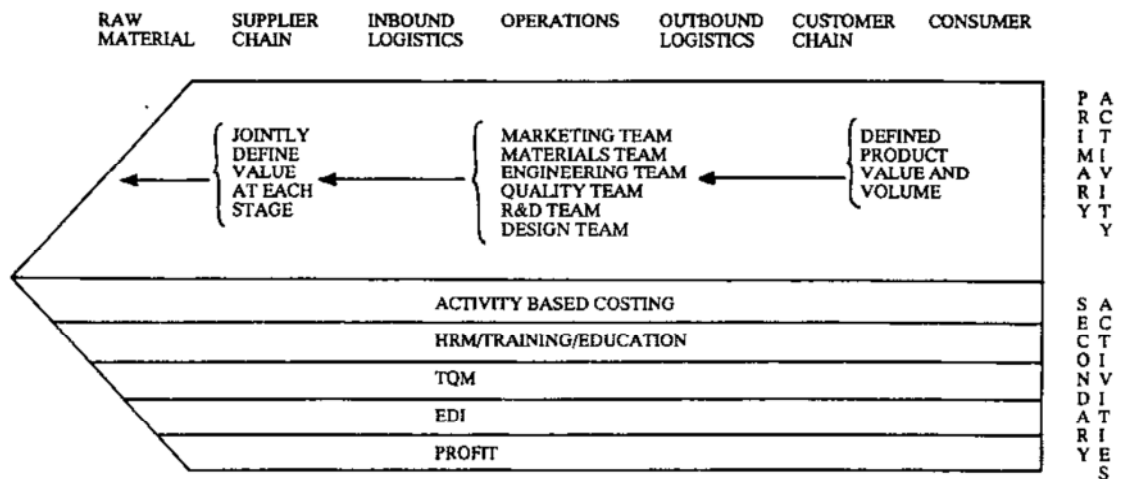


Figure 6 VSM's Integrated Materials Value Pipeline. (Hines, 1993, p.14)

Hines indicated that a strategic move away from the adversarial stance of Porter's model to a collaboratively focussed position would allow for the development of a position whereby the supplier:

Is perhaps, the greatest source of competitive advantage to the firm; In a similar way, the buyers of the firm's products, by their position in the network, are again, a group of potentially close collaborators and therefore can significantly help to add competitive advantage, not erode it.

(Hines, 1993, p. 16)

Further to this, it was suggested that competitor collaboration would also trigger like-for-like improvement, thereby increasing both quality and additionality of products and services offered to customers, whereby these specific activities also added value along the way.

Hines & Rich (2007, p.46) later introduced seven tools to be used in the mapping of value streams, in response to what they describe as *"ill-defined and ill-categorised toolkits"* which were being used to map value streams. In conceding that *"several of the seven mapping tools are already known"* (Hines & Rich, 2007, p. 47) they identified the individual tools as:

- Process activity mapping

- Supply chain response matrix
- Production variety funnel
- Quality filter mapping
- Demand amplification mapping
- Decision point analysis
- Physical structure

To those with an understanding of the Toyota Production System and the 'lean paradigm' it is immediately apparent that the seven wastes (*muda*) of overproduction, waiting, transport, inappropriate processing, unnecessary inventory, unnecessary motion and defects can be mapped into these seven tools. Further to this, the 'Production variety funnel' tool is very similar to V-A-T analysis discussed earlier in this review and addressed in the research of both Umble (1992) and Umble & Umble (2006) from the TOC perspective. Demand amplification mapping has its antecedents in the 'Forrester Effect' and is more widely referred to in supply chain as the 'Bullwhip Effect,' where variations in demand, and in the case of Negative Bullwhip²⁴ more recently seen in the current economic climate, amplify as they travel further back up the supply chain, placing unrealistic operational demands and scenarios on those in the supply chain. As such, the introduction of the mapping tools, rather than redefining mapping, collate previously tested tools so that:

Extension capability lies at the heart of creating lean enterprises, with each of the value stream members working to reduce wasteful activity both inside and between their organisations

(Hines & Rich, 2007, p. 63)

Value Stream Management was subsequently introduced (Hines *et al.*, 1998) following a consensus view amongst the users of value stream mapping, that although it provided a useful quantitative tool, it had several weaknesses which had been exposed in its prior applications. These weaknesses are

²⁴ Negative Bullwhip occurs when orders are cancelled, the level of amplification of the cancellations steadily increases as they pass back up the supply chain.

discussed immediately prior to the chapter summary. Under the new methodology, Value Stream Management was proposed as:

A strategic and operational approach designed to help a company or complete supply chain achieve its lean status... Value Stream Management also incorporates various education and policy deployment stages to make it a far better basis for ongoing company or supply chain development

(Hines *et al.*, 1998, p. 29)

The four stage map and seven mapping tools were replaced with a new system of analysis which contains twenty consecutive stages (1998, p.29). This researcher believes that a key part of Value Stream Management lay in its ability to collect and use qualitative data to support the quantitative analyses, data which arose from interviews and observations. Whereupon, the phenomenological 'why' of occurrences in these supply chains could now gain the same value as the 'what' and 'how' of data measurements. Once again, it is inescapable not to consider the operational impacts of a 20 stage mapping process, especially in consideration of an understood admission that whilst:

Value stream mapping was seen as too time consuming. Indeed, due to the more strategic and wider ranging role of the new approach, Value Stream Management may be seen to perhaps be even more time consuming

(Hines *et al.*, 1998, p. 40)

Indeed, it can be argued that a degree of congruity exists between the development of the original value stream mapping and the development of additional TOC layers as a barrier to wider uptake (Kim *et al.*, 2008.)

The work of Svensson (2003) supports the earlier work of Hines in suggesting that the value chain should work backwards up the supply chain from the point of consumption, with the customer to the forefront. However, the underlying reasoning for this stance is more profound and contentious, extending beyond metrics of organisational and supply chain behaviour:

Nothing in a supply chain attains a value until it reaches the ultimate customer. For instance, a manufacturer develops a new product, or succeeds selling a bulk of products to a wholesaler, who in turn discovers later that there is little demand for the bulk of the products purchased. In the final consumer market this leads one to state that this bulk of his products did in fact have a certain value for the manufacturer. But did it have any value for the rest of the channel?

(Svensson, 2003, p. 394)

By further identifying and discussing the different activities that have occurred in the journey of the product up to the point of consumption, Svensson (*ibid*) also alludes to Hines' earlier proposition that VCA presents divided networks, where it is often easier to present an atomistic rather than holistic perspective of value in the supply chain.

The researcher believes that Hines' redefinition and adaptation of Porter's VCA brought forth Value Stream Mapping (VSM) as a device. Its original manifestation of 'material and information flow mapping' within the Toyota Production System, was itself developed from the archetype internal *kanban* and *andon* systems, (Japan Management Association, 1989) and would be brought to further prominence as a management tool within the lean paradigm by the work of Womack & Jones. By taking into account the flows of information as well as the physical production activities, Samson & Singh (2008, p. 54) believe that a deeper level of understanding occurs, which allows greater insight during decision making processes. This research also recognises that the VSM tool is now also widely used within Six Sigma²⁵ where VSM is used as part of the pre-cursor activities to change.

An early example of a VSM exercise, which commenced with a walk down the soft drinks aisle of a Tesco supermarket, offers a clear, immutable study of 'value adding' time through to the point of consumption of a can of soft

²⁵ Six Sigma was originally developed by Motorola during the early 1980's. It is a tool aimed at reducing variability in products and processes through quality management and statistical process controls. The 6 σ system is managed by 'experts' who aim to achieve defect ratios <3.5 product failures per 1,000,000 units. Although widely used, it is not without criticism in relation to its setting of arbitrary standards, lack of originality and use of 'expert' consultants.

drink, backwards to the point of extraction for the bauxite (aluminium ore) of that can. The mapping exercise revealed that of the 11 months life cycle of the drink, only 3 hours were attributable to the conversion of the raw materials into a finished product, which they identify more presciently as a product in which there is no movement in the value stream for more than 99% of the time.

In identification of costs being added during movement and storage (two of the seven classic wastes or *muda* of the lean paradigm), Bailey *et al.* (2005) consider intra- and inter-organisational movement of products where incremental value increases as movement is decreased. Harrison & van Hoek (2011) consider time rather than movement to be more important in the deployment of VSM in logistics companies. This suggests that the physical ground and space between companies is occupied by a different set of operational factors, thereby supporting the previously discussed notion that issues of spatial proximity in local food supply chains are largely arbitrary without legal definition, when considered to be anything other than the relative time and distance taken to reach the market.

The effects of 'soft drink VCA' were profound in multiple retailing (Kaplinsky, 2000) with Tesco leading a reengineering of information and physical flows, where more dynamic information flowing back from the customer allowed more frequent deliveries of smaller quantities, and more innovative transit packaging and distribution solutions were developed in collaboration with key suppliers. The research also notes the investigations by Dekker (2003) of VCA between J. Sainsbury and its suppliers. Although the focus of this research was based on the development of a cost model for VCA to drive collaboration, it does reveal similar characteristics to Tesco's reengineering of flows between suppliers and shops, but this is not necessarily attributable to VCA, it may have been more symptomatic of manifest changes occurring as a result of better technologies and the continued development of the role of 3PLs in the marketplace during this period also. As with the work of Zokaei & Simons (2006) only a truncated VCA between the mid to end parts of the supply chains inevitably impacts upon the analysis, of which Dekker acknowledges, but recognises that of those studied "*the activities in the*

supply chain were thus characterised by sequential interdependence” (Dekker, 2003, p. 12). In addition it was also registered that “the principles of VCA were considered useful to support the exploitation of linkages with suppliers” (2003, p. 17).

Lysons & Farrington (2006, p.105) offer the following table contrasting Porter’s and Hines’ models:

Porter’s & Hines Models Contrasted		
STEP	PORTER	HINES
Principal objective	Profitability	Consumer satisfaction
Processes	Push system	Pull system
Structure & direction	Series of chains linking firms pointing from raw materials source to the customer	One large flow pointing from the customer to raw material source
Primary activities	Inbound logistics, operations, outbound logistics, marketing & sales service	Teams concerned with marketing, materials, engineering, quality, R&D and design
Secondary (support) activities	Firm infrastructure, HRM, technology development, procurement	Activity based costing, HRM / training / education, TQM, EDI, profit

Table 5 Porter’s & Hines’ models contrasted. (Lysons & Farrington, 2006, p. 105)

A noticeable similarity between TOC, VCA and VSM is the requirement to map out the scope of operations. Whilst TOC employs current reality trees, future reality trees, pre-requisite trees and transition trees to gather data, an equally pragmatic solution is employed in the other two tools by creating current state maps, key issues and opportunities maps, future state maps and action plans (Taylor, 2005). Neither the researcher nor the reviewed literature records any stated preference or propensity to a particular tool, but supports the view of Hines (1993, p.17) that “those who put the most in get the most out” to identify both tangible and intangible assets of the entities under scrutiny. Slack *et al.* (2010) indicate the importance of the mapping exercise as a route to revealing a holistic supply chain improvement rather

than the optimisation of individual processes, which if addressed individually might further increase supply chain sub-optimisation.

As Hines (1995) critiqued Value Chain Analysis in his introduction of Value Stream Mapping, of which Slack & Lewis (2008) continue to do so from a business sustainability perspective, believing that value chains represent a defensive approach to business sustainability, which protect company assets internally, it was inevitable that the work of Hines and value streams would also be critiqued. Hines himself, in the introduction of the Value Stream Management methodology (Hines *et al.*, 1997) recognises that a “*shop floor myopia*” (1997, p. 25) and a propensity for VSM to be “*too often focussed on order fulfilment or supplier integration processes ignoring other key processes*” (1997, p. 28). This researcher is once more drawn to the analogy of ‘low hanging fruit’ first identified in the TOC literature. In identifying the existence of a ‘chocolate box’ approach of picking and choosing elements of VSM tools as a constraint to successful mapping (*ibid*), doubts are raised about the inexorability of this occurring again, especially when there are more tools in the chocolate box to choose from.

Taylor records a weakness in the mapping techniques as “*the lack of a clear and workable financial model to measure costs of current operations and the potential financial benefits of lean improvements across the whole chain*” (Taylor, 2005, p. 758). Meanwhile, further identification of potential issues with accounting and financial modelling in VCA are a recurring theme in the literature review (Hergert & Morris, 1989; Lord, 1996; Dekker, 2003; Zokaei & Simons, 2006).

The research of Braglia *et al.* (2009) in their analysis of uncertainty in VSM also identifies further limitations to VSM in that it is difficult to conceptualise the inefficiencies of material flows, although this must be challenged in view of the introduction of the ‘physical structure mapping tool’ (Hines & Rich, 1997, p. 58) 12 years previously. This task of mapping material flows is also achievable on widely available software packages such as Microsoft Visio or Excel.

A more pertinent drawback they have identified is the ability of VSM “to address the complexity of high-variety low-volume type companies” (Braglia *et al.*, 2009, p. 436), of which this researcher has previously commented on in his introduction to VSM. The authors also record problems in its lack of ability to offer the capacity to dynamically evaluate ‘what if’ scenarios, and its ability “to give a real vision of the variability problems concerning the production processes analysed” (Braglia *et al.*, 2009, p. 437). However, it can be debated by taking a closed view of VSM, that the authors have missed an opportunity to add value to their research in choosing not to follow the Value Stream Management methodology of Hines *et al.*, (1998), which would have allowed them to address some of the shortcomings they allude to.

In conclusion of this review of VSM, VCA and Value Stream Management, which has tried to retain a ‘food’ focus within the wider context of this research, but has also assessed its development as a socio-economic tool in trans-continental food supply chains (Kaplinsky, 2000; 2004), it is recognised that the tools have proven suitable for the redesign of supply chains, and the removal of ‘arms length’ relationships under certain scenarios. Whilst the relative strengths and weaknesses of each methodology have been discussed, it is an unavoidable reality that they exist within, and for the benefit of the ‘lean paradigm’. As such, they are less likely to be of immediate benefit to the SMEs under research, particularly in light of the relatively small scale of most of the Case Study Partners, more so in light of their position in the food sector, which the literature suggests, is less likely to adopt VSM, VCA or Value Stream Management analysis due to the time commitments required. The literature further indicates that analysis outcomes are less likely to be adopted, as their relative scale, and therefore their relative ability to become lean in an uncertain and seasonal market decreases. Although Lasa *et al.* (2008) carried out an evaluation of VSM with Maier, a Tier 1 automotive components supplier, with a strong focus on lean production, it is interesting that they conclude in calling for the introduction of “more innovative concepts from the lean production paradigm

as well as other conceptual contexts such as the TOC approach” (Lasa et al., 2008, p. 50).

In consideration of the issues identified relating to the limitations of VCA, VSA and Value Stream Management, and indeed, the previously discussed limitations of TOC discussed earlier in the literature review (Andrews & Becker, 1992; Reid & Koljonen, 2003; Berry & Smith, 2005; Lubitsh, 2005; Umble, 2006; Linhares, 2009), where the timeline suggests limitations increase as greater degrees of complexity are layered upon the base theory, it is the conviction of this researcher that the use of the earlier TOC methodology is more appropriate, within the context of the ‘local food’ sector and the Case Study Partners in this research.

3.9 Summary

In summary of the this section of the literature review, the researcher opines that TOC and TOC TP have deployed successfully to deliver improvements in work flow, inventory reduction, product and cash cycle time. However, as the theories have developed, added layers of complexity have been introduced which impact upon the ease of use and ownership of projects. This added complexity potentially marginalises application and creates ‘super users’, which further distances the practices from realities of operational imperatives. The literature frequently refers to managers, supervisors, executives, stakeholders and teams, (Reid & Cormier 2003; Mabin & Balderstone 2000; Mabin & Balderstone 2003; Rahman 1998; Walker & Cox 2006; Lubitsh *et al.*, 2005; Kim *et al.*, 2008; Umble *et al.*, 2006) but fails to identify or record the active participation of operational colleagues with the exception of Umble *et al.* (2006) in their analysis of implementation at a Japanese manufacturing plant. This inevitably prompts further discussion on acculturation of TOC whilst additionally entreating questions which seek to discover why there is a lack of TOC implementation in food manufacturing, and by extension, local food systems in the extant literature.

TOC is not altruistic and was never developed to be, but an identified gap in both application and literature invites further research and development into

the possible application of TOC in humanitarian and crisis relief logistics. The United Nations Food and Agriculture Organisation has reported that between 2005 and 2008, that dependency upon food aid has increased by 100 million people (Taylor, 2010, p24). Concurrent to this, we have witnessed reductions in world stocks of staple foods such as rice and wheat, whilst developed nations seek to secure food supply for their own citizens with 20 year long programmes (Cabinet Office, 2008; DEFRA, 2010). Findings by the United Nations Office for Co-ordination of Humanitarian Affairs concludes that despite positive international responses, inefficiencies abound in the supply chains, which impact upon the ability of aid organisations to address the most basic needs of those most affected within desired time limits (United Nations, 2006).

If we were to substitute 'profit' with 'humanitarian aid relief' in TOC's aim to deliver profit now, and more profit in the future by increasing throughput within the context of SCM collaboration, then a potentially important new perspective begins to emerge, proffer, not profit.

The following literature review of local food indicates that there are significant issues and impediments along the supply chains of local food in England which are faced by both producers and potential markets. Herein lies the basis of the hypothesis in that a better understanding of the Theory of Constraints and its malleability offers alternative supply chain models, which may be more valuable contextually relevant to a local foodscape.

3.10 Literature Synthesis & the Research Questions

Whether policy driven, sociologically defined, supply chain or behaviourally framed, it is clear that there is a demand for 'local food' and there is a market and potential market opportunities for both value added products to be produced and shorter, more direct supply chains. However, due to the complexities of definition, willingness to conflate terms, route to market, scale availability, retailer (particularly multiple retailers) commitment or seasonal supply, constraints to supply will emerge. Identifying and then overcoming these constraints is key for both the survival and future development of operators.

The Theory of Constraints, first proposed by Goldratt (1984), has been subject to a number of developments as practitioners have evolved the model for application across manufacturing, supply chain and accounting scenarios, adding layers of complexity to the original methodology along the ways. Notwithstanding these developments, there is scant evidence beyond either in the academic or 'grey' literature of its application in the food sector. This in itself presents a clear research gap in TOC application, which combined with the constraints around the conditions and characteristics of 'local food' discussed in chapter 2, present a clear rationale for this thesis which proposes the following research questions:

RQ1. Does a continuing lack of regulation and definition around the term 'local food' stymie both sustainability and enhancement of local food supply chains?

RQ2. How might our understanding of the Theory of Constraints allow for the evolution of local food supply chains?

RQ3. Do potential markets and scenarios exist in addition to established channels, for the distribution of 'local food'?

Having explored the literature to justify this research question, the remainder of this thesis sets out to answer it. The following chapter sets out arguments for an appropriate methodology and the remaining chapters are directed to follow that methodology and discuss the outcomes of the research.

4 Methodology

4.1 Introduction to the Methodology Chapter

In this chapter, the researcher introduces the framework of the research and conducts a review of the methodology and philosophical stances utilised during the course of the research. The chapter also considers the 'world view' of this researcher and how it has both informed and underpinned the body of work, in the belief that the space between the object and the subject represents the most apposite position for the construction of meaning. The researcher also notes that in terms of this research, Crotty: *The Foundations of Social Research* (2003), has been a seminal text, of which the chapter draws significantly amongst other methodological texts, in allowing a clearer insight, from which the building blocks of a better methodology have emerged.

There is a traditional view that positivist paradigms are most suited to the research of business and management (Wainright & Waring, 2008), in which qualitative and interpretive investigation is seen as little more than anecdotal. In addressing this issue, particular focus will be placed upon the use of case study and template in this research, in order to allow thematic analysis of texts, the genome of which allows for a holistic and iterative approach. The journey of this research and the work of the supervision team have ensured that the findings are not those things of a hurried, last moment opinion. Competent longitudinal project management has addressed risk and quality factors without impacting upon the researcher's need to be unorthodox in 'thinking outside the TOC and local food boxes' whilst also attempting to be innovative. Fig 7 identifies the epistemology, ontology, methodology and methods of this research, and appears on the following page.

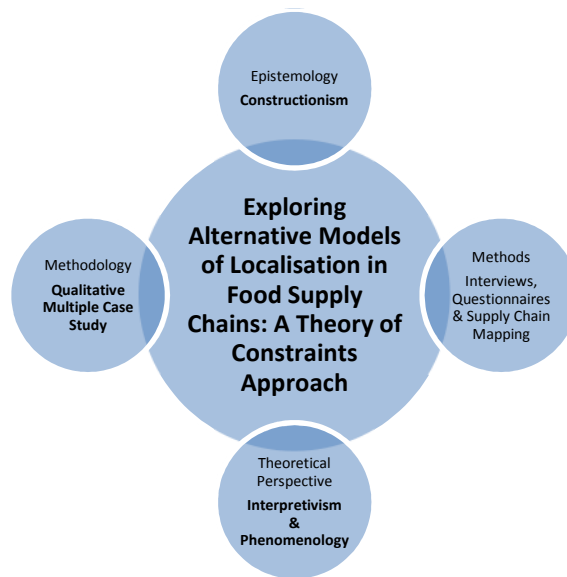


Figure 7 Research methodology

Eisenhardt (1989, p. 536) notes that: “*An initial definition of the research question, in at least broad terms, is important in building theory from case studies.*” Inevitably, this research by its genesis lying within DEFRA FO 0104 project exposes itself to questions about the population of the case study partners. However, the reappearance of these case study partners extends beyond replication, but exists to both explore TOC and act as a base for an emergent, modified TOC which may be more contextually relevant to small and medium sized enterprises operating at a ‘local’ level in food production and distribution.

Crotty (2003, p.2) indicates that the scope and focus of the research should inform its design and that there are two pre-cursors which must be comprehensively addressed in the initial development of the research proposal:

- What methodologies will we be employing in the research we propose to do?
- How do we justify this choice and use of methodologies and methods?

By extension, Crotty believes that the justification of methodologies and methods must extend beyond the reality of our individual ‘being’ and the assumptions we bring to the research; in challenging these assumptions, we can query our place in the landscape so as to invite investigation of our

theoretical perspective. In consideration of the world knowledge which lies beyond our own knowledge, that of which we hope to reveal as a result of our research, Crotty invites further questions around the efficaciousness and validity of our revelations, both from the perspective of self and the perspective of those reading our research; how do they regard the 'perceived characteristic' knowledge we present to them in terms of the researcher's credo of acquired knowledge and the journey undertaken? These questions of epistemology are further expanded by Crotty to encompass those perspectives and how they are informed (2003, p.3):

- What methods?
 - The techniques or procedures used to gather and analyse data related to some research questions.
- What methodology?
 - The strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcome.
- What theoretical perspective?
 - The philosophical stance informing the methodology and thus providing the context for the process and grounding its logic and criteria.
- What epistemology?
 - The theory of knowledge embedded in the theoretical perspective and thereby in the methodology.

Eisenhardt (1989) believes that useful case study research should be 'road mapped' at its very point of inception and provides us with a five-stage flow process:

1. Determine the object of the study;
2. Select the case;
3. Build theory through an initial literature review;
4. Collect and organise data;
5. Analyse the data to reach conclusions.

4.2 Epistemology

The epistemological stance of this research lies principally within Constructionism. It is the belief of this researcher that the space between the object and the subject, or alternatively, the space between the concrete and the abstract, represents the 'best place to stand' when conducting a qualitative case study. It is here in which the researcher's ability to construct meaning from observation, interview and analysis, places them on a path of experiential learning, where the intangible may become tangible, without being biased by the researcher's prior knowledge or perception of understanding. In consideration of this, the research can be regarded as residing within a wider epistemological sphere of social learning theory, in which cognitive learning occurs as a result of the observation of others and analysis of the outcomes of their behaviours. Here, learning and new meaning occur which supplement knowledge but do not necessarily impact upon the behaviours of the researcher.

4.2.1 Constructionism

Silverman's (2004) credence in the accords of constructionism is that meanings are mutually constructed between the interviewer and interviewee. The interviewee is not treated as 'special' because of their status (or in the case of this research, their scale), but each interviewee treated as equal, where the interview is the topic, not the interviewee participant. It is this stance that Silverman (2004) believes distinguished constructionism as a focussed interaction, "*not as something which can stand in the way of authentic understanding of another's experience*" (p. 95). Saunders *et al.* (2007) believe that constructionism lies between objectivism and subjectivism, whereupon the need to explore the subjective meanings of understanding of the interviewee leads to the emergence of constructed meaning. Bryman & Bell (2007) place constructionism as an ontological position which accepts the pre-existence of the objects and subjects of the research, where an objective reality exists, which forms "*the basis of the preconstituted world of phenomena for investigation*" (p. 21). They further believe that in organisational research, the state of flux and revision in the

organisation under scrutiny leads to the revelation of a constructed 'negotiated order' based upon pre-existing organisational characteristics. However, Crotty's (2003) view of constructionism is that meanings are not discovered, but the revelation of situational contexts leads to the construction of meanings. In the consideration of the 'world view' of the interviewee, Denzin & Lincoln (2000) believe that constructionism requires perpetual and continuous analysis by the researcher to not only 'make sense' but also to ensure that narrowness and inconsistency are overcome, which Silverman (2004, p. 97) describes as a predilection by the researcher, to "*simply focus on the conversational skills of the participants rather than on the content of what they are saying and its relation to the world outside the interview.*"

4.2.2 Objectivism

Objectivism purports that meaning 'lies within' and that the phenomena and meaning are able to pre-exist independently from social actors (Crotty, 2003). Here, social phenomena are held as external facts which are beyond the influence or reach of individual consciousness. Bryman & Bell (2007), assert that tangible and concrete organisational structure creates a reality in which the individual is subsumed in order to conform. This is particularly important when undertaking research in larger organisations, as it can reveal how individuals fit within the organisation, and the level to which the individual considers the reality of that organisation. Crotty (2003) believes in the appearance of an objective truth as a result of the interviewee not only knowing their position in an organisation, but understanding the value of the role. Tharenou *et al.* (2007) believe that 'hard' objective data which is drawn from the company reporting system itself, for example, operational outputs, material consumption, headcounts and policies, add validity to the research. By extension, if a questionnaire is employed as well as an interview, this data can be captured and readily modelled.

4.2.3 Subjectivism

It is important in this research to briefly acknowledge the epistemological stance of subjectivism, in that it informs upon a view of what is a perceived constraint as opposed to what is an actual constraint. Crotty (2003) considers that the abstract and sometimes intangible beliefs of the research participants are imposed upon the concrete and tangible aspects of the research topic, in ways which are informed by their own world meaning and are therefore subjective, of which Denzin & Lincoln (2000) position as being the 'real world' of the interviewee which makes a material difference in terms of their views.

4.3 Theoretical Perspective

The theoretical perspective of this research lies within its catholic structure, by which due consideration of paradigms and selected methodologies can help to identify aspects of the phenomena as they are revealed. The following subsections both review and consider their appropriateness in relation to the research and the epistemological stance of constructionism adopted by this researcher. "*The theoretical perspective provides a context for the process involved and a basis for its logic and its criteria*" (Crotty, 2003, p. 66). In identification of the separate theoretical perspectives, this researcher is able to position the research contexts and the assumptions that are particular to them, therefore aiding the development of the research and its observation of phenomena. In the first instance, the perspective of positivism is considered, steeped in natural science and often cited as anathema to case study in its ability prove, replicate and generalise as a path to research outcomes.

4.3.1 Positivism

The epistemological position of positivism endorses countenance to an objective and therefore 'value free' analysis of data, the purpose of which is to produce hypotheses which can be further engendered by the validity of testing to allow explanation. The knowledge derived from the measured data allows the researcher to expound upon its definition and develop laws, the foundations of which are based upon factual, objective data (Bryman & Bell, 2008). Crotty states that a positivist approach:

follows the methods of the natural sciences and, by way of allegedly value-free, detached observation, seeks to identify universal features of humanhood, society and history that offer explanation and hence control and predictability. (2003, p.67)

The most singular tenet of positivism is that it holds a central belief of an existential social world reality which is independent of the individual 'being' of actors and as such, may be measured objectively, rather than being inferred upon subjectively via inference, intuition, reflection or sensation. Its assumptions are that as realities are held as being external and objective, the ensuing knowledge's significance lies within its recording of the external reality as validity. Easterby-Smith *et al.*, (2008, p. 58) identify the philosophical assumption of positivism:

- *Independence*: the observer must be independent from what is being observed.
- *Value-freedom*: the choice of what to study, and how to study it, can be determined by objective criteria rather than by human beliefs and interests.
- *Causality*: the aim of the social sciences should be to identify causal explanations and fundamental laws that explain regularities in human social behaviour.
- *Hypothesis and deduction*: science proceeds through a process of hypothesising fundamental laws and then deducing what kinds of observations will demonstrate the truth or falsity of these hypotheses.

- *Operationalisation*: concepts need to be operationalised in a way which enables facts to be measured quantitatively.
- *Reductionism*: problems as a whole are better understood if they are reduced to the simplest possible elements.
- *Generalisation*: in order to be able to generalise about regularities in human and social behaviour it is necessary to select samples of sufficient size, from which inferences may be drawn about the wider population

It is widely implied across the literature (Denzin & Lincoln, 2000; Crotty, 2003; Silverman, 2004; Bryman & Bell, 2007; Saunders *et al.*, 2007; Easterby-Smith *et al.*, 2008; Gill & Johnson, 2010) that within positivism the researcher must be independent, that causality can be used to identify explanations, and that the research journey progresses from hypothesis through to deduction of the measured concepts, which allow for the emergence of statistical probabilities. Nevertheless, in citing the ill-suiting nature of positivism for the research of human behaviours, Bryman (2008) asserts that methods and methodology are as much informed by philosophical choice as by technical factors, indicating that the correct methodological choices withstand examination of the researcher's adopted practices.

This researcher believes that the findings and analysis contained within this research are not readily able to be reduced, generalised and simplified into measurable units, as the nuance and detail of the case study partner cohort enrich the validity of the findings. It is therefore suggested that Interpretivism and its attendant theoretical perspectives are better suited to this research.

4.3.2 Interpretivism

The position of Interpretivism stands in direct opposition to the positivist epistemology. Interpretivists identify the differences between humans and the objects of natural science (Bryman & Bell, 2007). Interpretivism posits that its strategies allow for the identification and extraction of subjective social meaning and reality (Crotty, 2003). It is held that the direct intellectual antecedents of Interpretivism lie within the earlier works of Weber (1946) and

his notions of *Verstehen*; to understand, see Fig 10. Crotty (2003) elucidated further in stating that it is:

Contrasting the interpretive approach (Verstehen, understanding) needed in the human and social sciences with the explicative approach (Erklären, explaining), focussed on causality, that is found in the natural sciences. (2003, p. 67)

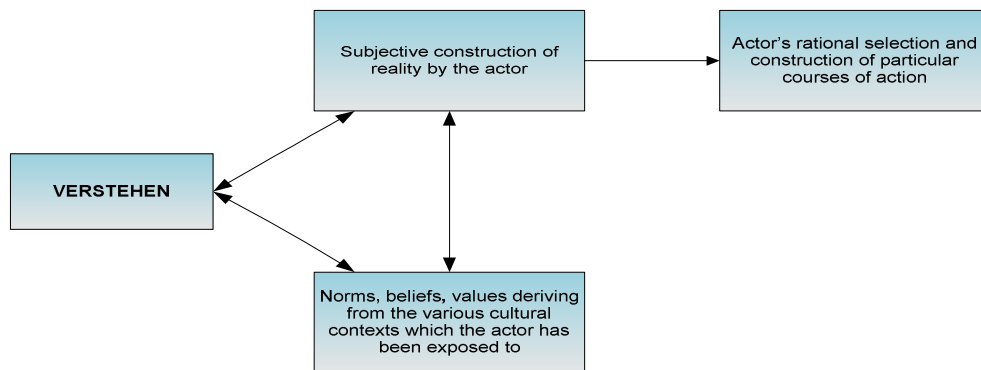


Figure 8 Model of analysing using Verstehen. Source: Gill & Johnson (2010)

Easterby-Smith *et al.* (2008) believe that the realities of Interpretivism are determined by human factors and therefore, that the meanings emerge in understanding the constructions of beliefs and meanings as a result of experience. The role of the researcher is to the comprehension and understanding of individuality, and the subjectivity of those individual experiences. Saunders *et al.* (2007) indicate that the complexities which can arise in the study of social science, particularly in organisational studies, extend beyond the capabilities of positivist generalisation to capture more rich and meaningful data, and that meaning lies within the recording of the constructions of the individual.

Interpretivism allows for the reification of data from an individually held abstraction into a construct where new meanings can materialise, in its study of naturally occurring and contemporary events (Jonsen & Jehn, 2009).

In the analysis of themes contained in the template, this research has a significant interpretive element in itself. The central notion to the interpretive position is that the researcher's actions and beliefs are themselves interpretive of prior exposure, and that by extraction, the researcher is

interpretive of the beliefs and actions of others to allow meanings to emerge. By not acting in perpetual isolation, the researcher is defined by shared interpretations and shared cultural practice.

Interpretivism as an anti-positivist position holds phenomenology as being central to its intellectual position and tradition, in its tenet that is as important to understand 'how?' of situations and experiences without preconception (Bryman & Bell, 2007).

4.3.3 Phenomenology

Phenomenology builds upon the fundamental propositions of Interpretivism by further devising an epistemology that allows for the capture and capitalisation of 'Verstehen' of the meanings and constructs of observable and recordable social realities held to be true by the individual (Bryman & Bell, 2007). This researcher holds that the oft-quoted description of phenomenology by Schutz remains the most prescient in its fundamental understanding of the difference between natural and social sciences, and the value that lies therein:

The world of nature as explored by the natural scientist does not mean anything to molecules, atoms and electrons. But the observational field of social scientists – social reality - has a specific meaning and relevance structure for the beings living, acting and thinking within it. By a series of common sense constructs, they have preselected and pre-interpreted this world which they experience as the reality of their daily lives. It is these thought objects of theirs which determine their behaviour by motivating it. The thought objects constructed by the social scientist, in order to grasp this social reality, have to be founded upon the thought objects constructed by the common sense thinking men living their daily life within the social world.

(Schutz, 1962, p. 59)

Crotty states of phenomenology:

What has emerged here under the rubric of phenomenology is a quite single-minded effort to identify, understand, describe and maintain the subjective experiences of the respondents. It is self-professedly subjectivist in approach (in the sense of being in search of people's subjective experience) and expressly uncritical.

(Crotty, 2003, p. 83)

Porter (2002) believes that phenomenology is firmly rooted in the analysis of the subjective experience, where the subject's perspective can be recorded and then interpreted at a point of happenstance between the subject's horizon and the researcher's horizon, without the researcher's preconceptions impacting upon the experience. Meanwhile, Holstein & Gubrium (2000) note that the relationship between the observation of phenomena and its source object cannot be passive, but that the consciousness of the researcher can easily disallow for an 'immaculate' perception and conceiving of realities and events.

Of phenomenology as a validating theme of qualitative case study, Jonsen & Jehn state that:

Objects of knowledge are seen as real structures that endure and operate independently of our knowledge, our experience and the conditions. That is, they exist not only in the minds of the actors but also in the objective world, and this is evidenced in patterns by which researchers can induce underlying constructs.

(Jonsen & Jehn, 2009, p 127)

This researcher contends that in the study and recognition of phenomena, we are actually witnessing the perceived state of metaphysical 'being' of each of the individual case study partner. Yin (2003) proposes that the observation of phenomena is also an observation between the concrete (individuals and organisations) and the abstract (their relationships, decisions and communities). It is here where the observed phenomena extend beyond physical aspects to reveal their own operational world mien in terms of existence and possibilities, or lack of possibilities, and the causes which lay beneath, whether it be latent or essential in which, for example, a legislative

event can be seen in two ways. Within this research, a precedent incidence of this would be the introduction of IPPC Directive²⁶ in the Pollution Prevention and Control (England & Wales) Regulations 2000. As will be shown, for example, in consideration of Cases J and W, its enclosure of larger scale intensive pigs and poultry agricultural activities. Whilst both national and federal government regard this as the most appropriate tool to control and reduce environmental impacts of operations, J and W believe it to be the single most significant constraint upon their operations. In the instance of Case W, which undertakes contract rearing and finishing for Case F, it is seen as so burdensome that it may impact on their future farm strategy. Rather ironically, Case F regards IPPC as an operational requirement and Case W is considerably more resource efficient than Case F under a 'per bird' analysis.

4.3.4 Hermeneutics

Hermeneutics focus upon the methods and theory employed in the interpretation of social activity. The original concept of hermeneutics is located within 17th century theology and is still considered as the science of biblical interpretation which leads to exegeses (Bryman & Bell, 2007). Hermeneutic theory proposes that the researcher can gain an interpreted deeper understanding of the words of the respondent, their speeches and the derived texts, which transcends that source's own understandings. Crotty (2003, p. 91) believes that this occurs because "*that in large measure authors' meanings and intentions remain implicit and go unrecognised by the authors' themselves.*" Resultantly, hermeneutic enquiries have the ability to reveal significance and objectives which are latently concealed within the text, in which Crotty trusts "*interpreters may end up with an explicit*

²⁶ IPPC: Integrated Pollution Prevention Control. The aim of IPPC is that its licence holders are required to reduce their operational emissions to land, water and air, as well as increase resource efficiency and decrease waste arising. The integrated approach requires the licence holder to carry out an initial assessment of their operational impact, then utilising the most appropriate best available technique controls available within their sector and scale to measure and reduce under the permitting process.

awareness of meanings, and especially assumptions, that the authors themselves would have been unable to articulate.” (ibid) Easterby-Smith et al. assert that hermeneutics have a role to play in organisational and management research, in the analysis of corporate reports, mission statements, and press releases etc. In recognition that contemporary interpretations of earlier texts are inevitably impacted upon by the cultural surroundings of the interpreter and their own gestalt, they do not perceive this as having a negative impact: “We therefore have to be aware that there may be no single, and correct interpretation of a particular text, because both the writing and the reading will be context dependent” (2008, p. 75).

4.3.5 Symbolic Interactionism

Symbolic interactionism is predicated upon by modern Western and in particular, North American, pragmatic philosophies and objectively held viewpoints of world, society and life. Wilfred Blumer is widely credited with bringing to the fore the posthumous works of G.H. Mead and Crotty (2003) cites Blumer’s interactionist assumptions as:

- Human beings act toward things on the basis of the meanings that these things have for them;
 - That the meaning of such things is derived from, and arises out of, the social interaction that one has with one’s fellows;
 - That these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he encounters.
- (Blumer, 1969, p. 2)

Methodologically, the pragmatic approach to symbolic interactionism requires the researcher to ‘see the same thing’ as the actor, and to understand how the determinant underpinnings of the acts and objects observed are representative of the meanings of that actor in their world view.

It may be argued that there is little to choose between symbolic interactionism and phenomenology; that they are only separated by the

individual opinions of authors and philosophers, and that convergence may bring more succour to the theoretical perspectives of Interpretivism. Notwithstanding, this researcher contends that a continuum of divergence may allow for alternative understandings to emerge. The interpretivist stance of this research is fixed within phenomenology as the author contends that it is in the laying aside of our own assimilated perceptions which can lead to enhancement and authentication of gist. A hermeneutic perspective has also been adopted. Whilst the author fully recognises the risk of fundamental radicalism that hermeneutical exegeses can lead to, it is argued that in this instance, it has allowed this researcher to revisit TOC and 'local food' texts, which it is hoped has led to the emergence of a more contemporary and contextually relevant position that may permit further debate as a result of the dis-agglomeration of texts in a meaningful and balanced framework.

4.4 Methodology

The consideration of methodology as a framework design, and its due consideration as being fit for the purpose of the research, is described by Crotty as an examination in which:

One discovers a complexus of assumptions buried within it. It is these assumptions that constitute one's theoretical perspective and they largely have to do with the world that the methodology envisages. Different ways of viewing the world shape different ways of researching the world. (Crotty, 2003, p. 66)

Within the methodology reside the choices of the researcher in relation to the nature of the study and the ensuing methods of data collection, the parameters around the data to be collected, the forms in which the data will be analysed, the planning and the execution of the research through to its conclusion (Silverman, 2004). By their nature, methodologies may be defined in their broadest terms, quantitative or qualitative for example, which Bryman & Bell (2007) do/ describe as quantification via the examination of data and qualification through the investigation of meaning, but as Silverman identifies "*Like theories, methodologies cannot be true or false, only more or less useful*" (2004, p. 4). Gill & Johnson (2010) assert that qualitative methodology has an underlying commitment to the revelation of Verstehen in that the actions of humans are driven by a subjective internalised logic.

The essence of this research has informed that a qualitative methodology is most suitable in its ability to be constructed to include tools and methods which reveal the phenomenological aspects of operational activity across scale, to allow for an inductive exploration across the case study cohort and their beliefs, experiences and strategies. In wishing to understand these precepts as drivers of conduct, this researcher proposes that they are not readily quantifiable. Therefore a qualitative methodology is more presciently suitable for the research in the form of case study to reveal phenomenology.

4.4.1 Case Study

Case study has the capacity for the researcher to undertake an enquiry which provides for a suitable and contextually exploration of contemporary phenomena, particularly where the reasons for those phenomena existing are not readily identifiable (Yin, 2003). Case study allows the researcher to conduct an inquiry into the existence of phenomena which may be present in either single or multiple cases (Stake, 2000), where “*optimising understanding of the case requires meticulous attention to its activities*” (p. 444). The use of case study enables the positioning of the case as the point of interest in its own right, whereby the researcher is able to construct a meaningful and contextual elucidation of the case in the recording of phenomena. Multiple case studies are most useful when consideration is given to companies and organisations functioning in similar market, service or product areas, whereby it may be possible to establish points of both differentiation and commonality, moreover, why and how it is that these phenomena occur (Bryman & Bell, 2007). The sources of data gathered in case study are not exclusively qualitative, but include semi-structured interviews, observations, questionnaires, secondary data as background research data, as well as legislative, organisation sector, trade body and competitor data to provide description beyond quantitative analysis (Eisenhardt, 1989; Yin, 2003). A case study’s value lies in its ability to record and demonstrate relevance, in organisational and management research it can lead to points of unique interest where, for example, it can reveal why one organisation holds an advantage, or is disadvantaged in relation to its competitors (Easterby-Smith *et al.*, 2008).

Gummesson (2000) identifies that the structures of businesses and organisations are such that it is difficult for cross case definitions and conceptualisations to be developed. He proposes case study as a more realistic tool to construct a holistic analysis of processes across organisations and as a more suitable strategy which extends beyond a positivist reductionist strategy.

Case study is also proposed as a relative methodology from which theory development can be shaped and formed throughout the case itself, and also that throughout this course, development may also lead to the emergence of new theory. Eisenhardt (1989) and Eisenhardt & Graebner (2007) remain its most fervid proponents, indicating that emergence may appear within a single or across multiple cases, although it is warned that:

The danger is that investigators reach premature and even false conclusions as a result of information processing biases. Thus, the key to good cross case comparison is counteracting these tendencies by looking at the data in many divergent ways.

(Eisenhardt, 1989, p. 540)

Gillham (2000) believes a key principle of case study research is that theoretical knowledge arising as a result of a review of the extant literature pertaining to the research, must not be bracketed at the front end of the project, as it may impact upon the research itself by blinkering. Further, that it is the very procedure of research which will prompt the emergence of notional awareness, although this can also be regarded from the similar aspect of the researcher's worldview and knowledge impacting upon the research as identified by both Gummesson (2000) and Easterby Smith *et al.* (2008).

Robert Yin is regarded as the leading exponent of case study and his three books on the subject are widely quoted in the proposition of case study as research methodology. In consideration of Yin's modern and, in this researcher's opinion, estimable proposition that the advancement of empirical research is dependent upon contemporaneous logical thought processes, and that it is compromised when the research is reduced to little more than a mechanistic endeavour, the researcher is inevitably drawn to the earlier philosophical propositions surrounding the emergence of theories of knowledge during the classical age of European Enlightenment. In particular, Kant's development of the earlier propositions of Hume & Locke suggested that 'being' and world views are reformed and improved by

epistemological processes, whereupon meaningful insight occurs as a result of meaningful questioning.

This researcher also contends that this further impacts upon the 'spatial approximations' identified in the literature review of local food, in that any representation of spatial proximity must include an appraisal of the pre-existing innate components of that space itself in order for new or alternative meanings to emerge as a result of epistemologically sound processes.

Patton & Applebaum (2003, p. 60) quote Yin's previous definition of case study as "*an empirical enquiry that investigates a contemporary phenomenon within a real life context where the boundaries between phenomenon and context are not clearly evident.*" In their argument for the continuing effectiveness of case study in management research to both generate and test theory.

Understanding constraints, whether they are actual or perceived, requires an *in situ* approach to the research where phenomena can be observed and conversations held to fully appreciate the nature, validity and extent of the constraints, an approach more widely known as Phenomenology. As Crotty (2003) states [phenomenology] "*first of all has a note of objectivity about it. It is a search for objects of experience rather than being content with a description of the experiencing subject.*" Crotty (*ibid*) further elucidates that as an established and accepted mode of procedure, phenomenology is "*a quite single minded effort to identify, understand, describe and maintain the subjective experiences of the respondent.*" It is this very subjectivity which will allow for a clear analysis of perceived and actual constraints which are observable, identifiable and recordable, whilst remaining expressly uncritical of the participating subjects. Patton & Applebaum (2003) call for honesty and openness throughout the process, and the recognition of the researcher as a variable, expressly warning against the perceptions, paradigms and defence mechanisms of the researcher, and that their prior knowledge or understanding may be at best, flawed and at worst, wrong.

In order to observe phenomena, real life case evidence is required, suggesting a case study approach. Case studies tend to be predominantly qualitative, their deployment as a research strategy acknowledges the necessity of an inductive approach where the contextual relevance of detail around the study object informs upon the phenomena as meanings emerge (Pattern & Applebaum, 2003). As Yin (2003), who remains perhaps the most pre-eminent source of case study design and methods identifies, “*case study research design is the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of the study. Articulating ‘theory’ about what is being studied helps to operationalise case study designs and make them more explicit.*” In definition (Yin, 2003, p. 13) of case study:

1. *A case study is an empirical enquiry that*
 - a. *Investigates a contemporary phenomenon within its real-life context, especially when*
 - b. *The boundaries between phenomenon and context are not clearly evident*

In other words, you would use the case study method because you deliberately wanted to cover the contextual conditions – believing that they might be highly pertinent to your phenomenon of study (ibid).

Yin’s stance is that as a research endeavour, which is able to perceive and observe phenomena, the case study is best suited to the recording of ‘real life’ events and is underpinned by its capacity to utilise diverse evidence drawn from observation, interview, questionnaire, secondary data, documents and artefacts. Case study can be used for multiple or single cases and at various plains of analytical interpretation, with each case acting to corroborate or un-corroborate the theory under test or emerging theory (Yin, 2003). It appeared that case study research design would thus seem most appropriate for this research, as it enables phenomenon to be observed *in situ* whilst enabling TOC to be articulated in a specific setting. These settings, contexts and phenomena are augmented within six possible

verifications of evidence. Table 6 identifies the six possible verifications, their strengths and weaknesses, and appears on the next page.

Six Sources of Evidence in Case Study: Strengths & Weaknesses

Source of Evidence	Strength	Weakness
Documentation	<ul style="list-style-type: none"> • Stable - can be reviewed repeatedly • Unobtrusive – not created as a result of the case study. • Broad coverage – long span of time, many events and many settings. 	<ul style="list-style-type: none"> • Retrievable – can be low • Biased selectively if collection is incomplete • Reporting bias – reflects (unknown) bias of author • Access – may be deliberately blocked
Archival records	<ul style="list-style-type: none"> • Same as above for documentation • Precise and quantitative 	<ul style="list-style-type: none"> • Same as above for documentation • Accessibility due to privacy reasons
Interviews	<ul style="list-style-type: none"> • Targeted – focussed directly on case study topic • Insightful – provides perceived causal inferences 	<ul style="list-style-type: none"> • Bias due to poorly constructed questions • Response bias • Inaccuracies due to poor recall • Reflexivity – interviewee gives what interviewer wants to hear
Direct Observations	<ul style="list-style-type: none"> • Reality – covers events in real time • Contextual – covers context of event 	<ul style="list-style-type: none"> • Time consuming • Selectivity – unless broad coverage • Reflexivity – event may proceed differently because it is being observed • Cost – hours needed by human observers
Participant Observation	<ul style="list-style-type: none"> • Same as above for direct observations • Insightful into interpersonal behaviour and motives 	<ul style="list-style-type: none"> • Same as above for direct observations • Bias due to investigator's manipulation of events
Physical Artefacts	<ul style="list-style-type: none"> • Insightful into cultural features • Insightful to tech ops 	<ul style="list-style-type: none"> • Selectivity • Availability

Table 6 Six sources of evidence in case study (Yin, 2003)

4.4.2 Previous Applications of Case Study in both TOC and Food Localisation Research

The previous application of case study in both TOC research and food localisation research suggests that there is further validity in the choice of case study methodology in this research. The following tables are extracted from this research's literature review chapters:

Evidence of Case Studies in the Research of the Theory Of Constraints

Author(s)	Title	Journal
Andrews, C. & Becker, S.W. (1992)	<i>Alkco Lighting Company and its Journey to Goldratt's Goal</i>	Total Quality Management, Vol 3, No 1, pp 71-95
Chaudhari, C.V. & Mukhopadhyay, S.K. (2003)	Application of Theory of Constraints in an Integrated Poultry Industry	International Journal of Production Research. Vol 41, No 4, pp 799-817
Ehie, I. & Sheu, C. (2005)	<i>Integrating Six Sigma & TOC for Continuous Improvement: A Case Study</i>	International Journal of Technology Management. Vol 16, No 5, pp 542-553
Linhares, A. (2009)	<i>Theory of Constraints & the Combinatorial Complexity of the Product Mix Decision</i>	. International Journal of Production Economics. No 121, pp 121-129.
Pegels, C.C. & Watrous, C. (2005)	<i>Application of the Theory of Constraints to a Bottleneck Operation in a Manufacturing Plant.</i>	Journal of Manufacturing Technology Management. Vol 16, No 3, pp 302-311
Reid, R.A. (2007)	Applying the TOC five step focussing process in the service sector	Managing Service Quarterly. Vol 17, No 2, pp 209-234
Reid, R.A. & Cormier, J.R. (2003)	<i>Applying the TOC TP: a case study in the service sector</i>	Managing Service Quality, Vol 13, No 5, pp 349-369
Scoggin, J.M., Segelhorst, R.J. & Reid, R.A. (2003)	<i>Applying the TOC Thinking Process in Manufacturing: A Case Study</i>	International Journal of Production Research. Vol 41, No, 4, 767-797
Tanner, J.F. & Honeycutt, E.D. (1996)	<i>Reengineering Using the Theory of Constraints: A Case Analysis of Moore's Business Forms</i>	Industrial Marketing Management, 25, 311-319.

Umble, M., Umble, E. & Murakami, S. (2006)	<i>Implementing the Theory of Constraints in a traditional Japanese manufacturing Plant: the case of Hitachi Tool Engineering</i>	International Journal of Production Research, Vo. 44, No 10, pp 1863-1880.
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Table 7 Evidence of case study in the research of TOC

Evidence of Case Study in the Research of Local Food & Food Localisation

Author(s)	Title	Journal
Chambers, S., Lobb, A., Butler, L., Harvey, K. & Bruce Traill, W. (2007)	<i>Local, National & Imported Foods: A Qualitative Study</i>	Appetite, No 49, pp 208-213
Ilbery, B. & Maye, D. (2005)	<i>Alternative (shorter) Food Supply Chains & Specialist Livestock Products in the Scottish-English Borders</i>	Environment & Planning A, Vol 37, pp 823-844
Ilbery, B. & Maye, D. (2005)	<i>Food Supply Chains & Sustainability: Evidence from Specialist Food Producers in the Scottish/English Borders</i>	Land Use Policy, No 22, pp 331-344
Ilbery, B. & Maye, D. (2006)	<i>Retailing Local Food in the Scottish-English Borders: A Supply Chain Perspective</i>	Geoforum, No 37, pp 352-367
Jones, P., Comfort, D & Hillier, D (2004)	<i>A Case Study of Local Food & its Routes to Market in the UK</i>	British Food Journal, Vol 106, No 4, pp 328-335
Morris, C., Buller, H. (2003)	<i>The local food sector: a preliminary assessment of its form and impact in Gloucestershire</i>	British Food Journal. Vol 105, No 8, pp 559-566
Spence, L. & Bourlakis, M. (2009)	<i>The Evolution From Corporate Social Responsibility to Supply Chain Responsibility: The Case of Waitrose</i>	Supply Chain Management: An International Journal. Vol 14, no 4, pp 291-302
Youngs, J. (2003)	<i>A Study of Farm Outlets in North West England</i>	British Food Journal. Vol 105, No 8, pp 531-541

Table 8 Evidence of case study in the research of local food & food localisation

4.4.3 Criticisms of Case study

Positivists argue against case study, principally in its lack of representativeness and generalisability. In focussing upon positivist criteria for hypothesis testing and statistical provability in a conviction that scientific evaluation ultimately allows for reliability, validity and generalisability issues to be better addressed. They further argue that it undermines methodological monism and relies upon an empathetic grasp of consciousness (Gill & Johnson, 2010) as well as a subjective bias on behalf of the researcher, which inevitably impacts upon the rigor of the findings. However, this argument in itself is biased in that it implies universal biasedness on behalf of case study and excludes the existence of an impartial observer. Gummesson records that:

Case study research is criticised by quantitative researchers for being just conceptual, useful at an exploratory stage but not for proving anything, lacking in rigour, and offering journalism and 'anecdotal evidence' with non generalisable outcomes.

(Gummesson, 2007, p.228)

Positivists further warn that boundary shifting and lack of parameters lead to emerging theory which can be overly long and complex, but which suits the researcher. Even the most noted proponents of case study as a tool to build theory warn of *"the lack of clarity about the process of actually building theory from cases, especially regarding the central inductive process and the role of the literature."* Eisenhardt (1989, p.532) further states that a narrow agenda may result in idiosyncratic and narrow theory, if any theory at all.

Another significant criticism upon the use of case study as method implies that it is often difficult to generalise findings. However, Yin (2003 in this research, but originally proposed in the 1984 1st edition) endorses case study research methods as tools to aid the building of theory which can become applicable and of use to the wider environment beyond that in which the case study originally occurs. It is also contended by this researcher that the

breadth, variety, reproduction and quality of the cases used in this research overcome many of the potential short-comings.

4.4.4 Sampling & Selection

Sampling entails the selection of individuals or organisations from a wider population in order that they portray a degree of representativeness in relation to that population, thus if the sample is representative, the results can be generalised in relation to the sector or population from which it was drawn (Tharenou *et al.*, 2007). Therefore, a good sample improves the construct of external validity identified as a key component to good case study research (Yin, 2003). Of the two primary types of sampling - probability and non-probability sampling - the former is more likely to be used when research objectives are linked to statistical probabilities and is most commonly associated with experimental and survey research. The latter - non-probability sampling - does allow for generalisability but not on statistical grounds. As there is not a random selection method, the implication is that certain organisations or individuals become more likely to be selected (Bryman & Bell, 2007). Non-probability sampling is further sub-divided into separate sampling techniques: quota, purposive, snowball, self selection and convenience. Of these, the researcher believes that purposive, also known as judgemental sampling (Saunders *et al.*, 2007), was the most apposite for this research. This sampling technique allowed the researcher to make judgement calls about the wider selection of case studies which had manifested as a result of the DEFRA project FO0104, selecting those which, ostensibly, appeared to be more likely to address both scale and geographic representativeness. Gomm *et al.* (2000) refer to this, specifically within the context of case study, as an ability to use appropriate knowledge in the selection process. Neuman (2005) indicates that purposive sampling is well suited to case study, as does Stake (2000), whilst the work of Patton (2002) is called upon by Saunders *et al.* to indicate its use in the selection of your case study partners, dependent upon your research objectives and questions. The same authors further indicate that the use of purposive sampling has also occurred in Glaser & Strauss's grounded theory, of which

similarities between it and template analysis are further discussed within the introduction to Template Analysis later in this chapter.

As previously identified, the antecedent roots of this research lie within the DEFRA research project FO0104, which in this respect, has acted as the gatekeeper to the research partners. Notwithstanding, it is important to recognise the role of the gatekeepers to that DEFRA research in greater detail as they allowed initial access to the ultimate research cohort contained within this dissertation. Bryman & Bell (2007) identify that gatekeepers are most likely to be in a senior management role and be able to act not only as point of access, but also as a sponsor.

Whilst articles were placed in press business sections and trade journals which did garner direct contacts, most notable amongst these were Case O, an egg farming operation, and Case W, a manufacturer of pig and poultry compound feeds. There were five other direct contacts (Cases C, G, H, L and O) as well as two contacts through professional acquaintances who had acted as consultants to Cases N and R. In addition to these, direct contacts were made with all of the eight English regional food groups, with varying degrees of success. Three did not respond to letters, telephone calls or email contacts, whilst a further two of the group 'faded away' after positive initial discussions, all of which led to a position where gaps began to appear from a geographical spread perspective. This issue was addressed by making direct contact and representations to personnel at regional development agencies, in their role as gatekeepers themselves to regional food groups. The existence of these multiple gatekeepers as persons controlling research access, helped to mitigate against the power relationships which can develop between gatekeeper and researcher, particularly when the research is restricted to a single or small number of organisations (Saunders *et al.*, 2007). Nevertheless, the power held, and arbitrary decisions taken by organisational gatekeepers can sway significant impacts upon research, of which this researcher experienced in the pilot study.

As a result of non-probability purposive sampling, the reduction of the original DEFRA research cohort to a group of 23 case study partners can be viewed as a second iteration of the technique, so that a practicable group could be assembled which offered product, process, scale and geographic representativeness without unnecessary duplication. Whereby, the nature of the topic under research prevailed upon the cohort, so that there were more micro and small scale enterprises. This ‘judgement call’ was made in view of both the literature and initial DEFRA fieldwork, which had indicated that it was at these scales that constraints were more likely to occur. The following table lists the case study partners, further tables organised by enterprise category, location etc are presented at the beginning of Chapter 6 as part of cross case analysis and findings.

IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN / RURAL	PRODUCTS	ACTIVITY ~ PRIMARY or SECONDARY	TYPE OF ACTIVITY	SECTOR
Case A	Micro	London	Urban	Sauces & pickles	Primary	Manufacturer	Food manufacture
Case B	Micro	Hampshire	Rural	Chilled ready cook meals	Primary	Manufacturer	Food manufacture
Case C	Micro	Herefordshire	Rural	Botanical extracts	Primary	Manufacturer	Ingredients
Case D	Small	Sussex	Rural	Pasta, sauces & cheese	Secondary	Manufacturer	Food manufacture
Case E	Large	Norfolk	Rural	Red meat	Primary	Farming & processing	Red meat
Case F	Large	North Lincolnshire	Rural	Poultry	Primary	Farming & processing	Poultry
Case G	Micro	North Yorkshire	Rural	Meat / Veg / Dairy / Pickles etc	Primary	Wholesaler	Wholesale
Case H	Large	Northumberland	Urban	Fishcake cores	Primary	Manufacturer	Seafood
Case I	Micro	Hampshire	Rural	Fresh milk & cream	Primary	Farming & processing	Dairy
Case J	Small	Lincolnshire	Rural	Pigs	Primary	Farming	Red meat
Case K	Small	West Midlands	Urban	Red meat	Primary	Processor	Food manufacture
Case L	Medium	Tyneside	Urban	Cheese products	Primary	Processor	Food manufacture
Case M	Medium	County Durham	Rural	Cooked poultry	Primary	Processor	Food manufacture
Case N	Micro	Tyneside	Urban	Fresh seafood	Primary	Processor / retail	Retail
Case O	Small	County Durham	Urban	Eggs	Primary	Farming / wholesale	Poultry
Case P	Micro	Hampshire	Rural	Cheese	Secondary	Farming & processing	Dairy
Case Q	Micro	Dorset	Rural	Water	Primary	Extraction & bottling	Drink
Case R	Micro	Northumberland	Rural	Pies & red meat	Secondary	Butchering & processing	Red meat
Case S	Micro	Worcestershire	Rural	Prepared red meat	Secondary	Farming & butchering	Red meat
Case T	Small	Lincolnshire	Rural	Farm shop	Secondary	Retail / food service	Retail
Case U	Large	Cambridgeshire	Urban	Animal Feed	Primary	Processor	Animal Feed
Case V	Medium	Lincolnshire	Urban	Red meat	Primary	Abattoir / butchering	Red meat
Case W	Micro	Yorkshire	Rural	Poultry	Secondary	Farming	Poultry

The process of data collection other than that undertaken in the pilot study which is duly addressed, adopted the form of a mixed method approach which commenced with telephone or email contact to the case study partners. These conversations and emails were used to discuss the aims of

this research and to establish dates and times which were deemed to be most convenient to themselves. The 23 initial interviews took place at times between 07:30 (Case H) through to 20:00 (Case P) over the period of a year commencing in early 2008.

The interviews themselves were semi structured; each interview undertaken broadly addressed the historical development of the business, its position in the marketplace, products, ongoing planned development of the business and the constraints believed as acting most significantly upon the business at the time of interview. This general set of subject matter was an intentional strategy to overcome initial barriers, which would allow the case study partner to lead our discussion wherever possible.

As a precursor to each interview, the undertaking of secondary data searches proved useful as it allowed for the development of less generic, more specific interviews and the formulation of questions extracting data which the respondent may not have readily given, for example, their access to grant funds. This gathering of secondary data helped to address the issues of validity, in the context of the knowledge being gained by the researcher during an interview is ultimately based upon the answers of the interviewees (Stake, 2000). This background research of secondary data within this research is posed as a triangulation technique to support the construct, internal and external validities identified by both Miles & Huberman (1994) and Yin (2003). In addition to the secondary data search and semi structured interviews, three quarters of the interviewees also offered a walking tour of their facilities. These tours proved fruitful as they allowed the researcher to take further field notes and add another dimension to the research:

The use of multiple sources of evidence in case studies allows investigators to address a broader range of historical, attitudinal and behavioural issues... Thus any finding or conclusion in a case study is likely to be much more convincing and accurate if it is based on several sources of information.

(Yin, 2003, p.98)

Saunders *et al.* (2007) suggest that triangulation is an important aspect in case study as it allows for corroboration and validation of the interview data. A common theme throughout was that those interviewed did not always have information to hand, despite it being indicated at the time when the interviews were arranged. To overcome this, a generic questionnaire which could be modified on a case by case basis, but still extract explicit information, was developed to gather missing data (appendices 10.4 & 10.5). The interview, facilities tour, field notes and questionnaire formed the basis of the narrative and supply chain map, which were developed by the researcher and submitted to the case study partner for review and agreement or mutually agreed amendment. Overall, this led to a significant body of mostly qualitative information relating to each case study, verified by the operator in question and validated by the aforementioned triangulation methods.

King & Horrocks (2010) believe that transcription of interviews should always be undertaken by researchers themselves, which is particularly important when interview is melded with field notes. They suggest that it is at this point where the initial phase of analysis commences, and that it should be undertaken as soon as possible, to capture as much contemporary understanding as possible. The construction of an individual narrative per each case study partner permitted for a 'reduction' of the interview, which allowed the researcher to focus on what was said. By inviting each of the interviewees to review drafts of the narrative and map themselves, which was developed as a result of data triangulation, the researcher contends that the reduction exercise was successfully executed, with the singular exception of Case O asking for significant changes to be made, which are discussed in Chapter 7 – 7.4.

The researcher believes that the system used helped to ensure internal and external validity to the case study, whilst also improving the likelihood of reliability and replicability within context. All confidences were respected and the case study partners remain anonymous throughout this research. Although not all of the case study partners indicated a wish to remain anonymous, the researcher indicated that anonymity would be constantly applied across the cohort, in the belief that this strategy would ultimately lead

to a more fertile landscape of data. It would appear that this was successful, particularly amongst the smaller companies where a common trait of “you won’t tell anyone who we are” emerged.

4.5 Research Design

The position of this research as being interpretivist of phenomena occurring in multiple case study partners and being informed by both reviews of the extant literature, frames an accepted method of case study design recorded by Hussey and Hussey (1997) as planning, acting, observing and reflecting, whereby the observation of and reflection upon the phenomena present an exemplification of phenomenological methodology. In the case of this research, the observation and reflection aspects were addressed by a semi structured interview, a complimentary questionnaire, creation of a process or supply chain flow map and ensuing thematic analysis of texts.

Jonsen & Jen (2009) believe that the deployment of complimentary techniques can help to minimise subjectivity in case study research, and further to this, that the choice of technique employed in management studies must also reasonably reflect upon the time restraints of those managers involved in the research, when pragmatic research design decisions are made without unduly impacting upon the appropriateness of the methodology.

The use of multiple cases and/or mixed methods can lead to a more complete and therefore well-founded and cogent understanding of the case study partner, the questionnaire for example, may help to capture anecdotal data which was missed by either the researcher or the informant during the semi structured interview, whilst the supply chain map allows the informer to quickly check that it is pictorially representative of the process or supply flow under review. Jonsen & Jehn (2009, p.141) maintain that as a result “*their realities correspond with our representation of the data, thus respecting the view of the natives.*”

4.5.1 Research Management Processes

There are two main aspects of research management; the first is a consideration of where the researcher actually positions themselves whilst in the field, where the research horizon stretches from covert to overt, and how this may impact upon the data they record.

The second aspect of research management relates to the administration of the project itself, and the researcher's ability to manage time lines, the individual requirements of case study partners, data generation, supervision and milestones, through to the completion of the research

4.5.2 Research Position

Gill & Johnson (2010) identify that the extent to which the researcher remains overt or covert when conducting fieldwork impacts upon data field data collection. Easterby-Smith *et al.* (2008) refer to this as 'observer effects.' These levels to which the researcher becomes a participant, as shown in Fig 9, can equally add or detract value from that research if the positioning strategy is not contingent to the research aims. It is identified that people who know they are under observation are likely to modify their behaviour thereby impacting upon the validity of the research, although Gill & Johnson caution against the adoption of a covert role on pragmatic grounds, both ethically and as a potential barrier to phenomena.

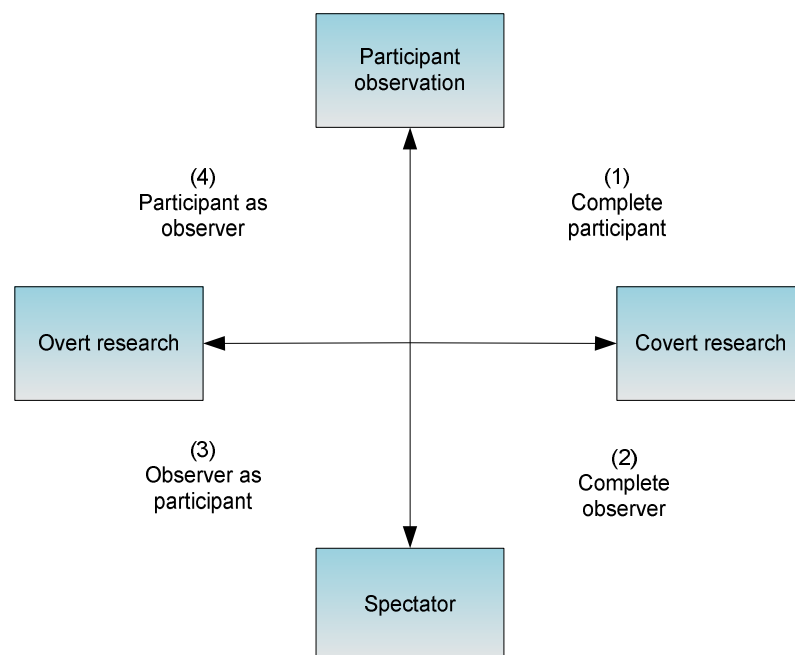


Figure 9 Taxonomy of field roles. Source: Gill & Johnson (2010)

Silverman (2004) considers the impact of position in terms of the reality accorded to the fieldwork, in that the researcher must mitigate against a possibility of being told what they want to hear, with the interviewees being

less than critical, so as to be helpful to the researcher with whom they have established a relationship with over time.

4.5.3 Research Management

Good research management extends beyond competent project management skills. In addition to these competencies, the researcher must also possess 'soft skills' which reflect their ability to have an awareness of 'self', establish openness with the other participants, communicate clearly at an appropriate level, integrate with others and respect their individuality, worth and social graces.

Saunders *et al.* (2007) record their belief that competent research management relies upon an ability to balance resource availability, gathering and exchange of information, schedule management and cost management.

This research started with a self developed research management risk control tool, Fig 10, shown below.

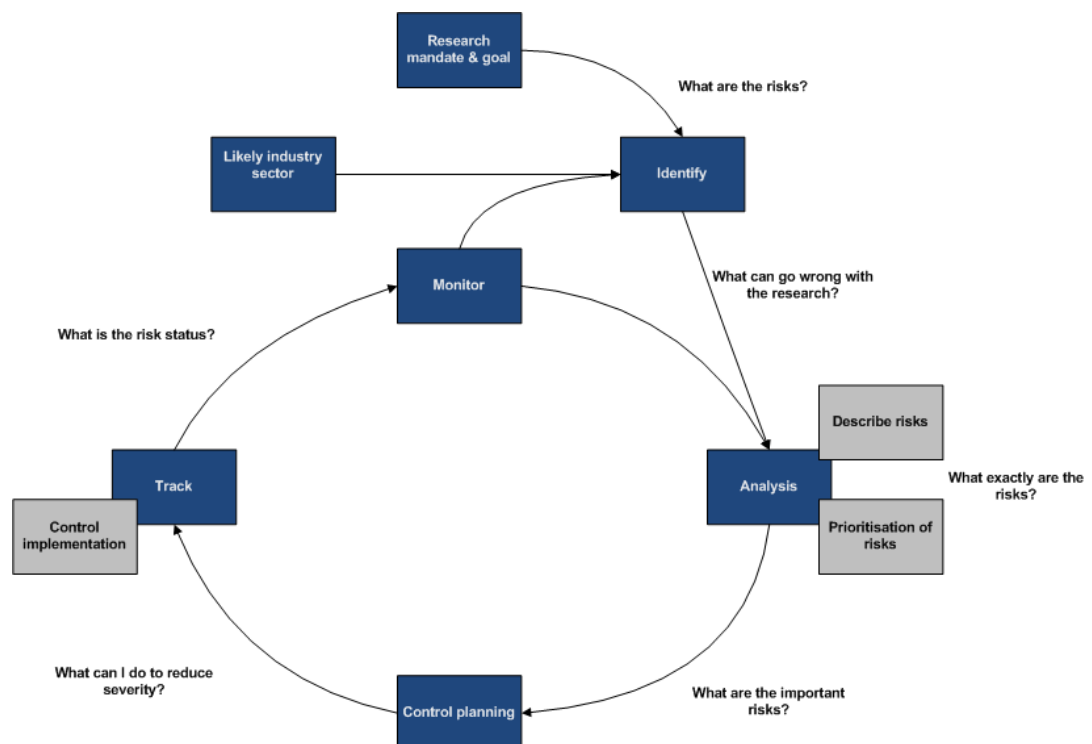


Figure 10 Research risk management tool

In addition to serving as a precursor to the research itself, the tool was utilised as a quality check device, which also managed the longitudinal aspects of the fieldwork. The tool was reintroduced at stages throughout the research to aid resource management, partner communications, planning, organising and implementations, which were also managed with the use of an Excel-based research database and calendar and a Gantt chart.

4.5.4 The Research Interview

Silverman (2004, p. 83) proposes that good research interview questions require the researcher themselves to undergo self questioning:

- Why is the research topic significant?
- How will it relate to other research?
- Why is an interview the most appropriate method?
- Is the size and sample appropriate to the topic and model?
- How do you transcribe your interviews?
- Do you need to be face to face with your respondents?
- Did you consider a focus group?
- What status will you accord of your data? Objective facts, subjective perceptions or narratives?
- How thoroughly will you analyse your data?

Gillham (2000) warns in a similar vein to Jonsen & Jehn (2009) that in undertaking 'real life' research interviews, constraints must be considered in relation to the workload requirements of those being interviewed, their time, availability and imperatives.

Yin (2003) suggests that it is important not to race headlong through the interview schedule, but that the researcher is able to stop and pause, taking time to investigate the actual data emerging from an interview and assessing its worthiness in relation to the research question, the analysis of which needs to be recorded within a framework, as both audit trail and guide. If the

questions need to be modified, the researcher must be able to identify at what point this occurred and to defend their decisions.

This research adopted a mixed method approach, where a semi structured interview was conducted with the case study partner; background research of secondary data (after analysis of the pilot study) was also conducted by the researcher before the interviews. As a precursor to each interview, the undertaking of secondary data searches proved useful as it allowed for the development of less generic interviews and the formulation of questions extracting data which the respondent may not have readily given, for example, their access to grant funds. Each interview undertaken broadly addressed the historical development of the business, its position in the marketplace, ongoing planned development of the business and the constraints believed as most significantly upon the business in the market at the time of interview. This general set of subject matter was an intentional strategy to overcome initial barriers and allow the case study partner to lead our discussion wherever possible. The interviews took place at times which were deemed by the case study partners to be most convenient for them and varied from 07:30 (Case H) through to 20:00 (Case P). With the exception of Cases D, E, K, U, V and W the researcher was also taken on a walking tour of the operation. These tours proved fruitful as they allowed the researcher to take further field notes. In order to minimise the time impact of the interview, a questionnaire was also left in paper form and on a memory stick, for the case study partner who recorded further details of their operation and its supply chain.

The interview, facilities tour, field notes and questionnaire formed the basis of the narrative and supply chain map, which were developed by the researcher and submitted to the case study partner for review and agreement or mutually agreed amendment. Overall, this led to a significant body of mostly qualitative information relating to each case study, verified by the operator in question. The researcher believes that this additionally ensures internal and external validity to the case study approach whilst also improving the likelihood of reliability and replicability within context. All

confidences have been respected and the case study partners remain anonymous throughout this research. Although not all of the case study partners indicated a wish to remain anonymous, the researcher indicated that anonymity would be constantly applied across the cohort, in the belief that this strategy would ultimately lead to a more fertile landscape of data. It would appear that this was successful, particularly amongst the smaller companies where a common trait of “you won’t tell anyone who we are” emerged.

4.5.5 Field Notes

The construction of contemporaneous field notes acted as a vitally important commentary for this researcher to refer back to, where the recording of observed phenomena occurred in a ‘real time’ stream of consciousness which was not blurred by time or reflection. Eisenhardt (1989, p. 539) believes that the key to successful field notes is the researcher asking themselves “What am I learning?” and “How does this case differ from the last?” By recording field notes, the researcher is able to chronicle their exposure, rather than to undertake sorting and sifting “*because it is all too difficult to know what will and will not be useful in the future.*” (*ibid*)

Spradley (1979) advances a four stage development of the original field notes as both audit trail and systematic framework to enhance their reliability.

1. Short notes made at the time
2. Expanded notes made as soon as possible after each field session
3. A fieldwork journal to record problems and ideas that arise during each stage of fieldwork
4. A provisional running record of analysis and interpretation.

Silverman (2004, p. 227) believes that field notes are crucial: “implicit in the process is the need to distinguish between the etic analysis (based on the researcher’s concepts) and the emic analysis (deriving from the conceptual framework of those being studied).”

The narratives and supply chain maps were used to confirm / disconfirm the accuracy of the researcher's analysis of each case study partner's operation under review, which at that time remained as intermediary analysis. Each of the case study partners received a draft copy of their narrative and map by post (the post included the same documents on a memory stick and a stamped, addressed return envelope). They were asked to agree / disagree with the accuracy of the map and narrative as a reflection of the interview by way of verification. Whilst Cases E, F and J identified small changes required in their process flows, only one instance occurred of a partner (Case O) asking for significant additions to their narrative. After a return visit to Case O, and following further discussions, the changes requested by Case O were not made. The reasons behind the request became apparent many months later and are discussed at the end of this research, as a pre-cursor to possible further research.

4.5.6 Pilot Study

A pilot study occurred after discussions with a senior manager of Case W, who acted as a gatekeeper to various organisations attending a one day workshop in Peterborough. The aim of the pilot study was to test data collection methods and protocols; questioning, round table discussions, process flow / supply chain mapping exercises in their ability to capture key information in relation to the research. Those present at the workshop represented a range of organisations of different scale, in a specific supply chain (pork). Each participant held a senior position within their respective organisations.

The workshop lasted for seven hours, and a number of important learning points emerged out of the process which significantly influenced and improved the ensuing fieldwork:

1. The importance of 'setting the scene' to the participants prior to any subsequent workshops or interviews so that particularly;

2. What is being asked for in terms of time and the nature of commitment is clearly understood, which is important from a relative scale aspect whereby;
3. In larger organisations, the correct people can be identified. The workshop revealed that if the most appropriate people to speak to were not attending the workshop, then it became difficult to access and extract data as they were divorced from the primary data gathering exercise, which;
4. Led to the development of a questionnaire to help gather data. This questionnaire in itself became a 'pilot' questionnaire which was significantly revised following feedback from one of the participants, who considered it to be too onerous on behalf of the respondents;
5. That the use of the questionnaire could be reduced to some extent in the 'setting of the scene', and that the researcher carrying out secondary data gathering exercises in relation to the organisations that the participants were employed by. This subsequently became part of the triangulation method adopted for the main data gathering exercise.

The pilot study also acted as a useful reminder of the precarious nature of the relationship between research and gatekeeper, in that none of the organisations in the pilot study appeared in the final case study cohort. One of the organisations present at the workshop seemed to offer clear access to key actors of different scale and end market in pork supply chains. Whilst there were many gaps in the data they provided on the day, it appeared *prima facie* that this organisation could open all the doors required by this researcher. As a result, the researcher spent the following four months enjoying almost unfettered access to this organisation, of which in hindsight, received an undue level of engagement and support as the 'what's in it for me' scenarios described by Bryman & Bell (2007) became more apparent. What was less apparent to the researcher was the distancing occurring between the researcher and the other organisations as a result of this undue focus. Nevertheless, it came as a complete shock to the researcher when the case study partner was taken over by a competitor. Following changes

to the senior management structure, the company withdrew completely from the research, thereby closing down all access points, citing a change in operational objectives. This served as a timely reminder and wakeup call that in equanimity lays value.

The pilot study thus, also acted to confirm that my own knowledge and strategies of data gathering within qualitative methodologies needed further development before I undertook primary data gathering. This was addressed through further reading, discussions with my supervisor and attendance at a grounded theory workshop.

The key issue identified were discussed in supervisions and addressed;

- Equal value was accorded to case study partners irrespective of scale, relative position in the supply chain and relationships with other organisations / companies.
- The role of participants from larger organisation was confirmed in relation to their suitability and access to the correct personnel and data.
- Secondary data research was instigated which had the benefits of data triangulation and of the interview being less generic, and the researcher having more background information of each partner.
- The questionnaire was redesigned to be more easily navigable and understood. Further, it delivered an element of instant measurement on behalf of each case study partner. An example of a pilot study questionnaire (appendix 10.4) and the subsequently modified questionnaire (appendix 10.5) given to sausage manufacturers at a medium scale (from the pilot study) and small scale (Case K) are included in the appendices.
- The modified questionnaire was delivered by email, printed forms and memory stick, its main advantage being that in population of the required fields, the respondents were able to measure their base CO₂ equivalent outputs of their operations as well as other outputs as units of production and consumptions. Those case study partners without ready access to spreadsheet software were also given the

option of submitting utility bills for the researcher to upload data and report back to them.

This researcher believes that the redesign aided the research in the likelihood of engagement with the questionnaire by the respondents, thereby addressing some of the issues of gratification required by gatekeepers and business participants in case study research identified by both Bryman & Bell (2007) and Saunders *et al.* (2007).

At the time that the pilot study was organised and initiated, the researcher thought that the depth of design in the research strategy was sufficient, especially in the emergence of one organisation that appeared to offer a 'one stop shop' scenario, which was not the case, both in terms of reliance upon a single gatekeeper and preparation for the gathering of data.

The pilot study, then, produced worthwhile lessons which were consequently deployed by the researcher in the gathering of subsequent primary data, as well as indicating several factors which had to be considered in relationships with case study partners irrespective of scale.

4.5.7 Prejudice

Silverman's (2004, p. 270) reiteration of Weber's (1946) oft quoted belief that "all research is contaminated to some degree from the values of the researcher" recognises that identification and the study of problems remains 'particular'. This is none more so that when the researcher represents the sole line of enquiry, whereupon there is a significant chance that the upshot of the research is "largely grounded in the moral and political beliefs of the researcher." (*ibid*)

Crotty (2003, p. 81) identifies that our own concepts and definitions of 'being' can lead to prejudicial behaviours which can cloud the richness of a phenomenon.

Due consideration of prejudice has been undertaken by this researcher, particularly in light of his practitioner role in a senior supply chain

management position in multi-national dairy company. By adopting a non-interventionist position during the interviews and analysis, the new meanings and understandings described by both (Yin 2003) and Crotty (2003) emerge, whilst overcoming a prejudice of 'knowing', which Gillham suggests is easily tainted by pre-existing knowledge.

4.6 Template Analysis

Template analysis emerged from the USA during the late 1980's. It is commonly held that in its approach to data identification, grouping and coding, it is similar to Glaser & Strauss's Grounded Theory. Nevertheless, template analysis has gained a strong foothold in the UK, largely due to the work of Nigel King and his colleagues at Huddersfield, in their adoption of the method in their case study researches of human and health sciences. Wainright & Waring (2008) record the increasing use of template analysis in business and organisational research, as a more suitable tool for the analysis of themes of texts gathered through semi structured interviews.

King (2004) positions template analysis as a more suitable tool for the thematic analysis of texts, between the predetermined coding and statistical analysis employed in R.P.Weber's Content Analysis tool, and that of Glaser & Strauss's Grounded Theory, which does not employ the use of *a priori* codes or a literature review. Grounded theory commences with the collection of data which is then coded, conceptualised and categorised in a reverse flow to theory. Template analysis allows for the modification, addition, or even removal of the *a priori* proposition codes as part of the researcher's interpretation of texts. This process also allows for the introduction of second order and third order themes as derivatives of the thematic analysis and coding of the texts under scrutiny.

The purpose of template analysis is to provide an overview of the key themes (first order propositions) and sub-themes (second and third order propositions) emerging from that qualitative data, where those themes and

sub-themes are features of the data that are relevant to the research questions. It is essentially a qualitative data reduction and categorisation exercise. King (2009) states that these themes “*are features of participants’ accounts characterising particular perceptions and/or experiences that the researcher sees as relevant to the research question.*” In this case, the research questions focus on the need to understand the localisation of food supply. Importantly, King (2009) suggests that:

In phenomenological studies you should hold back from creating the initial template until you have carried out preliminary coding on all transcripts or at least a substantial proportion of them.

In order to extract the key messages from this body of information, this research used template analysis as a data reduction tool. A more detailed description of template analysis is presented at the start of Chapter 6, which contains the analysis and findings of the template analysis exercise. King (2009) defines the use of Template Analysis as a particular approach to analysing data that is highly qualitative in nature: “*The data involved are usually interview transcripts but may be any kind of textual data including diary entries, text from diary entries, text from electronic “interviews” (email) or open-ended question responses on a written questionnaire.*”

However, in reaching a point of diminishing return, the researcher also needs to be able to explain how the point of saturation occurred, how the analysis and interpretation of the texts are both considered and balanced to allow the data to be presented as meaningfully derived conclusions (Easterby-Smith *et al.*, 2008).

Further detail of template analysis and an example of how it works is presented at the beginning of Chapter 6: Findings.

4.7 Validity & Reliability of Case Study Interviews.

It may be argued that a narrative and supply chain map, which is only agreed between the researcher and the respondent, represents data that is little

more than mutually reciprocal. It was an important output of this research that reliability and validity were achieved as part of the research process by instigating a number of quality checks throughout. As previously discussed, case study is not without its detractors, who also claim that a lack of scientific method and ensuing possibilities for narrow subjectivity lead to insufficient operational measures (Llewellyn & Northcott, 2007).

Yin (2003, pp 33-34) identifies the need to ensure the quality of case study research in its own right and its disparagement by positivists. In elucidation of case study quality being embedded within an operational framework, Yin suggests that a model, originally designed to test the empirical quality of social research, is an essential prerequisite for case study research, which addresses:

- Construct validity
- Internal validity
- External validity
- Reliability

In addition to this, the identification of 'respondents,' multiple sources of 'evidence' and construction of 'remaining cases' implies that the research is substantiated and therefore has increased representativeness if multiple case studies are employed.

The next page commences with Table 9, which identifies the tactics that a researcher can employ to build quality and validity into their case study research.

Case Study Tactics for Quality & Validity.

TEST	CASE STUDY TACTIC	PHASE OF RESEARCH IN WHICH TACTIC OCCURS
CONSTRUCT VALIDITY	• Use multiple sources of evidence	Data collection
	• Establish chain of evidence	Data collection
	• Have key informants review draft case study report	Composition
INTERNAL VALIDITY	• Pattern match	Data analysis
	• Explanation building	Data analysis
	• Address rival expectations	Data analysis
	• Logic models	Data analysis
EXTERNAL VALIDITY	• Use theory in single case studies	Research design
	• Use replication logic in multiple studies	Research design
RELIABILITY	• Use case study protocol	Data collection
	• Develop case study database	Data collection

Table 9 Case study tactics for four design tests. Source: Yin / COSMOS (2003)

Miles & Huberman (1994) indicate that confidence in the findings of case study and its validity are strengthened when multiple case study partners exist within the research, however they also warn against this strategy as a basis for generalisability arising from qualitative research.

King (2009) recognises that a potential shortcoming of template analysis is *“the tendency to focus too much on what is common across cases, and lose the sight of the context in which themes are identified in individual accounts.”*

With regard to the template and its thematic analysis of text, it is again important to recognise the possible validity of the of positivist research, driven by calculations and measurements of which the researcher is a detached and objective observer.

King (2009, p. 11) records that "*there is no single set of criteria that researchers agree for all qualitative studies,*" before suggesting that the quality of the template output can be strengthened and verified by the researcher engaging in an independent scrutiny of their analysis. In which:

- A sample of data is analysed separately and compared for both difference and similarity
- The use of an external expert with extensive knowledge of the subject area
- Defence of your findings to scrutiny by an expert panel

The literature reveals an end point in data analysis which may be steeped in the researcher's own subjectivity if these safety checks are not completed. In suggesting that the point of saturation appears only when no new meanings emerge from the coding exercises in the template, which Eisenhardt (1989), for example, also indicates as the end point arrived upon the position where marginal improvement to data diminishes even further. Whilst the research has mitigated against this occurring by completing the analyses beyond the 17th case study, where the researcher perceived a point of saturation had been reached, this researcher also undertook two further interviews at a small brewery and with an owner of a specialist local food retail and distribution business. In both cases the interviews were excluded from the research as they did not provide any new evidence which would have impacted upon the template analysis. Whilst both companies did reveal their own operational constraints, the issues they faced had already been addressed in the analysis of the case study partners.

In terms of its findings, the external validity of this research is underpinned by its analysis and template output findings being scrutinised during April 2010 by a director of a regional food group; this director also remains anonymous, but of which the research will consider at greater length in its closing stages.

4.8 Reflexivity

By the very nature of this researcher's connection to the case study partners and the research process itself, in ways which both meld and shape the resultant outcomes, a high degree of reflexivity was required to have been enjoined throughout the process. Silverman says of the need to be reflexive throughout the research process that:

The study of conditions of knowledge production in terms of positioning of the researcher is thus a guard against not only conflation of scholastic with practical reason, but also the complacency and arrogance that is born in dispositions that have the potential to accompany all modes of thought – whatever their claims may be concerning the constitution of social reality. (2004, p. 5)

Gummesson (2000) insists that it is of paramount importance that the researcher should always be aware of the influences of their own paradigms, when a failure to be reflexive may allow personal perception of pre-understandings to threaten the research by triggering of selectivity and defence mechanisms. The researcher must be able to recognise how their own prior learning and assumptions may impact upon the objective analysis of phenomena in ways which may act as barriers to new understandings emerging. Easterby-Smith *et al.* (2008) assert that reflexivity on behalf of the researcher 'informs' the research beyond the realms and parameters of positivist contexts. The ability to remain non-judgemental of the subjects and a recognition that it is not a case of "what would I have done?" but rather a case of "what did they do and why?" indicates that the researcher is undertaking reflexivity. Embedding reflexivity in the quality process prompts the researcher to constantly think beyond mechanistic coding and contemplate upon what it is they are actually bringing to the analysis and how the analysis is grounded within the template texts.

4.9 Ethical Issues

Ethical research practice seeks to protect the interests and identities (when required) of the research participants / interviewees. Easterby-Smith *et al.* (2008, p. 134) list the key principles in research ethics:

Key Principles in Research Ethics	
1.	Ensuring that no harm comes to participants
2.	Respecting the dignity of research participants
3.	Ensuring a full informed consent of research participants
4.	Protecting the privacy of research subjects
5.	Ensuring the confidentiality of research data
6.	Protecting the anonymity of individuals or organisations
7.	Avoiding deception about the nature of the research
8.	Declarations of affiliations, funding sources and conflicts of interest
9.	Honesty and transparency in communicating about the research
10.	Avoidance of any misleading or false reporting of research findings

Table 10 Key principles of research ethics. Source: Easterby-Smith *et al.* (2008)

The research was completed within the guidelines and rules of Northumbria University's ethical code of practice. Appropriate consent forms have been gathered from each case study partner; there are two randomly selected examples of these consent forms in the appendices. Additionally:

- Electronic data relating to the questionnaires, interviews and supply chain maps is currently securely stored under 28bit encryption on servers within the University main frames. Access to this data is restricted to this researcher and their principal supervisor.
- Anonymity has been applied as a blanket operation throughout the research.
- The narratives and supply chain maps arising from the interviews, questionnaires and maps were supplied to each case study partner for perusal and identifications of amendments, points of clarification, deletions or additions where there is a basis of mutual consent.

- Case study partners were informed that part or all of the data generated under the research process will be used for this thesis, and may also be used for further publication in academic journals, conference papers and book chapters.
- In addition, all DEFRA survey control protocols were approved and adhered to during research project FO 0104.

4.10 Summary

As already identified, the use of case study is not without its positivist detractors. However, Wainright & Waring identify that:

Business and management research can be critiqued for its lack of emphasis on theory generation and development. Many researchers who do use a deductive approach very often find that there is still much unknown about certain theoretical aspects. (2008, p.93)

Successful case study research is a highly iterative process, in which the researcher must be willing to engage in a constant process of iteration, both backwards and forwards. This process also lies at the heart of competent thematic analysis, when the researcher is required to steadfastly return to the coding and be willing to introduce further propositions as new evidence emerges, until a point is reached of diminishing return within the data extracted from the case study cohort. Case study, and by extension, the thematic analysis derived from the coding propositions within the template is animated with tensions between the convergent and the non-convergent. However, this is not a negative aspect, especially when these findings can be validated by the literature and may be used to propose theory, or in the case of this research, suggest a more contextually relevant adaptation of existing theory. Of this, Eisenhardt states that:

Creative insight often arises from the juxtaposition or paradoxical evidence... reconciling these contradictions forces individuals to reframe perceptions into a new Gestalt... this constant juxtaposition of

conflicting realities tends to 'unfreeze' thinking and so the process has the potential to generate theory with less researcher bias than theory built from incremental studies, or armchair axiomatic deduction.

(1989, p. 546)

Notwithstanding, it can be argued that a positivist position relying upon mathematical modelling encompassing linear algorithms, calculus and algebra, all too often misses the nuances of why something happens in businesses at the expense of identifying how it happens, which Pattern & Applebaum (2003, p. 62) describe as "*the flesh and bones of everyday life... removed from the substance of the research itself.*" The authors also call upon the earlier work of Kaplan (1964) of the *mystique of quantity* whereby in business research, there is an undue exaggeration in the significance of the measurements because they are quantitative and provable, without sufficient regard for what has been measured, and what can be done with those measurements.

Of the use of template analysis itself, the researcher could reasonably be expected to be challenged over its employment in preference to NVivo for the analysis stage. However, having undertaken training in NVivo and identifying its suitability for future research, this researcher contends that as the sole collector of the case study data, and having 30 years of work experience, from apprentice through to 11 years in senior supply chain role, that this research benefitted from experience of a wide range of working environments, which allowed for an immersion amongst the template data to a greater depth of understanding, over that which may have been possible with software packages.

Gummesson (2007) believes that good case study is underpinned not only by the requisite skills of analysis, interpretation and a critical eye, but also in the 'soft skills' abilities of the researcher to open doors in order to access data, and subsequently to conduct meaningful observations and interviews. The researcher must be able to comprehend the various motives and power plays for supplying the data, whether in a single person operation or a large company. In doing so, the researcher can better comprehend the individual

slants upon the forthcoming data. It is the personal belief of this researcher that this has occurred during the research contained herein.

The researcher records here their previous use of case study from a methodological perspective, and template analysis from research design perspective, in post graduate research which sought to investigate the phenomena of 'revolving door' students with declared learning disabilities at a Further Education College. The researcher wanted to discover why the same students were being welcomed back into an FE environment year after year after year, and which revealed a propensity to 'over support' students in the class room by support workers who themselves were poorly supported, insufficiently trained, and had not been practice assessed for many years.

The next chapter introduces the case study partners by way of case study narratives, process and supply chain maps.

5 Case Studies

5.1 Introduction to the case study partners

This chapter introduces each case study partner, identifying the company history, background and products as appropriate, before describing and mapping their supply chains or elements of that supply chain. A few of the case study descriptions are shorter than others, but this reflects the relative paucity of time given to the research on behalf of these case study partners, where access was restricted to telephone and email or the briefest of interviews. A decision was made to retain the larger case study partners despite some of the aforementioned paucity being evident, but as examples of vertically integrated companies and supply chains where collaboration or good practice does not cross boundaries, largely as a result of constraints becoming more institutionalised within larger organisations and their operational models. Each of the case study narratives has been reviewed and agreed by the case study partners as an accurate reflection of their operations, or the scope of operation which impacts upon this research.

As the case studies represent time spent with case study partners across a wide sphere of manufacturing and production, they have been expediently constructed so as to be easily accessible and understood by those partners. Jonsen & Jehn (2009) indicate the importance of articulation of text at an appropriate level of meaning that is both non superior and respectful of those informants involved in the research.

The case study map appears on the next page, displaying the location of each case study partner, who in themselves represent different degrees of both scale and localisation in their products. The page following the map lists the colour codes used to differentiate between the stages in each schematic; this colour coding aids visualisation and allows the researcher to achieve an enhanced visual impact and commonality of colour coding across the case study partners. A page has been left blank between each case study.

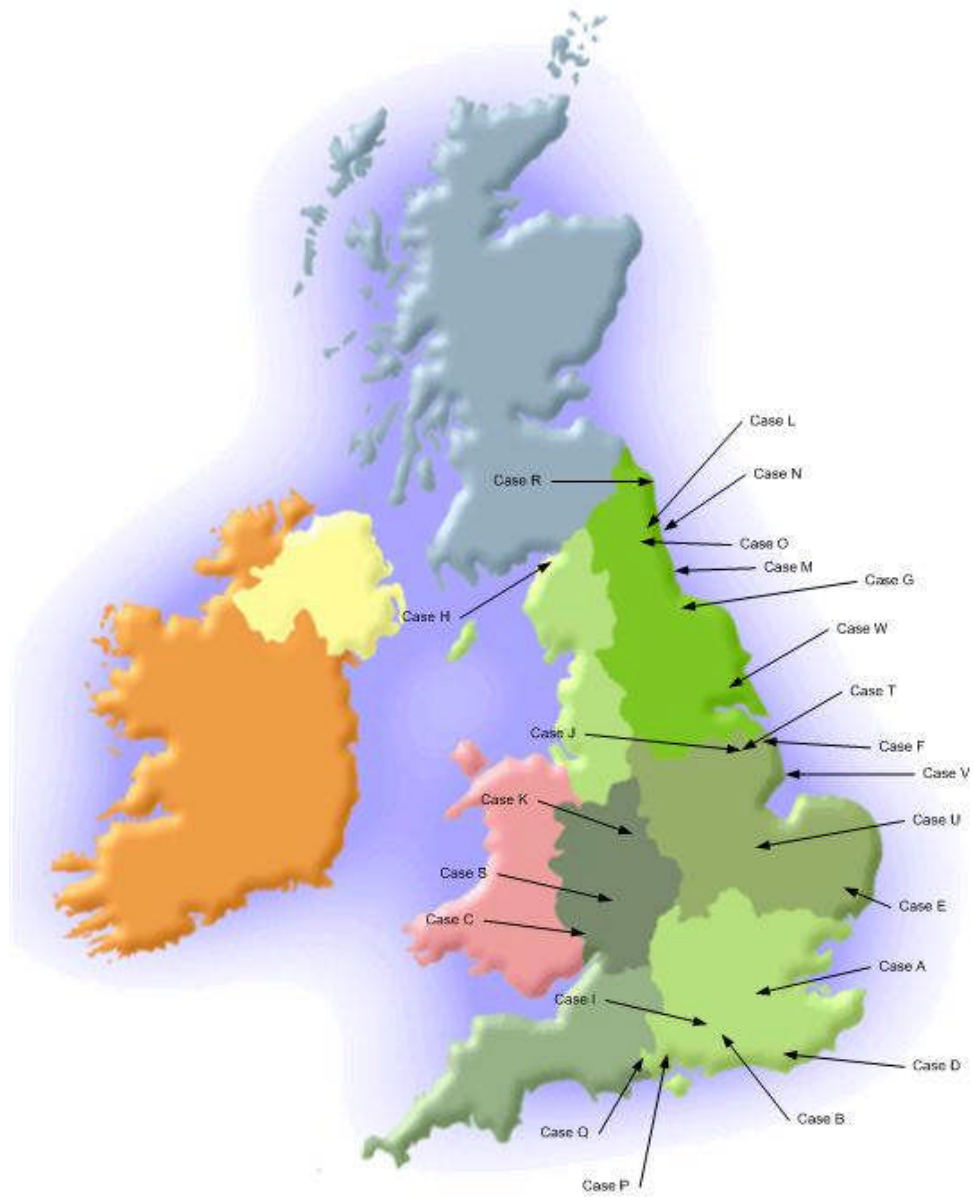


Figure 11 Case Study Partner map

Supply Chain / Process Maps Colour Coding Guide

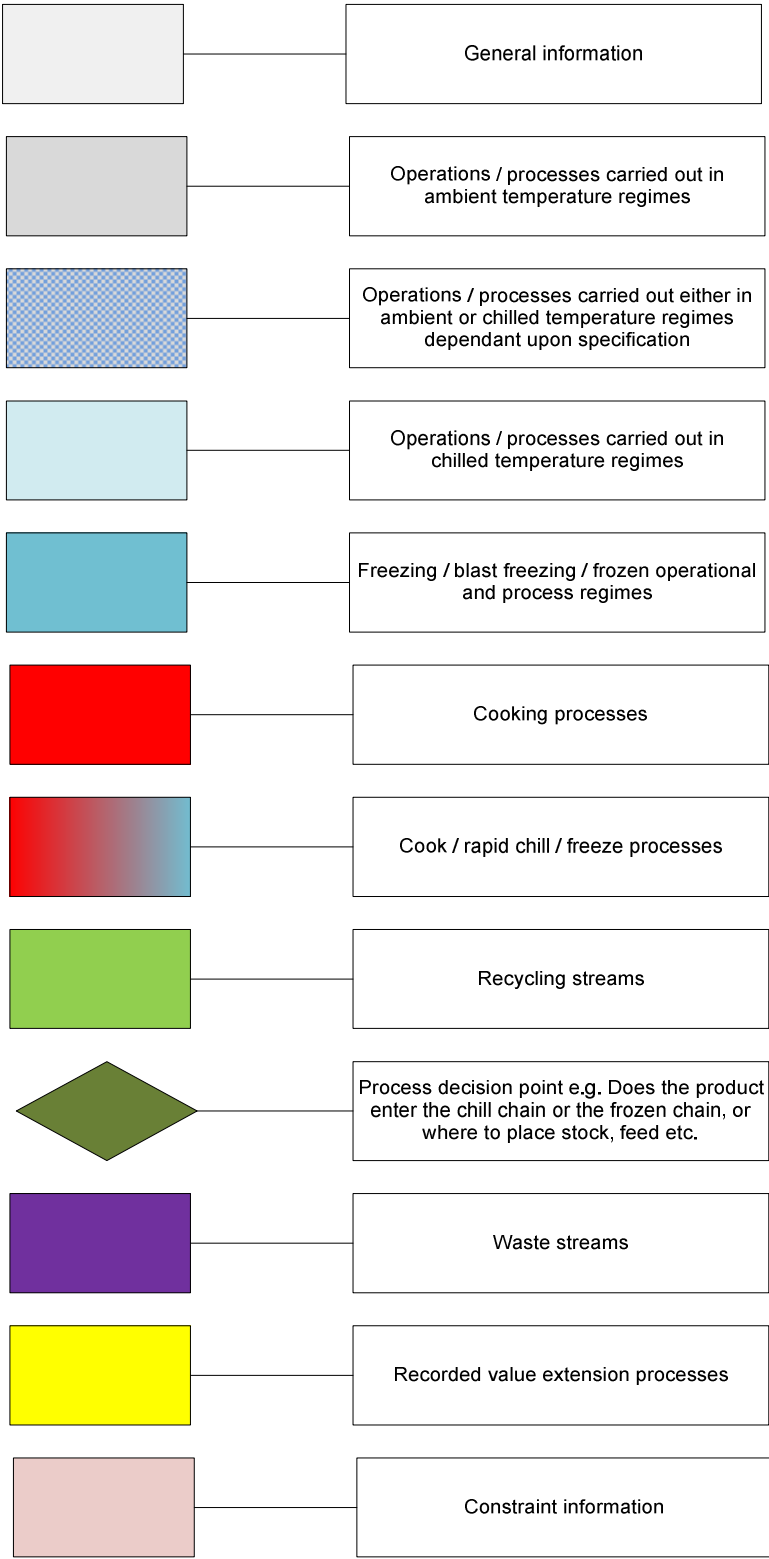


Figure 12 Supply chain / process maps colour coding guide

5.2 Case Study Partner A

Case Study Partner A was set up in 1997 to produce a small variety of Indian cooking sauces. Although still classed as a small scale manufacturer under conventional SME measurements, the company has managed to develop its product range and market penetration steadily over the intervening period. In 2003 the company moved its manufacturing to a small facility in Hounslow, West London and now make a range of 22 different pickles, chutneys and curry sauces which are based on traditional family recipes.

The composition of the products inevitably requires the company to purchase many of the ingredients from wholesalers and food markets supplied from international supply chains. However, the company purchases ingredients from UK crops whenever they are available seasonally such as apples, carrots, cabbages, mint, spinach and coriander. They have recently tried to buy from more local growers, but are faced with growers telling them that their volumes are insufficient to commercially supply. Even within international markets, some inelasticity still occurs around seasonal supply, and the company have to buy when stock is available, or when there is price advantage, and then store the ingredients until they are needed. This factor also needs to be considered when the company are forecasting for the manufacture of pickles, where the demand is seasonal and certain types of pickle require maturing on the shelf prior to despatch.

As there is a degree of seasonality in demand of some products and supply of certain types of ingredients, the company has to rely on push models of production, making products for stock. This requires constant analysis of orders and stock levels to help balance and even out production profiles and efficiencies, as well as aiding price standardisation banding across the ranges of products.

At interview it was recorded that the company ethos is “quality of product first, then cost.” The company has won ten ‘Great Taste’ awards for its products and they are used by a renowned ‘celebrity’ chef in their restaurants. Manufacturing processes remain commercially confidential, but the company believes that one of its unique selling points is that no water is

added during any of the processes, the products are also free from additives, preservatives, artificial colourings, sugar, gluten and dairy products, which they also believe has helped to secure product reputation and the niche positioning of their ranges. The company has several routes to market, they have an internet site, and orders can also be accepted by fax, email and phone. At the time of interview (May 2008), the company had over 400 retail customers including; Harrods, Fortnum & Mason, Wholefoods, Selfridges, several Budgens stores, delicatessens, butchers, farm shops, specialist gourmet shops and garden centres. The company also uses a distributor and is looking to develop export markets further following a successful entrance into the Republic of Ireland market, with a range of products placed in specialist shops. The company has also started to develop international markets, establishing a small presence in Bahrain. There is a recognition of the trade-offs occurring as a result of using a distributor, who may then sell on again to specialist wholesalers, thereby distancing the products further, but increasing their geographic penetration.

The company are a member of the regional food group Surrey Food Links, as well as the Vegan Society, but they believe they owe much of their marketing success to self developed strategies, and tireless rounds of personal representation of the company's products by the two owners at specialist food shows, exhibitions, regattas, agricultural shows, country fairs and at 22 farmers' markets.

At interview it was identified that a proactive distributor was essential to further develop market penetration, in addition to the direct marketing and customer development undertaken by the company itself. The company had also been approached by a major multiple but had declined the opportunity to supply, due to what they describe as the unrealistic prices for their products being offered by the retailer.

The production facility employs three members of staff and it is managed by one of the owners, whilst the other owner concentrates on product and market development. Hounslow has very low levels of unemployment, with many of the available local work force employed in service industries

supporting the Heathrow airport operation. Despite the potential for labour market fluidity the company has been successful in training and retaining their small group of colleagues, it considers itself to be an ethical employer and allows the team to work around family commitments when the need arises.

All of the primary and secondary product packaging is readily recyclable; the products are filled into glass jars sealed with press form metal screwtops. There is a waste minimisation and recycling system in place, with organic waste being composted.

The company owns a small panel van which it uses to service deliveries to its London customer base; it is also used for transport to farmers' markets, specialist food shows, exhibitions, regattas, agricultural shows and country fairs, where the products are personally represented by the owners. Third party logistics companies are used to fulfil direct sales to the wider market.

Case A identifies its constraints as a choice, by which they have chosen to retain control of procurement and manufacturing, whilst trying to retain as much control over the distribution supply chains and representation of their products as is possible.

A manufacturing and distribution process flow map (Fig 13) for Case A appears on the following page.

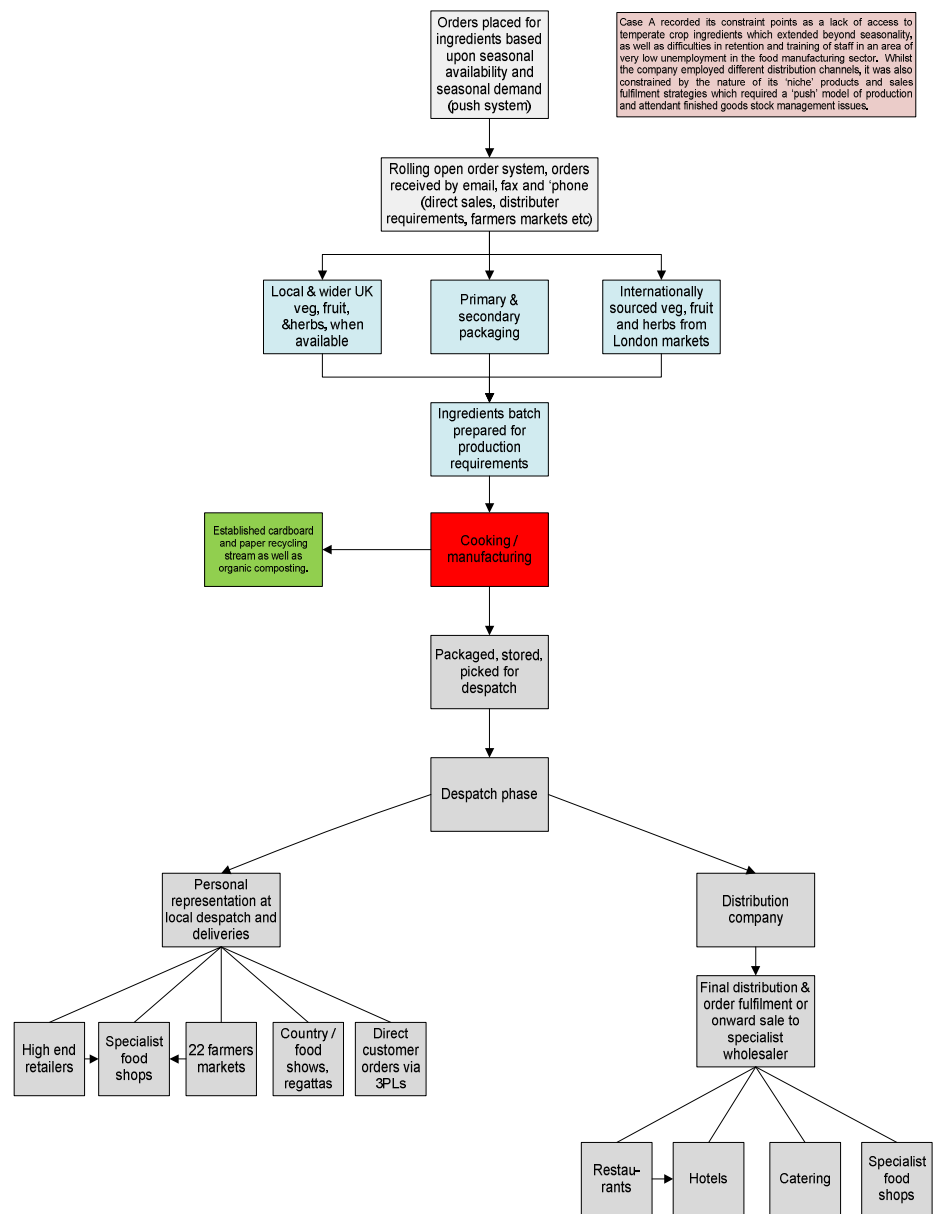


Figure 13 Case A: Manufacturing & distribution

5.3 Case Study Partner B

Case Study Partner B was set up in 2004, originally as a single person operation which aimed to produce a range of ready prepared foods using meat, vegetables and herbs from the farm where the enterprise was located. All other ingredients which were required but not grown on the farm were sourced from local suppliers. The business has won several awards in 'ready meal' categories and at the time of interview (May 2008) was working towards accreditation under membership of the Safe and Local Supplier Scheme (SALSA).

Company B is located on a farm three miles east of Alton, Hampshire. The farm grows arable crops and also raises cattle and sheep. The animals are grazed on permanent meadows and pasture under the Country Stewardship Scheme. The farm has remained in the same family for over one hundred years and is currently under fourth generation stewardship. As a business, the farm has successfully diversified into the speciality ready meals market, as well as a traditional butcher's shop in Alton. The farm also offers luxury 'niche market' prepared camping facilities, as well as acting as sole UK booking agent for another 20 farms operating similar luxury campsites under the franchised brand operation. After two years, the company moved into a bespoke production facility based on the farm, which had been created to address the increasing volume of orders and an expanded range of products being offered across categories.

At the time of interview Company B was in the final stages of becoming a collaborative venture, which has developed as a direct result of earlier collaboration around supply logistics activity and successful cross category product placement in a London delicatessen shop. Manufacturing activity by the partner company, which had occurred in London for more than 20 years, supplying its own delicatessen shop and its catering arm, has been transferred to the farm production facility, which has resultantly seen further investment. Consequently, the new venture is able to offer an enhanced menu of cross category products to the market and develop products for its existing customers, such as complimentary vegetarian options to traditional

meat-based products. This new venture will continue to be a member of the Hampshire Fare Regional Food Group which has helped to date in identifying new markets and promoting products. As a result of attending events organised by this regional food group, the company is currently investigating new market opportunities at regional airports and through passenger cruise lines operating from Hampshire ports.

All of the beef and lamb used in the products is reared on the farm. The meat is butchered at the family butcher's located in Alton. The animals travel eight miles to a local, smaller abattoir which the company believes is important from an animal welfare perspective. Although in what is a common thread with other interviewees (case study partners P, R and S), the company has raised concerns over the disproportionate leverages placed upon smaller local abattoirs, which is felt disadvantages farmers and livestock as well as reducing choice, thereby hindering localisation. Anecdotal evidence suggests that cattle being reared on neighbouring farms for sale in local supermarkets as 'local' produce, are travelling to Yorkshire for slaughter and primal cutting. All of the pork and pork products used by the company are supplied by local farms known to the company, as are the chicken and eggs which are drawn from free range flocks.

Herbs and vegetables are grown on the farm; from its inception, the company has striven to source locally produced ingredients which are not grown on the farm or are readily available on the farm. However, the company has now also had to engage with suppliers from a broader geographic area, which also allows access to vegetables and herbs supplied into wholesale markets from outside the UK. This move has been necessary to overcome inelasticity in some local supply chains, short notice negative variance of local supply and seasonality factors, as well as supply issues which have developed as a result of the increase in the range of products.

There are currently six full time employees including a fully trained, indentured chef and one part time employee. The staffs are drawn from the local labour market; one member of staff prepares and controls logistics and

supply chain functions, whilst the other members of staff are involved in the food preparation, manufacturing and packaging.

There is an open, rolling order system, where orders can be placed by email, fax or 'phone. Production orders are generated for the kitchen and bakery, with finished good being packaged and stored prior to distribution into two distinct supply chains. Employing this lean, 'pull' manufacturing allows the company to reduce potential exposure to stock write offs, whilst being able to plan for seasonal variations and surges in demand. Local deliveries are made to independent branches of midmarket small supermarkets, farm shops, delicatessens, food shops and a food service company. These deliveries are grouped and addressed over two distinct delivery patterns within the local framework and coincided to ensure maximum shelf life of the products with the customers. The company has recently undertaken a consolidation exercise to bulk orders into larger lots, reducing packaging and deliveries whilst increasing transport utilisation viability. There is also an option offered by the company to collect the orders directly from the farm production facility.

The other distinct supply route is for the London market, which is serviced by regular deliveries two to three times per week depending upon the time of year and demand. These deliveries are made to the shop in Chelsea, where they are placed for shop sale or can be collected by the customer. Outstanding deliveries are then held in storage at the shop before final delivery fulfilment on a second vehicle which 'runs' daily deliveries to hotels, restaurants, catering companies and personal customers.

Regular limited backhauling occurs on the return phase of the London trip; certain prepared vegetables are picked up and brought back to the farm for the production requirements. Direct deliveries of ingredients and packaging are made to the production facility. The company has held initial discussions with another local firm which delivers specialist artisan butchers' sausages and pork products to London, with a view to developing collaborative logistics activity, although there is a recognition that this may well result in modifications to the delivery vehicles for multiple zone storage.

The company has identified their principle constraints as the current economy (May 2008), inflationary pressure on the price of ingredients and pressure from organisational buyers and potential buyers for price reductions. Fig 14 represents their manufacturing and distribution flows.

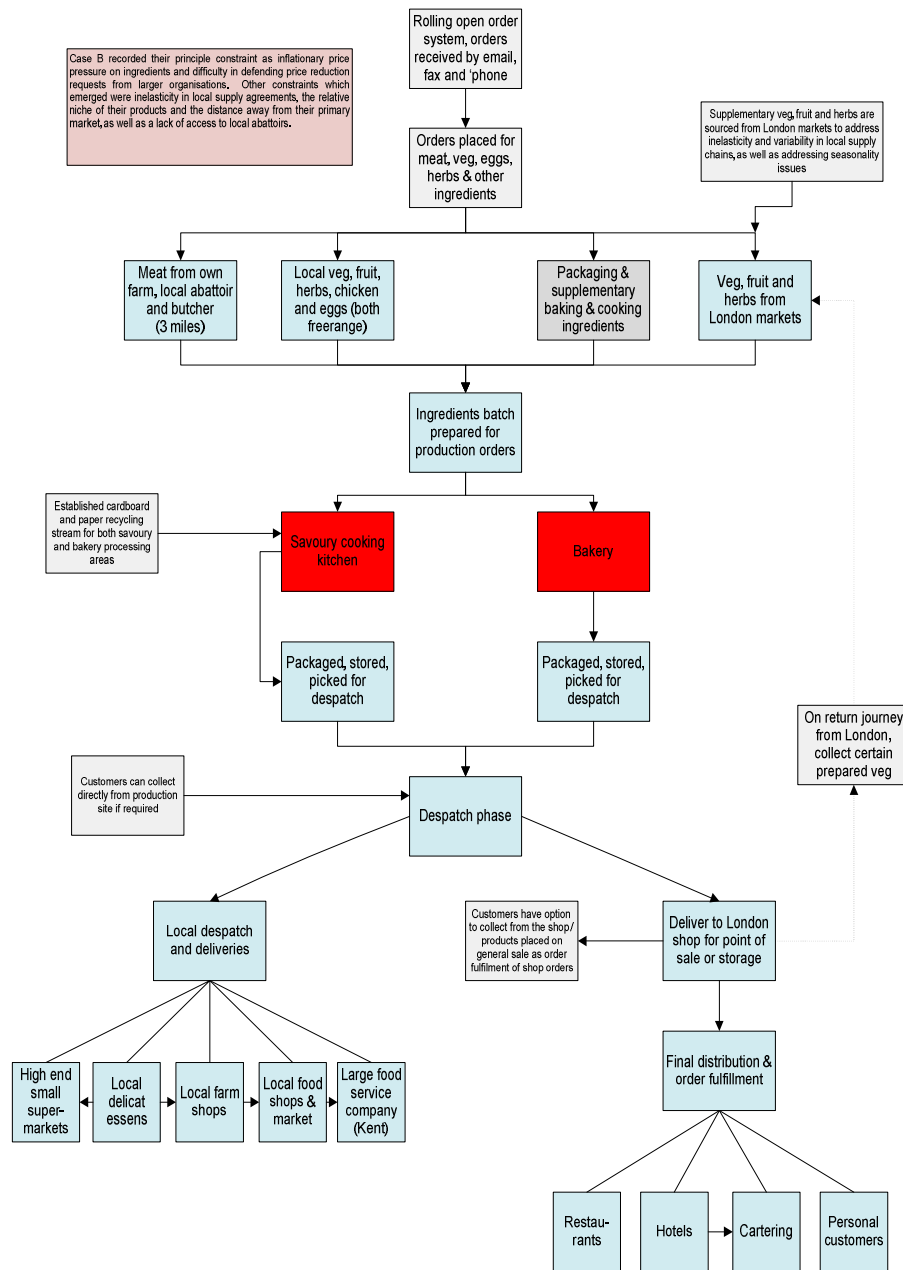


Figure 14 Case B: Manufacturing & distribution

5.4 Case Study Partner C

Case Study Partner C is based on a farm located four miles north-east of Ross on Wye. The farm itself is a previous winner of the 'Silver Lapwing' award for environmental excellence in farming. The company started trading in 2005 and is a specialist manufacturer of botanical ingredients for the food and beverage industry, as well as supplying into the herbal supplements and cosmetics manufacturing sectors. The company's stated emphasis is centred upon ethical trading of organic products. The owner of the company has over 30 years experience in large scale herb farming. This case study considers the manufacturing of elderflower flavouring concentrate for the beverages industry, but also considers the wider activity of the operation as well.

Unemployment in the area was reported at 2.5% during February 2009, which although had increased by one percentage point over the previous twelve months, was still at a low level compared to the national average which was recorded at 6.5% at the same time. The company has seven employees; the owner of the company believes that customer relationship management is essential to maintaining and developing the customer base. The company aims to respond to all communications / questions / issues raised by any of their customers within one working day, whilst identifying that this is one of the benefits of de-scaled production operations in smaller companies.

The company holds higher accreditation from the British Retail Consortium (BRC) for its manufacturing operations. It holds Soil Association accreditation for some of its products, whilst quality standards testing occurs at the on-site lab and at the external Campden Laboratory Accreditation Scheme (CLAS) accredited laboratories. New product development is carried out 'in house' although the company also uses the services of Aston University for supplementary development and testing.

The company is a member of a regional food group - Heart of England Fine Foods - and is positive about its membership, identifying the role that the regional food group has played in helping it to market its food ingredients

products, a role which is often overlooked, as there is perception that regional food groups exist to promote food rather than food ingredients and food development.

As with another case study partner (Case A), the company endeavours to buy ingredients such as organic apples from the British crops whenever possible, but is restricted by seasonal and economic supply factors. The company purchases fresh, frozen and cut/dried botanicals as the bases for their products. Many of the imported base ingredients are bought from a UK agent who ships in bulk loads purchased from known farms in long term supply partnerships. Deliveries are made to the UK by sea or air freight depending upon the relative weight / cost attributes of the base materials. The elderflowers travel by road from Austria; this chosen supplier / supply chain overcomes inelasticity in other business to business supply chains for elderflowers by virtue of its relative large scale and agility, which addresses the commercial imperatives of Case C by being able to react to fluctuation in demand rapidly. The palm oil requirements of the business are addressed by purchasing oil processed from managed and certified sustainable plantations.

The principal ingredients of the elderflower concentrate are Austrian elderflowers, French ethanol and local water. Although the exact process remains commercially confidential, the general flow for production is: storage of elderflower under controlled atmosphere conditions, soaking, compression, filtration and filling into 10 litre or 25 litre HDPE containers, which are then capped, labelled and sealed before being placed in cardboard outer boxes and slaved onto single trip wooden pallets. Production profiles follow 'pull models,' where production is triggered in response to customer orders, rather than made to stock. Although some production is made for stock against outline purchase agreement order numbers from larger customers, this stock is then 'called off' at a later date by that particular customer.

There is a small amount of cardboard and paper waste, but these have to enter the general waste stream as they do not constitute sufficient volume to

be of interest to a commercial recycling company at the time of interview. There is a readily available local market for recycling drums used to ship the ethanol and pallets used for deliveries.

The company use third party logistics providers who operate within The Carriage of Dangerous Goods regulations (2007) to move their products to customers. They have an established relationship with a main logistics supplier. Full and part pallet loads are despatched by road and road/ferry for UK and mainland Europe customers, whilst small 0.5kg samples are delivered by courier service.

At interview it was identified by the owner that small companies would benefit from the availability of free or minimal cost, basic, generic software packages for logistics planning, manufacturing and stock control²⁷. The company have also identified that they are constrained by the geographic location; the factory / farm is down a narrow country lane making deliveries by articulated lorries particularly difficult. There is also no access to mains drains at the site, they are therefore forced to use a tanker to store and remove waste water arising from machinery wash-downs etc. from the site. However, the company do acknowledge that this has driven resource efficiency and waste minimisation initiatives.

A process map (Fig 15) for Case C appears on the following page.

²⁷ These types of software are available either freely or at minimal cost, it may therefore be an opportunity for Regional Food Groups to publicise access to these packages as part of their membership schemes.

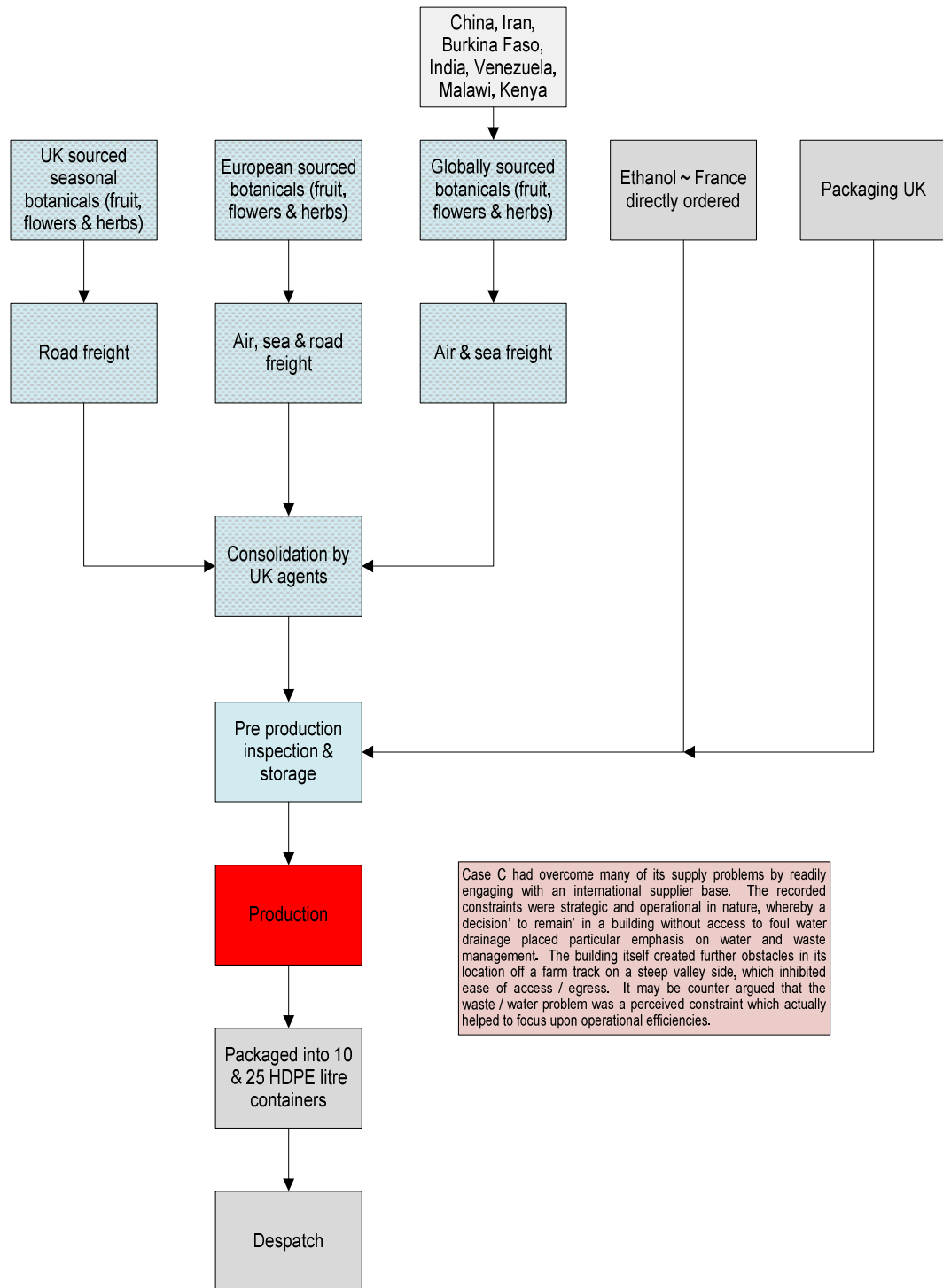


Figure 15 Case C: Process flow

5.5 Case Study Partner D

Case Study Partner D is based on a farm in rural Sussex, seven miles north of Eastbourne. The company employs six members of staff including the two founding family members, and manufactures butter, cheeses, fresh and dried pastas and pasta sauces, both on site and as part of collaborative ventures with a dairy farm who are the sole provider of milk for the cheeses, and whose herd is restricted grass and silage feed regimes. All of the food products manufactured by Case D are certified by the Vegetarian Society. The relationship with the dairy farmer is a 50/50 venture, whereby the dairy farm, which is located 45 miles away in West Sussex, retains 50% of the finished cheese. Case D believes that this type of collaborative venture allows the primary producer a shorter and more direct route to market for its products. At the time of interview (June 2008), Case D had recently received an award for one of its cheeses at the Nantwich International Cheese Competition for a cheddar- parmesan hybrid manufactured under this arrangement.

The butter is manufactured on the farm using cream that is only sourced from Hampshire dairy farms and it is considered by Case D to be its main product at farmers' markets; the butter holds four 'Great Taste Awards' stretching back to 2005.

The durum wheat for the pasta is grown in Surrey on a Conservation Grade Farm²⁸, the wheat is then milled on the Isle of Wight at a small, artisan mill before delivery to Case D. Depending upon the success of the crop, customer demand and forecast accuracy, the wheat is then either wholly used for pasta production, or blended with durum wheat imported from

²⁸ The Conservation Grade Farming Protocols are a set of farming sustainability protocols and standards which are employed by farmers in return for a contractually obligated premium price in return for their crops. Proponents argue that farming under these protocols increase biodiversity at farm level. Farmers operating under these schemes are also qualified to access funds from the agri-environmental stewardship schemes, which in turn are funded by the current Rural Development Plan for England. For more information on the RDPE strategy, please refer to the Local Food section of the Literature Review chapter.

Canada. All of the eggs required for pasta production are sourced from Hampshire, whilst the ricotta type cheese is made by its collaborative partner. The other ingredients, spinach for example, are sourced locally within season, whilst demand across seasonal demand is addressed by purchasing from major fruit and vegetable markets and wholesalers. Case D indicates that producers at farmer's markets have been used as supply points to the business in addition to the local supply networks that the company has developed.

The pasta sauces which substitutes sugar with carrots also use as many local ingredients as is possible to source at the required quantities and quality when in season. The range of pasta sauces, like the pasta, is manufactured, filled and labelled on site.

There are a number of routes to market for Case D's range of products; they are sold at 12 farmers' markets throughout Sussex, Berkshire, Hampshire, Kent, Surrey and Buckinghamshire, as well as country shows and specialist events. The products are also available for direct purchase through the company's website for both public and trade customers (independent retailers, restaurants etc.). In addition to these routes, Case D also supplies wholesalers. The company believe that the product range they have developed and their order fulfilment strategies allow them to target consumers who are "time poor but looking for convenience foods with a clear conscience" whilst continuing to service the more traditional local food markets.

A process map (Fig 16) of Case Ds' products appears on the following page.

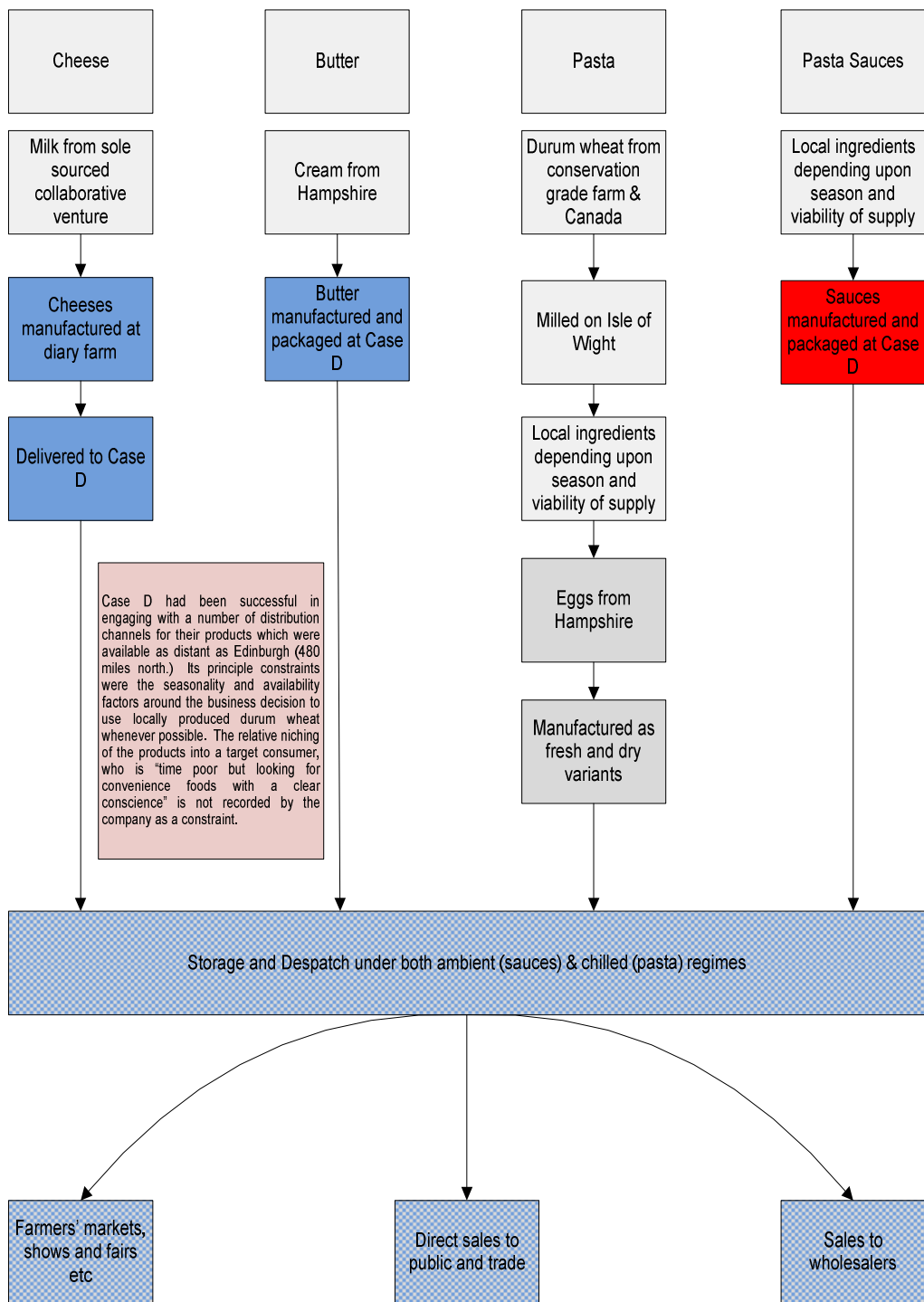


Figure 16 Case D: Manufacturing & distribution

5.6 Case Study Partner E

Case Study Partner E is a vertically integrated pork business based at various sites across Norfolk. Its core processes are pig production, processing and agriculture. It manages its own transport network for both livestock movement and refrigerated movement of products to market. The company own over 4,000 acres of land where pigs are reared and bred outdoors under the Freedom Food Initiative²⁹. The company is also a member of other food and systems compliance schemes including the British Farm Standard (Red Tractor) and the Assured British Meat scheme. Supplementary pig rearing and finishing requirements for the business are addressed by contracting in services from farmers with whom long term relationships have been developed. Contractor farms are also subject to the same protocols and welfare standards and feed regimes that are employed on the company's own farms. All of the feed requirements for the company and its contractors are met by Case Study Partner U.

The company is the primary supplier of pork products to a major UK multiple retailer, as well as supplying pork cuts and products to other multiple retailers, meat manufacturing companies, pie / savoury manufacturers, wholesalers and food service companies, and also direct sales into the 'not for profit' food service sector. The company also export a small amount of their pork products throughout Western Europe, Russia, Japan and South Africa.

The company was founded during the late 1950's and at the time of interview was still a private family owned business, currently under the directorship of third generation family members. Case E has reported an operating turnover of £90 million in the previous financial year (2007 – 2008).

²⁹ The Freedom Food Initiative is a farm assurance and food labelling scheme established by the RSPCA in 1994. See

<http://www.rspca.org.uk/servlet/Satellite?pagename=RSPCA/RSPCARedirect&pg=FreedomFoodHomepage>

For the purposes of this case study, I have considered the operation of the central company abattoir, primal cutting and processing plant located in a village which lies approximately equidistant between of Norwich and Kings Lynn. During the time frame that the case study occurred,³⁰ Norfolk recorded an unemployment rate of 2.2%. The plant currently employs 768 staff across abattoir, processing, supply chain, engineering and clerical support activities. The majority of these employees live outside the village and travel in for their work. The plant processes approximately 10,000 pigs per week at a target weight of 75kg, which is linked into another company processing target of 500,000 pigs per year weighing a total 37,550 tonnes deadweight over the same period of time. The pigs complete a 28 stage process up to primal carcass cutting, and value extension activities occur throughout the process, blood and offal plates being examples of this value extension³¹, which can also occur further down the processing stream during cutting, when trims are collected for further processing into other pork products.

The company currently processes the pork into 150 separate product SKUs³² (Stock Keeping Units) to address the needs of its customer base. These are despatched to more than 50 wholesalers, as well as their retail customers and others identified in the first paragraph. More than a quarter of a million of these stock movements utilise multi trip crates and 43,500 stock movements to market occur on multi-trip pallets every year. Orders are received by EDI (Electronic Data Interchange), email, fax and phone depending upon the complexity and size of the customer. The larger

³⁰ September – October 2008

³¹ The blood is collected in holding tanks where it has an anti-foaming agent added to it before further processing into products for the pharmaceutical industry (blood plasma) and red blood cells are separated and dried for use as fertiliser. At the time of interview, a reverse vertical supply of this fertiliser back to the supplying farms on a carcasse quid pro quo basis had not been considered.

Offal plating occurs after evisceration, where the offal is inspected and separated into rendering and waste streams. The useable offal is then 'plated' prior to chilling or freezing for the export stream.

³² Stock Keeping Units i.e. the range of products demanded by their customer base and broadly described by cut type, packaging, weight, presentation, labelling etc. One leg of pork could be used in up to 10 products.

customers provide forecasts, although variations occur between planned and actual requirements on a frequent basis.

With the exception of its major customer, which collects its own products directly from the processing facility on a rolling seven day programme, for delivery into several of its own RDCs³³ under a 'factory gate' agreement, the company's remaining logistics to market operation is primarily serviced by 13 articulated tractor and trailer units > 33 tonnes, although there are also five other smaller rigid body vehicles within the fleet, which are all diesel fuel vehicles. The company also has a small fleet of livestock transporters for moving livestock from farm to farm and from farm to abattoir.

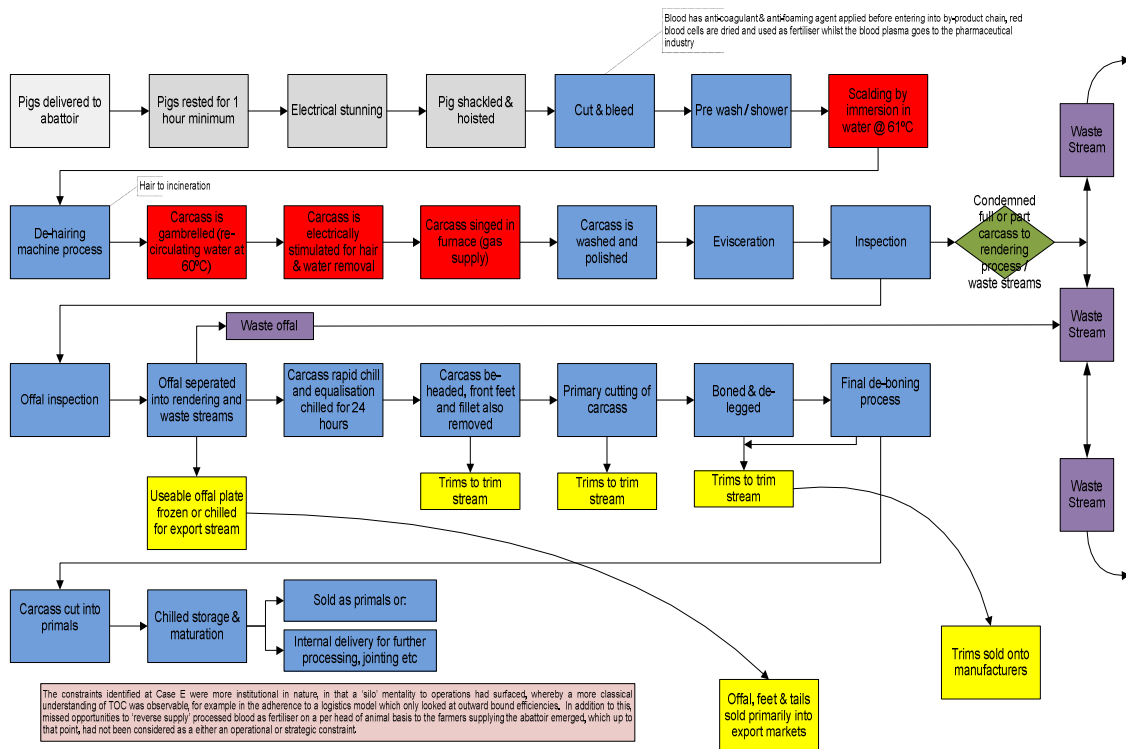


Figure 17 Case E: Abattoir process flow

³³ RDC: Regional Distribution Centres which service the supply requirements of the retailer's individual stores on a continuous basis, and act as internal hub points and consolidation centres for onwards distribution to other distribution centres in the network as required.

A process flow of the loin processing (Fig 18) undertaken by Case E is also included here as an example of manufacturing process, where typically product extension occurs in the form of trims entering the sausage production processes. Please refer to Case K for a detailed sausage production flow which is almost identical to the sausage manufacturing processes employed by case E.

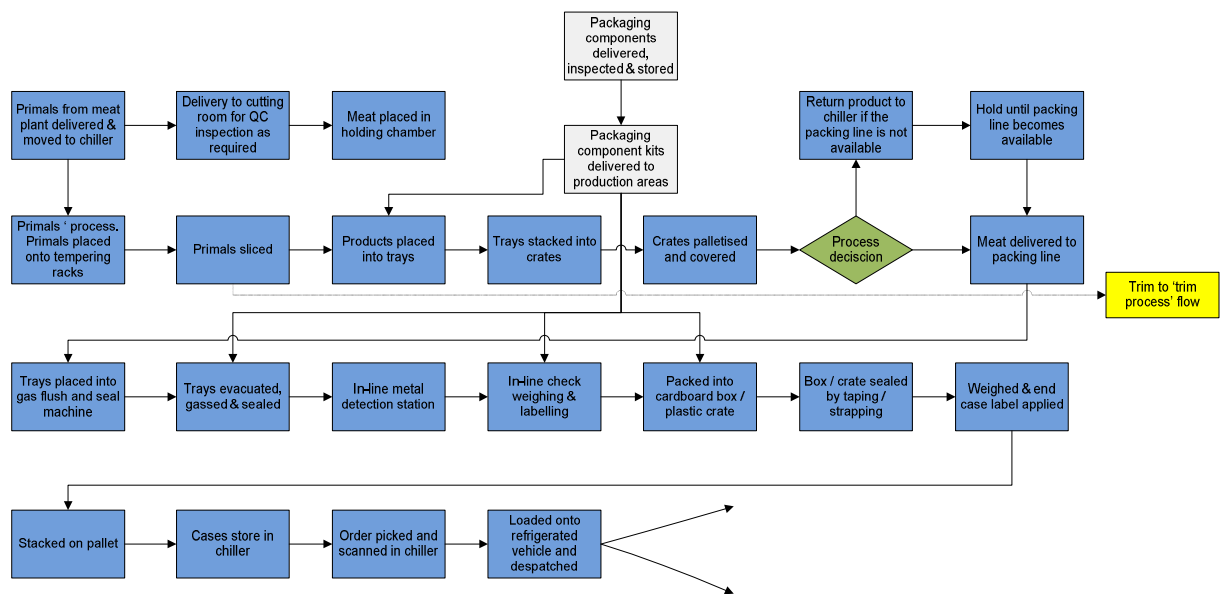


Figure 18 Case E: Loin process flow

5.7 Case Study Partner F

Case Study Partner F is a company situated in a rural location approximately 20 miles south east of Scunthorpe and 13 miles south west of Grimsby. The prevailing rate of unemployment across the area is low at less than 3% at November 2008, but there are significant 'black spots' nearby where unemployment and people in receipt of benefits is greater than 6.5%, notably, Grimsby, Kingston upon Hull West and Hessle. The company currently employs 631 members of staff at the processing plant as well as a number of other staff members (approximately 160 at the time of interview) who are employed at hatcheries and rearing farms at 20 locations over a geographic area stretching 44 miles north, 27 miles west, 51 miles south and 11 miles east to the coast³⁴. Case F also further contractually engages 36 rearing farmers within the same geographic area to raise poultry under their stewardship and management / quality systems³⁵.

Case F was set up in 1959 by a member of the family, who still retain ownership of the company today. It is the largest manufacturer and processor of specialist poultry in the UK, supplying a range of chilled, cook-chilled, frozen and cook-frozen specialist poultry, portions and added value products. At the time of interview the company held 75% of the UK market share for these products, which significantly, from a business sustainability perspective, includes supply principally via wholesalers and specialist food service companies, to approximately 70% of the UK Chinese restaurant and take-away trade. In addition, the company also currently supplies into a further 80 foreign markets, some of these products being examples of value extension, whilst other products have a greater demand from abroad. At the time of interview Case F had recently started supplying a number of different free range specialist poultry products to Marks and Spencer, as part of the strategy to identify and engage with emerging markets across categories.

³⁴ There is one significant outlying site which is located at Chelmsford, 158 miles south, where parent stock are raised for use across the wider operation.

³⁵ A study was also conducted during this research for one of these 'contractor' farms which allowed for a ready juxtaposition of data between a company owned farm and a contractually engaged farm (Case W) which revealed greater levels of resource utilisation and efficiency.

The company are currently processing 8,950,000 birds per year for supply into the retail, food service, restaurant, catering, sandwich / snack and third party food manufacturing sectors.

Commencing with grandparent flock egg selection, grandparent ducks are hatched³⁶ and transported to rearing farms at one day old. Grandparent stock start laying parent eggs from about 25 weeks old, these parent eggs are then sent to a hatchery³⁷. From here the parent eggs are then sent to two different sites where they are reared for 17 weeks, before being transported to 1 of 10 different laying sites. Eggs produced by the parent flocks at these laying sites are collected and delivered to a different hatchery where they are incubated and hatched, before being transported at a day old to 1 of 44 growing farm sites, 8 of which are owned by Case F. As part of the standardised operational processes, straw bedding is used at all of the rearing farms; it is sourced locally to each farm and is changed daily, with the soiled bedding being collected and returned to the supplying farms for local crop application of farm yard manure (FYM).

Birds are reared to weight and age specification, then delivered to the central processing plant; here the birds are slaughtered, de-feathered, eviscerated and have their feet removed. Value extension of the deadweight bird occurs throughout this process, feathers undergo a washing and drying process for onward sale, feet are exported and the offal, necks and tongues are sold on to enter further processing streams not for human consumption. The carcasses are inspected and graded before being allocated to fresh chill, fresh cooked to chill, frozen or cook to freeze process requirements which are in turn, driven by cross category / sector customer demand. There is a considerable amount of water used at this processing plant, the effluent arising as part of the processes is collected and treated at site, with some 1,500,000 gallons of primary sludge separated out from the effluent to be used as fertiliser.

³⁶ Standard incubation times for eggs at a hatchery are 27 days.

³⁷ A small amount of parent eggs are exported.

Over £2,000,000 of capital investment has occurred at the processing plant over the previous 36 months, which has included a number of energy reduction projects. One of these has seen a 30% drop in energy consumption by retro fitting four condenser fans with low voltage variable drive inverter motors, the resultant demand drop from the refrigeration plant has also led to further energy savings. Energy management, consumption and efficiency of refrigeration plant in this sector of industry is crucial, as it often represents the primary and most significant source of electricity consumption on a processing site.

Case F's logistics operations encompass inwards, internal and finished goods to market transport movements. They control the ordering, flow and type of feed being delivered from the feed mills, both for their own and their contractor's farms. Feed is collected from Case U's feed mills, bulk loaded into the company's small fleet of tractors and articulated trailers, then delivered to farms for transfer into feed silos. Some of these feed delivery requirements are also fulfilled by Case Study Partner U's fleet. The management and scheduling of transport phases between hatcheries, rearing farms, contractor farms and the processing plant is also controlled internally.

There are several paths for the finished products to take to market; the company have their own small fleet of four rigid body, 17 tonne, diesel fuelled vehicles for deliveries to directly to customers or into national and regional distribution and consolidation centres. A further 40% of distribution activity is carried out by third party logistics partners under instruction of Case F, whilst 6% of finished goods are picked up by several customers directly from the processing plant despatch dock. In addition to the primary and transit packaging, the finished goods are despatched on standard, four way entry white wooden pallets, which are ordered and managed as single trip items, when any post delivery reuse or recycling is at the discretion of the customer. The company is also contractually obliged to supply on blue and euro / euro blue pallets for a small proportion (in terms of volume) of its customers.

The first flow process diagram (Fig 19) identifies the selection and rearing phases, whilst the second diagram (Fig 20) identifies the various processing stages of the birds at the central processing plant.

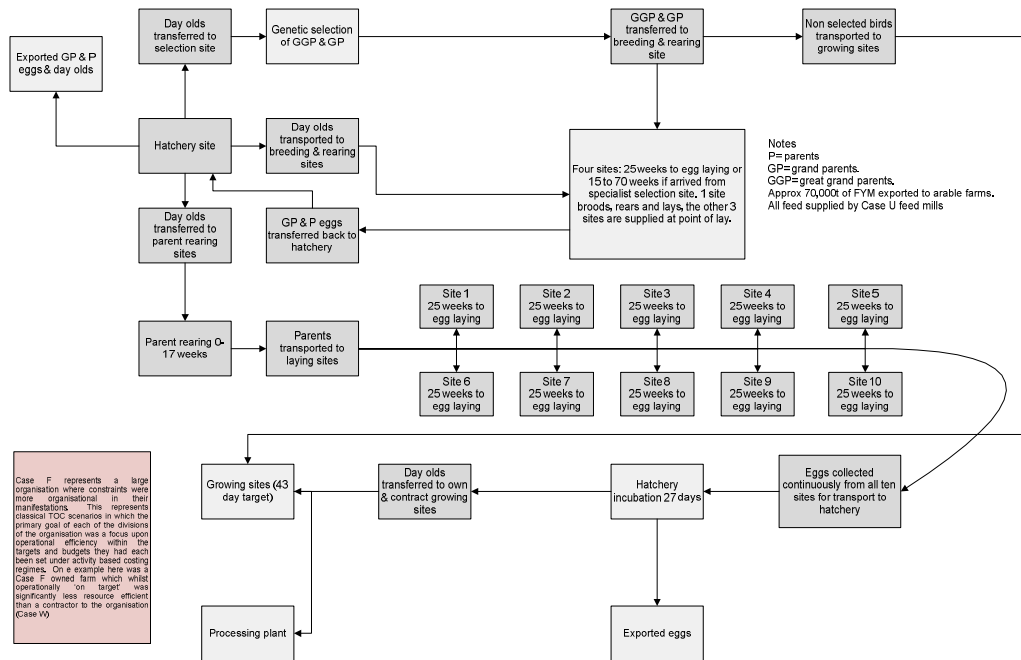


Figure 19 Case F: Selection & rearing process flow

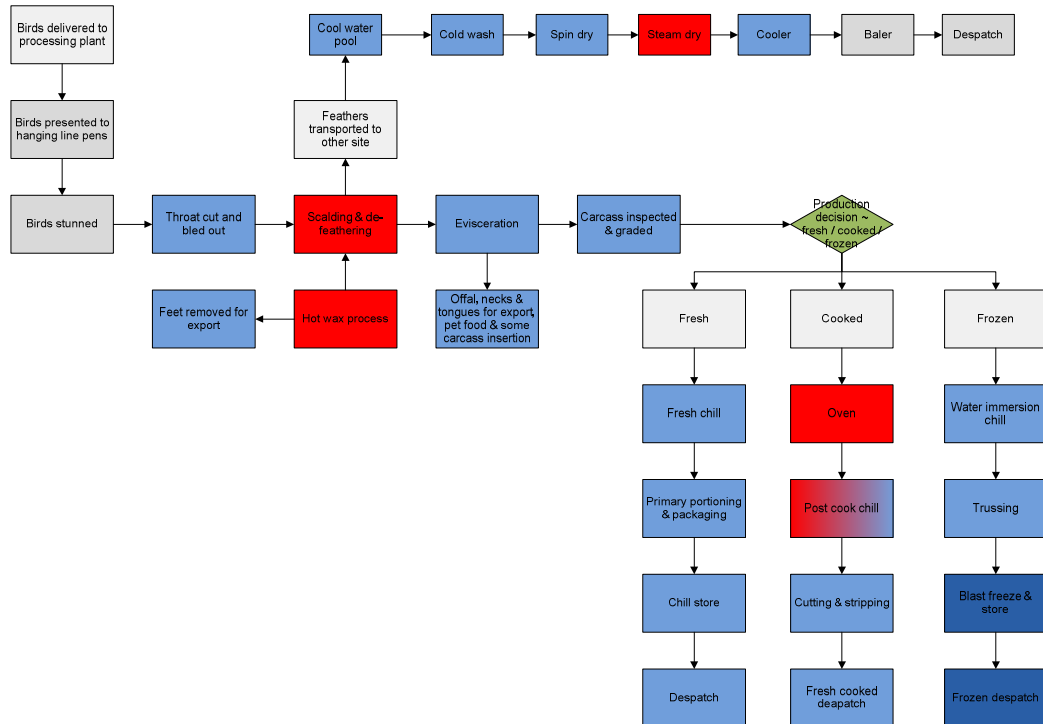


Figure 20 Case F: Poultry processing flow

5.8 Case Study Partner G

Case Study G is located in a semi-rural location, two miles from Stokesly, North Yorkshire, and eleven miles south west of Middlesbrough. It employs three full time and one part time members of staff. The original business plan and strategy had been developed to source and supply local foods (meats, poultry, vegetables, fruits, preserves etc) from small independent producers and offer a home delivery van service throughout North Yorkshire and Teesside. The company can place and receive orders by email, fax, phone and its internet site, as well as manual order forms submitted at the point of delivery. The company's small diesel fuelled fleet of three vans and two larger panel vans deliver orders and are also used for back loading, factory gating and cross docking to increase resource efficiency and utilisation. There is a small storage facility at head office, but the majority of stock is held at a multiple temperature zone hub store based on a nearby food business park.

Fluctuations in demand and other constraint factors relating to a lack of predictability and repeatability in customer purchasing patterns, such as holidays, convenience, top up shopping trips and price perceptions have led Case G to conclude that the original home delivery business model was not sustainable at a level which the business required to remain financially viable.

Resultantly, Case G has had to reposition the direction of the company by the development of new supply strategies into other channels in order to retain viability by increasing the scope of the operation. At the time of interview (April 2008) the company was suspending its doorstep delivery operation and refocusing upon business to business supply, with the company taking sole ownership of locally sourced foods, acting as a consolidator agent and specialist wholesaler of these foods, for supply into restaurants, cafes, specialist food shops and farm shops. The company are also in the early stages of conducting a viability study to open a local food

shop of its own in a nearby market town³⁸. The company owner does believe that there will be viability in doorstep orders, and it remains a long term goal of the company to reintroduce this service at some time in the future.

Importantly from both a business and local food perspective, Case G has managed to introduce a range of local foods into 24 local branches of a major multiple, which has provided refrigerated and ambient display gondola ends for the range of local products at each of the stores. This specific positioning of local foods is a 'first' for this particular multiple retailer³⁹. Whilst this is a commercial decision based upon perception and willingness to buy, the principle advantage is with the smaller, independent producers whose products are now exposed to a larger and wider market demographic. Many of these producers supplying Case G (in common with other small producers directly linked to the case study, Cases A, N, P and R) have expressed an unwillingness to supply or restart supply to large multiple retailer companies, quoting unrealistic pressure on point of supply price, logistics problems, proof of delivery (POD) disputes, payment issues and extended cash cycle times.

By choosing to supply Case G many of these problems are addressed as they sell to Case G, which then in many cases collects their products, before consolidation, picking and delivery to the customer's stores. POD issues are removed as Case G has a reliable order picking and delivery tracking system in place, which also bears the costs in both monetary and resolution terms, of any POD disputes arising on a store by store basis. Case G is, by virtue of its relative scale and trading relationship with the multiple retailer, able to be paid more quickly than a small independent producer, and is able to pass this cash flow payment advantage onto each small independent producer the company trades with. Although it was not verified by this researcher, Case G indicated that the prices they were paying for products from local producers

³⁸ At the time of finalising this research (August 2010) the researcher discovered through an internet search that this shop is now open, also offering catering and banqueting services with the locally sourced products.

³⁹ Another major retailer has introduced regional food hubs, but the analysis contained within this research indicates that small producers believe that it works against the market and in direct competition to the aims and objectives of Regional Food Groups.

were greater than the prices which had been historically paid or offered by multiple retailers for the same products.

Case G is continuing to employ a number of different strategies to increase fleet utilisation, which also include logistics collaborations with other small companies and dual activity of the fleet, with delivery vehicles also collecting goods from suppliers 'en route' for further distribution, both on that same delivery run, and at later times as component parts of other picked orders. Case G's transit packaging is either fully recyclable at point of delivery or has a 'multi trip' capability. The single trip components of transit and delivery packaging are made of readily recyclable materials.

Adaptation to a different supply model and the broader requirements of the customer geography and end customer social demographic has required Case G to become more agile. The business is still located in a semi-rural setting, and its collation, consolidation, storage and distribution occurs via a more rurally located food distribution park. The business model and customer requirement focuses upon a strong emphasis on the local aspect of the products supplied. For example, that foods sourced and placed in the market in West Yorkshire would not be placed in East Yorkshire or South Yorkshire unless there was a specific request to do so. An example of this and of fleet multiple activity would be the relationship with a butcher's shop based in Ilkley, West Yorkshire and featured on the Rick Stein's Food Heroes TV series. This butcher only uses beef, pork and lamb which has been reared within Yorkshire on farms that have had long term, cross-generational supply relationships with the shop. Orders are received from the multiple retailer by Case G, which in turn place orders with butcher, picking up the ordered products whilst on delivery runs in the vicinity of Ilkley (seven stores). Any orders which are for the multiple retailer's stores, which are yet to be delivered on that day's run, are picked at source and added to the those store orders. This places the butcher's products in a much wider, but still locally defined market, with consumers having access to locally reared and butchered meats without the perceived inconvenience of making a dedicated shopping trip outside of their regular visit to their supermarket. Whilst there are arguments both for and against this model, it is undeniable

that this is a model where a local product has found its way to an enhanced, wider local market without being transported around several counties, NDCs and RDCs, increasing miles travelled, decreasing shelf life and extending product point of sale cycle times all along the way.

As a conduit to a wider local market for local producers, Case G foods appear to offer a realistic and significant opportunity for local market growth of these local producers, although this relationship is ultimately reduced to a decision on behalf of the producer to supply to Case G, or a perception of demand for the products.

It was also recorded at the time of interview that the multiple retailer had asked Case G to extend its local food supply operation into its larger stores in Wearside, Tyneside, County Durham and Northumberland by July 2008. The proposed supply chain map is also included in this case study description.

Current (Fig 21) and proposed (Fig 22) distribution maps for Case G appear on the next two pages.

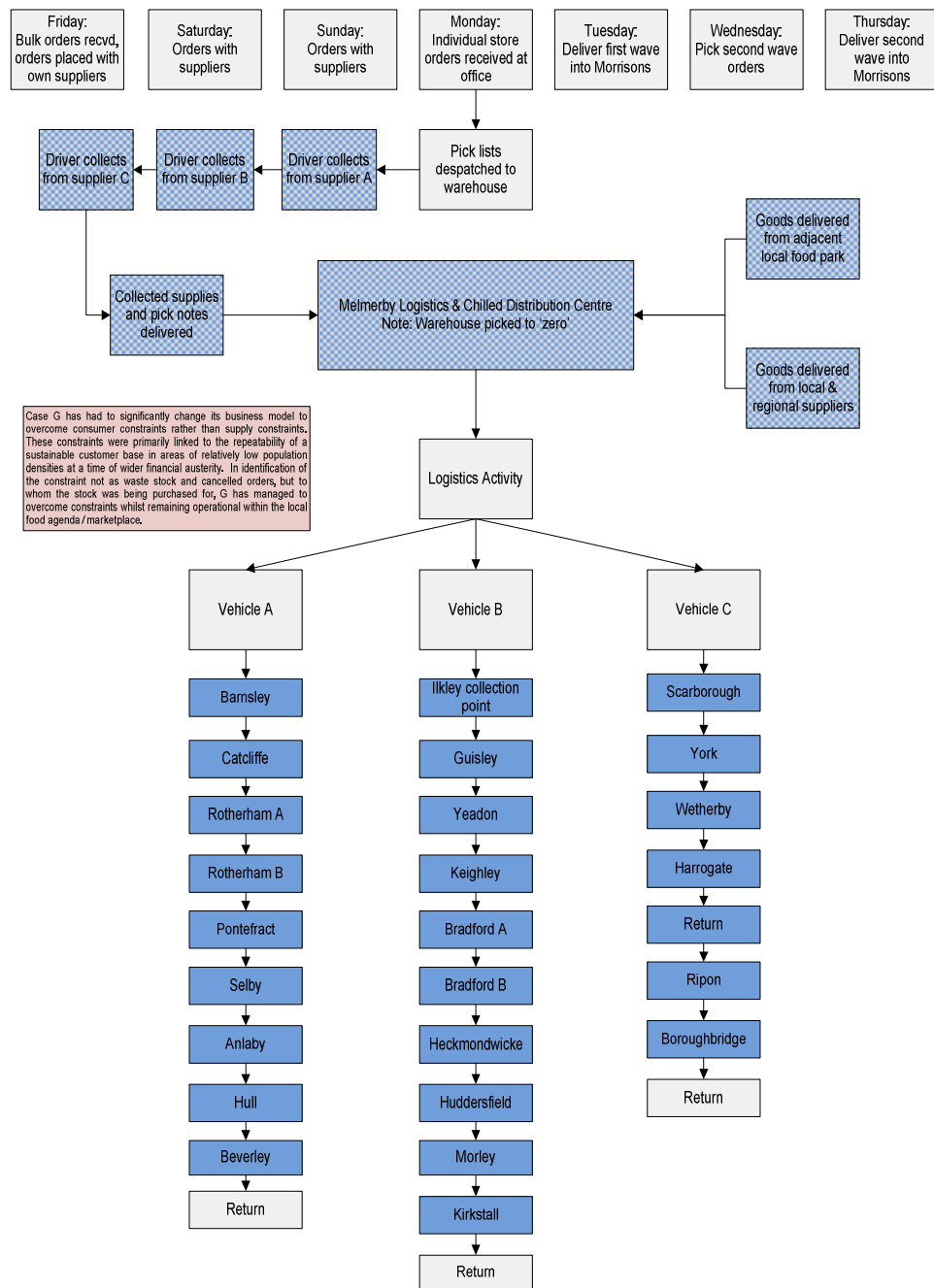


Figure 21 Case G: Current distribution map (April 2008)

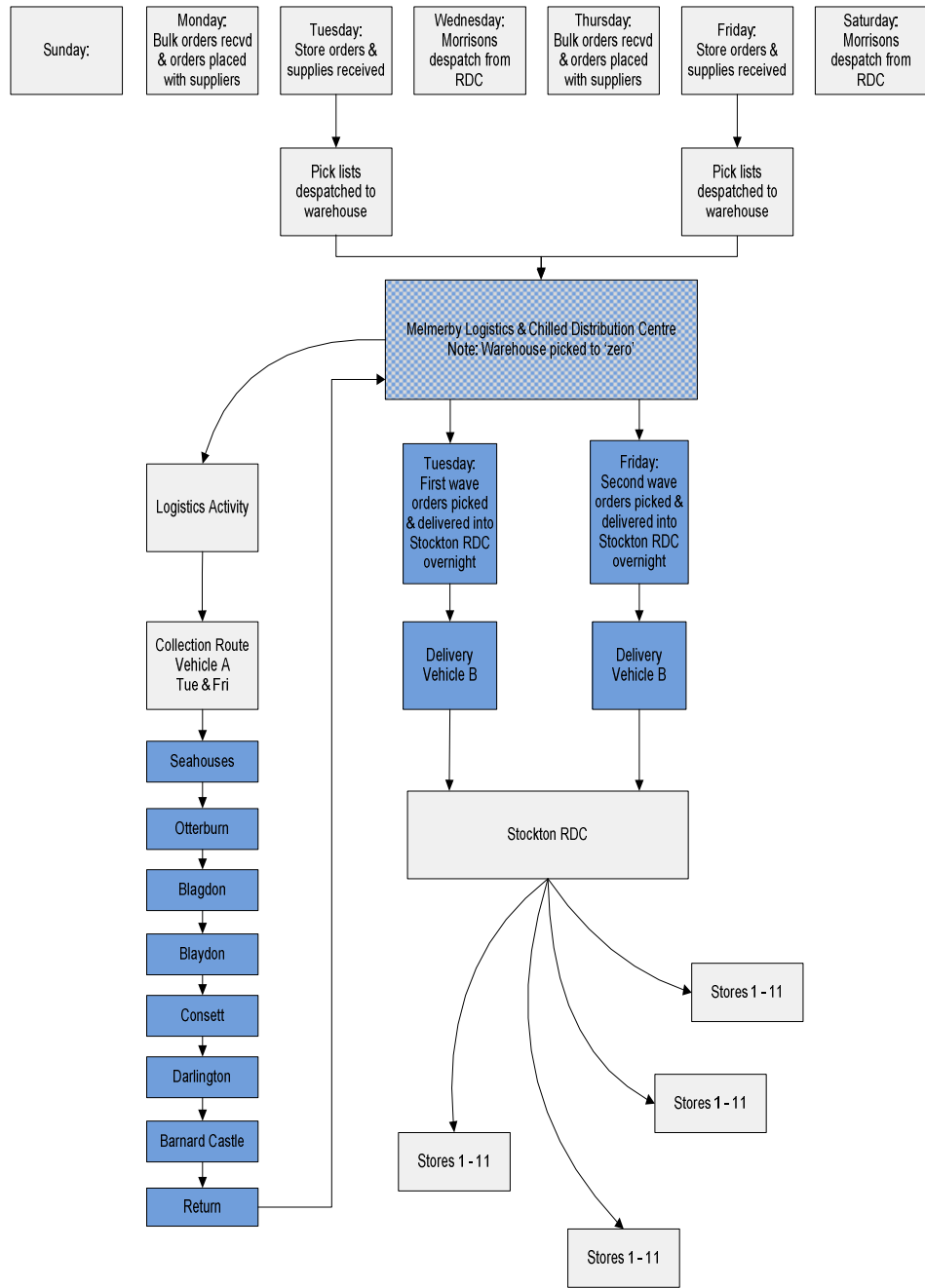


Figure 22 Case G: Proposed distribution map (July 2008)

5.9 Case Study Partner H

Case Study Partner H is located in a Northumberland coastal town which has high levels of unemployment (9.8% as a total, but with a particularly high rate of 20.3% of 16-24 year olds), situated 30 miles north of Newcastle upon Tyne. The site is part of a larger company which supplies UK multiple retailers with seafood products, fish and shell fish. At the time of interview (October 2008), there were 38 full time members of staff at this production site which manufactured over a standard, Monday to Friday, 37 hour, two shift production pattern - 'cores' for fish cakes, which were then transferred to two other production sites, the first lying 42 miles to the south, and the second lying 110 miles to the south west, for coating, flash frying and freezing, packaging and despatch. Production requirements are triggered by demand from a downstream manufacturing plant under companywide MRP system which processes in the main, EDI orders from two multiple retailers. Procurement of fish and transit packaging is managed centrally, although Case H controls procurement and ordering of the other manufacturing ingredients required for the fish cake core.

Prior to the interview with Case H, two meetings (December 2007 and February 2008) were held at main office with a Health, Safety & Environment Manager who was able to give an overview of the wider operations of the company, which in addition to the work undertaken at Case H, also included controlled thawing of deep frozen 'fresh' fish stock processed at sea, fillet coating, and shell fish processing which also included some exporting of shellfish for processing, before re-importing for final processing. Whilst the majority of production is for the UK market, some exporting of finished products does occur; the fish and shellfish are sourced both nationally and globally.

The major component ingredients of the fish cake core - fish and potatoes - are collected from each of the separate suppliers on the same 'run' which occurs three times per week. The company vehicle (diesel fuelled 17t rigid body) travels to the fish suppliers, which are based in Grimsby and Scunthorpe; they receive their stock as part of frozen containerised

shipments. Once the fish orders have been picked up, the vehicle then proceeds on its return journey, calling at the supplier of the potatoes. The potatoes only require minimal amount of further processing, as the constitute the core of the potato, the skins and small layer of flesh have been removed to manufacture frozen 'potato skins' products, the remainder of the potatoes collected by Case H are classed as manufacturing waste arising by the potato manufacturer.

The fish and potato are blended with the other ingredients in the core manufacturing process, then they are packed and stored in single trip bags and boxes, before being stored in a temperature controlled environment prior to despatch. Upon delivery of the cores to other production sites, the vehicles pick up ingredients and transit packaging which have been delivered to the site 42 miles south (some of the ingredients have also been delivered directly to Case H), as well as laundered manufacturing garments which are cleaned and managed centrally at the site 110 miles away. Any supplementary inter-site product and materials movements required are addressed utilising a local third party logistics company.

A process map (Fig 23) for Case H appears on the next page.

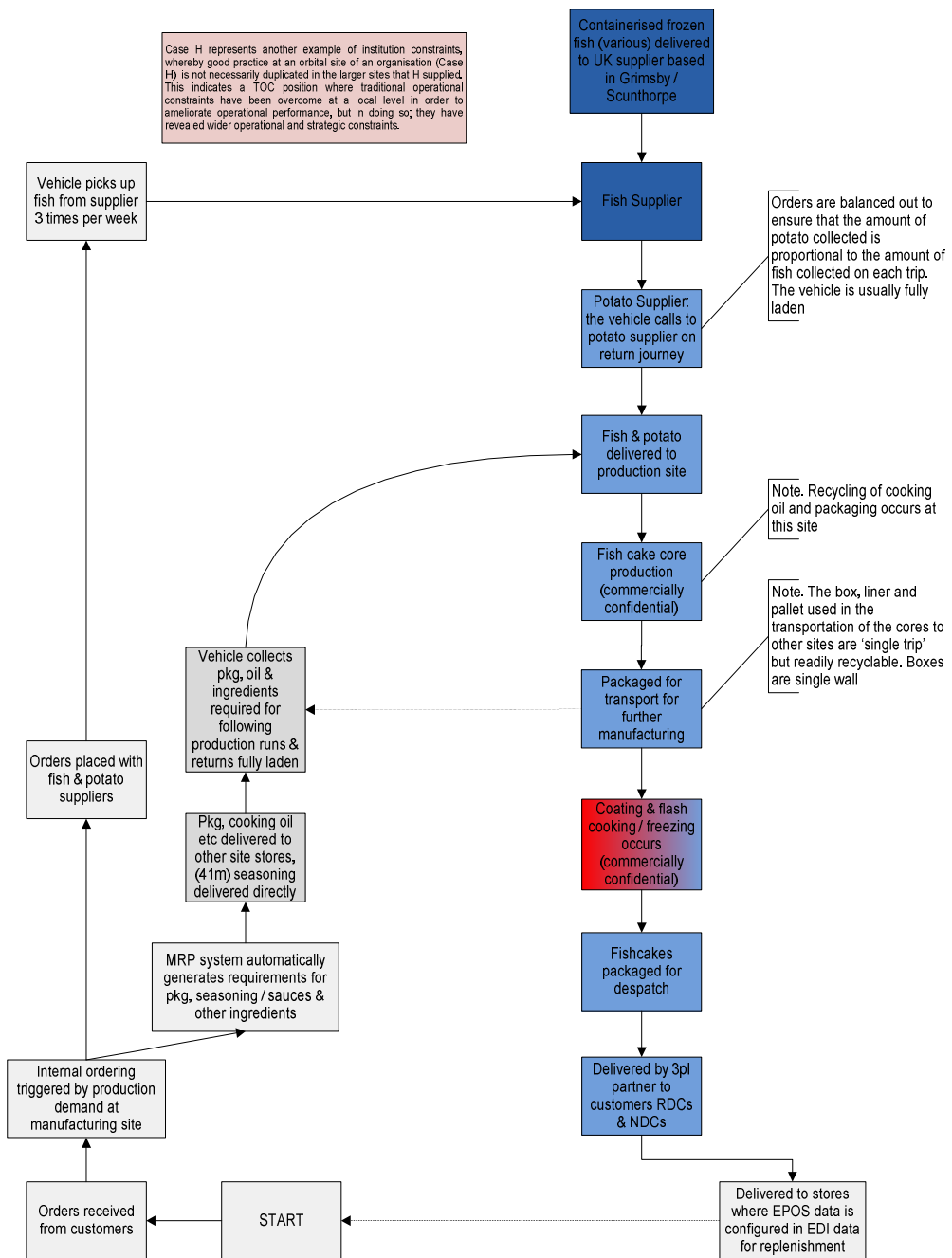


Figure 23 Case H: Process flow for fishcake core manufacturing

5.10 Case Study Partner I

Case Study Partner I is a small dairy based on a farm three miles north of Hook and eight miles north-east of Basingstoke, Hampshire. Unemployment across Hampshire was recorded at <2% in November 2008, although it should be noted within the context of this particular case study, that there are less than 115 dairy farms remaining in Hampshire. Evidence indicates that dairy farms as single entities in Hampshire and the surrounding areas are closing at a rate of one per month. The dairy was a regional winner (2007) of a 'Local Food Hero' award, and by way of establishing and maintaining links with the local communities it serves, the farm offers educational trips for schools, distributes regular newsletters with deliveries and invoices and encourages customers to visit the farm.

The dairy is based on a small tenant run farm, which at the time of interview (May 2008) manages a herd of 80 cattle. The business model has developed by the tenant as recourse to standardised farm and livestock management models commonly used to support the supply of farm milk to dairy companies for processing, packaging and on sale to major multiples, distributors and tied rounds.

The underlying reasoning of the business is a belief by the owners that there is a viable and sustainable local alternative supply mechanism for fresh, un-homogenised milk, which differs significantly from the mechanisms under which the vast majority of the population procure milk as a commodity, unaware of environmental and social burdens of its production. The model has been described by the owner of the business as a 'modern, traditional' system which encompasses alternative farm and herd management strategies, as well as reintroducing direct supply of the milk to the local population from the farm. This distribution model has all but disappeared, firstly as a result of the introduction of the Milk Marketing Board (1933), which was introduced to control the production and distribution of milk across the United Kingdom as well guaranteeing a price to milk producers and acting as a buyer of last resort for surplus raw milk stocks. Secondly, the growth of major multiple supermarkets since the early 1970's has also led to

significant proportions of the population disengaging with the principles of food localisation, as they are offered a wider range of standardised foods drawn from global markets.

Business orders are accepted by email, phone and fax, whilst the domestic doorstep orders are controlled by the four delivery roundsmen.

Processing and bottling of the herd's milk occurs on the farm for direct delivery into local markets. The herd itself is managed less intensively than the norm, which has led to a fall in the herd replacement rate from an annual industry standard of 25% to 15%. The business is also about to introduce new litreage per head of cattle targets capped at 6,500 litres per annum. This is a significant reduction from the current 9,000 litres per head and is being introduced with the express intention of extending the life cycle of the cattle. The cattle are sustainably grazed on fresh pasture grass during late spring, summer and early autumn and grass silage at other times.

Currently, all of the filling occurs using labour intensive manual filling stations, but there is a plan to install an automated filling line and a second pasteuriser in the near future. To this end, the business has met and entered contract negotiations with an investor to part fund the planned processing and filling development.

None of the milk is homogenised and whilst there is a wider debate around homogenised versus un-homogenised milks, it is seen by the owner as a unique selling point for the product. Un-homogenised milk has a different colour and mouth feel to that of standardised, homogenised milk types; this significant reduction in the processing cycle of the milk has been used as a successful marketing device by the company. Case I states that there is no intention of homogenising the milk at any point in the future. Currently, about one third of the daily production requirement is dispensed into glass multi-trip bottles; the remainder is filled into 2pt and 4pt HDPE plastic bottles. The business is currently trialling a 1 litre glass bottle with a projected 25 trip life cycle, with the intention to offer it as an alternative to the 2pt and 4pt HDPE plastic bottles. The labels on the plastic bottles fall within the same material classification as the bottles to ease and increase recycling by the consumer.

There is also a small amount of cream production which is filled into single trip cream pots. A significant proportion of the company's energy requirement is taken from the national grid at times of surplus; night electricity is used as much as possible for processing and bottle washing, for example.

The business has managed to build up within three years, a customer base of more than 1,500 domestic addresses, as well as supplying local farm shops, village stores, restaurants, hotels and an independent local school. The milk is priced at a broadly similar point to 'commodity purchase milk' for sale at supermarkets. The milk rounds are planned and managed with the express intention of completing all domestic address deliveries by 07:30 on a normal working day. The business currently has five full time employees in addition to the owner, and one part time employee.

Case I also hopes to develop supplementary activities to increase fleet utilisation by introducing an internet based 'Farm Fresh At Home' service, which would allow on-line ordering of chilled and fresh local produce, as well as an ability to supply a range of ambient non-food products too. The business intends to offer delivery three times per week in bookable slots, all deliveries are planned to be within 72 hours of the order being placed. Case I has also held initial discussions with its regional food group about offering ambient and chilled logistics solutions to other members of the food group, which could potentially lead to further increases in fleet utilisation.

A process map (Fig 24) for Case I milk production and distribution appears on the next page.

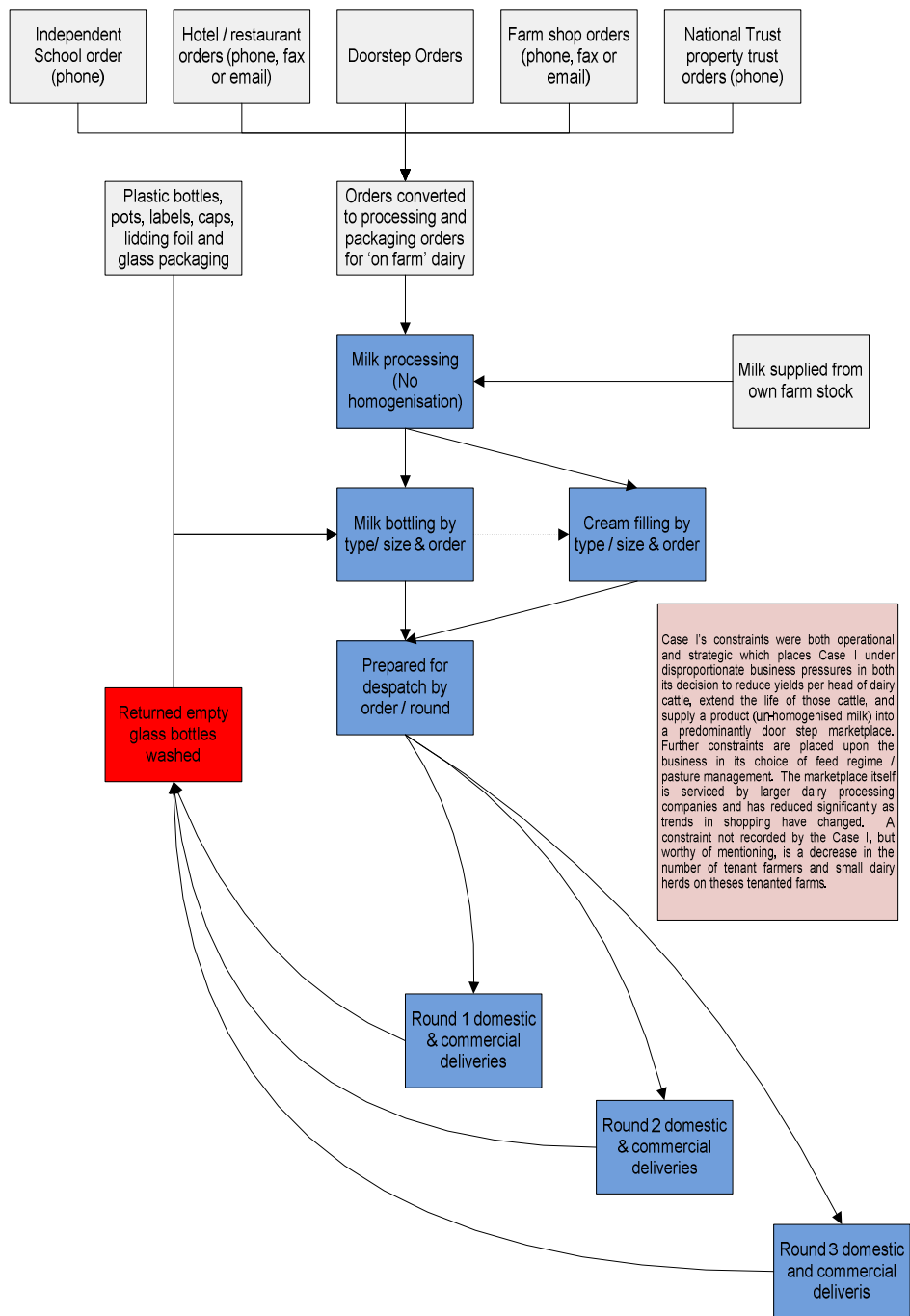


Figure 24 Case I: Milk production & distribution process flow

5.11 Case Study partner J

Case Study Partner J is a vertically integrated pig rearing business (Fig 25 & 26) which employs indoor animal management from husbandry through to farm gate at three farms in North Lincolnshire. Case J supplies Case U with its arable crops for feed production; Case U supplies all of the animal feedstuffs required by Case J across its three farms. Case J also sends a small proportion of its pigs to Case V, which then supplies the farm shop Case T. The homestead farm is situated 15 miles north of Lincoln and 9 miles north-east of Gainsborough. The business has been owned and managed since 1991 by fourth generation farmers; the farm is a livestock and arable farm and also serves as the headquarters of the business' other farming enterprises.

Each of the three farms operates an indoor pig production system and in total has 750 sows, which produce 50,000 pigs per year. The farm near Louth is a totally integrated finishing farm, some of its pigs are sold off at 30kg, but Louth also raises pigs up to weights of 110kg.

The farm near Waddingham raises pigs to a weight of 40kg before they are moved onto another farm for 'finishing'. At interview (October 2007) it was recorded that one of the principle reasons of the business for moving pigs between its sites at 40kg is to increase disease control and bio security.

The farm near Grayingham is a 'finishing' farm which receives pigs at 40kg from elsewhere in the business to be reared to their finished weight prior to being transported to an abattoir. In addition, there are also two other 'feeder' farms which are not owned by the company but are retained as a buffer to the main production operation.

More than 99% of the finished pigs are supplied under contract to a large firm which has its main abattoir located Spalding, Lincolnshire. This firm is a meat processing company which employs over 2,000 staff across six production sites throughout Lincolnshire. The core of their business consists of pork processing; sausages, pies, chops, sliced meats and cuts to major multiples, wholesalers, and food service companies.

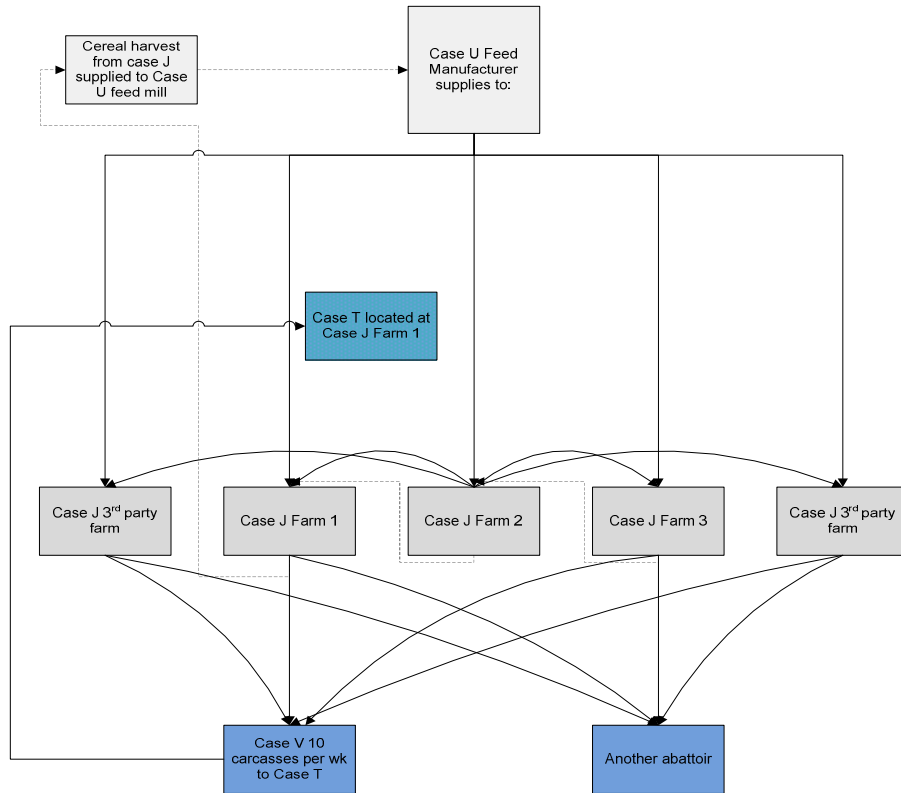


Figure 25 Supply relationships between Cases J, T, U & V

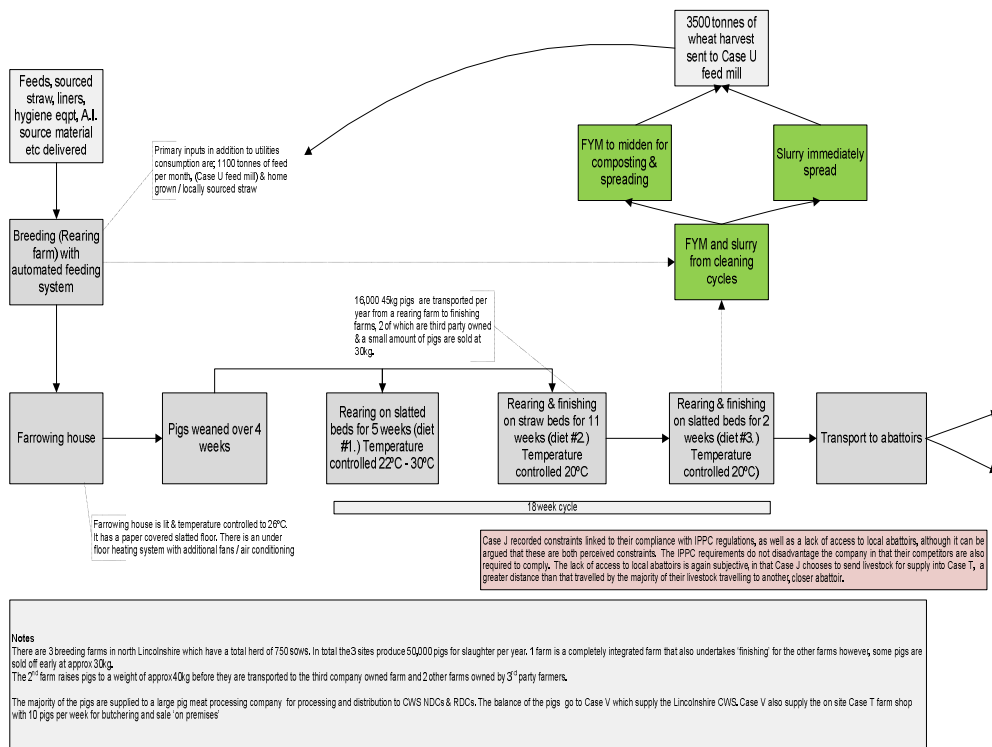


Figure 26 Case J: Pig rearing process

5.12 Case Study Partner K

Case Study Partner K is a family owned business which was established in Wolverhampton in 1938. The company has developed over time to become a vertically integrated pig meat processing company. There are two principle processing sites, one of which is based in Wolverhampton and which processes hams, gammons, shoulders, loins, chops and other pork premium cut products. The other factory is based three miles away in Bilston and is a specialist manufacturing facility producing a comprehensive range of pork cuts and joints, sausages and sausage meats for sale and distribution as both bulk delivered and van sales through two distribution centres, one of which is also based in Bilston, the other is based in Stroud, Gloucestershire. Contractors are also used for the delivery of some bulk orders and larger customers are also allowed to pick up their orders from the factory as required; a small amount of distribution does occur further afield, again employing the services of third party contractor too. The company is able to address customer order fulfilment requirements by fax, phone and email, repeat orders accepted by van deliveries are uploaded upon the driver returning to base.

At the time of interview (August 2008), Bilston had an unemployment rate recorded at 5.9%, although as with Cases L and M, the underlying rate of joblessness and people in long term receipt of benefit is higher. The focus of this case study is on the sausage production facility which employs 36 staff, 6 of which are part time members of staff. The remaining 30 staff are all full time employees working 40 hour per week shift patterns within the operating hours of the factory (07:00 through to 22:00) over a standard working week of Monday to Friday. There is no regular weekend working and Case K reports a low turnover of staff.

Case K represents a middle ground in terms of production scale between the smaller Case T and the larger Case E. The sausage production processes used by Case K are almost identical to those used by Case E, only the scale and minor operational details differ. The pork used by the sausage processing facility is all supplied via internal supply chains which

extend back up to the company owned pig farms. Case K also owns its abattoir and primary cutting operations which allows for complete latitudinal and longitudinal internal traceability of all of its meat, utilising a business wide ERP system. This study has focussed upon a single fresh product; 'Butchers Pork Sausages,' which are sold as bunch wrapped links in individual packs weighing approx 454g / 1lb. The individual packs are collated into outer cases, each containing 14 packs, on average the company pack and distribute 1140 cases per year which equates to approx 380 tonnes. This production generates a combined packaging requirement of 175 tonnes per year, of which the 150 tonnes is classified as cardboard / paper and is readily recyclable.

The diagram exhibits a detailed view of the process flow, which briefly comprises the delivery of packaging, dry ingredients and meats, batch weighing of ingredients, inspection and boning out, flaking, chopping, blending and mincing before sausage cases are filled and the sausage enter either chilled or frozen streams for packaging, final inspection, storage and despatch. The factory holds accreditation from several inspection services including SAI Global/EFSIS and the company is also a member of the British Meat Processors Association.

Case K provides evidence of the changes that occur with scale, where operational requirements are more easily absorbed into fixed overhead costs which are offset by volume, scale, standardisation and repeatability.

A process flow diagram (Fig 27) for sausage production at Case K appears on the next page.

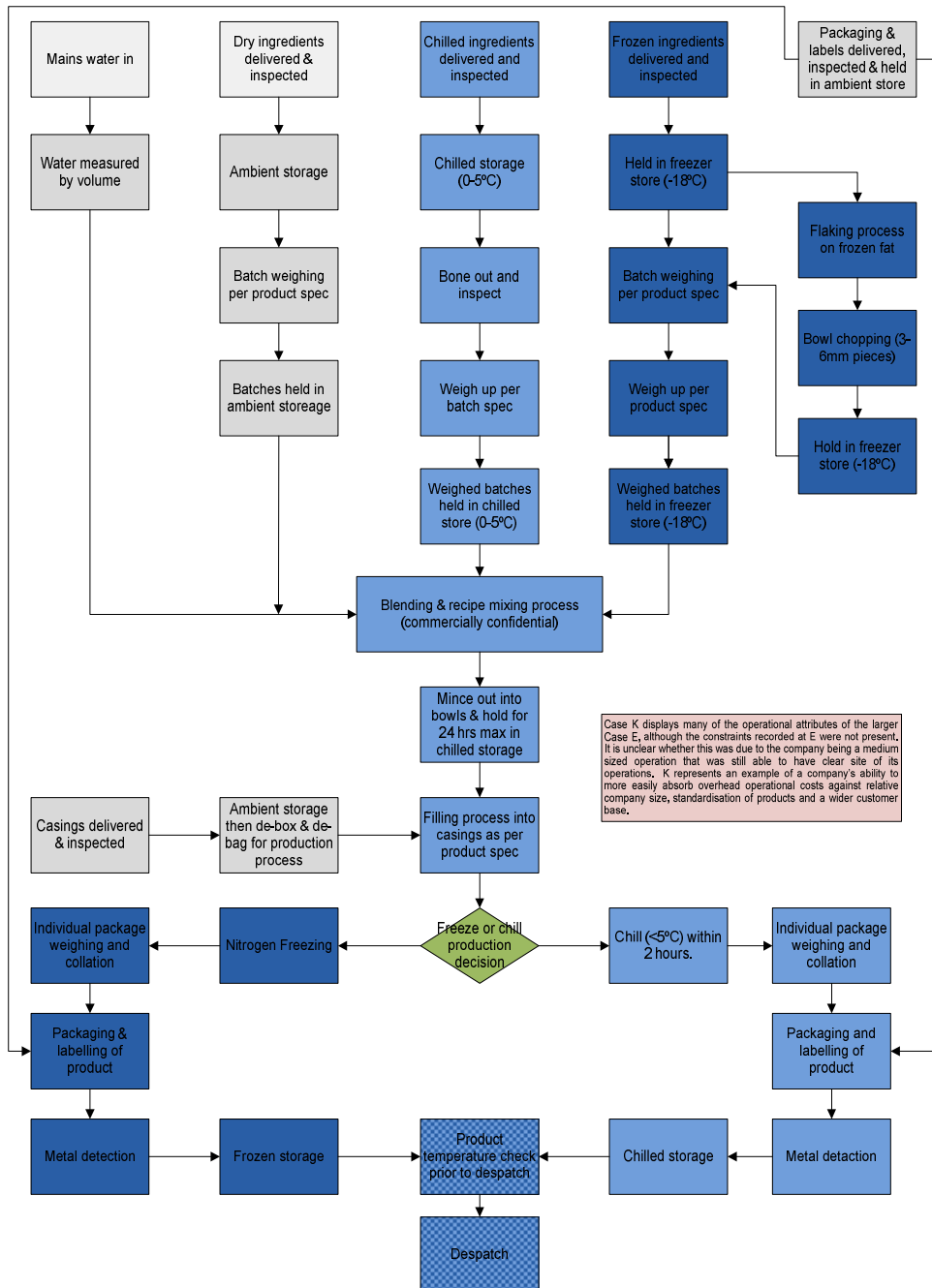


Figure 27 Case K: Sausage manufacturing process

5.13 Case Study Partner L

Case Study Partner L has two UK production sites, one in South West Scotland and the other in Tyneside, which produces branded cheese products. Case L also has production facilities in Scandinavia and their products are retailed in more than 50 countries. For this research I have worked with the Tyneside production site which produces approx 3500 tonnes of products per year. Case L has operated from this site for more than 45 years and at the time of interview (February 2009) employed 113 colleagues. The company places an emphasis on training and development, with many of the supervisory and management posts held by internal candidates. At the time of interview the metropolitan borough in which the factory is situated recorded unemployment levels of 7% however, other areas within the borough recorded unemployment at 14.4%.

The Case L Group is wholly owned by a charitable foundation. The entire dividend paid by the group goes to the foundation where it is used to fund scientific research, cultural development and humanitarian operations in 20 countries. The articles of the foundation record its purpose to contribute more to communities beyond taxes and employment. The foundation is separate from all of the commercial group activities.

The Tyneside factory produces to stock. The finished stock levels furnish the forecasted requirements of their customers, allowing the flexibility required to service multiple retailer customers and wholesalers supplying smaller retailers in the convenience store channels. Demand is variable and further complicated by seasonality across the range of products. The base components for the products are sourced globally, with the company taking opportunities to purchase and store opportunistically as when the market conditions allow. Variation in demand is offset to a level by constant evaluation demand based on rolling sales versus stock averages and analysis of historical data. The factory operates under a range of ISO standards and has SAI Global / EFSIS and BRC accreditation at the higher levels.

Each of the major customers have different stock requirements, for example, customer A might require stock to arrive at its distribution centres with a minimum of 80 days of shelf life, whilst another may require 75 days, another 83 days and so on. This shelf life specification demand from customers, and the aforementioned variability and seasonality factors, inevitably leaves Case L with products that are in perfect condition, and have many weeks of shelf life remaining, but beyond customer shelf life specifications. Case L is unique amongst our case study cohort in that they then directly distribute this food to a number of local charities.

Orders are placed by EDI, email and fax on a rolling system based upon daily customer requirements. The standard production profile is addressed by a two shift system operating from Monday to Friday, and is supported by an overarching ERP system capable of multiple stock and process location management. Production ingredients and packaging kits are built and delivered to the processing areas based on information in the weekly production plan. The production plan is a 'live' document which is reviewed throughout the week; this allows Case L to successfully manage lean and agile manufacturing and packaging, despite production being predominantly 'push type' in nature.

There is a comprehensive waste management process in place; a third party company controls the waste streams for plastic, paper and wood. Last year the total yield was 71.95 tonnes recycled. When this is considered against the consumption of primary and secondary packaging for finished goods over the same period, which totalled 80.35 tonnes, this research records that there is only a difference of 8.4 tonnes between company consumption and recycling of packaging.

The Tyneside operation uses several third party logistics (3PL) companies to deliver its products to its customers' distribution centres (60+ destinations / 20,000 deliveries per annum). 'Factory gating' also occurs when it is commercially viable to do so and currently accounts for approximately 1,000 pallet movements per year. Products are despatched on multi trip and single trip pallets depending upon customer requirements.

As an unintended consequence of this research, Case L has recently started working with a small local cheese producer (who was not part of this research) to enable them to move their goods to market in a more cost effective way. Case L now allow this small volume cheese producer to 'slave' their products onto part pallet loads of Case L products for a nominal charge. This cost, time and management saving builds added value into their products. In addition to this, Case L have been given details of the regional food group and are looking to commence a dialogue to see if this system can be developed further.

By charging the smaller company £10 per part pallet and allowing the small company to 'slave' their same category products onto part pallets heading for the same customers has allowed Case L to essentially generate one free trailer every fifth day which, based upon the prevailing pallet costing charges for Case L and the small producer, will save £37,500 per annum against budget.

A process flow diagram (Fig 28) of Case L appears on the next page.

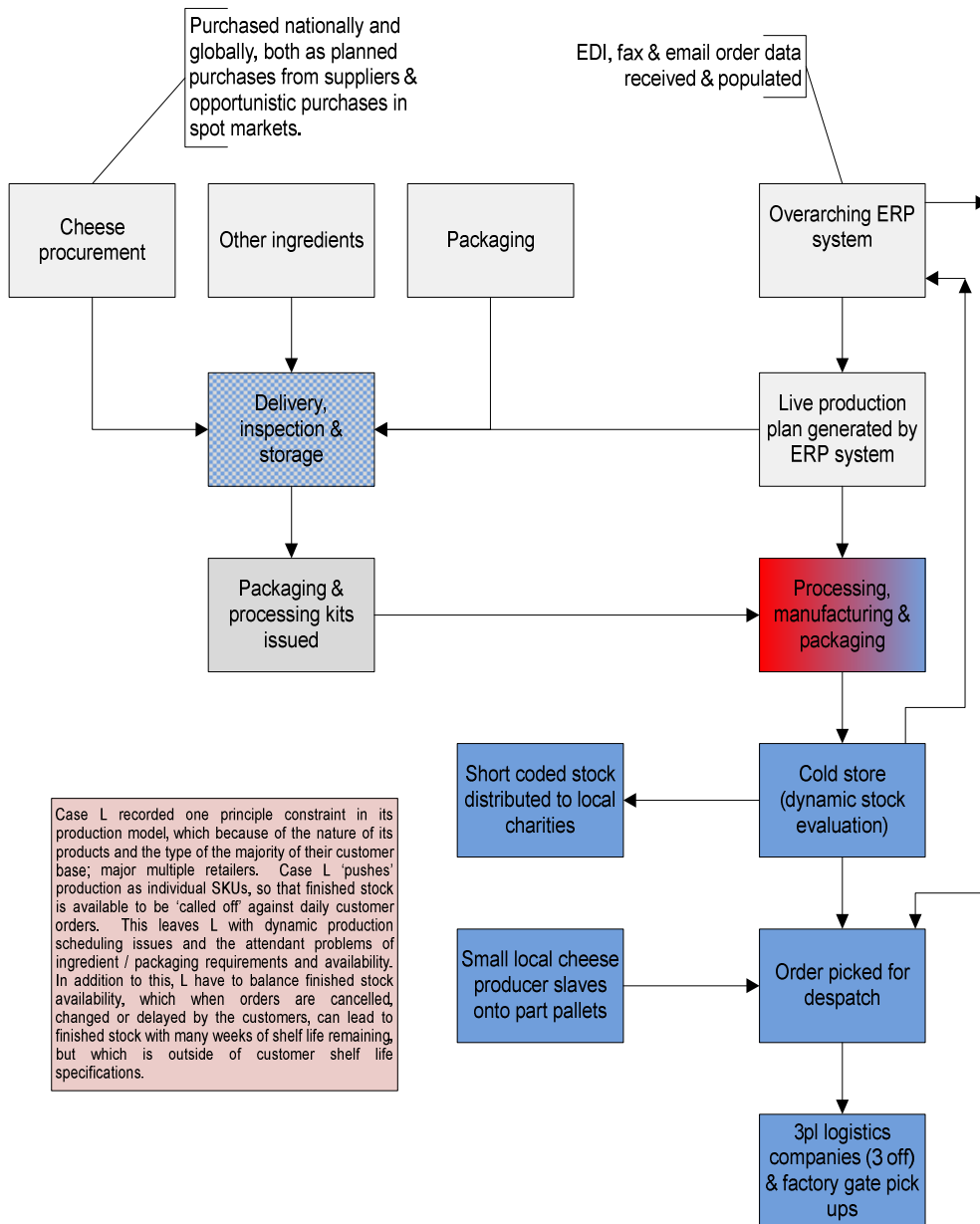


Figure 28 Case L: Manufacturing & distribution

5.14 Case Study Partner M

Case Study Partner M is situated in a 'new town' which received its designation order in 1948. Its current population is recorded at just under 22,000 people, of which 7.8% were registered as unemployed in November 2008. Social and economic indicators reveal that as well as one of the highest unemployment rates in the country, the district has significantly higher than average numbers of the population in receipt of other benefits including long term sickness and disability claimants. The town is situated ten miles south of Sunderland and eight miles east of Durham City.

Case M was set up in 1988, with the express intention of transferring and introducing skills and quality standards which had been acquired by one of the founding partners during 14 years of employment at senior management level in the Australian meat processing sector. Case M has grown organically and currently employs 145 staff.

The company has many long term customers, some of whom can be traced back to the initial customer cohort at company inception. Case M has developed collaborative working ventures with existing and potential customers where its own technical department works with customers' New Product Development Technologists to reduce time frames for the development and introduction of new products for those customers, as well as continuing to constantly develop their own product portfolio. The company endeavours to manage a range of clients across several categories supplying into different production sectors and channels in order to be able to manage production loading throughout the year. As a result, adverse production loadings are minimised by being able to compensate for seasonal variability in demand across the range of customers. Case M holds a European Food Standards Inspection Service (EFSIS SAI Global) Class A certification for food processing and quality management. Case M specialises in cooking and processing chicken, although it is also able to cook and process other poultry if there is a customer requirement or market opportunity. At the time of interview (January 2009) Case M produced a portfolio of products which include: cooked or roast whole chicken (unique

cooking process), flavour cooked chickens or chicken pieces to one of 74 flavours, breast portions which can either be naturally stripped, cubed or diced and proportional mixes of white and dark meat. Case M supplies its range of products to both first and second tier customers. Examples of these tiers may be a customer who uses the meat for fresh sandwiches or toppings as a first tier customer. An example of a second tier customer could be one that uses the meat as a primary component part of a pie which is then sold onto a retailer or distributor.

By its very nature and relative position in category markets, Case M is constantly exposed to import competition, in particular from poultry originating in Thailand and Brazil and presented to the UK marketplace as price lead poultry. Case M seeks to counter this position by an overarching strategy which includes product USP, portfolio width, collaborative activity, and adoption of best practice programmes.

Case M has developed long standing relationships with a small number of UK poultry farms. All of the chicken supplied to the company has been raised under the Approved Chicken Production Scheme. The company currently cooks and processes over 7,000 tonnes of poultry per year. Orders from customers are received electronically; this process then initiates Case M to pull orders for poultry, ingredients, packaging and logistics through its own supply chain management system. This lean and agile production management system linked directly to customer orders allows the company to minimise finished stock and abrogate on site disposal of finished stock.

Case M has developed and established several waste minimisation programmes and recycling streams. The chicken carcasses and fat renderings are collected bi-monthly for further processing activity separate to the human food chain; plastic, card and wood is recycled generating more than 170 tonnes per year to recycling streams.

There are ten deliveries of poultry per week by road transport to the factory from three principle slaughterhouse supply points. Normally scheduled production occurs over a standard Monday to Friday week. Despite the range of products and customers, there is a maximum time between poultry

entering the factory and being despatched to customers of 120 hours. There are two post cooking scenarios, which are cook to chill chain and cook to freeze chain; in both scenarios the company has processes which significantly reduce the cycle time for the cooked poultry to reach optimum temperature for the following process, these times are typically 25% less than industry standard guidelines.

The cooked to chill products are 'factory gated,' whereby the customer or a third party logistics company acting on their behalf comes to the factory and picks up the products themselves on a daily basis. They are delivered to any one of nine regional distribution centres throughout the UK.

Case M also utilises a third party logistics company to distribute its other customer orders which have been cooked to freeze. Consolidated loads of these customer orders are collected by a specialist cold chain third party logistics company, who then deliver them to their distribution centre. The customer orders are then further consolidated into the logistics company's own fleet and those of fourth party logistics partners. From this point, the customer orders are either directly delivered or go for further distribution activity at one of five regional distribution centres throughout the UK for onward delivery to customers.

A production and distribution process flow diagram (Fig 29) for Case M appears on the next page.

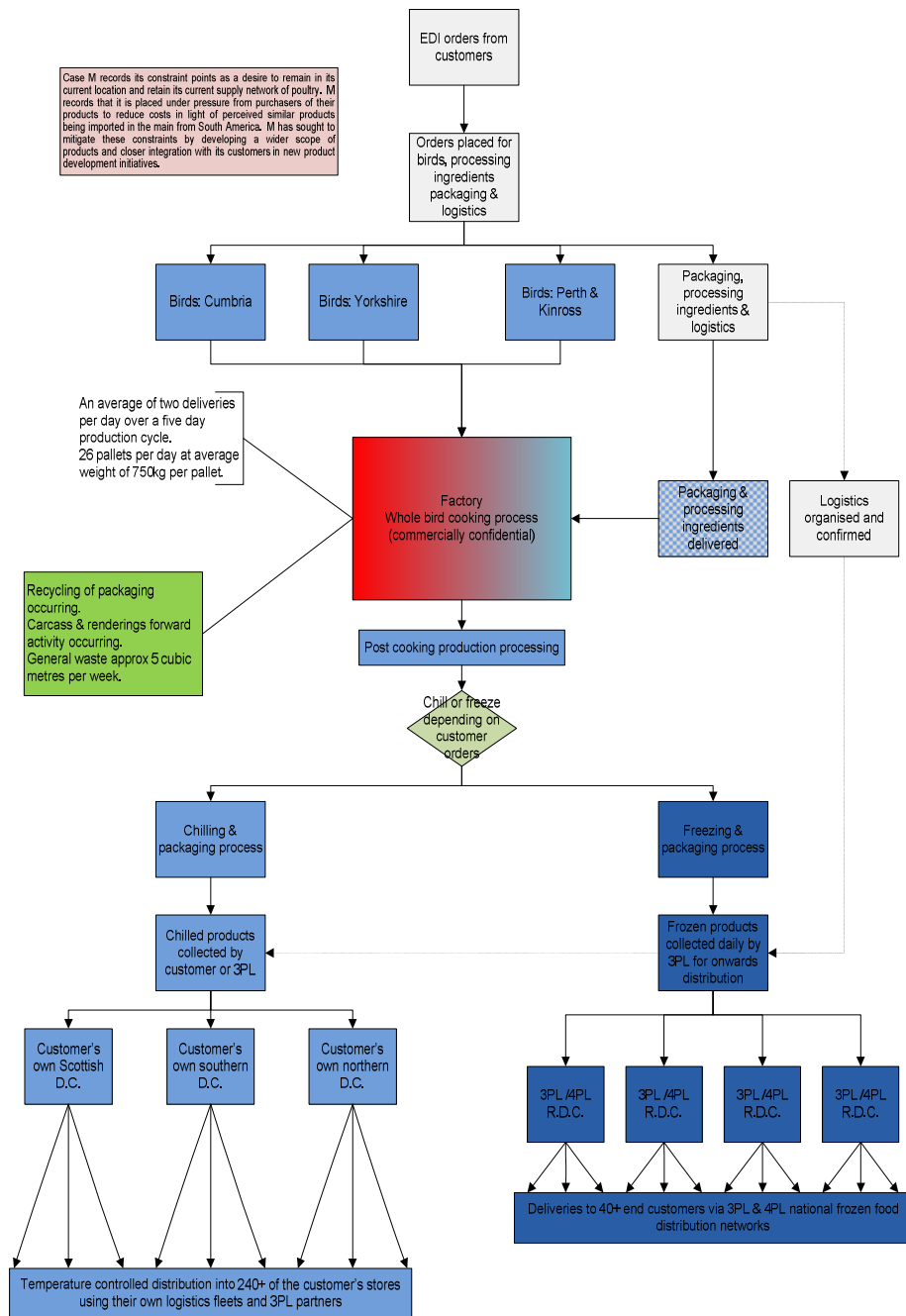


Figure 29 Case M: Manufacturing & distribution

5.15 Case Study Partner N

Case Study Partner N is located in a coastal village four miles north of Sunderland and three miles south of South Shields. The business is in its sixth year of trading and was set up by the owner after returning from the North West coast of Scotland where he had been a commercial fisherman, but had been placed under increased trading pressures linked to the quota systems. Case N has been named as the 'Best Local Food Retailer' by the BBC at their annual Food and Farming Awards.

At the time of interview (November 2008) the business employed five full time and six part time members of staff; the employees have recently undertaken food safety and HACCP⁴⁰ training in conjunction with initiatives developed by the local regional food group. The business plans to move its operation to the front of the original building during spring 2009, which will allow the business to extend its range of sea food and derived products such as dressed shellfish, speciality pasties etc., as well as increasing available café floor space. There are also plans to develop a cooking demonstration area and seafood cookery school.

The emphasis of the business is upon supply of seasonal fresh local fish and shellfish from sustainable stocks. All of the fish and shellfish on sale are clearly identified by the geographic coastal region where they have been caught. Case N has developed long term relationships with local fishermen, who in some cases are able to contact Case N before the catch has been landed at the quayside. The owner of Case N has also been able to use his own experiences as a fisherman to help some of his supplying boats to identify and develop new markets for their catches. Stock is primarily supplied from three harbours, Boulmer, Seahouses and Eyemouth, with supply occurring on a rolling daily basis, serviced by two company owned panel vans.

⁴⁰ Hazard Analysis and Critical Control Points; a systematic approach to preventative controls and management systems which is widely used in food manufacturing, identifying and controlling biological and chemical hazards and developing preventative control systems.

A small amount of more exotic species are also available for sale; these are picked from deliveries made to North Shields Fish Quay from southern English ports, Billingsgate Fish Market and western Scottish ports, as part of established national supply chain frameworks.

Case N stated that the business would like to take stocks landed at North Shields and Hendon, but will not do so at the moment (November 2008) as a result of the government's decision to allow dredge material from the current construction of a second Tyne Tunnel to be dumped within a 12 mile radius of the Tyne River mouth. At interview it was identified that this decision impeded upon an area which Case N considers to have ideal seabed topography and geology suited to shellfish, and the potential to supply many local requirements sustainably. Case N is also greatly concerned by the lack of a cohesive strategy on shellfish 'takes' from local coastal waters which threatens the heritage of, and significantly disadvantages local, small boats fishing under a historical 'one boat-one net' sustainable system, as well as being continually dismayed by legislative controls enforcing the 'side dumping' of cod caught during langoustine fishing.

Unlike other case study observations for this research (Cases D and T), it was difficult to be able to initially 'pigeonhole' the customer base of people entering the premises upon socio economic identifiers. The researcher notes that during the interview and immediately after the interview when draft notes were being reviewed, that from observation and extensive local knowledge, the customers visiting the business reflected a much wider spectrum of customers than those traditionally identified, and linked to shopping at a specialist, local delicatessen / food shop. These customers were predominantly and firstly 'local' then secondly, socially identifiable.

In addition to shop counter sales, the company will also accept orders through its email system, which has also been identified as a potential area for further development in conjunction with a recently redesigned website.

The focus of the business is to further develop and grow the operation based upon the cores skills, competencies and experience of the owner and his

team. There are no current plans to supply into food service sectors despite the company receiving numerous requests to do so.

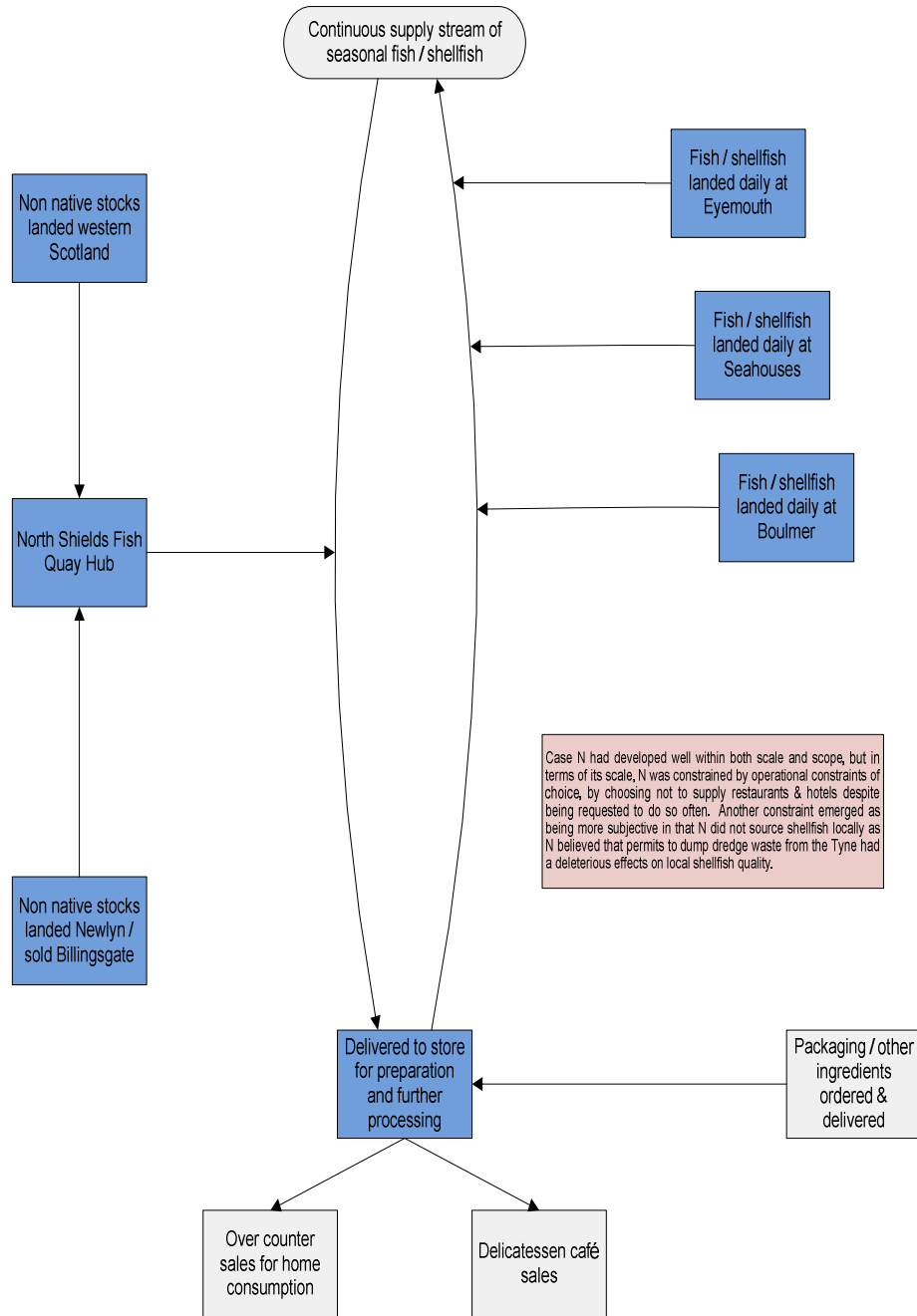


Figure 30 Case N: Operational process flow

5.16 Case Study Partner O

Case Study Partner O is located just to the south of Burnopefield Village, which itself is situated 10 miles south west of Newcastle upon Tyne and 17 miles north west of Durham City. The village grew from the mid the 19th century as local coal mining industries expanded; the current population of Burnopefield is recorded at 3,480 and at the time of interview (January 2009) the recorded unemployment figure for the region was 8.6%. Case O employs 30 members of staff; the majority of these colleagues are drawn from the local village. Regionally there has been a steady decline in the amount of poultry farms, several underlying reasons are often quoted, which include: aging sheds which require replacing versus the relative costs of reinvestment, the current structure of salmonella regulations and aging farmers whose children are not following them into farming.

The farm is primarily an egg production, packaging and distribution facility which is owned and managed by the third and fourth farming generations of the owning family. Other farm activity includes arable crops (200 acres), sheep and two livery yards which can accommodate 60 horses under DIY livery. The farm also had a herd of 500 cattle until 2006. The business has grown steadily from very modest beginnings when a small farm (three acres) was purchased locally (four miles away) in 1951, although the family connection with egg production predates even this, with the Great Grandfather developing and managing Government schemes which were designed to encourage people to produce eggs in their own gardens and yards during the Second World War. At the time of purchase, the original farm had both pigs and poultry, although the pigs were replaced by more poultry after a short while, with the poultry cages being designed and manufactured on site by family members. The business mirrors much of the evolving history of post-war agricultural development, whilst successfully developing and managing egg production, packaging and distribution systems across various market channels and supply chains within the local area.

Around the period the farm was being set up, many small farms were being connected to the national electricity grid, which allowed artificial heating and lighting to be introduced. The effect on the poultry industry allowed the development of more durable fresh egg supply chains which could overcome many seasonality factors. It is easily forgotten that up to this point, egg production was largely seasonal within the UK. Concurrent with these developments, changes in consumer behaviour were beginning to emerge with the introduction of supermarkets.

After 15 years the farm had increased its flock to 15,000 birds and developed several local rounds of 'door to door' deliveries as well as supplying local shops. However, the business had outgrown the farm and in 1961 the family purchased their present farm from the Coal Board. Over the intervening period, the family have gradually acquired surrounding farm land, which has led to a growth from the original 128 acres purchased in 1961 to 500 acres in 2009. The cage system adopted at the previous farm was also introduced here in order to control lighting, heating and feed factors as well as improving disease control. The farm has started to phase out the traditional intensive cage systems well ahead of the EU 2012 regulations, which will outlaw these in their present configurations. Flocks are gradually being introduced to free range systems including the latest 'artificial jungle' design; each new unit can accommodate up to 16,000 birds, with each unit requiring 40 acres of land for the birds to roam.

Amber Link chicks are sourced from local hatcheries (6.7miles) and enter the on-site rearing sheds at a day old; they are reared in these sheds for up to 20 weeks, but the majority are introduced to laying sheds between 16-18 weeks. The farm currently has flocks totalling 125,000 birds which produce 4.5 million eggs per year. There are plans to increase the total size of the flocks by a further 35,000 free range birds, a perpetual, integrated system allows flocks to be replaced as yields start to decrease below optimal production targets.

The eggs are continuously picked, graded and packed seven days a week throughout the year. The packaging is readily recyclable and multi-trip

pallets are also utilised in the distribution phase. The farm controls its own distribution network and owns its own fleet of vehicles, which currently consist of five large panel vans that deliver over a five or six day cycle depending upon customer service requirements. Eggs are usually delivered within 24-48 hours of being laid, whilst some deliveries occur within a few hours to address short notice emergency orders from customers. The customer order system is flexible and allows for several ordering options including traditional 'phone and fax orders as well as electronic ordering, 'call off' systems and 'following on' orders placed with the distribution drivers at the point of delivery. The original 'door to door' rounds have been gradually supplemented by the addition of many other customer types across the food retail and food service sectors, which now include local branches of two major multiple supermarket companies, hotels, farm shops, shops, restaurants, and local authorities, over a geographic area broadly encompassed within a 35 radius of the farm and bounded by the coast to the east. At the time of interview the farm had just secured a new contract to supply 200 Nisa convenience stores throughout the region.

The farm did have an on-site feed mill that utilised their own harvested arable crops, which were supplemented by harvests from surrounding farms and addressed the feed requirements of the flocks, sheep and a herd of cattle. However, the farm no longer manufactures its own feed, the crops are now sold to a local grain company and feed is purchased through farm input schemes. Consumables linked to the operation are sourced locally wherever it is possible to do so cost effectively.

The farm is the only egg production facility in the North East to hold 'Lion Code' approval and accreditation across their entire range of egg categories. The farm is a founding member of a national countryside stewardship scheme as well as a national woodlands egg scheme which has involved the planting of 4,000 trees to date.

There is an established recycling stream in place for packaging. The organic poultry manure which is >90% non leachable, is distributed to four local farms, replacing industrially manufactured fertilisers.

Case O have always marketed their eggs directly and have continuously developed their customer base, seeking further market penetration within the region.

As Case O move to a completely free range system, they have identified that future demand for their products may vary from their current demand base and represent something of an unknown, especially in consideration of the prevailing economic climate at the time of interview. However, their strategy represents a trade off between current and future animal welfare legislature. By a decision to pre-determine the market, Case O may be able to 'steal a march' on their competitors. Coupled with forwards investment requirements for new buildings and an ever present reality of cheaper, imported eggs from Spain and Portugal, which are freely available locally, Case O remain aware that 'free range' is still regarded by many consumers to be a purchase of choice and conscience.

A process flow for Case O rearing, laying and egg distribution (Fig 31) appears on the next page.

Case O recorded constraint points linked to its need for legislative compliance linked to its operation; principally these were salmonella control regulations, animal feed regulations, IPPC compliance and an imminent end to intensive cage systems for poultry across the EU. In terms of their operational effectiveness (see section 7.4) it can again be argued that these are perceived, rather than actual constraints in terms of market access and their competitor's requirements to 'comply' also.

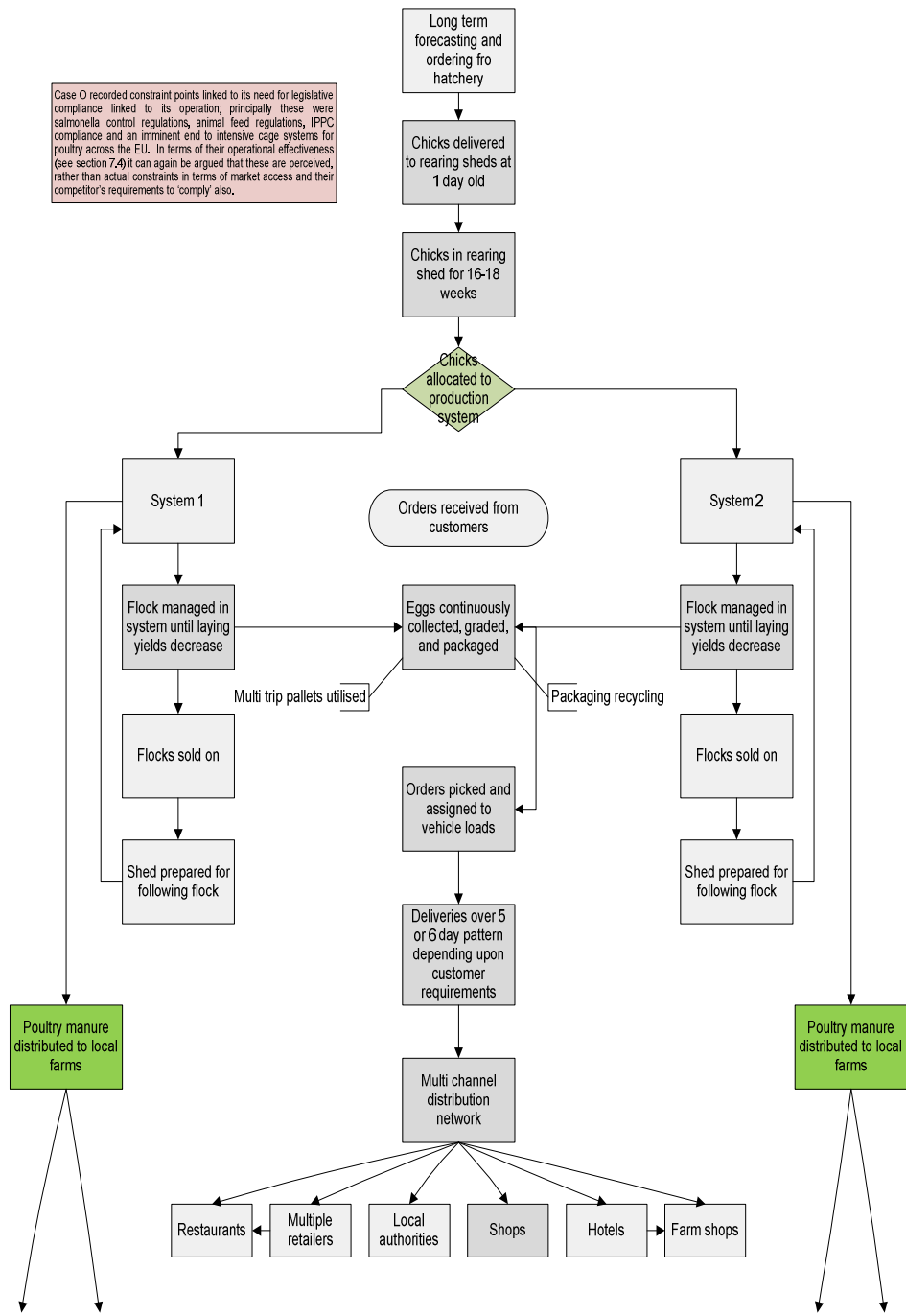


Figure 31 Case O: Rearing, laying & egg distribution process

5.17 Case Study Partner P

Case Study Partner P is located on the northern edge of the New Forest, 12 miles south east of Salisbury and 15 miles north-west of Southampton. It is part of the 3,000 acre Hamptworth Estate and has been farmed by the same family for 39 years. In addition to the three family members, the farm also employs a dairy person, tractor driver, cheese maker and vegetable crop supervisor. The principle farm activities are dairy, organic vegetables and an artisan cheese production facility which draws all of its milk requirements from their own herd of 180 Friesian cattle. Small volume butter production also occurs for sale at farmers' markets and there is also a small farm shop on site which opens seasonally. The post code of the farm and its geographic location tends to push most of its supply of 'local' foods in a westward direction under the current guidelines of their principle supermarket customer.

The farm currently has 37 hectares under organic management. It has farmed organically for ten years and is a long standing member of the Soil Association. The principal organic crops grown currently include sweet corn, pumpkins and squash, although the farm has also grown runner beans, carrots, courgettes and broad beans under the same organic system. The farm is an established supplier of organic vegetables to Waitrose and Riverford.

The cheese manufacturing operation produces a range of hard cheeses which are textured between continental Gouda and a traditional English Cheddar; it also produces a range of infused cheeses and at the time of interview (January 2008) was developing a new cheese product which will have similar characteristics to Tomme de Savoie type cheeses. The cheeses have won many awards at regional, national and international cheese shows.

There are four main routes to market for the chesses; farmers' markets, direct sales, which are developed and maintained by the family, cheese wholesalers and sales to a multiple retailer. Direct sales are multiple channel category across the food service and food retail sectors, including

restaurants, hotels, cafés, speciality shops, butchers, delicatessens and niche food service companies. Case P also supplies cheeses for British Airways 'club' and 'business' class food service. There is also a small but well established export market to France, Germany, Japan and the USA.

Case P was involved in the initial development of farmers' markets during the late 1980s and they still consider this as a very important route to market, accounting for more than one third of the annual cheese production. Case P sells at farmers' markets in Winchester, Petersfield, Southsea, Basingstoke and Southampton. At interview it was identified that personally undertaking the representation of the products at farmers' markets, in addition to managing the farm placed considerable time and travel constraints upon the owner. The hours committed to this enterprise far exceeded what many of us would consider to constitute a reasonable working week however, Case P believes that it is very important to be able to connect directly with customers, develop relationships with them and help the wider public to re-engage with farming and food production. This desire to re-engage extends beyond the farmers' markets, Case P also organises educational visits to the farm by both members of the public and employees of a major multiple, with particular emphasis being placed on employees who may come into contact with his products at point of sale.

The business has its own delivery van, but it is important to note here that Case P has established an informal distribution network entity with two other local cheese makers, which they believe is underpinned by shared values linked to the integrity and provenance of their products. This has allowed for the development of a more diverse range of cheese products travelling to farmers' markets and direct sales customers as well as exposure to a wider geographic area of markets including London.

The business encountered significant problems whilst recently recruiting a skilled cheese maker, despite extensive local advertising there was little interest in the post, with the incumbent cheese maker returning to Poland. Although the vacancy has been filled, (the new cheese maker was about to commence employment just a few weeks after this interview), the business

had to find someone who is relocating south some 440 miles and will have to undergo an extensive training program. Failure to overcome this issue could have impacted upon the development of the cheese business, which had recorded an increase of 16% over the previous 12 months.

The business has held SALSA accreditation since 2007, which has helped to overcome many of the drawbacks and costs related to SAI Global/EFSIS and British Retail Consortium (BRC) audit systems. The SALSA system is able to address and manage all of the most salient standards and processes identified in these larger audit systems, which are primarily aimed at larger enterprises and place significant cost and time burdens upon smaller producers.

Although the business has been asked to supply its products to other major multiples, it is currently unwilling to do so at the price points indicated by these prospective customers. Analysis of these price points indicate that production, packaging and distribution costs would not be adequately addressed at the prices offered by these major multiple retailers. Case P feels that this is mainly attributable to the mind set of many purchasing professionals working in this field, who refuse to see beyond the model of food category as a price led commodity.

A product distribution flow diagram (Fig 32) for Case P appears on the next page.

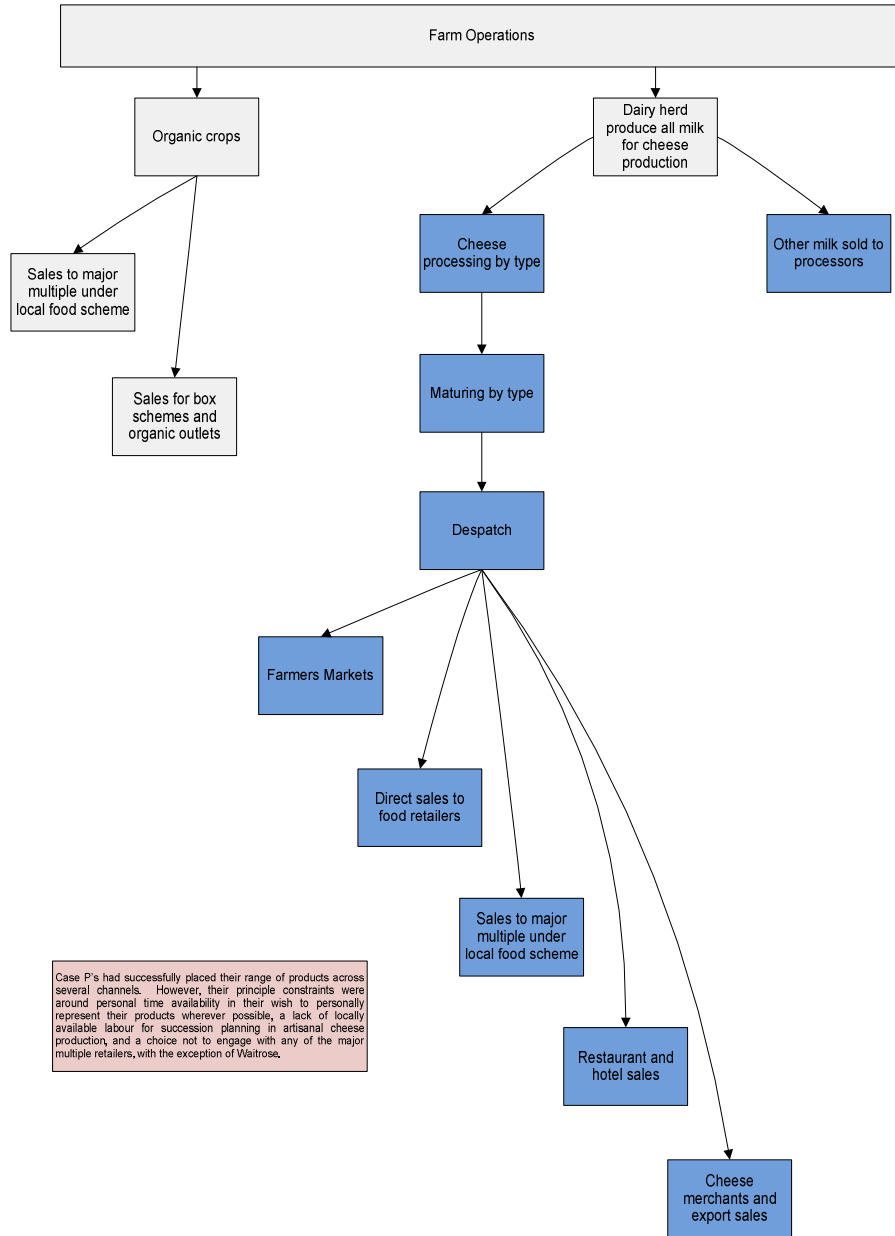


Figure 32 Case P: Manufacturing & distribution

5.18 Case Study Partner Q

Case Study Partner Q is located in a small village which is situated 13 miles north of Christchurch. At the time of interview (January 2008) the company employed four full time members of staff and one part time member of staff. The recent history of the company is unique amongst the case study partners, in that it has been purchased to establish a route to market for an innovative packaging product which was under development at the time of interview; a collapsible concertina design bottle which is moulded from Poly Lactic Acid (PLA), a plastic manufactured from a corn base. The bottle design has been developed to be readily recognisable for ease of separation at sorting stations. They are readily compostable and biodegradable, and the bottles can be composted under commercial composting conditions; typically this is $>60^{\circ}\text{C}$ to overcome the 'glass transition' temperature of PLA which is just below 60°C . The composting rates are 90% within 60 days and the remaining balance composted within 90 days. PLA plastics look like traditional petroleum based products; they are highly transparent and share many of the physical attributes of polyethylene terephthalate bottles (PET), currently the most commonly used material for plastic water bottles. PLA bottles require 25% less energy at manufacture and produce only half the carbon dioxide of like for like PET products. PLA is manufactured by a company based in the USA which is wholly owned by a global, multi- billion dollar company.

Whilst Case Q has continued to develop the new product and potential market in relationship with a multiple retailer for initial trials in London convenience stores, there has been a comprehensive overhaul of the inherited existing business operation. This has included the redesigning and re-launching of container ranges and labels, as well as the introduction of a range of glass bottles for a premium product category also. This strategy has lead to significant year on year increases in sales over the previous two years. The company has been particularly successful in developing local markets for its range of glass bottled waters in niche higher end hotels. The established range of conventional bottles, closures, labels and transit packaging are all manufactured from readily recyclable materials.

The existing extraction and production facility has been upgraded with the acquisition of a small automated bottling line and the filtration system from the artesian aquifer bore hole has been upgraded to a multi stage, back wash system which filters out particulate at separation rates <2 microns.

Orders for the products are placed by fax, email and telephone to Case Q or directly to the distributors who pick up from the site by case and pallet configurations. Local deliveries are made under a multi-drop system, which also includes crate management arrangements with certain customers, whilst there is also a small amount of 'factory gating' and direct delivery by the factory. Deliveries further afield utilise third and fourth party logistics companies either at the direction of Case O, or as part of the extended networks accessed by the distributor. The water is supplied across channel categories in the food service and retail sectors, and Case Q identifies that marketing activity by the current distributor has also driven sales growth in addition to the direct marketing carried out by Case Q.

The company is a member of Hampshire Fare, a regional food group, and the New Forest Marque Business Partnership, which has been created to develop a readily recognisable sign which identifies products as originating in the New Forest.

A process flow diagram (Fig 33) for Case Q appears on the next page.

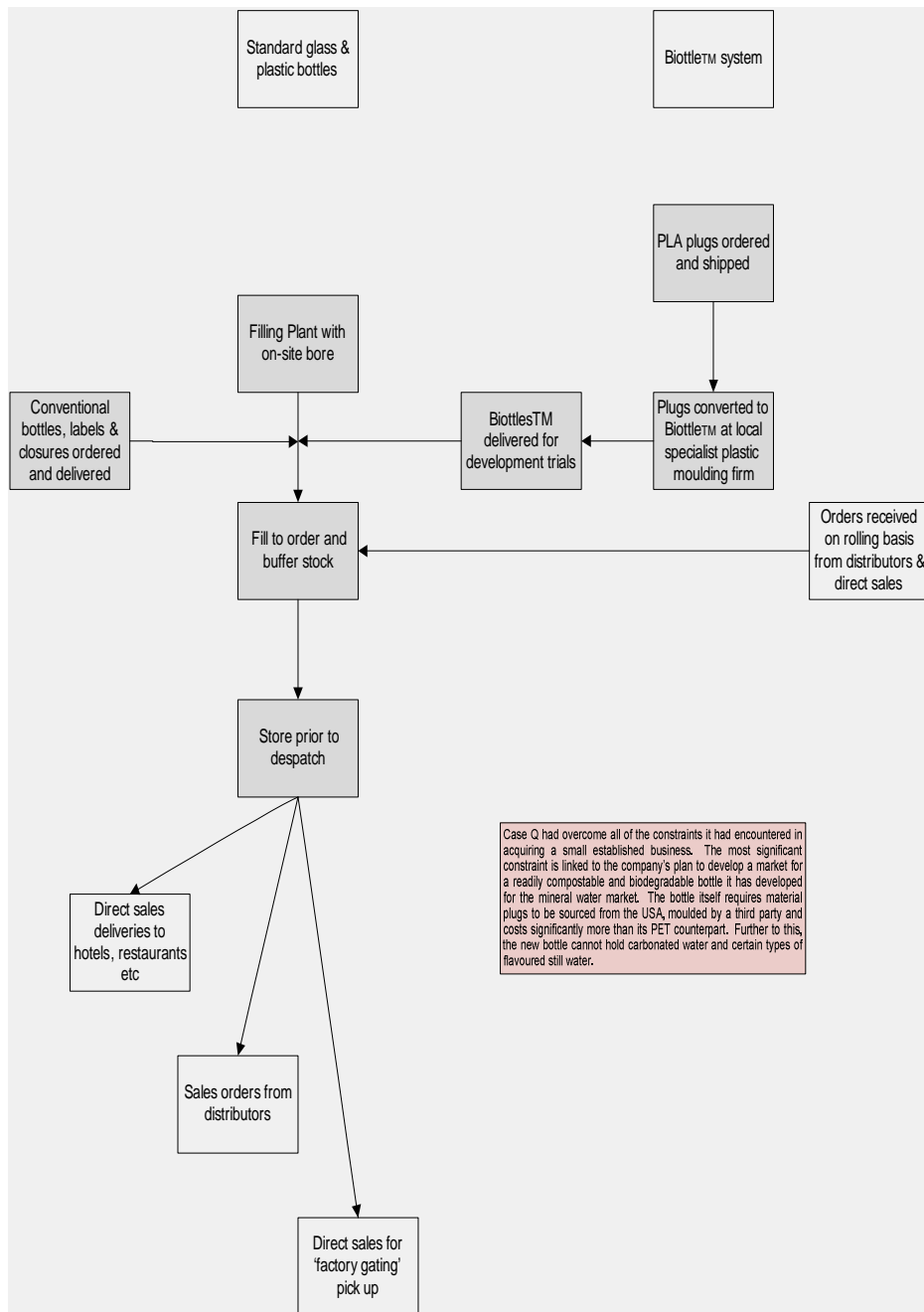


Figure 33 Case Q: Manufacturing & distribution

5.19 Case Study Partner R

Case Study Partner R is located near the small village of Warkworth, Northumberland, which lies 30 miles north east of Newcastle upon Tyne and 7 miles southeast of Alnwick. The village itself is largely dependent upon tourism, contingent to both day and holiday visitors. There are many weekend second homes and 'holiday lets' properties in this small town, which is a pattern repeated upwards along Northumberland coastal towns and villages. The average commuting distance for residents of the village travelling to work is 16 miles.

This butchery business was formed two years ago and is located on a fourth generation, 850 acre tenanted farm raising beef cattle, sheep and rare breed pigs. At the time of interview (January 2009) Case R employed two full time staff and one part time staff member. In addition to this, there are as seasonal employees who are employed in the coffee shop during the spring and summer seasons, there is also an onsite butcher's shop which is open seasonally too. Since its inception, the company has managed to develop a customer base which stretches more than 50 miles to the south (Durham), although a significant proportion of its business occurs as a result of supplying into Tyneside and its surrounding areas. The business has been awarded a gold medal at the Guild of Fine Food's 'Great Taste Awards' and is also a 'Rick Stein Food Hero'.

The meat used for the butchers and sold in the farm shop is almost entirely raised on the farm and travels 23 miles to an abattoir, which also supplies any supplementary meat requirements of the business, with carcasses supplied from local stocks of known provenance. In what is a current thread recorded in other interviews (Cases B and S, for example) for this research, Case R stated that they are limited to abattoir choice as a result of the closure of three local, small abattoirs. Whilst it would be expected that some small and medium sized abattoirs would have closed as a reflection of the changes in the ways in which we shop, there is still a strong feeling some 12 years after their introduction, that smaller abattoirs are significantly disadvantaged by disproportionate costs of meat inspection charges.

The company supplies a range of traditional butchery products to restaurants, delicatessens, cafes, hotels and pubs, as well as seasonal counter trade from the shop. Within this portfolio of products, the company has developed a niche for their sausages, pies and burgers; the pies have proven to be particularly successful and are based on recipes handed down to the company from a retiring cook. By virtue of its relative size in the marketplace, and its direct ordering and delivery strategy in which orders are taken by phone or in person at time of delivery, all of the orders are fulfilled within 24 hours. Case R has developed face to face personal relationships with chefs, and is able to coalesce with these customers to develop and introduce new products (blends of sausages for example). Case R believes and regards this approach as key to their continued involvement and records that acquiring new commercial customers is directly attributable to their ability to “knock on doors and offer a range of top quality products to the market” as well as word of mouth recommendations. At the time of interview Case R reported that contacts with the regional food group for their area have not led to new business opportunities, and it is thought by Case R that currently there is little scope to further develop this relationship within existing frameworks.

The business continues to strive for greater market penetration of its products; at the time of interview, the company had samples of its products being assessed by a multiple retailer for introduction at its Newcastle store under its local sourcing strategy. In addition, the company has submitted samples of its products into a national pub retail and brewing company; this particular company was about to change its sourcing strategy to allow individual managers to directly purchase certain local products.

There is a recognition as its client base increases, the company will have to supplement its employees’ HACCP training and skills with membership of a nationally recognised accreditation scheme. It has identified the Safe and Local Supplier Approval (SALSA), which has been developed to help local and regional food and drink manufacturers supply their products to national and other regional buyers, and Case R is currently taking its first steps towards membership. This recognition is largely due to Case R recently

declining a significant business opportunity which would have allowed them to employ an additional four members of staff. The company was approached by specialist food service group and asked to initially supply 130,000 pies over a 12 month period. This would have required a further investment for the company for equipment, recruitment and training which would have amounted to £40,000, however, the company were only offered a small proportion of this amount by government funding agencies, with further conditions and constraints placed upon funding, which would oblige the company to engage with a restricted range of skills sets providers linked to the agency, and delivering fixed cost provision which they believed further constrained choice.

Case R operates a flexible ordering system, orders can be placed by 'phone, fax and verbally at point of contact. An email option will be developed with the website. Deliveries are made to the customer during the same working day or the next day.

A company website has been constructed and is near to launch. It has been developed after receiving positive feedback from holiday visitors to the shop, who have indicated a desire to buy Case R's products throughout the year. The website will also allow for further development of the current ordering system and changes to labelling layouts and artwork will also allow further appropriate identification and placement of the company website.

The company would like to join a farmer's market scheme but have been refused permission on the grounds that there is already sufficient representation of meat products and butchers in the current local market profile. A similar problem has occurred when the company applied for permission to sell at a local town's open market which is two miles distant from their premises, but contains stalls of butchers travelling from Tyneside and Wearside to sell their products. Case R is currently appealing the decision.

A production and distribution diagram (Fig 34) for Case R appears on the next page.

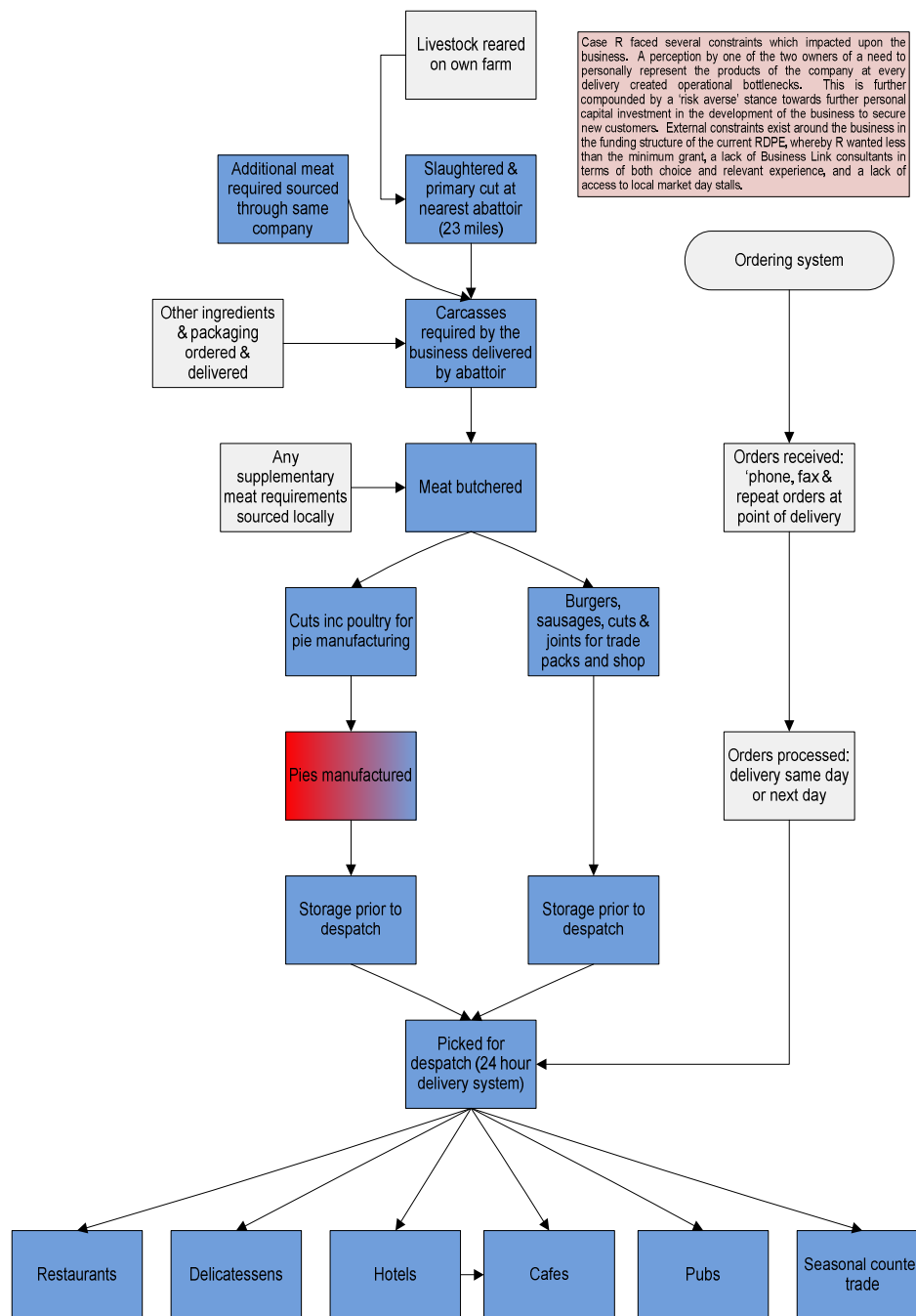


Figure 34 Case R: Farming, butchering, manufacturing & distribution

5.20 Case Study Partner S

Case Study Partner S is a farm-based business located near Clifton on Teme, which is situated 12 miles west of Worcester. The farm has been owned by Case S's family for five generations and it has been part of the Countryside Stewardship Scheme since 2001. The farm is spread over four blocks of land; the principal farm livestock activity is related to the management of a 350 head flock of breeding ewes which are divided into two lambing flocks producing Suffolk Cross lambs for meat and breeding. In addition to this, there is a herd of Hereford cattle, a herd of Tamworth breeding sows and a smaller flock of Ryeland sheep.

At the time of interview (June 2008) the cattle, pigs and sheep were all recognised as rare breeds. The farm raises lambs, pigs and steers from these rare breeds through to finished weights for its own direct meat supply operation (Case S). All of the animal stock is raised under non-intensive, high welfare systems. Pasture, land and feed management is at the forefront of the farming operation; the cattle are raised on a grass and silage only diet, whilst the grain feed for the pigs is sourced from local producers and is additive free.

This non-intensive, and what Case S believes to be a more sustainable farming system, in which the livestock are slower to mature to finished weight, underpins the 'alterity' of the closed loop system which supplies the direct meat sales operation and ensures complete provenance and security along the supply chain. The researcher notes that as well as the farm and its location representing what many people would regard as 'the perfect rural idyll,' it appeared evident from observation at the time of interview, that land and livestock management appear to be to very high exacting standards. During the interview it was identified by Case S that "we give the best life we can to the animals and it is reflected in the meat they give to us." The

business holds CMI⁴¹ accreditation and both Case R partners have successfully undertaken HACCP⁴² training.

A local, rural abattoir is used to address the needs of the business. Animals are taken to the abattoir 'just a few at a time' and are processed at the start of the day before stocks from other farms arrive, which Case S believe is important for the welfare of their animals. Case S has a cold room facility 3.5 miles away from the farm for temperature controlled maturing and storage, the beef is matured for a minimum of 28 days.

Case S retail beef in boxed packs containing a selection of cuts, pork is sold as carcass, half carcass or a boxed pack of cuts, whole and half lambs are available to order, although the lamb meat is generally sold in boxed packs of cuts. The range of products is available throughout the year and is supplemented by Holly Bronze turkey for Christmas sales.

The meat is currently sold across channel / retail categories and into the value added food service sector with delivery being undertaken by the company directly. Case S notably supplies meat to luxury hotels and 'high end' restaurants in the local area and extending into the Ludlow market. The company also sells its products at a local farmers' market and makes approximately 200 direct sales of front door deliveries annually. The questionnaire also records that many repeat customers prefer to travel to the farm to pick up their orders from the 'farm gate.' Case S's products can be ordered by mail order, telephone, email and an internet portal, as well as re-order at point of delivery.

It was identified during the interview that there has been a gradual reduction of long established informal supply chain networks once common in rural areas, which were typified by loose trading systems, mutual benefit and

⁴¹ CMI is Europe's largest certification provider in the food and farming sector, currently certifying over 40,000 clients (Feb 2009).

⁴² HACCP Hazard Analysis and Critical Control Points; a systematic approach to preventative controls and management systems which is widely used in food manufacturing, identifying and controlling biological and chemical hazards and developing preventative control systems.

common need. Whilst this has not significantly reduced the ability of Case S to deliver their products to market, the partners firmly believe that the demise of these informal networks has a wider impact upon rural communities.

The farm has established links with several local education authorities and organises field trips from a range of schools. The visits are structured to encompass all aspects of the farm and its management of livestock, pasture, orchard, hedgerow and water courses. Case S opines that it is vital that children from urban communities, regardless of their background, are encouraged to connect with farming and develop greater understanding of the food chain including livestock rearing, crop growing and countryside stewardship, although they do identify that this needs to be a long term exercise which extends beyond a single generation. The farm has worked with the Herefordshire Healthy Schools Initiative on educational visits linked to legacy projects from the 'Year of Food and Farming'⁴³ program.

A process flow diagram (Fig 35) for Case S appears on the next page.

⁴³ <http://www.thinkfoodandfarming.org.uk/>

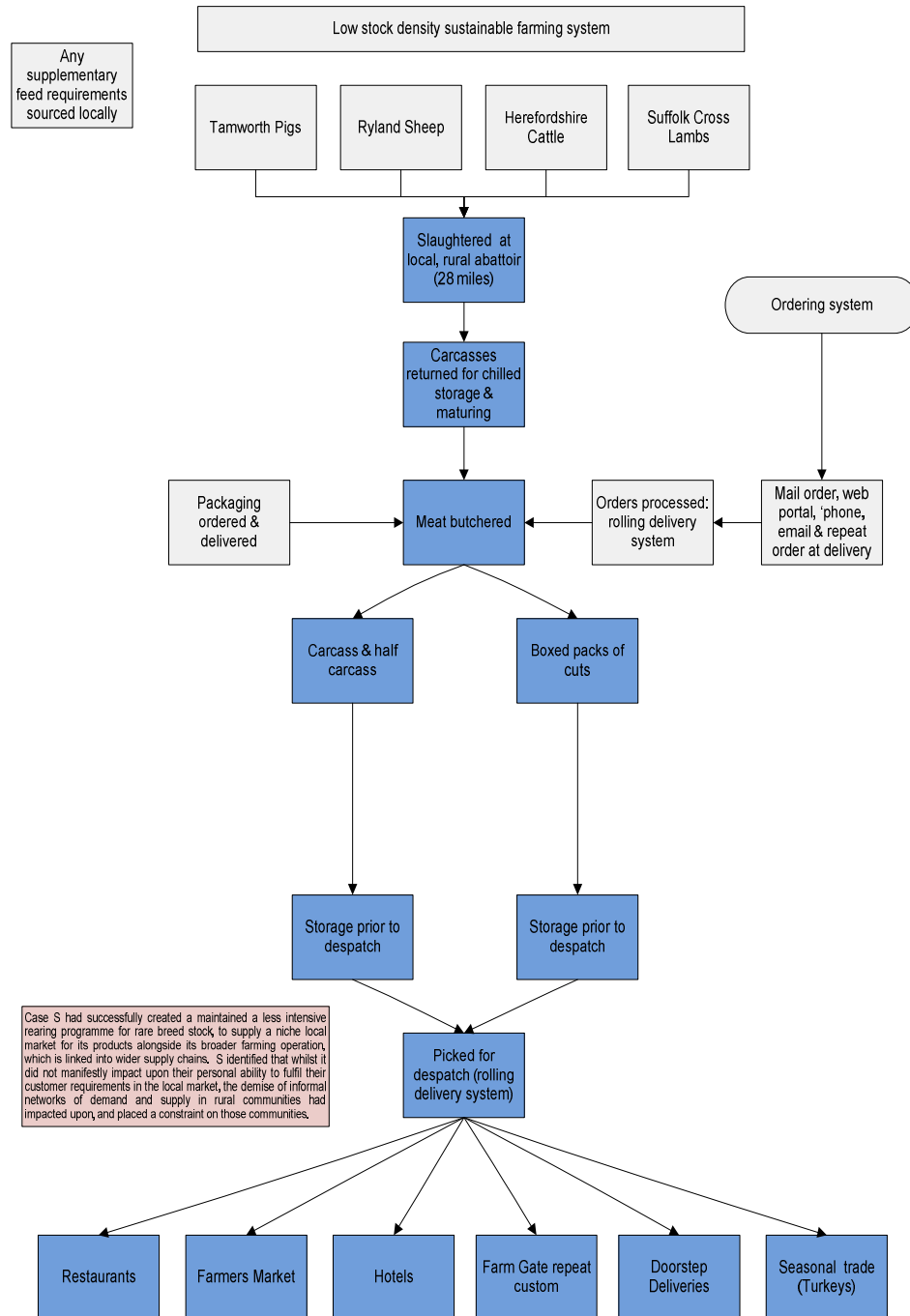


Figure 35 Case S: Farming, butchering & distribution

5.21 Case Study Partner T

Case Study Partner T is a farm shop located on the homestead farm of Case J, although it is owned and managed separately from Case J. It is situated 15 miles north of Lincoln and 9 miles north east of Gainsborough. As well as the farm shop, the facility also has a café and meeting / education rooms. The farm shop business has been a finalist in the Radio 4 Food and Farming Awards. In this case study, I have considered the company's sausage manufacturing, as it represents an example of the relatively late stage in which much food becomes local, as well as representing a clear example of how local food sits as a niche within larger, standardised production systems, without which, it would be difficult to sustain the niche local streams, whilst further highlighting the issue of a willingness on behalf of the consumer to conflate terms and overlook certain aspects of food production across scale. This production scenario also stands as a direct comparison with Case K's sausage manufacturing.

The main focus of the shop produce is that it is fresh and seasonal. All of the employees at Case T are locals, the butchery forms a major part of the farm shop and it is serviced by a full time on-site butcher and a part time butchery assistant. All of the pork sold in the farm shop is 'home-grown'⁴⁴ Hampshire breed and has been supplied by Case J. It is identical to the pig meat from stock born, raised and finished for supply to a large meat processing company which sells all of its products into national supply chains. The other meats on sale in the farm shop are also butchered on-site, with the animals being born and finished on Lincolnshire farms and bearing the 'Lincolnshire Quality Standard' mark. In addition to the meats, fruit and vegetables sourced locally, regional pickles, jams, preserves and specialist foods / ingredients from further afield are also available for sale.

The butcher working at Case T processes ten carcasses per week. These pigs have been slaughtered at the Case V abattoir in Skegness. Case J sends, on average, 70 pigs per week to this abattoir for slaughter, with the

⁴⁴ This 'home grown' description is an example of a willingness to conflate and blur on behalf of the producer and consumer, overlooking the intensive pig husbandry and rearing methods employed.

balance being supplied to the Lincolnshire Co-operative Wholesale Society and local butchers. Although this abattoir is 53 miles from the farm shop, the animals have been placed there as Case J believe that the abattoir is closely allied to their own beliefs relating to local food production and its positive impacts and benefits within the communities where it is grown and processed. It should also be noted that the distance travelled to and from the abattoir should be considered within the context of many local abattoirs closing as a direct result of proportional charges for hygiene inspection and management. Many, including Cases B, P, R and S in this research, still view this as an 'unfair' levy which allowed larger abattoirs to gain a further advantage due to economies of scale. During the interview (October 2007) it was clearly observable that the owner of Case T believed that the benefits of local produce sold locally are far more manifest than the operating profit generated by the shop business itself, further, that they extend into the local community in terms of employment, sustainability and transference of money from urban to rural economies. Whilst these may seem as extraneous benefits, it appeared upon visiting the café, shop and car park that there may be enough evidence to suggest that this particular enterprise ostensibly benefits the local economy by attracting incoming urban visitors on specific journeys to the countryside. Once the carcasses have been delivered to the butchery at Case T they are placed in a temperature controlled 'cold room' for a minimum of 24 hours at 4°C. After the carcass has been butchered down to joints, chops, cuts, trims and meat for sausage, they are placed back in the 'cold room' or else supplied to the shop display fridges and café kitchen as required.

Sausages are manufactured three times per week, with an average weight of 200kg of sausages being produced per week. The meat for the sausage is minced and then blended with a number of ingredients, which differ depending upon the specification of the sausage being manufactured. Although all sausages produced at the butchery have an 80% minimum meat content, all of the additional ingredients and the casings are purchased by the farm shop and the sausages are hand filled into the casings and hand linked. The finished links for sale are sealed in a labelled bag and held in the

'cold room' until they are placed in the fridge display cabinets of the farm shop, whilst the finished links for use in the farm shop café are returned to chilled storage.

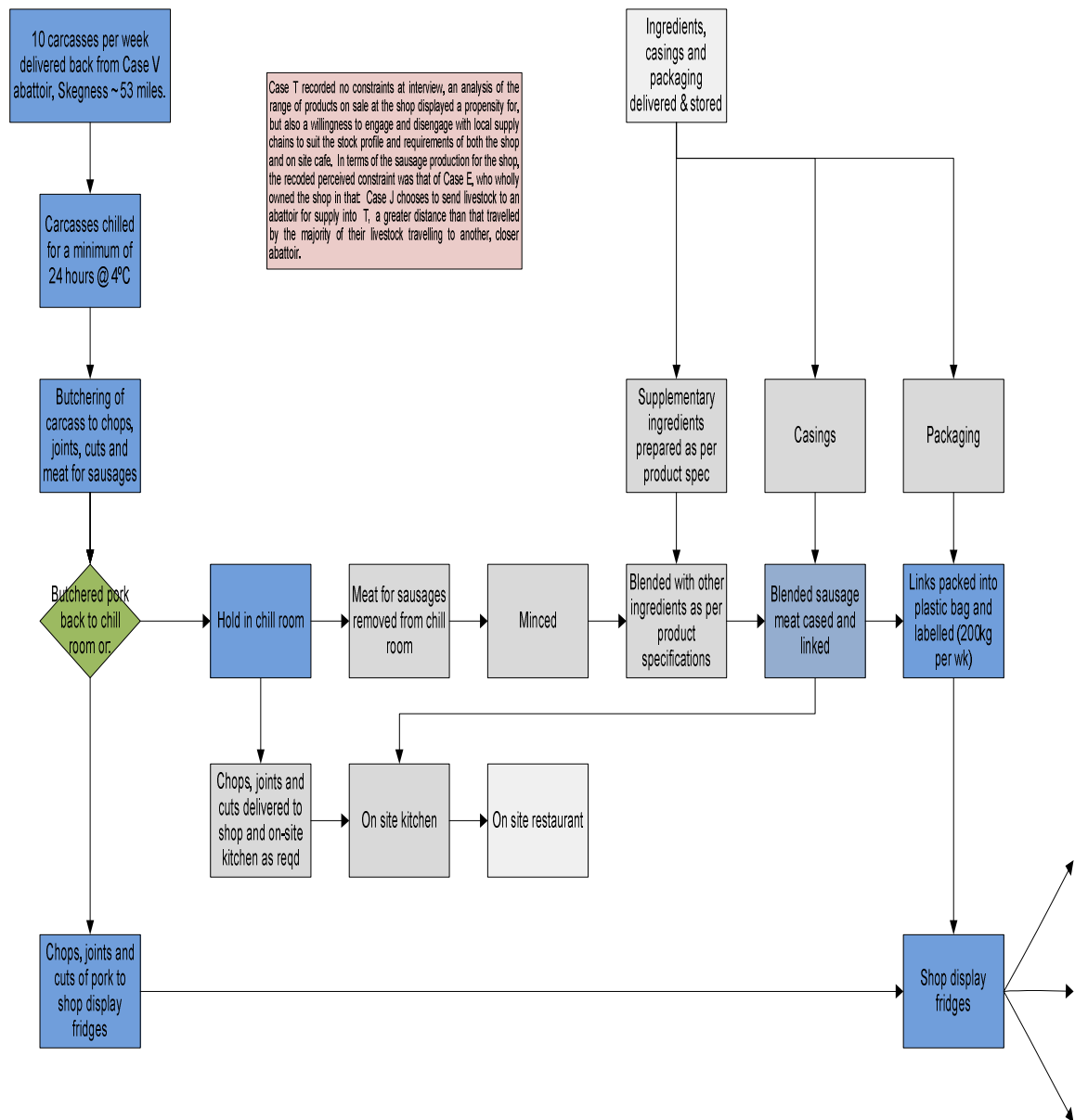


Figure 36 Case T: Sausage manufacturing at the farm shop

5.22 Case Study Partner U

Case Study Partner U is based in Peterborough, and is a wholly owned subsidiary of a global ingredient, food manufacture and retail company with a multi-billion pound turnover. Case U itself has seven subsidiaries feed companies in the UK and a further subsidiary company, which is one of the largest feed manufacturing companies in China. Case U was instrumental in the introduction to cases E, F and J through the DEFRA project FO 0104 described in the introduction chapter.

This research considers very briefly Case U's feed mill operations. Case F supply Cases E, F, J and W with their pig and bird feed regime diets from two of these mills. Case J also supply Case F's local feed mill with their cereal crops. Case U sources the constituent parts of its animal feed, both nationally and internationally (mainly soya and maize), and is the third largest feed manufacturer in the UK.

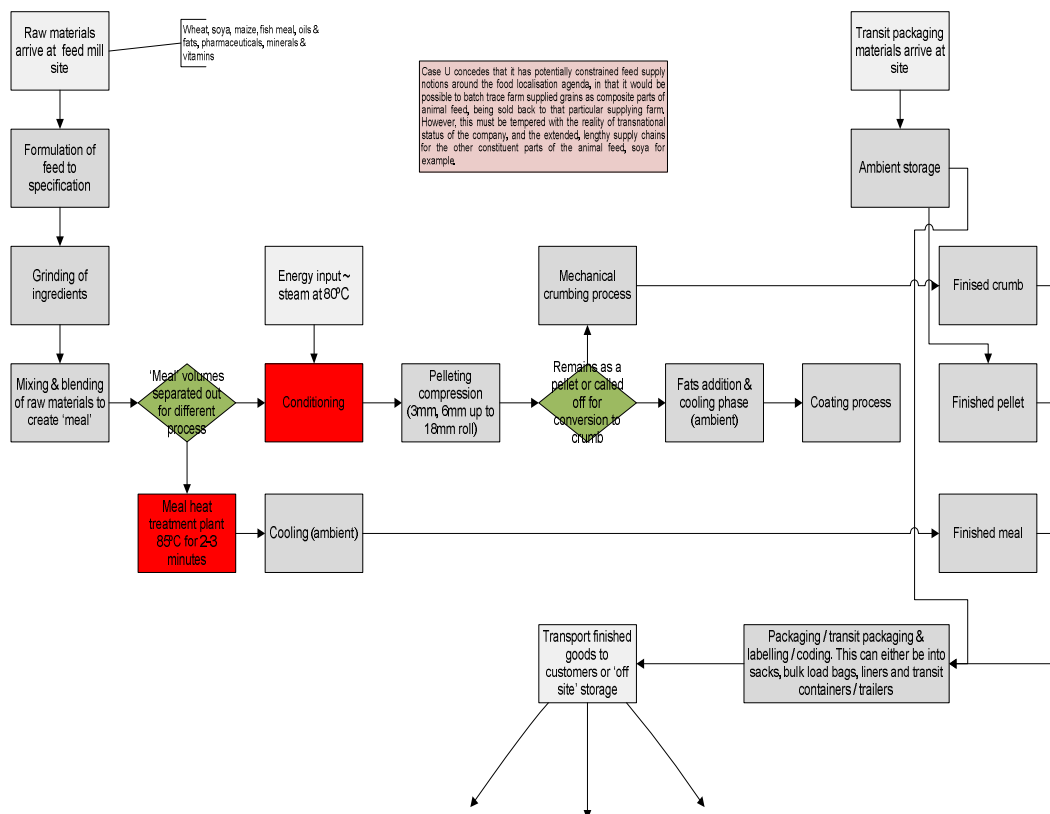


Figure 37 Case U: Typical flow for feed mill operations

5.23 Case Study Partner V

Case Study Partner V is an abattoir located near Skegness, which at the time of interview (May 2008) employs 32 members of staff in an area with the highest rate of unemployment in Lincolnshire, which was recorded at 5.3%.

Case V slaughters and primary cuts pigs supplied by Case J; ten of these carcasses are then supplied to the farm shop Case T. The abattoir had been purchased by Case V in 2006 and undergone modernisation which has led to the redesign and re-equipping of the slaughter lines, as well as new lairage areas, boning rooms, chillers and a packing room. In addition to pig slaughtering, the abattoir also slaughters sheep and cattle. Case V also slaughters animals as part of the Lincolnshire Quality Beef, Lamb and Pork Scheme which is a collaborative red meat venture founded around a co-operative supply base of 90 Lincolnshire farmers. The animals from this supply base are sent to Case V for slaughter, cutting and processing, the products are then supplied to 68 Lincolnshire Co-operative Society shops and independent butchers throughout the county. Not all of the animals reared on these farms go to Case V, for example, the pigs sent for slaughter by Case J represent only a small proportion of the 50,000 pigs sent for slaughter each year; the majority of these pigs are sent to an abattoir owned and operated by Case J's biggest customer.

Case V believes that the long term viability of the abattoir is based upon its ability to increase throughput from its customer base, increase that base in order to reduce slaughter costs per head of animal, and develop both export and premium markets. It is included in this study as it closes the loop around Case J and Case T, and further, as an example of an abattoir which is in the middle ground, more resistant to the inspection charges and hygiene compliance than smaller, rural abattoirs have found too great to bear, but an operation ultimately at the mercy of the market and farmer choice, which may in turn may well be linked to contractual obligations with wholesalers and multiple retailers. The process flow is focussed upon the slaughter and primary processing of pigs, there is a great deal of commonality with the

process flow present at Case E's abattoir in a vertically integrated supply chain.

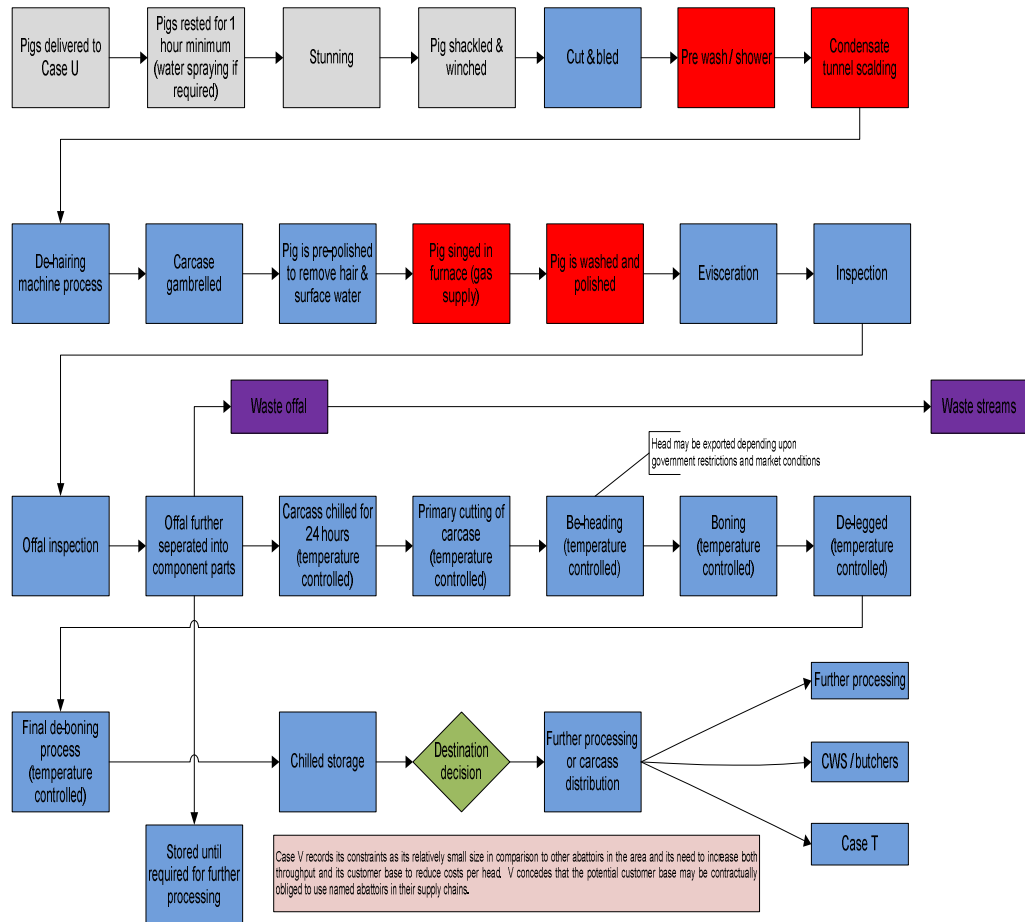


Figure 38 Case V: Abattoir process for pigs

5.24 Case Study Partner W

Case Study Partner W is located 14 miles east of York and is contracted to raise poultry for Case F through to finishing weight. In addition to owning eight of their own rearing farms, Case F, at the time of interview (April 2008) contracted the services of a further 36 'contractor rearing farms' located across Lincolnshire and Yorkshire to furnish the needs of their central processing plant in North East Lincolnshire.

As well as the contract 'growing' of the birds, Case W also has 100 hectares of mixed arable crops; the majority of the land is given over to combinable crops (wheat and barley) as well as a small amount of rape and potatoes. The litter from the 'duck house' (approx 1,200 tonnes per year) is incorporated into the farm cropping system, whilst the water used in the duck house is irrigated on to crops.

Case W follows management operating system protocols and specification set by Case F, which manages the rearing of the ducklings to the same feed regime and welfare standards that the ducks would be raised to if they were being raised and finished on a farm owned by Case F.

The average cycle time for raising a duck to its finishing weight of 3.5kg is 63 days. The birds are delivered to the farm at one day old from one of the hatcheries. In the year preceding this case study, Case W raised 209,187 birds to the target finishing weight, consuming 1,612 tonnes of feed which consisted of four different feed types. The management of the feed stocks and the logistics of delivery are controlled by Case F; they are delivered as bulk loads from any one of several feed mills owned by Case U, in articulated trailers for transfer into feed silos.

The birds are subsequently transported 46 miles to the processing plant in North East Lincolnshire. This transportation phase occurred 66 times over the same period of time with an average of 3,200 birds per delivery. Both the deliveries of birds and the 'pick ups' of the finished birds are made in specialist, dedicated articulated vehicles > 33 tonnes. As with the feed, all of

the logistics requirements for the contractor farms and company owned farms are managed centrally by Case F.

The rearing sheds at Case W are more modern than those at the Case F-owned farm adjoining the processing plant site. One of the notable aspects of the more modern building is that it has a natural, automated ventilation system, as opposed to the electrical ventilation systems found in the Case F's growing sites thus, the electricity demand at Case W is considerably lower per bird. However, the 'leanness' of Case W extends beyond electricity consumption; side by side analysis of Case W and a Case F-owned growing farm also revealed that, although the company owned growing site raised nearly three and a half times more birds (751, 722 birds) over the same period, possible economies of scale were not being achieved.

In addition to the power and fuel consumptions, this research has further identified that although the birds follow the same feed regime and are reared under the same welfare standards, with all 36 of the contractor farms being subjected to a rolling audit scheme and spot checks, Case W:

- Uses less water per bird as part of the growing process;
- The birds at Case W require less feed per bird to achieve the contracted 'finished' target weight;
- The recorded mortality rate of fallen stock was less at Case W;
- Managed to achieve a higher output of finished weight birds per employee than that of the company owned growing site;
- Operational CO₂ equivalents for the growing cycle per finished bird were significantly lower excluding logistics and feed manufacturing impacts.

Many of the underlying reasons for Case W achieving a higher operational efficiency despite raising significantly fewer birds may lie within the business model of Case F, whereby different parts of the operation are run as cost

centres, under which operational efficiency is driven and measured by accounting methods.

Case W records that it believes considerable constraints are placed upon their operation from both business and legislative aspects, in relation to future return on investments, and the ongoing requirements of the Integrated Pollution Prevention and Control regulations (IPPC) that they are obliged to manage.

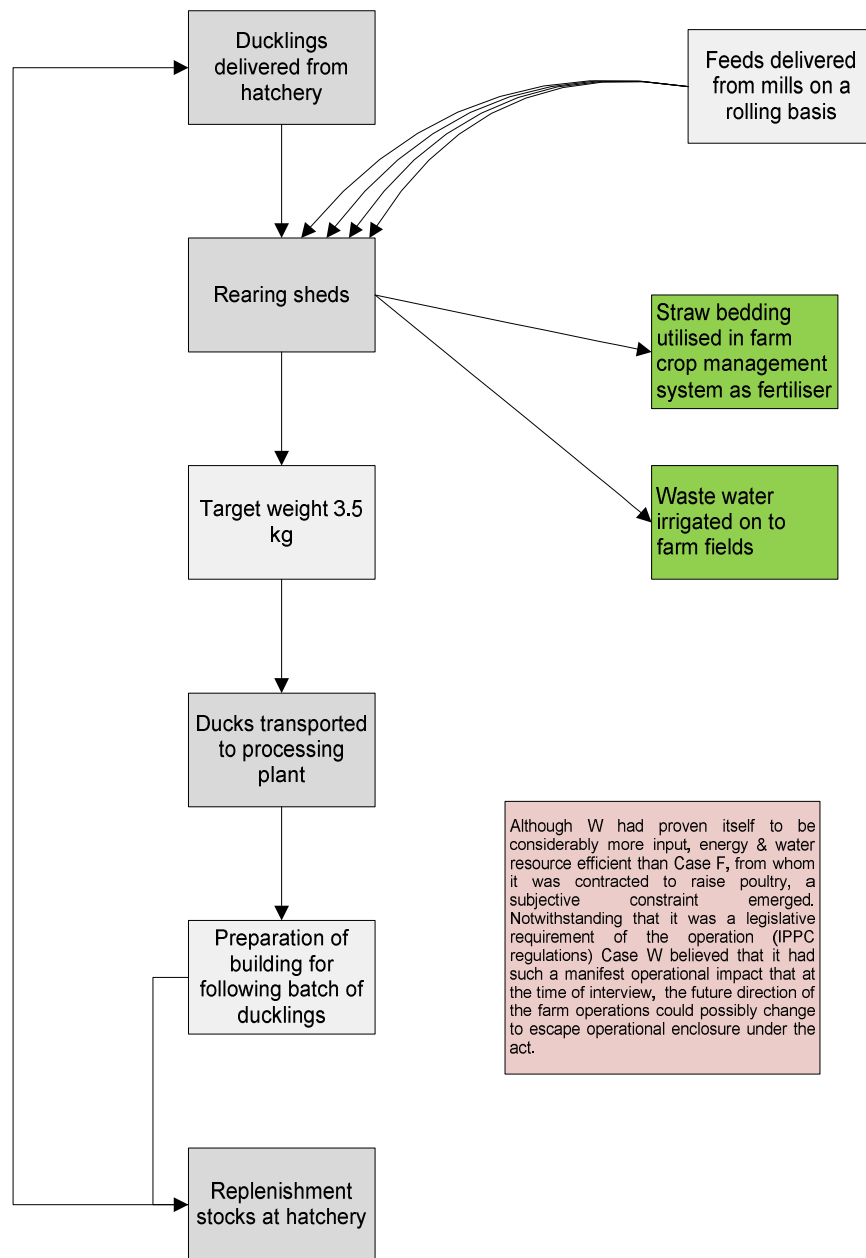


Figure 39 Case W: Contractor poultry rearing process

6 Findings

6.1 Introduction to Findings

This research has adopted Template Analysis as a systematic tool which has allowed for a consistent examination of the research data. The *a priori* codes themselves emerged from considerations of the research question, literature reviews and fieldwork. These *a priori* codes are:

- Constraint points
- Commercial operations and logistics
- Collaboration
- Policy
- Localisation
- Animal welfare

As previously recorded in the Methodology chapter, King (2004) positions template analysis between the Content Analysis and Grounded Theory tools as a more suitable instrument for the thematic analysis of texts. Template analysis is a highly iterative process which allows for the categorisation and data reduction of texts. It requires the researcher to read through the case material, identifying and highlighting any evidence which emerges that is relevant to the research question. The actual template acts as a tool in which the researcher can place the case evidence following the introduction of the key themes as code. As the qualitative data is analysed, second and third order themes and proposition begin to emerge, which are themselves relevant to the research questions. As these emerge, the texts which have already been analysed should be revisited to see if the emergent evidence may also be present within them.

In this case, therefore, the researcher was looking for evidence that was attributable to local food and food localisation operations within the contexts of constraints, commercial operations, collaboration, policy, localisation and animal welfare. This highlighted evidence, which was case specific, was then translated into a more generalised proposition or statement that varied

according to the subject issue. For example, a piece of very clear evidence was found in one case study (Case R):

“I know fine well that it is important for me to make the deliveries and speak to the chefs personally, and I need to do that as soon as possible, whether they are in the town or out towards Durham. It’s what I think they need, and it’s what they get. They never complain about the service.”

Although this is not a specific journey under discussion, the quote suggests that transit in vehicles which transport less, but use proportionately more fuel (per kg mile) are less resource efficient. This supports the more generalised proposition that:

- Local food suppliers respond to small scale demand but are required to still deliver on time, which leads to inevitable logistical inefficiency.

This proposition becomes the statement that enters the template as a factor that represents a constraint to localising food supply chains. Coding derivation also allows for the development of a constraint point code and further, whether it is perceived or actual. For example, would Case R’s business have been better able to cope with the demands of short notice requirements and planned production orders if Case R were to have introduced a delivery system where they did not personally represent their products, but visited each customer by arrangement at set intervals?

Continuing the template analysis in this research thus required that each set of case study evidence was scoured for such clues, quotes and tenets.

However, although one might have expected something new to be revealed by each new case, as the analysis continued, repeated propositions inevitably started to emerge under a constructed lens of coding, suggesting that each additional case study had a diminishing marginal benefit to the overall template.

King (2009) suggests that because there are other ways of interpreting qualitative data sets, there is no stage where you can say with absolute certainty that the template is 'finished', but a point will be reached where further investigation yields little additional benefit. This is the point of saturation - where no marginal benefit is derived through further case analysis, no additions are made to the list of first-order propositions and a 'final template' is reached. Of this point, King (2009) states:

You can never reach a 'final' template, in the sense of it being one that is incapable of revision to useful effect. But on pragmatic grounds, you can apply a law of diminishing returns to recognise when the amount of time and effort involved in recoding the data is simply not repaid in terms of meaningful enrichment of your understanding.

(King, 2009)

In this research, this final template would reveal itself be the one that provided an exhaustive listing of all propositions that relate to constraints to the logistics and distribution barriers faced by local food supply chains and food localisation where additional case evidence started to add zero marginal benefit to that listing.

Due to the size of the complete template, which extends across 11 pages, it appears as an appendix. The template contents are therefore summarised in the following sections and tables, as more presentable and readily digestible summaries of the template derived. What follows is a series of points and arguments that arose from the analysis and which present different categories of constraints. As a summary guide, the following tables and charts identify the case study partners from A-Z and the by size⁴⁵, whether they are geographically located in urban or rural areas, whether the operation is primary or secondary, the activity being undertaken by type, and finally, the sector of operation.

⁴⁵ HM Revenues & Custom define SMEs by head count: Micro <10, Small <50, Medium <250, Large >500

IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN / RURAL	PRODUCTS	ACTIVITY ~ PRIMARY or SECONDARY	TYPE OF ACTIVITY	SECTOR
Case A	Micro	London	Urban	Sauces & pickles	Primary	Manufacturer	Food manufacture
Case B	Micro	Hampshire	Rural	Chilled ready cook meals	Primary	Manufacturer	Food manufacture
Case C	Micro	Herefordshire	Rural	Botanical extracts	Primary	Manufacturer	Ingredients
Case D	Small	Sussex	Rural	Pasta, sauces & cheese	Secondary	Manufacturer	Food manufacture
Case E	Large	Norfolk	Rural	Red meat	Primary	Farming & processing	Red meat
Case F	Large	North Lincolnshire	Rural	Poultry	Primary	Farming & processing	Poultry
Case G	Micro	North Yorkshire	Rural	Meat / Veg / Dairy / Pickles etc	Primary	Wholesaler	Wholesale
Case H	Large	Northumberland	Urban	Fishcake cores	Primary	Manufacturer	Seafood
Case I	Micro	Hampshire	Rural	Fresh milk & cream	Primary	Farming & processing	Dairy
Case J	Small	Lincolnshire	Rural	Pigs	Primary	Farming	Red meat
Case K	Small	West Midlands	Urban	Red meat	Primary	Processor	Food manufacture
Case L	Medium	Tyneside	Urban	Cheese products	Primary	Processor	Food manufacture
Case M	Medium	County Durham	Rural	Cooked poultry	Primary	Processor	Food manufacture
Case N	Micro	Tyneside	Urban	Fresh seafood	Primary	Processor / retail	Retail
Case O	Small	County Durham	Urban	Eggs	Primary	Farming / wholesale	Poultry
Case P	Micro	Hampshire	Rural	Cheese	Secondary	Farming & processing	Dairy
Case Q	Micro	Dorset	Rural	Water	Primary	Extraction & bottling	Drink
Case R	Micro	Northumberland	Rural	Pies & red meat	Secondary	Butchering & processing	Red meat
Case S	Micro	Worcestershire	Rural	Prepared red meat	Secondary	Farming & butchering	Red meat
Case T	Small	Lincolnshire	Rural	Farm shop	Secondary	Retail / food service	Retail
Case U	Large	Cambridgeshire	Urban	Animal Feed	Primary	Processor	Animal Feed
Case V	Medium	Lincolnshire	Urban	Red meat	Primary	Abattoir / butchering	Red meat
Case W	Micro	Yorkshire	Rural	Poultry	Secondary	Farming	Poultry

Table 11 Case Study Partners listed alphabetically

IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN / RURAL	PRODUCTS	ACTIVITY ~ PRIMARY or SECONDARY	TYPE OF ACTIVITY	SECTOR
Case A	Micro	London	Urban	Sauces & pickles	Primary	Manufacturer	Food manufacture
Case B	Micro	Hampshire	Rural	Chilled ready cook meals	Primary	Manufacturer	Food manufacture
Case C	Micro	Herefordshire	Rural	Botanical extracts	Primary	Manufacturer	Ingredients
Case G	Micro	North Yorkshire	Rural	Meat / Veg / Dairy / Pickles etc	Primary	Wholesaler	Wholesale
Case I	Micro	Hampshire	Rural	Fresh milk & cream	Primary	Farming & processing	Dairy
Case P	Micro	Hampshire	Rural	Cheese	Secondary	Farming & processing	Dairy
Case Q	Micro	Dorset	Rural	Water	Primary	Extraction & bottling	Drink
Case R	Micro	Northumberland	Rural	Pies & red meat	Secondary	Butchering & processing	Red meat
Case S	Micro	Worcestershire	Rural	Prepared red meat	Secondary	Farming & butchering	Red meat
Case W	Micro	Yorkshire	Rural	Poultry	Secondary	Farming	Poultry
Case D	Small	Sussex	Rural	Pasta, sauces & cheese	Secondary	Manufacturer	Food manufacture
Case J	Small	Lincolnshire	Rural	Pigs	Primary	Farming	Red meat
Case K	Small	West Midlands	Urban	Red meat	Primary	Processor	Food manufacture
Case N	Small	Tyneside	Urban	Fresh seafood	Primary	Processor / retail	Retail
Case O	Small	County Durham	Urban	Eggs	Primary	Farming / wholesale	Poultry
Case T	Small	Lincolnshire	Rural	Farm shop	Secondary	Retail / food service	Retail
Case L	Medium	Tyneside	Urban	Cheese products	Primary	Processor	Food manufacture
Case M	Medium	County Durham	Rural	Cooked poultry	Primary	Processor	Food manufacture
Case V	Medium	Lincolnshire	Urban	Red meat	Primary	Abattoir / butchering	Red meat
Case E	Large	Norfolk	Rural	Red meat	Primary	Farming & processing	Red meat
Case F	Large	North Lincolnshire	Rural	Poultry	Primary	Farming & processing	Poultry
Case H	Large	Northumberland	Urban	Fishcake cores	Primary	Manufacturer	Seafood
Case U	Large	Cambridgeshire	Urban	Animal Feed	Primary	Processor	Animal Feed

Table 12 Case Study Partners grouped by size of enterprise: micro, small, medium & large

IDENTITY	ENTERPRISE CATEGORY *	LOCATION	RURAL	PRODUCTS	ACTIVITY ~ PRIMARY or SECONDARY	TYPE OF ACTIVITY	SECTOR
Case B	Micro	Hampshire	Rural	Chilled ready cook meals	Primary	Manufacturer	Food manufacture
Case C	Micro	Herefordshire	Rural	Botanical extracts	Primary	Manufacturer	Ingredients
Case D	Small	Sussex	Rural	Pasta, sauces & cheese	Secondary	Manufacturer	Food manufacture
Case E	Large	Norfolk	Rural	Red meat	Primary	Farming & processing	Red meat
Case F	Large	North Lincolnshire	Rural	Poultry	Primary	Farming & processing	Poultry
Case G	Micro	North Yorkshire	Rural	Meat / Veg / Dairy / Pickles etc	Primary	Wholesaler	Wholesale
Case I	Micro	Hampshire	Rural	Fresh milk & cream	Primary	Farming & processing	Dairy
Case J	Small	Lincolnshire	Rural	Pigs	Primary	Farming	Red meat
Case M	Medium	County Durham	Rural	Cooked poultry	Primary	Processor	Food manufacture
Case P	Micro	Hampshire	Rural	Cheese	Secondary	Farming & processing	Dairy
Case Q	Micro	Dorset	Rural	Water	Primary	Extraction & bottling	Drink
Case R	Micro	Northumberland	Rural	Pies & red meat	Secondary	Butchering & processing	Red meat
Case S	Micro	Worcestershire	Rural	Prepared red meat	Secondary	Farming & butchering	Red meat
Case T	Small	Lincolnshire	Rural	Farm shop	Secondary	Retail / food service	Retail
Case W	Micro	Yorkshire	Rural	Poultry	Secondary	Farming	Poultry
IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN	PRODUCTS	ACTIVITY ~ PRIMARY or SECONDARY	TYPE OF ACTIVITY	SECTOR
Case A	Micro	London	Urban	Sauces & pickles	Primary	Manufacturer	Food manufacture
Case H	Large	Northumberland	Urban	Fishcake cores	Primary	Manufacturer	Seafood
Case K	Small	West Midlands	Urban	Red meat	Primary	Processor	Food manufacture
Case L	Medium	Tyneside	Urban	Cheese products	Primary	Processor	Food manufacture
Case N	Micro	Tyneside	Urban	Fresh seafood	Primary	Processor / retail	Retail
Case O	Small	County Durham	Urban	Eggs	Primary	Farming / wholesale	Poultry
Case U	Large	Cambridgeshire	Urban	Animal Feed	Primary	Processor	Animal Feed
Case V	Medium	Lincolnshire	Urban	Red meat	Primary	Abattoir / butchering	Red meat

Table 13 Case Study Partners grouped by geographic location: rural / urban

IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN / RURAL	PRODUCTS	ACTIVITY ~ PRIMARY	TYPE OF ACTIVITY	SECTOR
Case A	Micro	London	Urban	Sauces & pickles	Primary	Manufacturer	Food manufacture
Case B	Micro	Hampshire	Rural	Chilled ready cook meals	Primary	Manufacturer	Food manufacture
Case C	Micro	Herefordshire	Rural	Botanical extracts	Primary	Manufacturer	Ingredients
Case E	Large	Norfolk	Rural	Red meat	Primary	Farming & processing	Red meat
Case F	Large	North Lincolnshire	Rural	Poultry	Primary	Farming & processing	Poultry
Case G	Micro	North Yorkshire	Rural	Meat / Veg / Dairy / Pickles etc	Primary	Wholesaler	Wholesale
Case H	Large	Northumberland	Urban	Fishcake cores	Primary	Manufacturer	Seafood
Case I	Micro	Hampshire	Rural	Fresh milk & cream	Primary	Farming & processing	Dairy
Case J	Small	Lincolnshire	Rural	Pigs	Primary	Farming	Red meat
Case K	Small	West Midlands	Urban	Red meat	Primary	Processor	Food manufacture
Case L	Medium	Tyneside	Urban	Cheese products	Primary	Processor	Food manufacture
Case M	Medium	County Durham	Rural	Cooked poultry	Primary	Processor	Food manufacture
Case N	Micro	Tyneside	Urban	Fresh seafood	Primary	Processor / retail	Retail
Case O	Small	County Durham	Urban	Eggs	Primary	Farming / wholesale	Poultry
Case Q	Micro	Dorset	Rural	Water	Primary	Extraction & bottling	Drink
Case U	Large	Cambridgeshire	Urban	Animal Feed	Primary	Processor	Animal Feed
Case V	Medium	Lincolnshire	Urban	Red meat	Primary	Abattoir / butchering	Red meat
IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN / RURAL	PRODUCTS	ACTIVITY ~ SECONDARY	TYPE OF ACTIVITY	SECTOR
Case D	Small	Sussex	Rural	Pasta, sauces & cheese	Secondary	Manufacturer	Food manufacture
Case P	Micro	Hampshire	Rural	Cheese	Secondary	Farming & processing	Dairy
Case R	Micro	Northumberland	Rural	Pies & red meat	Secondary	Butchering & processing	Red meat
Case S	Micro	Worcestershire	Rural	Prepared red meat	Secondary	Farming & butchering	Red meat
Case T	Small	Lincolnshire	Rural	Farm shop	Secondary	Retail / food service	Retail
Case W	Micro	Yorkshire	Rural	Poultry	Secondary	Farming	Poultry

Table 14 Case Study Partners grouped by primary or secondary activity

IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN / RURAL	PRODUCTS	ACTIVITY ~ PRIMARY or SECONDARY	TYPE OF ACTIVITY	SECTOR
Case V	Medium	Lincolnshire	Urban	Red meat	Primary	Abattoir / butchering	Red meat
Case R	Micro	Northumberland	Rural	Pies & red meat	Secondary	Butchering & processing	Red meat
Case Q	Micro	Dorset	Rural	Water	Primary	Extraction & bottling	Drink
Case J	Small	Lincolnshire	Rural	Pigs	Primary	Farming	Red meat
Case W	Micro	Yorkshire	Rural	Poultry	Secondary	Farming	Poultry
Case S	Micro	Worcestershire	Rural	Prepared red meat	Secondary	Farming & butchering	Red meat
Case E	Large	Norfolk	Rural	Red meat	Primary	Farming & processing	Red meat
Case F	Large	North Lincolnshire	Rural	Poultry	Primary	Farming & processing	Poultry
Case I	Micro	Hampshire	Rural	Fresh milk & cream	Primary	Farming & processing	Dairy
Case P	Micro	Hampshire	Rural	Cheese	Secondary	Farming & processing	Dairy
Case O	Small	County Durham	Urban	Eggs	Primary	Farming / wholesale	Poultry
Case A	Micro	London	Urban	Sauces & pickles	Primary	Manufacturer	Food manufacture
Case B	Micro	Hampshire	Rural	Chilled ready cook meals	Primary	Manufacturer	Food manufacture
Case C	Micro	Herefordshire	Rural	Botanical extracts	Primary	Manufacturer	Ingredients
Case D	Small	Sussex	Rural	Pasta, sauces & cheese	Secondary	Manufacturer	Food manufacture
Case H	Large	Northumberland	Urban	Fishcake cores	Primary	Manufacturer	Seafood
Case K	Small	West Midlands	Urban	Red meat	Primary	Processor	Food manufacture
Case L	Medium	Tyneside	Urban	Cheese products	Primary	Processor	Food manufacture
Case M	Medium	County Durham	Rural	Cooked poultry	Primary	Processor	Food manufacture
Case U	Large	Cambridgeshire	Urban	Animal Feed	Primary	Processor	Animal Feed
Case N	Micro	Tyneside	Urban	Fresh seafood	Primary	Processor / retail	Retail
Case T	Small	Lincolnshire	Rural	Farm shop	Secondary	Retail / food service	Retail

Table 15 Case Study Partners grouped by type of activity

IDENTITY	ENTERPRISE CATEGORY *	LOCATION	URBAN / RURAL	PRODUCTS	ACTIVITY ~ PRIMARY or SECONDARY	TYPE OF ACTIVITY	SECTOR
Case U	Large	Cambridgeshire	Urban	Animal Feed	Primary	Processor	Animal Feed
Case I	Micro	Hampshire	Rural	Fresh milk & cream	Primary	Farming & processing	Dairy
Case P	Micro	Hampshire	Rural	Cheese	Secondary	Farming & processing	Dairy
Case Q	Micro	Dorset	Rural	Water	Primary	Extraction & bottling	Drink
Case J	Small	Lincolnshire	Rural	Pigs	Primary	Farming	Farming
Case A	Micro	London	Urban	Sauces & pickles	Primary	Manufacturer	Food manufacture
Case B	Micro	Hampshire	Rural	Chilled ready cook meals	Primary	Manufacturer	Food manufacture
Case D	Small	Sussex	Rural	Pasta, sauces & cheese	Secondary	Manufacturer	Food manufacture
Case K	Small	West Midlands	Urban	Red meat	Primary	Processor	Food manufacture
Case L	Medium	Tyneside	Urban	Cheese products	Primary	Processor	Food manufacture
Case M	Medium	County Durham	Rural	Cooked poultry	Primary	Processor	Food manufacture
Case C	Micro	Herefordshire	Rural	Botanical extracts	Primary	Manufacturer	Ingredients
Case F	Large	North Lincolnshire	Rural	Poultry	Primary	Farming & processing	Poultry
Case O	Small	County Durham	Urban	Eggs	Primary	Farming / wholesale	Poultry
Case W	Micro	Yorkshire	Rural	Poultry	Secondary	Farming	Poultry
Case E	Large	Norfolk	Rural	Red meat	Primary	Farming & processing	Red meat
Case R	Micro	Northumberland	Rural	Pies & red meat	Secondary	Butchering & processing	Red meat
Case S	Micro	Worcestershire	Rural	Prepared red meat	Secondary	Farming & butchering	Red meat
Case V	Medium	Lincolnshire	Urban	Red meat	Primary	Abattoir / butchering	Red meat
Case N	Micro	Tyneside	Urban	Fresh seafood	Primary	Processor / retail	Retail / Seafood
Case T	Small	Lincolnshire	Rural	Farm shop	Secondary	Retail / food service	Retail / Farm shop
Case H	Large	Northumberland	Urban	Fishcake cores	Primary	Manufacturer	Seafood
Case G	Micro	North Yorkshire	Rural	Meat / Veg / Dairy / Pickles etc	Primary	Wholesaler	Wholesale

Table 16 Case Study Partners grouped by sector

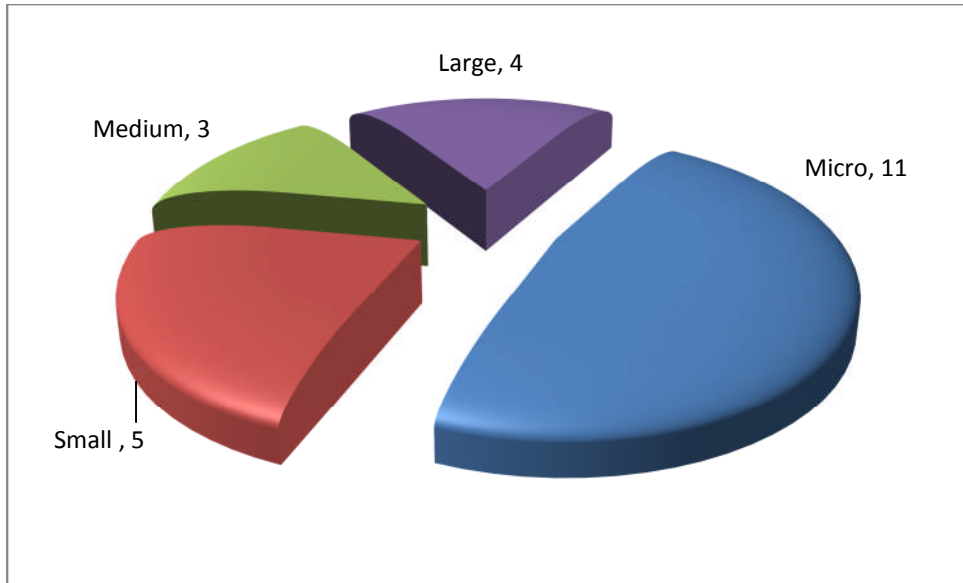


Figure 40 Case study partners by scale

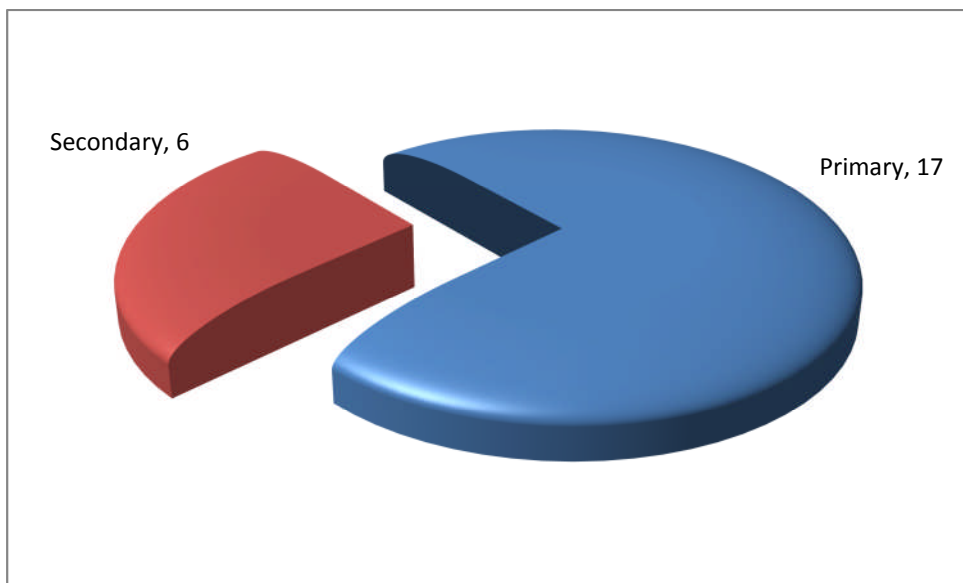


Figure 41 Primary / secondary activity split

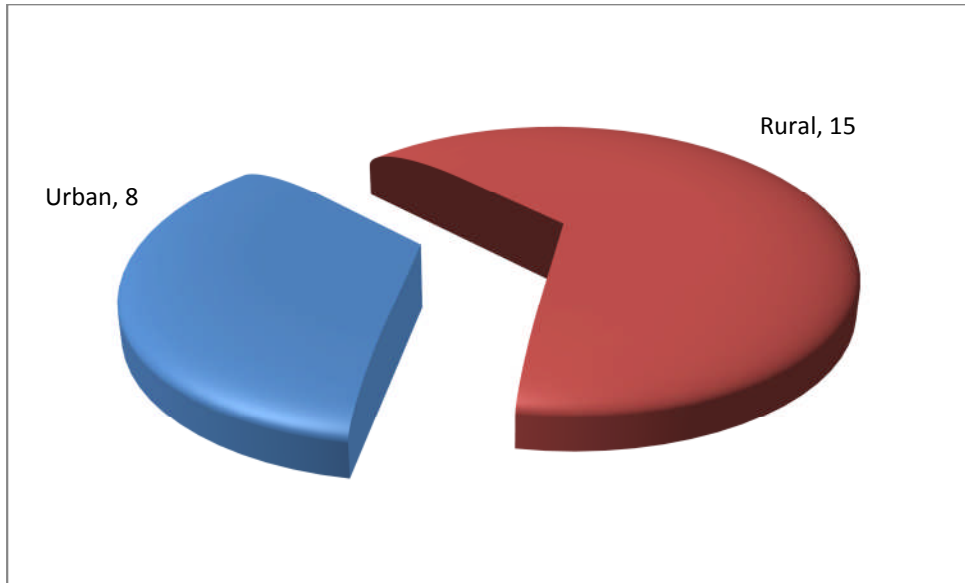


Figure 42 Rural / urban split of case studies

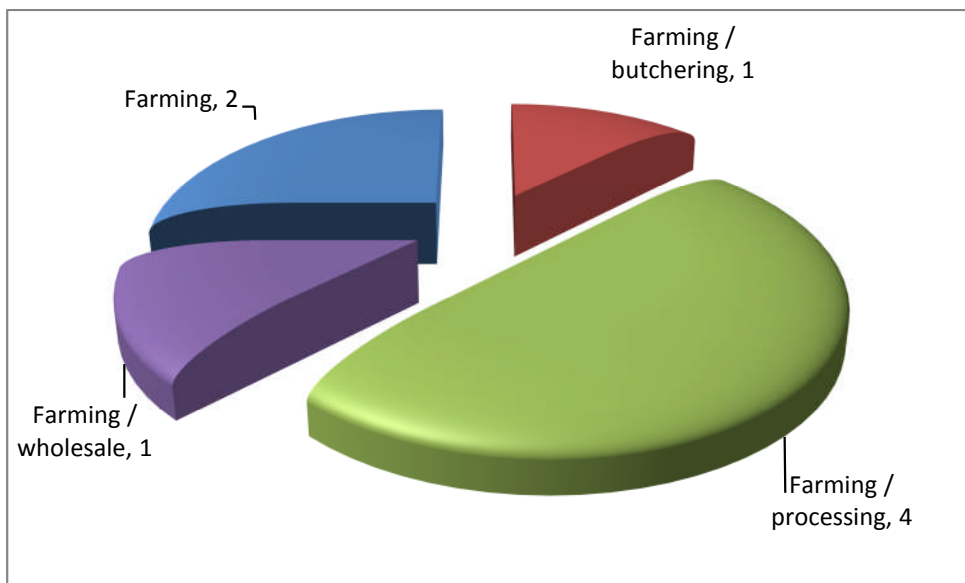


Figure 43 On farm activity across case studies

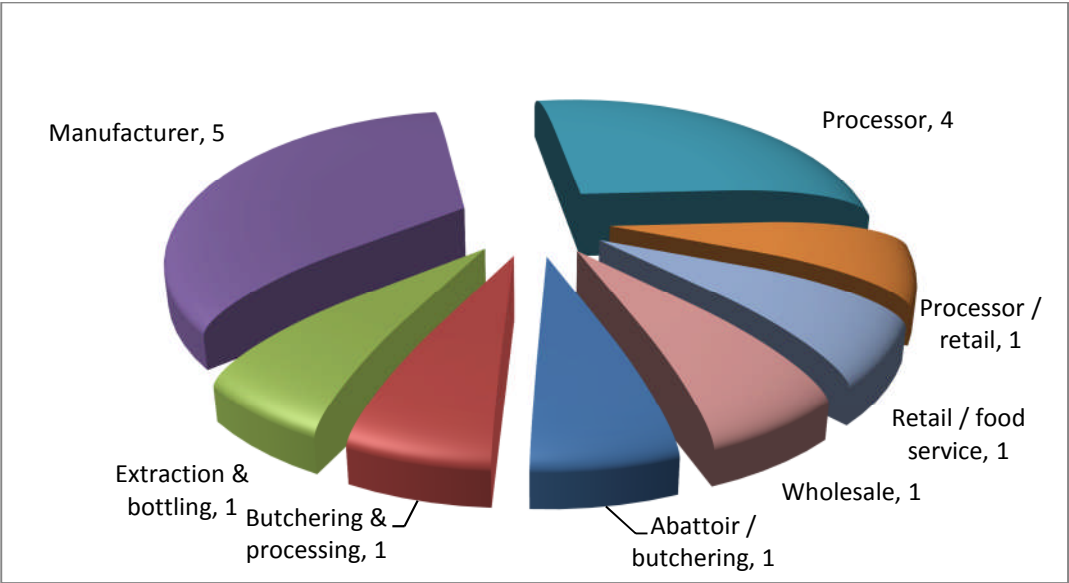


Figure 44 Non-farming activity across case studies

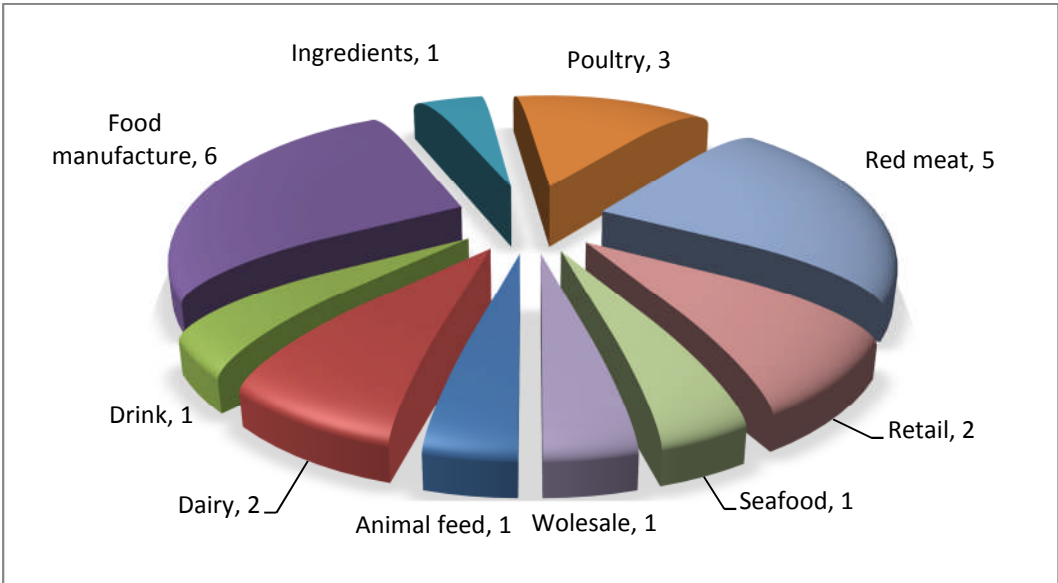


Figure 45 Sectors serviced by case study partners

6.2 Constraints around 'local food'

6.2.1 Supplying a wider customer base

Prior exposure to large organisations can leave some smaller producers of local and regional food unwilling to engage with the large multiple retailers or specialist brokers (Cases G, N, P, A):

"I have supplied high end hotels and restaurants before, could do so tomorrow if I wanted, but I don't, they are simply too much trouble."

(Case N)

"Most of the people I buy goods off have supplied to major multiples over the years and have become heartily sick of them, standing around at back docks, unsigned POD's, invoice queries, damaged stock, missing crates and pallets, they have been subjected to it all and don't want any part of it anymore." (Case G)

"I will not, under any circumstances, supply Tesco's, I have done it twice and they are bastards. They call me and approach me at shows, tell me everything is different now, but I would sooner throw my stuff away." (Case P)

"You show me a cheese broker, I will show you the devil incarnate, they are not interested in you; they want your product for their portfolio. I have to constantly chase them and badger them into placing orders." (Case P)

"We know that we would not be in Ireland or other parts of the country without them, but we do not like distributors and wholesalers, we are just a number for them and they always want it cheaper and quicker."

(Case A)

Previous research indicates that a key barrier amongst urban consumers and therefore constraint around local food is accessibility and lack of access to a 'one stop shop' scenario (SERIO / DEFRA 2008).

Aggregations of constraints are likely to become more than 'a sum of its parts' in smaller companies, typically with less sophisticated management systems (Cases A, I and N).

6.2.2 Levels of detour

Levels of detour are often overlooked when 'local' produce is offered for sale at multiple retailers, degrading much of the 'received benefit' of customers specifically choosing to buy 'local' (Case B):

There is meat for sale in the local town (Alton, Hampshire) which comes from farms hereabouts but travels to Wetherby for slaughter and butchering, how is that local?" (Case B)

6.2.3 Farmers' Markets

Farmers' markets allow 'face to face' engagement with customers and increased margins per product / kilo. Notwithstanding, this market framework in itself is a constraint point, although this research clearly records that they are an important route to market (Cases A, B, D, P and S) Farmers' markets form one third of annual sales by Case P however:

- The profile of produce does not readily reflect the profile of foods available locally;
- Emphasis is placed on regional aspects of the produce on offer;
- Entrance criteria for potential stall holders restricts freer access to possible market outlets, although this has been offset recently by the introduction of 'guest stalls' to address seasonality and variety factors;
- All stall holders must undergo a scheme accreditation process and audit from the market manager, as well as hold a current SALSA certificate. Even amongst established stall holders, this is regarded as an obstacle.

Farmers' markets have a core clientele profile which ultimately stagnates sustainable development and growth (Cases A, D, P and S):

"It's an old boys club." (Case R)

"I'm a member (SALSA) but they just want more and more, especially since Waitrose have backed them." (Case P)

Emergence of alternative 'unofficial' farmers' markets where stallholders are not scrutinised or subject to levels of accreditation / membership / audit inevitably raise questions about quality and provenance, but undoubtedly offers a route to market for these products, whereby short term constraint can be alleviated, but does not address underlying constraints.

6.2.4 Scale and products

Diseconomies of scale require higher margins per unit of output, which may be more readily achievable in products that are 'regional' rather than 'local'.

Decisions to participate in niche specialisation e.g. rare breed livestock restrict potential end markets for produce (Cases R and S).

Seasonality restricts choice, whilst strategies to overcome seasonality in 'fresh' produce can significantly increase environmental impact and / or cost per product (Cases A, B, C, H, I and O).

Further diseconomies of scale and scope inevitably lead to greater environmental burdens including waste management, which can be linked to constraints arising through lack of collaboration throughout the supply chain.

A summary table appears on the next page.

AREA	KEY THEMES
Customer base	<ul style="list-style-type: none"> • Poor perception of downstream actors impacts on potential sales (prior experience / onerous requirements / unrealistic pricing) • Lack of 'one stop shop' opportunities • Scale impacts upon ability to address requirements of wider base
Detour	<ul style="list-style-type: none"> • Readily overlooked • Degraded received benefit
Farmers' Markets	<ul style="list-style-type: none"> • Face to face • Shortens supply chain • Increased margin per unit • Restricts customer base • Lack of frequency can impact upon repeatability • Personal presentation of products • Do not always reflect profile of locally available foods • Regional emphasis blurs perception of 'local' • Restricting access leads to unregulated markets • Relatively unsophisticated fulfilment strategies
Scale and products	<ul style="list-style-type: none"> • Niche products narrow customer base • Availability impacted upon by seasonality • Diseconomies of scale • Diseconomies of scope

Table 17 Key themes summary table: actual constraints

6.3 Constraints recorded as perception

6.3.1 Concepts of local food

The concept of local food *per se*, is constrained as a device by an ongoing lack of government regulation relating to geographical indicators as designations of origin. This lack of clear consensus definition leads to mutable interpretations by key actors and stakeholders yet restricts emerging interpretations.

Perceptions of local food are often linked to relatively unsophisticated raw / fresh produce.

Larger companies in this research consider that regulatory compliance and adherence to their own developed models of corporate social responsibility addresses their 'local' agenda, thus absolving them of obligation or burden of

food localisation (Cases E, F, H, and U). An exception to this 'stance' within the case study cohort is Case L, which leads to an emerging adaptation of perspectives of local food for further research.

6.3.2 Concepts of the market

A common trait which is readily linked to the relative scale of operation of the case study partners is a perception that they alone are best at placing their products and they alone know and understand it better than anyone else (Cases A, B, I, N, P, Q and R):

"I would never dream of letting anyone delivering any of our cuts, what could a delivery driver do for us? I see every chef personally, at least once a week, in fact, I'm going out delivering after we have had this chat." (Case R)

"I struggle to convince myself that they (distributors) do little more than erode my margins." (Case Q)

Companies acting as classic intermediaries (agents, distributors, food service groups and brokers) in food supply chains are often regarded in low esteem (Cases A, P, Q):

"You show me a cheese broker, I will show you the devil incarnate, they are not interested in you, they want your product for their portfolio. I have to constantly chase them and badger them into placing orders." (Case P)

"We know that we would not be in Ireland or other parts of the country without them, but we do not like distributors and wholesalers, we are just a number for them and they always want it cheaper and quicker." (Case A)

"I struggle to convince myself that they (distributors) do little more than erode my margins." (Case Q)

Lack of promulgated rules at unregulated markets potentially constrains and impacts upon the sustainability and further development of farmers' markets. Negative publicity linked to a food hygiene or health scare linked to a farmers' market would not discriminate between the two types initially (lack of HACCP frameworks / traceability).

A lack of access to 'local' fresh food is readily identified as a reason which underpins poor dietary habits linked to social inequalities. This suggests a narrow view of the market on behalf of producers.

The relative range of products and fulfilment mechanisms displayed in smaller case study partners increases risks which may have otherwise been addressed by developing economies of scope within scale (Cases I and R):

"I know fine well that it is important for me to make the deliveries and speak to the chefs personally, and I need to do that as soon as possible, whether they are in the town (Newcastle) or out towards Durham. It's what I think they need, and it's what they get. They never complain about the service."

(Case R)

6.3.3 Concepts of the customer

It is recorded here that Case R and its business partner worked extremely long hours as they stopped and started butchery and processing around delivery demands, which were addressed in ways which did not necessarily reflect good distribution planning and execution.

Niche characteristics and positioning of local food are regarded as a constraint which is also ultimately driven by consumer behaviour and the relative exposure of products to those consumers either as retail, for profit food service sector, niche positioning or direct sale (Case Q):

"I have a 90% success rate in placing our glass products in local hotels." (Case Q)

6.3.4 Concepts around skills and jobs

Retail outlets in rural communities tend to support local employment. However, this may be considered as a constraint point within a wider context of social and employment mobility (Case T).

In some cases, supply and demand for artisan skill sets leads a view of vulnerability. Short term measures to import artisan skills place longer term constraints upon these businesses unless they choose to invest in training and development.

Inter alia, derivation of implied social capital within the context of local food is subjective, and acts as a constraint to better understanding of 'local' by wider cross sections of society. Resultantly, this may impact upon potential increases of both customer base profiles and growth of sales (Case N).

AREA	KEY THEMES
Concepts of local food	<ul style="list-style-type: none"> • Lack of disambiguation restricts market • Ready willingness to conflate terms by actors • Fresh products • Unsophisticated products and packaging
Concepts of the market	<ul style="list-style-type: none"> • Restricted view of where the market is • 'I know best' attitude • Intermediaries held in low regard • Regulated & unregulated not readily discernable
Concepts of the customer	<ul style="list-style-type: none"> • Narrow view of the customer restricts potential growth • Presumption of customer requirements impacts upon ops • Received behaviours of customers shape product ranges • Appetite for niche products • Willingness to pay
Skills and jobs	<ul style="list-style-type: none"> • Supports rural employment • Artisan skills seen as central aspect • Arguments "for" are subjective and may restrict social & employment mobility.

Table 18 Key themes summary table: perceived constraints

6.4 Institutional Constraints

Recorded constraint phenomena were not restricted to the small case study partners. In some of the larger organisations, more traditional constraints, as described by the Theory of Constraints, were observed as a result of adherence to business models and a 'silo' mentality even across different manufacturing and process divisions of the same company (Cases E, F, U):

“The blood [red corpuscles] is processed off and goes to the ground as fertiliser but we have not considered who’s ground, it’s just a commodity to us, not something we have specifically contemplated from a vertical integration point of view.” (Case E)

“No, we had never thought about batch traceability and closing the loop for their [Case J] cereal to go back to them as the animal feed they order.” (Case U)

“Our fleet runs at 94% efficiency.” (Case E)

In this instance of 94% efficiency for example, further questioning revealed that the fleet did not engage in backhauling, reverse logistics, or factory gating. As their business model did not call for this, they considered the fleet to be within operation targets.

6.4.1 Resource efficiency

Investigation of claims around resource efficiency revealed that a fleet of vehicles was not 94% efficient, it did not engage in backhauling, reverse logistics, or factory gating. As the business model did not call for this, the company considered the fleet to be within operation targets.

A 'silo' mentality can emerge when producers manufacture to cost controlled targets at a departmental and operational level, as a cost centre for example.

Good practice does not necessarily migrate to other sites or departments (Case H).

Large organisations can miss opportunities for backwards integration of by-products back up the supply chain (Cases E, F and U).

6.4.2 Business model

Like-for-like operational activity at Case F was considerably less resource efficient than a contractor undertaking the same operations (Case W). The difference in resource efficiencies had not been considered as the site at Case W is run as a cost centre and operates within the operation parameters and targets it has been set.

Absolute costs and resource inefficiencies can be offset to some degree by the nature of the marketplace, and willingness of the buyer to engage in purchasing behaviour which supports comparative price advantage, although acceptance of this 'status quo' may constrain further development of routes to market (Cases A, D, G, R and S).

An analysis of like-for-like product costs between Case N and a major multiple retailer located 900 metres away recorded negligible differences in cost (November 2008).

AREA	KEY THEMES
Resource efficiency	<ul style="list-style-type: none"> • Not necessarily exploited sufficiently in larger companies • Diseconomies of scale impact upon smaller producers, resource efficiency decrease with diminishing scale • More smaller producers equals more waste and waste streams per product
Business model	<ul style="list-style-type: none"> • Silo mentality • Accounting models may stagnate resource efficiency • Organisational view overlook opportunities for backwards integration • Good practice not always adopted

Table 19 Key themes summary table: institutional constraints

6.5 Commercial Operations & Logistics

6.5.1 Development of customer base

Local produce is often associated with added value products and relatively unsophisticated low levels of product and logistics packaging. Evidence exists which identifies the peculiarities and identifiers of the groups of buyers most likely to purchase 'local food.' A common recorded constraint is a relative lack of sophistication in their marketing and fulfilment strategies. Inabilities to develop their markets, address seasonality and effectively deliver to target customers, are constraints which can be readily linked back to a prior constraint proposition which identified unwillingness to 'let go.'

Potential markets identified by the case study partners, Regional Food Groups and business development agencies, such as cruise line port terminals, stations and airports face traditional hurdles of significant price, volume and economies of scale factors to overcome where local and regional attributes of food are rated significantly lower than price in purchasing model (Cases B, P and R).

6.5.2 Perceived lack of complexity

Whilst local foods are regarded as wholesome, trustworthy and of known provenance, the relatively low level of processed and more complex food products will hinder access to all but a small share of the total food market, when considering tinned, frozen, dried and ready meal products.

6.5.3 Business to business sustainability

Some of the smaller producers when interviewed described a feeling of 'worth' when dealing with one particular multiple retailer. Notable comments were that they knew who they were going to speak to and that they had seen the same technologists and category buyers for years on end; that if someone was moving jobs or retiring they would be informed well in advance and be introduced to the new point of contact. The same case study partners also appreciated that the particular retailer under consideration would take time to invest in their products by having some of the store

colleagues visit their operation to find out more about their products (Cases A, C and P):

“We also organise educational visits as well as public visits and employees of the major multiple we supply, with particular emphasis on those who might come into contact with our products at the point of sale.” (Case P)

6.5.4 External business targets

Evidence has emerged of logistics service providers that do not necessarily treat smaller companies on an equal footing to larger companies, despite the smaller company pushing more ‘volume’ through the company. This is a trait which was also encountered by the researcher during his career in supply chain management. Smaller companies are usually the first to be subjected to price increases, the last to benefit from price decreases and the least likely to be able to negotiate (Cases H, I and Q):

“Listen, I know that John up the road pays less per pallet than me but is constantly hassled by the rep about getting into other parts of the business. We tell them how many pallets, on which days and to where, we are steady and reliable customers but can’t get a lower price because we don’t have a bigger carrot to wave at them.” (Case Q)

6.5.5 Homogeneity of products

Small and local producers can be disadvantaged when their products are considered in the main, as a price led commodity which is readily available through multifarious retail points (Case I). Further, atavistically driven decisions to return to a ‘better time’ of processing will not necessarily form a market for that particular product.

“This is a significant reduction down from 9,000 litres per head (down to 6,500 litres per head) and is being introduced with the express intention of extending the life cycle of the cattle.” (Case I)

6.5.6 Operational growth

A decision to ‘remain in situ’ can act as a constraint on a business. Case C records its only access road and its requirement to collect all of its operational waste water arising in tankers for removal and remote treatment as its key constraints. At a larger scale, Case M state:

“We fight to stay here, it is a constant battle with buyers telling me it is much cheaper to buy similar products from Brazil at 60% of the price.” (Case M)

6.5.7 Development within scale

Development of de-scaled networks and hubs can result in opportunities to remove or alleviate constraints linked to relative scales and scopes of logistics operations in local food supply chains (Case G):

“Most of the people I buy goods off have supplied to major multiples over the years and have become heartily sick of them, standing around at back docks, unsigned POD’s, invoice queries, damaged stock, missing crates and pallets, they have been subjected to it all and don’t want any part of it anymore.” (Case G)

However:

“You call people and tell them that their product is going really well, you would be surprised how many tell you that they can’t give you more.” (Case G)

6.5.8 Business to business elasticity

Local producers and retailers can suffer from inelasticity within their own local business to business supply chains. When this occurs, previous cycles of virtuous local collaboration are broken (Cases A, B & G):

“They just told us when we rang up to order, that it was not worth their while supplying us anymore.” (Case A)

“We have had to source vegetables from further afield now, we would call to place an order and be told, sorry we can’t do that this week. We also have to consider seasonality factors both in our customer demands and the availability of local produce.” (Case B)

AREA	KEY THEMES
Development of customer base	<ul style="list-style-type: none"> • Unsophisticated marketing • Regional outlet objectives • Marketing & fulfilment strategies • Narrow view of customer base
Perceived lack of complexity	<ul style="list-style-type: none"> • Small scale for simple products
Business to business sustainability	<ul style="list-style-type: none"> • Supplier ‘worth’ • Business to business relationships
External business targets	<ul style="list-style-type: none"> • Inflexible business models • Classic diseconomies of scale • Lack of recognition
Homogeneity of products	<ul style="list-style-type: none"> • Shortened direct supply chains leverage margins upwards • Niche marketing of products • Market not driven by atavistic products • Difficult to create local market where homogeneity exists
Operational growth	<ul style="list-style-type: none"> • Decisions to ‘remain’ may impact upon operational effectiveness
Development within scale	<ul style="list-style-type: none"> • Small scale does not necessarily lead to poor supply chain strategies
Business to business elasticity	<ul style="list-style-type: none"> • Inelasticity in supply at similar scale • Information sharing on forecasted growth

Table 20 Key themes summary table: commercial operations & logistics

6.6 Collaboration

6.6.1 Informal collaboration ~ logistics

It has been identified by several of the smaller case study partners that there has been a gradual reduction of informal supply chain networks once common in rural areas, which were typified by loose trading systems, mutual benefits and common need (Cases I, P and S):

“We firmly believe that the demise of these informal networks has a wider impact upon rural communities and local food distribution.”
(Case S)

“I can take some of their stuff on some days and they can take some of mine on others, but the girl down the road, we fell out with her so she can take her own now.” (Case P)

Informal networks develop as a result of shared values linked to the integrity and provenance of products. This in turn has allowed development of a more diverse portfolio of products simultaneously represented at market and for delivery over a wider geographic area (Case P and two others).

6.6.2 Formal collaboration ~ logistics

Ultimately, the system of transport and the relative utilisation per load are the most important factors in overall analysis of the environmental efficiency of moving 'local' goods to market. Collaboration and the development of smaller hubs acting as feeder points into spokes of larger hubs can act to decrease relative burdens and increase resource efficiency (Cases B, G, I and L):

“We are happy to help and would look to do more in the future, it is a commercial no brainer for us, they are charged £50 per part pallet, we let them slave the same category goods onto our part pallets going to the same address for less than a third of that. Over the year it works

out at about 75 free trailers for us and that is a canny saving against budget.” (Case L)

“I have vans which are mostly free and in their area on an afternoon, I have approached them and offered ambient or chilled delivery of their goods for lower than they can do it themselves but they are just not interested and think there is a cat away somewhere.” (Case I)

“We are still making the same amount of runs to London, but we are taking a lot more in the same vehicle and bringing more back with us. We are very happy.” (Case B)

6.6.3 Formal collaboration ~ purchasing

Evidence drawn from case study partners whose operational activity was principally, or included farming aspects, indicates that collaborative and cooperative activity occurs as part of their purchasing strategies for farm inputs: resources used in farm production typically grouped as seeds, feeds, chemicals, capital equipment and energy. Prices for farm consumables are susceptible to wider market impacts creating cost – price squeezes. Collaborative purchasing activity can offset price squeeze and retain balance in parity ratios.

The evidence gathered in this research and in supplementary ‘off record’ interviews with key stakeholders, suggests that opportunities exist for reasonably easy adaptation of input purchasing schemes to address many of the needs of smaller, more rural producers typically regarded as being ‘local’, ‘regional’ or ‘artisan’ which are not being developed. This links back to earlier constraint observations as well as potentially hindering production processes from becoming lean and agile:

“They just told us when we rang up to order, that it was not worth their while supplying us any more.” (Case A)

6.6.4 Formal collaboration ~ wholesale and distribution

Development of box schemes in themselves, do not address other key issues linked to availability of produce, business to business inelasticity and seasonality. Box schemes are susceptible to conflation of ‘local’ terms on behalf of both the customer and supplier.

Collaborative activity can help overcome constraints. Although regional food groups would be well placed to develop and deliver an integrated system, conflicts arise due to issues identified in the policy section. An example (within this research) is a result of sole entrepreneurial activity (Case G):

“Most of the people I buy goods off have supplied to major multiples over the years and have become heartily sick of them, standing around at back docks, unsigned POD’s, invoice queries, damaged stock, missing crates and pallets, they have been subjected to it all and don’t want any part of it anymore.” (Case G)

Evidence suggests that regional food hubs set up by a major retailer are anti-competitive and act against the interests of members of the Regional Food Groups in which they are located.

AREA	KEY THEMES
Informal collaboration ~ logistics	<ul style="list-style-type: none"> • Shared values / Wider presentation of products • Increases resource efficiency
Formal collaboration ~ logistics	<ul style="list-style-type: none"> • Opportunity for creation of hubs • Increases efficiency during logistics phases
Formal collaboration ~ purchasing	<ul style="list-style-type: none"> • Farm input schemes may act as model for potential savings.
Formal collaboration ~ wholesale & distribution	<ul style="list-style-type: none"> • Box schemes insufficient • Supply inelasticity • May be anti competitive and divisive

Table 21 key themes summary table: collaboration

6.7 Policy

6.7.1 Development of alternative accreditation and compliance schemes (SALSA / LEAF / HEFF Standard) and provenance of goods

Whilst some Regional Food Groups continue to support the Safe and Local Supplier Approval Scheme (SALSA), evidence is emerging of other Regional Food Groups developing their own compliance schemes, whilst parallel schemes are also currently being developed by food service companies. This proliferation of schemes leaves smaller, local producers with bewildering choices and a future possibility that they may have to become members of more than one scheme to satisfy their customer base. This in turn links back to a fundamental constraint linked to size and scale, where it is more difficult to overhead the costs of specialist managers controlling quality, environment and health and safety:

“Neither will bring me nothing in terms of new business, only I can do that.” (Case R)

“I’m a member (SALSA) but they just want more and more, especially since Waitrose have backed them.” (Case P)

It is also recorded that the existence of the schemes is dependent upon repeating membership fees and new members.

6.7.2 Compliance with legislature throughout the chain

Evidence drawn from case study partners whose operational activity was principally, or included farming aspects, indicates a common thread of ‘over regulation’ and compliance. This was recorded as the single perceived constraint in Cases F, J and W, whose intensive farming operations were subject to IPPC pollution prevention and control regulations.

Feed hygiene and salmonella regulations were also cited as examples of 'over regulation' in light of similar products entering the market from elsewhere in the EU where similar regulations are not in place (Case O).

6.7.3 Food miles

Food miles are the reverse to popular thought (see localisation also). Economic scale efficiencies as a result of collaboration can support efficiencies in transport miles and assist in removing constraints linked to scale. Decreased constraints and increased collaboration will inevitably lead to increased efficiencies and decreased environmental impacts during logistics phases.

Evidence from the research also suggests that rather than reduce or displace overall transport miles, decisions by consumers to travel to buy 'local' produce in addition to their standard purchasing activity may increase overall mileage (Cases D, N, R, S and T).

6.7.4 Government funded business support initiatives other than the Rural Development Programme for England (RDPE) programmes

Evidence suggests that it is difficult to access funding through these business initiatives, in part due to advisors and consultants not readily matching with the relative scale or type (food and drink) of production under consideration (Cases I, P and R):

“Waste of time, he was unable to see what we needed to do to was stabilise, he was only interested in growth, to where, I don't know.”
(Case R)

6.7.5 The Rural Development Plan for England 2000-2006 and 2007-2013 schemes

The two grant allocation funding schemes specific to this research are the Rural Enterprise Scheme (RES) and the Processing and Marketing Group (PMG) are flawed in their pre-requisite requirements to access funds. A key

barrier to adoption is a minimum projected cost per application of £70,000 and a requirement for 'new' capital equipment purchases where required in an application, which decreases the likelihood of smaller scale individual projects going ahead, regardless of PMG or RES funding availability. This implicitly suggests a loss of additionality in the awarding of grants to smaller schemes which may be more likely to deliver against the public priorities of additionality and local food programme development (Cases B, I, O, P, R):

"I wanted to build a little classroom for both the kids and the adults, it was going to cost 25k and they just weren't interested at all." (Case P)

"Oh they said I could apply but it would have to be for a new filling line, I'm a tenant farmer, where am I supposed to get that sort of money from to match fund?" (Case Q)

"I applied, but they said that they weren't convinced that it would bring local benefit, so me and Alec [name changed] had to fund the whole thing ourselves." (Case B)

By extension, it is more likely that those who have overcome operational constraints and are able to 'step back' are more likely to be successful in the grant application process (Case O).

6.7.6 Regional Food Groups

All of the case study partners are located in England, which has eight regional food groups.

The eight regional food groups are held in loose alliance, but given the nature of their funding, which is drawn in the main from their attendant regional development agencies, each food group has its own strategy, which to some extent, is informed by the relative position of each of the RDAs and their attendant strategies for the allocation of funds under the RDPE schemes. Although this cannot be recorded as an institutional constraint, it is emblematic of wider constraints which ultimately link back to a lack of definition surrounding 'local', localisation and fund allocation influenced by local political imperatives.

6.7.7 Regional Development Agencies

The regional development agencies, from which the regional food groups attract their funding, have a broad remit to create and safeguard jobs and business by focussing on the specific needs and priorities that stimulate and support economic growth in their area. Regional imperatives drive specific strategies, which in turn drive and inform the relative positions of each regional food group.

Evidence subsequent to the case study interview has emerged (Case O) of specific intervention by a regional development agency. This intervention, drawing on public funds from the Rural Development Programme for England clearly addresses constraints identified by the case study partner, but is not a free market solution. Please also see 6.6.6 Regional Food Groups.

AREA	KEY THEMES
Alternative accreditation schemes	<ul style="list-style-type: none"> • Proliferation of schemes • Multiple membership regarded as costly and onerous
Legislative compliance	<ul style="list-style-type: none"> • A view that there is too much legislature • IPPC burden on intensive agriculture • Uneven playing field
Food miles	<ul style="list-style-type: none"> • Counter intuitive
Business development ~ non RDPE	<ul style="list-style-type: none"> • Lack of specialist subject knowledge • Restricted choice
RDPE 2000-2006 & 2007-2013	<ul style="list-style-type: none"> • Funding criteria excludes smaller actors • Funding criteria impacts upon additionality • Grants maybe driven by local political imperatives • Most likely to benefit 'bigger players' • Funding not necessarily a market solution
Regional Food Groups	<ul style="list-style-type: none"> • Strategies informed upon by fund allocation bodies • Different strategies of what should be supported • Emphasis on regionality but willingness to conflate • Loose alliance impacts upon market development
Regional Development Agencies	<ul style="list-style-type: none"> • Driven by regional agenda • No evidence of cross RDA food strategy

- Local interpretation of DEFRA directives and RDPE schemes

Table 22 Key themes summary table: policy

6.8 Localisation

6.8.1 Employment and skills

After public sector employment, food manufacturing is the major manufacturing sector in local areas containing case study partners E, H, K, L and M.

Assessment of underlying long term unemployment trends are required to indicate the stability of these manufacturing and processing bases.

Continuous development of staff and transferability of skills in these areas should be linked into long term food security programmes, Food 2030, for example. To date, there is a general theme which calls for appropriate research, skills, knowledge and technology, but requires much further contextually relevant development:

“We place emphasis on training and development, many of our supervisory and management posts are held by internal candidates.”
(Case L)

Training, development and skills acquisition are important, but take up is minimal with smaller companies. This links back to propositions within other areas of the research which indicate that the smaller you are, the more difficult it is to free up time and resources on a day to day basis, even though there is an acknowledgement that this training and skill acquisition benefits in the medium to long term, and, in many cases, can support the acquisition of accreditation schemes, which in turn, significantly increase the potential market into which you can sell.

Evidence of skills shortages appear throughout the research. Case P reported significant problems with training and retention in skilled roles, resulting in them having to bring in people with the required skill sets from the wider EU community, despite extensive local advertising.

Recognition and cogitation of sustainable supply of artisan skills is required by all concerned parties, but it must also be tempered with the realities of scale and a recognition of the possible wider impact of educational training

transferability across the food manufacturing and processing sector as a whole.

6.8.2 Perceptions and market devices around 'local'

The research case evidence indicates that 'local' without the aforementioned government regulation is mainly notional, and may be regarded in some quarters as a market construct. Cases B, G, J, P, Q, R, S and T display traditional 'local' credentials in their activity. Nevertheless, the recorded 'local' enterprise forms only a small proportion of overall activities undertaken by these enterprises at large, typically farming.

Boundaries and perceptions around the term 'local' and small are blurred. Artisan production can also fall into this scenario (Cases A, C, D and T). Further blurring occurs as a result of 'slow food' organisations and mass media programming (Local Food Heroes etc), which positions 'local' food as a device.

The owner of the company Case C, who employed a team of six, considered the operation to be 'local' despite identifying an almost complete dependence on raw materials sourced globally, and no local requirements for the company's range of products.

Accepted views of 'local' and localisation ignore the role of medium and large enterprises in urban areas beyond employment and production / distribution benefits linked to economies of scale and scope (Case L).

Conversely, constraints around the adaptation and possible emergence of developing alternative food localisation systems can be linked to strategic business models and shareholder imperatives.

6.8.3 Local / localisation

The desire to remain locally 'in situ' can blur the need for operational efficiency (Case C), or create operational barriers linked to component price (Case M):

“We fight to stay here, it is a constant battle with buyers telling me it is much cheaper to buy similar products from Brazil at 60% of the price.”
(Case M)

The research suggests the emergence of an alternative view of ‘local’ which is recorded in the template for further analysis. Cases L and M’s relative positioning of food processing factories in urban areas of high unemployment, the training, attendant transferability of skills and the possible impact of withdrawing from these communities, as well as targeted altruistic activity for the management of short coded stocks support this view:

The articles of the foundation record its purpose to contribute much more to communities beyond taxes and employment (Case L).

6.8.4 Altruism / education

A re-engagement of urban customers to the source of their food (within context) has emerged. Case study partners I, P, S and T have all developed links with local education authorities, which has led to the development of extracurricular activities, some of which are legacy projects from the Year of Food and Farming project. The case study partners see this as a long term strategy to remove barriers; by extension this strategy could be seen as an attempt to remove a constraint, but leads to further debate as to the nature of the constraint as perception or reality or even one of necessity. This evidence suggests that this desire to re-engage extends beyond that of the reasons commonly given by both customers and producers at farmers’ markets:

“It is vital that children from urban communities, regardless of background, are encouraged to connect with farming and develop greater understanding of their food chain, including livestock rearing, crop growing and countryside stewardship.” (Case S)

“We were the regional winner of a Local Food Hero award by way of us establishing and maintaining links with the local communities we

serve, we also arrange educational trips for schools and encourage customers to visit us.” (Case I)

“Visiting the farm is an experience that gives the children inspiration and information about parts of the curriculum that are sometimes difficult to teach in a classroom environment. A visit allows children to see for themselves how a modern farm works in a safe and enjoyable environment.” (Case T)

AREA	KEY THEMES
Employment & skills	<ul style="list-style-type: none"> • Support rural employment • View of skill sets as artisan • Short term measures to fill skill gaps • Transferability of acquired training & skills
Perceptions and market devices around 'local'	<ul style="list-style-type: none"> • Local commonly occurs as niche of larger scale production • Continued blurring & conflation by actors • Constrains emerging themes of 'local'
Altruism / education	<ul style="list-style-type: none"> • Re-engagement with buying public • Educational activities

Table 23 Key themes summary table: localisation

6.9 Animal Welfare and Anthropomorphisms

6.9.1 Personal perspective of producers

A naturally occurring human tendency towards anthropomorphism lends itself towards constraint.

Development of a non-intensive, sustainable farming system in which livestock is slower to mature can lead to niching of the product and restrict its potential market (Case S):

“We give the best life we can to the animals and it is reflected in the meat they give to us.” (Case S)

Animals are taken to the local, rural abattoir ‘just a few at a time’ and are processed at the start of the day before stock from other farms arrives (Case S)

Development of production systems which stand counter to accepted sector best practice and which extend beyond sustainability to encompass personally held beliefs and a degree of atavism, restrict resource efficiency, increase cost per unit of production and invite external pressures on a business in terms of input consumption per unit of output (Case I):

“This is a significant reduction down from 9,000 litres per head (down to 6,500 litres per head) and is being introduced with the express intention of extending the life cycle of the cattle.” (Case I)

6.9.2 Business perspective of producers

When strategic and operational decisions are taken without anthropomorphised considerations, the case study partners were more likely to be able to overcome operation constraints.

Case O employs a perpetual, integrated system which allows flocks to be continuously replaced as yields start to decrease below optimal production targets:

“Cage systems are the best way to manage feeding, watering, medication and egg collection.” (Case O)

Intensive systems drive resource and input efficiency (Cases E, F, J and W):

“The pigs will only ever see daylight going up the ramp or down the ramp of the trailer. Intensive indoor pig breeding and rearing is the most resource efficient system for us.” (Case J.)

However, there is evidence that case study partners have to react to public perception of their operating models and change accordingly. This has been magnified in the poultry sector by recent campaigns by the ‘celebrity chefs’, Hugh Fearnley Whittingstall and Jamie Oliver. Case O planned to introduce further ‘artificial jungle’ colony systems in new poultry sheds as it moved away from cage systems ahead of schedule, primarily to satisfy public perception (see also the section on Regional Development Agencies.)

6.9.3 Abattoir issues

Case study partners B, I, J, R and S all record within this research that they are limited to abattoir choice as a result of the closure of local, small abattoirs. Whilst it would be expected that some small and medium sized abattoirs would have closed as a reflection of the changes in the ways in which we shop, there is still a strong feeling some 12 years after their introduction, that smaller abattoirs are significantly disadvantaged by disproportionate costs of meat inspection charges. Upon reflection, this constraint appears to overarch institutional, actual and perceived constraint analysis.

6.9.4 Distances travelled by live and dead stock

Linked to these abattoir constraints is a theme common to the same cohort, which is a concern over the distances some livestock travels to abattoirs and related to this (and the cost structures of abattoirs in dealing with regulatory compliance) the survival of remaining small abattoirs. Here the research records constraints about current government legislation linked to abattoir hygiene and inspection regulations and charges, as well as emerging constraint propositions linked to perceptions around animal welfare, which within this research, are linked to scales of production.

Given the relatively late stage of meats becoming local, dead stock movement is not significantly impacted upon, although in large distribution systems, it is likely to be more resource efficient per unit of output / per mile travelled to point of sale. To present the summary in full, Table 24 appears on the following page.

AREA	KEY THEMES
Personal perspectives of producers	<ul style="list-style-type: none"> • Personally held beliefs may impact upon efficiency • May incur external pressures • Can lead to flawed business strategy
Business perspectives of producers	<ul style="list-style-type: none"> • Intensive systems drive resource efficiency • May be informed by public opinion
Abattoir issues	<ul style="list-style-type: none"> • Loss of smaller local abattoirs • Restricted choice • Hygiene & inspection charges seen as unfairly advantaging scale
Distance travelled by live and dead stock	<ul style="list-style-type: none"> • Excessive distances of livestock trips in resource driven large processing systems • Dead stock movement not significantly impacted upon

Table 24 Key themes summary table: animal welfare & anthropomorphism

6.10 Example of TOC Drawn from the Case Study Partners

Case G represents an example of a company which has overcome operation constraints through an analysis of its current position and the development of a strategy to overcome the identified constraint, increase throughput and increase revenue, classic indicators of TOC.

By focussing on its constraint point, where fluctuations in repeatability of orders made stock balancing and ‘picking to zero’ of short shelf life products difficult, the company was able to identify that the constraint point lay not in stock management, but in the purchasing behaviours of its non-food service domestic customers. In replacing these multifarious domestic customers with a single end customer, the company was alleviating constraint and maintaining its supply chain expertise. In closing an orbital storage facility and moving all operations to a hub, the company was able to cut operational costs, and by using delivery vehicles as dynamic hubs, where a delivery schedule would typically include picking up from suppliers for delivery elsewhere on that run and/or returning to the hub for forwards distribution, (small scale factory gating) as well as acting as a third party logistics provider in delivering products across Yorkshire to a food park on behalf of one of its

suppliers, the resource utilisation and efficiency of the delivery vehicles increased.

By receiving bulk orders twice weekly from the new customer, Case G is able to plan stock orders more accurately and is able to 'pick to zero', which shortens cycle times, removes waste and ensures maximum shelf life of products.

Whilst Case G had received little help from its Regional Food Group in accessing suppliers when it was originally set up, this was not the case when Case G approached another RFG for help in sourcing regional products for supply into Teesside, County Durham, Tyne & Wear and Northumberland.

In consideration of Case G's position in the supply chain and its role as a specialist wholesaler and intermediary, it not only acts as a high decoupling point in the chain, but it allows a beneficial trickledown effect to its suppliers. This trickledown effect in terms of order accuracy and repeatability, reduction in delivery and invoice paperwork and a shortened cash cycle, allows this researcher to suggest further credence in consideration of a simplified model of TOC previously mentioned in Chapter 4, 4.1 which may prove to be more contextually relevant to, and useable by small scale producers, which will be introduced and discussed in the following chapter.

6.11 Summary

This chapter has provided an introduction to template analysis and the summarised findings of that template. The templates *a priori* coding allowed for second and third order propositions to be derived during the analysis of the primary research data, which revealed a wide range of constraint factors, as well as recording issues relating to the concepts of local food from a number of perspectives. In describing the strategy of Case G, the research presented an example of where TOC methodology may have well been suitable for application. So far, the research has focussed on situational aspects of local food and the phenomena which are at play amongst the case study partners. The findings of the research will now be built upon.

7 Discussion

7.1.1 Introduction

In this chapter the researcher pulls together the findings drawn from the template analysis, whilst considering the themes and gaps which have emerged from the relevant literature domains. The researcher will then present his conclusions and introduce an adapted TOC framework as contributions to the current body of knowledge.

The structure of this chapter is as follows:

- Discussion of the findings and their relationships to the themes which have emerged during the reviews of the relevant literature domains
- Discussion of an adapted TOC framework and its potential benefits
- The case of Case O, a Regional Development Agency and the Rural Development Plan for England
- Conclusions
- Contribution to the current body of knowledge
- Limitations to the research
- Reflections
- Suggestions for further research

7.2 Discussion of the findings and their relationships to the themes which have emerged during the reviews of the relevant literature domains

The findings recorded around the constraints of local food, from the ability to supply a wider customer base, farmers' markets, scale and scope, reveal a 'low regard' of wholesalers and most multiple retailers. Of farmers' markets, Cases A, P and S believed that as well as the more obvious benefits of shortening the supply chain and returning a higher margin of profit per unit than conventional mass streams, participation in farmers' markets extended to a reconnection with the customer, where face to face transactions allowed for a greater understanding of the products that customers were buying.

These factors of an embedded customer-supplier relationship are in accordance with the findings of Hinrichs (2000), Kirwan (2004), Ilbery & Maye (2005), Marsden & Smith (2005) and Tropp (2008). However, the farmers' markets, as an instrument in themselves, are open to conveniently derived connotations of 'local' and 'regional' as both a construct and a ready willingness both producer and customer. Case A sells its products which rely heavily on a global supply chain at farmers' markets and country shows widely throughout the South East. Cases B and D readily engage with a wider supplier base to overcome seasonality and local supply inelasticity, although Case B remains quite open about their operational requirements. Case R indicates that the profile of products for sale at farmers' markets in their geographic area does not readily reflect the profile of locally produced, seasonal food, something of which Ilbery & Maye (2005) agree upon in their research in the same geographic area. This willingness to conflate is also recorded in the research of Morris & Buller (2003), Ilbery & May (2006) and is undoubtedly perpetuated by an ongoing indeterminacy and lack of definition, which may be understandable at some levels, especially with regard to possible market disadvantage from spatial proximity perspectives identified by Amin & Cohendet (1999), Holt (2005), and Hinrichs & Allan (2008).

The lack of frequency of these markets does allow producers to represent their products over a wider geographic area as they have the ability to 'get around' from one market to the other (Cases A, D, P and S). However, it can be argued that the infrequency of the markets impacts upon their ability to attract a purposeful repeat customer base (Heron, 2010).

At present the issues of frequency and repeatability impact upon being able to offer a viable 'one stop shop' scenario which the majority of shoppers are contingently dependent upon (Wetherell *et al.*, 2003; Lobb *et al.*, 2006; Chambers *et al.*, 2007; Megicks *et al.*, 2008; SERIO, 2008, Khan & Prior, 2010). Evidence from Case R further suggests that entrance criteria for stall holders at these markets is anachronistically liable to 'who you know', which they described as "an old boys club," who were able to influence the market manager over and above the regulatory compliance requirements of stall

holding. Although not directly stated, this is also alluded to in the research of Morris & Buller (2003) and Marsden & Smith (2005). This has led to the emergence of unregulated markets. The emergence of these markets which Case R was able to sell at, but declined to do so, is an example of the new competitive localism referred to by Morris & Buller (2003). Unregulated markets offer all of the benefits to the producer, but without the need for membership of compliance and accreditation schemes. Ultimately, this may impact upon farmers' markets, as it is unlikely that the wider public would readily discern the difference between the two types in the event of a food health scare; embeddedness may invoke a sense of worth, being and closer engagement with food sources, but it does not invoke epidemiology. This lack of repeatability and frequency of markets further indicates a relatively low level of sophistication by these producer actors, which in turn raises questions around the ability to develop better local strategies to help overcome these issues, which could act as a conduit to those local products in-between market days, positioned and controlled by FARMA or an RFG, for example. This suggestion does not imply the need for one of these organisations to bear the costs of network development, but that they would be better positioned to engage with regional freight transport partnerships, which in turn are developing sustainable transport systems and have access to live logistics exchange systems.⁴⁶ These transport partnerships are also taking a leading role in the development of 'final mile' delivery networks, where goods will be delivered to consolidation centres outside conurbations and cities, with the last leg of the journey being undertaken by electric and low emission vehicles.

The analysis of constraints recorded as perception in the template indicates that the main concepts are focussed upon the products, our understanding of those products, a supplier's view of where the market lay and suppositions of skill and job benefits.

⁴⁶ Logistics exchange systems are dynamic platforms which allow member companies to access live data relating to 'cross fleet' live information about which vehicles are where, which direction they are travelling, the type of vehicle and its spare capacity.

Ongoing mutable interpretations of 'local' not only impacts upon the market and its ability to produce a measureable 'alterity' of worth (Kirwan, 2004) but in arguing what it is (DEFRA, 2002; DEFRA, 2003; Tregear & Ness, 2005; Soil Association, 2010) we lose sight of what it may become. As previously stated, a lack of access to local fresh food is readily identified as a reason which underpins poor dietary habits (Dowler & Caraher, 2003). The ensuing status quo thus suggests that producers may have a narrow view of not only where their market is, but who the end customer is likely to be. This simultaneously acts to both stagnate the market and constrain its development, where the received behaviours of customers shape product ranges, frame niche products and rely on a willingness to pay. Notwithstanding, a willingness to pay can reduce the impact of scale through the nature of the marketplace, which allows absolute cost and resource inefficiency to be offset somewhat by comparative price advantage.

Cases A, B, I, N, P, Q and R believed that they alone were best positioned to place their products into the marketplace and knew exactly where that market was. These assumptions were earlier recorded by Hinrichs (2000) in that where a balance maybe achieved in consideration of the marketness and instrumentalism of local food, and by Murdoch *et al.* (2000) in their assessment of the need to embed and dis-embed in a 'flexible localism'.

Cases A, D, P and Q recorded their use of specialist wholesalers and distributors (of which Case G had become) but they were held in low esteem, with the exception of Case Q who considered them to offer a broader route to market. Ilbery & Maye (2006) record the role of these specialists in supporting the range of products offered for sale at specialist food shops with a strong local element, but with a ready inclination to substitute local food with product from these wholesalers if they believe they represent a better choice for the market. Evidence of this was found in the range of goods for sale at Case T. It should be noted that Case Q was unique amongst the case study cohort in that they had purchased a 'local' producer as a channel to market for a new packaging product. The prior marketing experience of Case Q was very probably instrumental in their ability to significantly increase sales of the inherited products whilst undertaking new product

development. A further contribution emerged in the perception of what the customer needed, based upon presumption rather than analysis, and an ability to balance the requirements of commercial customers with the practicalities of daily production schedules.

Whilst the evidence suggests that local food can support rural employment (Case T), it is equally justifiable to indicate that production for national supply and export streams can also support rural employment (Cases E and F). Whilst local food is often associated with artisanal skill sets, producers themselves are likely to seek those skill sets from further afield or abroad even, to satisfy production requirements (Case P). This strategy in itself potentially places longer term problems on companies if they do not engage in training and apprenticing of their longer term skills requirements.

The benefits of scale and scope are not always fully exploited by larger companies. This may be as a result of adherence to traditional accounting driven management systems which focus upon cost minimisation through resource efficiency (Reid & Koljonen, 2003; Berry & Smith, 2005). However, this assumes an implicit knowledge of those production systems in the setting of targets. Case W was consistently more resource efficient as an input per 'finished weight' bird ratio to the much larger Case F. When the data was double checked with Case F (it was correct), the manager responded that the division consistently operated within targets set of it. The emergence of a 'silo' mentality, where operational parameters restrict horizontal views across the organisation was not limited to Case F. Intra-organisational discrepancies emerged with Case H, where the orbital site manufacturing fish cake cores exhibited far greater levels of resource utilisation and operational efficiency than the head quarters site, suggesting that good practices in orbital cost centres does not necessarily migrate to other sites within the organisation. Both Button (2000) and Kim *et al.* (2008) record this phenomenon as a willingness to accept poor management practices in the workplace, so long as they do not overly impact upon individual managers.

Evidence further suggests that larger organisations miss opportunities to enhance and strengthen supplier relationships through backwards integration. Although Case E had a valuable resource as by-product (dried red blood cells from the abattoir as a fertiliser), no consideration had been made of this other than a commodity for onwards sale, rather than a potential backward integration instrument, offered to those supplying farmers on a 'per head' basis. Case U had not considered batch provenance of cereals supplied by Case J to its local mill, then returned to Case J as animal feed, which in turn could have added further provenance to the 'local' meats sold at Case T.

The identification of potential markets which commenced with the Curry Commission report (2002) and has been developed since then by regional food groups, DEFRA, IGD and others, tends to focus on 'for profit' food service. Attempts to integrate local food in local government and NHS procurement strategies have been largely unsuccessful (Sustain, 2010). Whilst it may be easy to identify potential markets such as cruise terminals, airports and rail stations, it is considerably more difficult to penetrate these markets (Cases B, P and R), when potential suppliers are faced with constraints existing in large service companies⁴⁷ which are invariably linked to cost per unit.

The perception of local foods of relatively low complexity and sophistication in their presentation to the market is twofold; firstly in that these goods are perceived to be more wholesome, fresher and of known provenance (Cases D, G, I, S, P and T), which is a theme also recorded across the literature (Tregear & Ness, 2005; Wetherell *et al.*, 2003; SERIO, 2008; Smithers & Lamarche, 2008; Oglethorpe & Heron, 2009; Khan & Prior, 2010). Secondly, this ultimately impacts upon the ability of these foods to penetrate a wider

⁴⁷ As a point of interest, during this research period, the author attended a presentation by the Port of Tyne Authority on its cruise ship operations for the Chartered Institute of Logistics & Transport. It transpires that in taking on of provisions at dock side, it is not uncommon for those provisions to have travelled across from various parts of the EU. Although the local RFG had laid on tasting events, it was the opinion of the terminal manager that the transient nature of the customer and an inability to fulfil post sailing orders, impacted upon the usefulness of such events.

market sustained by tinned, frozen, dried and ready meal products, as well as those packaged under sophisticated modified atmosphere packaging environments.

There is evidence that good business to business sustainability extends beyond a willingness to promote locally sourced foods in multiple retail stores, but extends to the development of a feeling of 'worth' by the producers. This suggests that the need to develop these relationships also extends to other multiple retailers and specialist wholesalers, distributors (Case A) and food service companies. Case P identified the development of a long term relationship with the same channel category buyer, and the benefits of knowing who to ask for or who they were speaking to whilst conducting business. Case G identified that many of their suppliers had been distantly managed when supplying multiple retailers, which had further heightened their sense of disconnection from the customer. By extension, this calls into question to the current format of 'meet the producers' and 'meet the buyers' events organised by RFGs and multiple retailers. There seems little use in creating an opportunity for small, local suppliers if it is not backed by communication strategies from purchasing actors, which extend beyond ordering, invoicing and queries, to develop the sense of 'worth' identified in the research. Further to this, it is suggested that the model developed by Waitrose could potentially be adopted by other multiple retailers utilising existing members of staff. Ilbery & Maye (2006) record similar activity, where a multiple retail store manager recorded the presence of specifically identified local food in their store as politically motivated, whilst both the purchasing manager of a department store food hall in Newcastle upon Tyne, and several of their suppliers recorded the importance of more meaningful supply relationships.

The aforementioned feeling of worth needs also to extend to companies supplying services, particularly logistics and distribution services to smaller companies. Disproportionate charging for pallet services, for example, does exist, and smaller companies are usually the first to be subjected to price increases and the last to be given price decreases. This action extends beyond scale considerations and into business strategy, with the

transportation companies looking for a 'bigger slice of the pie' (Case L). This therefore suggests that smaller companies may well benefit themselves from formalised collaboration or even the transfer of ownership of goods to specialist companies on their way to customers, and that these de-scaled networks and hubs can alleviate operational constraint. Another possible benefit of such network development may be the ability to overcome business to business supply inelasticity, which can lead to virtuous local collaborations breaking down Cases (A, B and G). This identification for possible collaboration may go some way to offsetting the demise of informal networks identified by cases I, P and S, which were typified by loose trading systems, mutual benefit and common need. Although Case P did participate in an informal collaboration, it suggests that this collaboration was product specific and linked to shared values and beliefs around those products, which by extension, suggests that the underlying values which drive informal collaborations may be highly subjective, therefore missing opportunities to present 'more goods more of the time' simultaneously across the market base. Consequently and ultimately, this indicates that the relative resource utilisation per product becomes the most important factor in the consideration of the environmental impact of moving 'local food' to market.

The research also records that even when there is a reasonably efficient delivery system in place for products (Case I), that those products face significant competition by way of their homogeneity, and that a decision to atavistically return to a 'better time' of processing will not necessarily form a market for that particular item, let alone inform the market sufficiently enough for it to become self sustaining.

For the research to only identify the need for collaboration in moving goods to market overlooks significant opportunities to offset scale and scope by looking back up the supply chain to consider business inputs. Where the principal operational activity of the producers was related to farming (Cases B, F, I, J, O, R, S and W), collaborative purchasing activity via farm input schemes did occur which offsets wider market impacts creating cost – price squeezes. This indicates that a proposal to develop collaborative purchasing activity may also offset price squeeze and retain balance in parity ratios.

The research records the use of box schemes as both a conduit device (Case G's original business model) and as an outlet for products (Case P supplying to Riverford). Notwithstanding this, the research suggests that they do not deliver the benefits identified in the literature (Pretty, 2001; Edwards-Jones *et al.*, 2008), and are as equally susceptible to the demand of the market, typified by imported components of Riverford boxes reaching 20% (Riverford, 2010), as well as further indication of a willingness to conflate 'local food' terms time again. Whilst seasonality of produce in box schemes is seen as a positive, this ultimately marginalises them in terms of the requirements of the consumer at large (Wetherell *et al.*, 2003, Blackwell *et al.*, 2006; Lobb *et al.*, 2006; Chambers *et al.*, 2007; SERIO, 2008; Khan & Prior, 2010).

The development of alternative accreditation schemes such as SALSA, LEAF, Soil Association and HEFF standards have proved useful instruments, whereby membership of a compliance scheme has allowed producers to present the products across a wider market segment, where for example multiple retailers or food service companies would require membership of an accreditation scheme as a pre-requisite for potential supply (Cases A, B, D, P, Q, S and certain suppliers to Case G). However, evidence emerged of a perception of these schemes as becoming more complex and onerous as they developed, as well as a realisation that schemes depend upon repeating membership fees and the attraction of new members. Although not directly related to the research cohort, evidence has emerged of a specialist distributor (not Case G) receiving a £70,000 grant under the RDPE 2007-2013 scheme to set up another compliance scheme.

The decision to encompass intensive pig and poultry operations within the Integrated Pollution Prevention and Control legislation remains a contentious issue (Cases J, O and W). Case W recorded IPPC as their single greatest constraint, to such an extent that its imposition was informing future farming strategy at Case W, where they were considering a move away from contract rearing to Case F. The emergence of this phenomena is an example of a legislative event being held as a personal attack almost, yet Cases E, F and J were also covered by IPPC but regarded it as an operational necessity,

giving further weight to the arguments that scale offsets legislative demand and that the costs of managing these requirements are much more easily 'over headed' in larger operations, which also have the advantage of data capture within their data management systems.

It is likely that by the time of submission of this thesis, September 2010, the HMRC controlled Business Link programme will have undergone significant changes, the Cabinet Office having already identified it as being likely targeted, quoting its £35 million yearly costs for its website alone (COI, 2010). Cases I, P and R all recorded disappointment in their exposure to Business Link, namely that its structure restricted access to approved advisors, and that those advisors had very little specialist knowledge of the sector, or ability to aid grant fund access.

The Rural Development Plan for England is currently in its second phase and has more than two years remaining. The literature (Ilbery *et al.*, 2010) suggests that the two grant schemes which were supposed to aid development of local foods and provide additionality have had very little success beyond the farm gate. The reasons behind this are many, from the relatively high minimum project spend of £70,000, through to a requirement for the purchase of new capital equipment rather than used equipment, an emergence of networked serial adopters and the structure of the awarding bodies. This implicitly suggests that an inability to achieve additionality in the lack of grant awards to smaller schemes, which it may be further argued, would be more likely to deliver against public priorities of additionality and local food programme development is significantly impeded upon (Cases, C, I, O, P and R).

Cases A, B, C, N, O, P, Q and S all spoke in very positive terms about the work undertaken by Regional Food Groups on their behalf. This represents three of the eight RFGs. All of the RFGs are held in loose alliance, each RFG having its own local agenda, which in turn is informed by the different Regional Development Agencies, who in turn are influenced by political imperatives in their remit, to both create and safeguard jobs by stimulating and supporting economic growth in their area. Although this is not recorded

as a constraint in itself, it points to an emblematically wider constraint in a lack of disambiguation around the term 'local' and connotations of 'local' and regional representation on a group by group basis and by extension, where fund allocation may be influenced by the composition of awarding bodies and local political imperatives, of which will be highlighted in an examination of Case O, where evidence emerges to support the contention of Ilbery *et al.* (2010).

The research case evidence and literature review indicate that a lack of regulation around the term 'local food' and a willingness to blur and conflate terms by all actors reduces the term 'local food' as a largely notional market construct. Given the broadly analogous state of food production in the UK, the decision on whether it becomes local or not occurs at a relatively late stage. As identified in the template summary, Cases B, G, J, P, Q, R, S and T display traditional 'local' credentials in their activity. Nevertheless, the recorded 'local' enterprise forms only a small proportion of overall activities undertaken by these enterprises at large, typically farming establishments. It is therefore reasonable to argue that in many cases, niching into local streams is largely dependent upon those actors supplying in to larger scale supply networks also. Further to this, traditional views on 'local' and spatial approximations ignore the role of medium and large food manufacturing facilities in what derived social capital they can deliver to their local area, which by extension, sustains the traditional 'local' view and overlooks the possible emergence of food localisation systems.

In the areas where case study partners E, H, K, L and M are situated, food manufacturing represented the major employment sector after public sector employment, which advances the argument that continuous development of staff and the transferability of those acquired skills are more important for longer term sustainability and security in a manufacturing section which accounts for 7% of GDP and employs over 3 million people (Cabinet Office, 2008).

The research revealed altruistic activity aimed at educating and re-engaging urban customers and schoolchildren to the sources of their food and its

component parts (Cases I, P, S and T). What is clear is that this requires longitudinal activity across generations, to remove the barriers which have been erected in the construction of multiple retail convenience shopping. What is less clear is how this will be achieved or if there is a political will to do so. Notwithstanding this, it does suggest that the activities undertaken by Cases I, P, S and T do extend beyond the reasons given for attending farmers' markets.

The attribution of human belief systems, values and characteristics to the animals we raise for food is a phenomenon in itself, which has given rise to a modern, empathetically driven interpretation of anthropomorphism. The research indicates particularly in consideration of Case I and to a lesser extent, Case S, that in the purposeful development of non-intensive farming systems, in which lower yields are planned and stock is slower to mature, places significant constraints around products. Furthermore, it increases the likelihood of niching for these products, increases cost per unit and invites external pressures upon that business. Case S could mitigate against this somewhat as the majority of its livestock entered wider supply chains, but Case I are wholly dependent upon a system borne out of personal belief and a degree of atavism.

Contrary to this position was the intensive indoor pig rearing operations spread over a number of farms by Case J. All of the animals are held at stocking densities which conform to legal limits. Case J sits on an industry executive board and has been involved with the previous government's Farm Welfare Council. In these intensive indoor systems, which produce 70% of British pork, the animals are managed through to finishing weights as units of production, of which Case J stated in an interview with a national broadsheet newspaper in 2008: "*we think it works very well and we are very proud of it.*" This research records no particular view of right or wrong in either system, but it does indicate that constraints emerge as a human condition in relation to their views and beliefs around their livestock. Intensive systems drive resource and input efficiency (Cases E, F, J, O and W) but are more likely to come under public scrutiny through animal welfare groups (Cases E and J) and 'celebrity chefs' endorsing public awareness campaigns, which have

been particularly prevalent in the poultry industry, where campaigns have benefitted from the support of Hugh Fearnley-Whittingstall and Jamie Oliver in particular.

Another theme throughout the research (Cases B, I, J, R and S) and an ongoing point of contention some 12 years after introduction, is a perceived lack of fairness in the disproportionate leverages placed upon smaller abattoirs for meat inspection, which have led many to close. It is held by those interviewed that their choices are restricted and their livestock end up taking longer trips to abattoirs, although this overlooks the distinct possibility that many small and medium sized abattoirs have closed as a result of our shopping habits, where the supply of meat to the majority of endmost actors requires large integrated systems. Interestingly, Case J's decision to send animals for slaughter at Case V, for supply into Case T overlooks the fact that the majority of Case J's livestock supplied to a pork processing company travels less distance. Given the relatively late stage that meat becomes a 'local' food, the research indicates that dead stock movement is not significantly impacted upon although more contentiously, it also suggests that animal welfare above legal compliance is linked to smaller scale 'local food' operations, which elicits two distinct views on animal welfare and a modern anthropomorphism; it is important and needs to inform future practice, or it is a human condition which acts as a constraint, impacting upon resource efficiency and utilisation.

7.3 Discussion of an adapted TOC framework and its potential benefits

The literature review recorded a distinct lack of TOC application in food; even Adelman's 1995 study of TOC at a doughnut shop was pitched as a service sector presentation at conference. TOC however has been used in food manufacturing, the researcher has firsthand experience of TOC analysis and application in the dairy industry over a number of years, so why is there not more TOC research in the largest manufacturing sector in the UK? Ronen (2005) suggests that it is a practitioner-led skill separate from academic interest, although Anthony-Inman *et al.* (2008) suggests a lack of empiricism is a root cause-. Elsewhere, Reid & Koljonen (2003) believe it is unable to work in FMCG environments, which stands wholly contrary to the researcher's own experiences, whilst Linhares (2009) suggests that combinatorial complexity impacts upon successful TOC interventions. But it is perhaps the complexity of a developing TOC system and its subsequent introduction of thinking processes, trees, branches and sub-branches that adds so much complexity to an original idea, that it is beyond the limits of a research paper to be able to introduce, record team dynamics, measure, discuss TP systems, apply TOC, re-measure, empirically analyse and prove or disprove TOC's usefulness. This would also indicate that a researcher would have to be embedded in the organisation over a considerable length of time and would require a significant amount of access to the individuals undertaking the project. Rahman (1998), Mabin & Balderstone (2003) and Kim *et al.* (2008) all identify the need for research that extends beyond concept and includes method analysis.

The research recorded an unwillingness to 'let go,' particularly in the development of the customer base, with smaller companies wanting to manage every aspect through to delivery, typified by an 'it's my cake, why would I want to give anyone a slice of it?' mentality. The fact that these companies exist prove that there is a market for their products, which further suggests competence in manufacturing. If we acknowledge that these small companies have core competencies around their products, this researcher suggests that an adapted and simplified TOC could be of potential use to

these organisations, by enabling them to identify their strengths in order to address their weaknesses.

An adapted Theory of Constraints for Local Food

STEP	TRADITIONAL TOC	ADAPTED 'LOCAL FOOD' TOC
1	Identify the system constraint	Identify core operational competencies
2	Decide how to exploit the system's constraints	Identify best practice for other operational factors (inputs & outputs)
3	Subordinate everything else to the above decision	Focus on successful implementation of new practices or systems
4	Elevate the system's constraints	Re-identify and re-measure benefits and impacts upon core competencies
5	When the constraint has been broken, return to point 1 and start again. Do not let inertia become the next constraint	When the benefit to the core competency has increased, the constraint has decreased, return to point 1 and continue

Table 25 A proposed adaptation of TOC for the 'local food' producer sector

TOC tells us that we are doing something wrong and it is here to help us, and therein lays a potential problem; in introducing TOC we are implying that not only is something wrong, but also that there is an operational predicament. When small companies believe that they acting with the best of intentions, it can be disheartening to be told from the outset that what they are doing is wrong. Hill & McGowan (1999, p. 6) argue that in many small businesses “*decision making is often largely confused, chaotic, unstructured,*

certainly non-linear and time compressed.” Whilst Lepore & Cohen (1999, p. 29) identify in their work on management philosophies linked to TOC and Deming’s system of Profound Knowledge that *“breaking cost rules in order to survive and decision making is never so crucial as when companies are struggling to stay alive.”* It was not surprising during this research to find evidence of almost intangible and misplaced business decisions linked to perceived constraints, which have impacted upon some the smaller case study partners.

By inverting TOC itself, it is possible to develop a relatively simple tool to identify what it is that a small company is doing right. It would seem a more likely proposition that engagement with small food companies operating in a ‘local food’ marketplace would be more positive. In recognising core competencies, then recording the inputs and outputs around those competencies, the researcher contends that change could occur, especially when it could be linked back to an ability to place further focus on core competencies.

Fig 46 represents a four stage ABCD model of a cycle of improvement based on an adapted TOC, which would commence with the identification of the company’s core competencies, before moving on to the next stage which would be to modify strategies around inputs and outputs. This would be followed by developing relationships which have been formed by the modification of the input and output activity in step two. Step four reflects the fourth stage of the adapted theory, whereby operational activity can be assessed to indicate whether operational efficiency and resource utilisation have been achieved, before returning to Step 1 again. Fig 46 is presented on the following page.

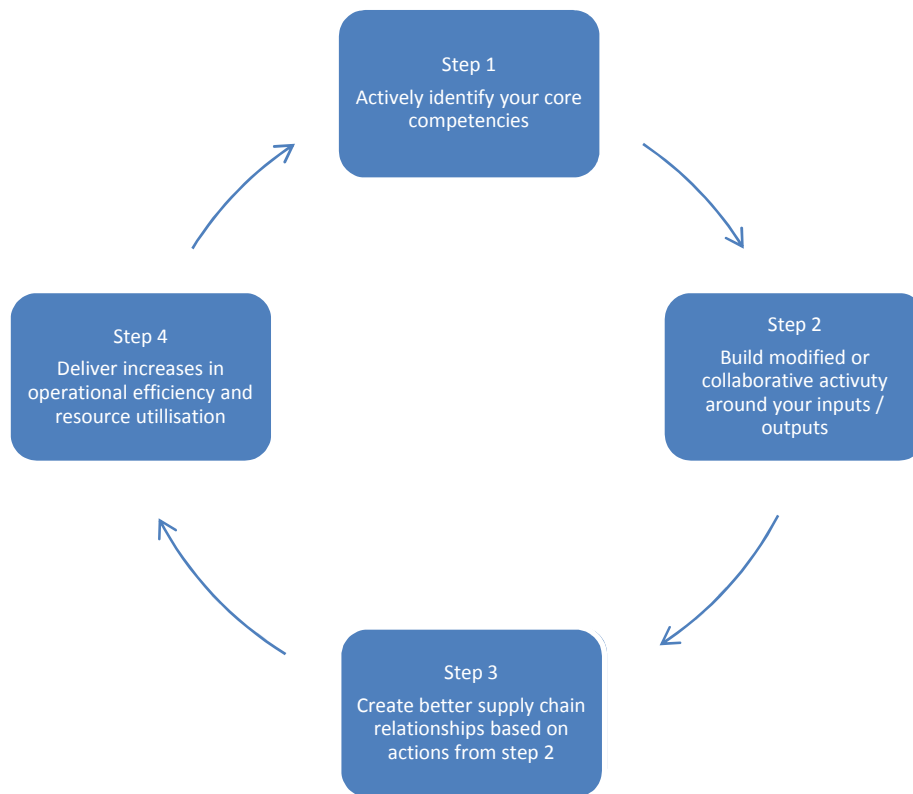


Figure 46 A proposed 4 stage model for small business development

It is not beyond the realms of possibility to think that this may be achievable. Holt (2005) identified a wealth of successful agricultural cooperative activity in the UK, although these cooperatives were primarily concerned with the purchasing of capital equipment and there was a leaning towards this type of activity being relatively short term. Holt further records a historical inclination of farmers to be readily disposed toward short term price hikes, hence the term 'Farmers Loss.' Longer term collaboration and cooperative activity would be more likely to offer better market solutions underpinned by closeness of communication and repeatability. The researcher recognises that this is easier to allude to rather than instigate, but offers the possibility of a keiretsu system of interlocking businesses of similar size.

When food supply is an issue, it seems almost recidivist to not embrace resource utilisation and maximisation of return on inputs such as fertiliser and fuel, as well as proficient animal husbandry. Collaboration borne of modified TOC or otherwise, may help business and market performance = better productivity = better environmental management = lower impact per

product. Integration throughout the supply chain, including potential waste savings and diversions, as well as integration of new customer bases in disadvantaged areas and may equal new interpretations of local foods.

7.4 The case of Case O, a Regional Development Agency and the Rural Development Plan for England.

As previously mentioned, the researcher wishes to return to Case O in this chapter. Case O had been an active and open case study partner; their business exemplified a steady organic growth of a family business over 50 years. The business itself characterised many of the traits held to exemplify a competent local food production and distribution system, and the three family members I met were courteous and professional throughout. I was allowed open access to their operations.

The following is a press release from One North East issued on 27th January 2010. The researcher has taken the decision to anonymise it wherever possible but retained its typeface and structure:

Expanding family farm egged on to succeed

An egg farm which has joined forces with similar businesses across the North East following changes in legislation has received funding to help it cope with the extra demand.

Case O, in XXXXX, bordering Newcastle upon Tyne and County Durham, has been awarded £457,000 from One North East's Rural Development Programme for England (RDPE) to expand and modernise its egg processing, grading and packing facilities.

As a direct result six new jobs will be created and eight businesses will benefit through a collaborative agreement.

At the last British Egg Industry Council (BEIC) subscriber meeting it was agreed that there will be no Lion accredited birds in conventional cages from January 1 2012, so retailers know that Lion eggs will be produced in a colony system.

The decision left a number of egg production businesses in difficult positions as they were unable to afford investment into the new colony systems. Case O has consequently supported a number of such smaller egg producers in the region by taking in their egg production, grading, processing and packing functions and employing the business owners and staff within Case O.

In order to meet this extra demand, Case O will use the RDPE funding to take forward a development project which will include a new packing centre fed by automated egg collection from the new colony buildings, which is instrumental in both quality and cost control.

Kevin Bird (name changed), RDPE Manager at One North East, said: "This project will secure Case O as a major independent producer in the region while also allowing for further growth.

Case O clearly sees the need for collaborative working and is offering support to other local producers to ensure egg production in the North East continues, retaining a strong egg supply chain following the changes in legislation while also retaining valuable skills in the region that would otherwise be lost.

“The new facilities will help the business create and secure employment, keep egg production and processing local and also minimise food miles used in egg production and processing in the North East.”

Case O was established in 1952 by Ian Gibson Snr (name changed) and has since remained with the Gibson family, first being taken over by Ian Gibson (name changed) - son of the founder and now being run by his two sons.

It is the largest egg producer within the region marketing 38.6m eggs across the North East each year. This equates to approximately 8% of the region’s consumption which is anticipated to rise to 13% by the end of next year.

Neil Gibson (name changed), Manager of Marsden Hall Farm (name changed), said: “After developing collaborative agreements with smaller producers to allow them to continue with existing customer bases and consequently expanding our business base, it presented us with a challenge and opportunity to develop our business.

“The RDPE funding is a great boost to our £3.5m investment plan for the next two years; and is in addition to the £2.5m already invested over the last four years on our free range sector. We are very proud of what we do at Case O having gone from strength to strength over 57 years of trading and we think it’s imperative to invest for a sound future while contributing to a thriving food production and distribution business in the North East.”

The Rural Development Programme for England 2007-2013 is jointly funded by DEFRA and the European Union, with the aim of delivering targeted support to rural businesses and communities. It is managed in North East England by One North East, Natural England and the Forestry Commission.

The RDPE investment being managed by One North East combines larger projects to help many businesses in different sectors of the rural economy - including bio-energy and land-based skills, and projects adding value to agricultural and forestry products - with smaller investments to help individual businesses to start-up, grow or diversify, and support to develop more sustainable rural communities.

RDPE Business Support is part of Solutions for Business, the Government’s package of publicly funded support products offering help to companies to start, grow and succeed. Solutions for Business makes it easier for businesses to get the advice and assistance that they need.

For further information on the full package of support, visit <http://www.businesslink.gov.uk/northeast> or Tel: 0845 600 9006. For more information on RDPE in North East England, visit: , visit: http://ec.europa.eu/agriculture/rurdev/index_en.htm or <http://www.defra.gov.uk/rural/rdpe/index.htm> Ends.

Upon reading this, it became obvious why Case O had wanted this researcher to make changes to their narrative, which was declined by the researcher. Parts of the narrative appear to have been used in the funding

application, which is reasonable, given that Case O held the source data and therefore intellectual property rights for content of much of the narrative and supply chain map. In reading the press release, the researcher was more interested in the rationale that lay behind the grant allocation to boost expansion by removing competitors from the market place. If the justification was based upon economies of scale reducing environmental burden, then there is an argument that it is to the benefit of public good. But what of the business's competitors? The local businesses which were being taken out of the market by this strategy, and the businesses who had remained, either locally, regionally or nationally, having now been disadvantaged in a market which was potentially being distorted with public monies in the guise of RDPE funds, to the benefit of a company who given their recent investments, were more than likely to proceed with this investment anyway.

Collaboration implies that you work jointly, not that you remove your competitors one by one, with the help of funds allocated from the RDPE. This researcher can readily identify which valuable skills would disappear from the region - none, and it is also difficult to comprehend that 'food miles' are used to underpin a grant, when DEFRA itself has distanced itself from the validity of food miles as an indicator of sustainability.

Nine weeks later the researcher found himself at a DEFRA breakfast meeting 'Food 2030' road show. By coincidence, the person sitting opposite me was Kevin Bird. During the morning we had an extended conversation over the £457,000 awarded to Case O, the researcher's position being that it bordered on positive discrimination and market intervention, that did not satisfy or deliver on public priorities of additionality and the development of local food supply chains, it was plainly not a market solution. Whilst there was clearly an operational constraint, it was overcome with public money thereby distorting the market. The researcher cannot fully report Kevin's response verbatim as he does not have his permission to do so, but it can be reported that the reasons given to the researcher were somewhat flawed, and that there was a grudging acceptance that it indeed was not an intervention to the good of the market. There were two senior NHS dieticians at the meeting also and representatives of the RFG; one can only imagine

what they could have done with an unexpected £457,000 to counter the findings of Rayner & Scarborough (2005) and those contained in the Cabinet Office Strategy Unit report Food Matters: Towards a Strategy for the 21st Century:

There are social inequalities within diet related health that demand attention. And alongside the social impacts, the economic burdens of diet related ill health are huge – perhaps £6 billion in additional NHS costs alone each year. (Cabinet Office, 2008, p viii)

The report also identifies that:

Poor diet is known to influence the risk of cancer, heart disease and other conditions. The importance of nutrition for mental health and wellbeing is gradually becoming clearer. Around 70,000 fewer people would die prematurely each year in the UK if diets matched the nutritional guidelines on fruit and vegetable consumption, and saturated fat, added sugar and salt intake.

(Cabinet Office, 2008, p viii)

In consideration of the contributions to knowledge, the above statements are perhaps more pertinent, when we deliberate upon the current 'state of play,' the possible emergence of new interpretations of 'local food', the restrictions surrounding fund allocation, and the restricted view of the marketplace itself.

8 Conclusions

It is clear that we need to abandon simplistic and stereotypical concepts of what local food is, and for whom it is meant. For example, by calling for an enhanced role of the convenience retail sector (IGD, 2005; IGD, 2006) to deliver a local food initiative, based upon their knowledge of the local market, we simply fly in the face of supply, retail and consumer behaviour common sense. This research acknowledges the strong links between areas and their convenience stores, but when those convenience stores are located in areas of urban poverty, we further reinforce prejudicial and anachronistic stereotype, contemporaneously requiring the shopkeeper to abandon a reasonably successful model. It remains highly unlikely that an independent or symbol convenience retailer with local knowledge would be likely to manifestly change the profile of their stock for a market that is utterly not there. There are many reasons why it is not there, but there is hope that there can be a market in the future, based upon education, meaningful grant allocation to provide additionality, impartial and apolitical, transparent decision processes and awarding bodies, as well as most importantly, a shift in stance and perception of all actors from seed to plate of what local is.

Further to this, if we continue to believe that there is a food culture *per se*, then we continue to perpetuate it, thereby acting as a significant constraint upon the future development of local food. This in itself requires further effort on behalf of the food producers to break away from the historical image of what local food is, but to focus upon a more contemporary holistic of the food available as a result of local production. Links can be established with communities, but not overnight or for short term gain.

Disengagement and distance can help us to overcome barriers; it is accepted that looking both upwards and downwards along supply chains can help you identify where problems occur that impact upon your operations. Future application of a more contextually relevant and simplified TOC may well improve efficiencies at operational levels, as well as allowing strategies to be developed at a policy level to ensure that additionality is achieved to

the benefit of producers and customers most likely to receive greatest benefit.

In addition to these factors, it is also important to look for emerging concepts in the wider supply chain and 'local food' spheres which Kirwan (2004) believes needs to overcome malfeasance in order to develop trust, which in turn may support the original proposition of exploring alternative models of localisation in food supply chains. Spence & Bourlakis (2009) propose a model of Supply Chain Responsibility (SCR) which extends beyond the currently accepted remit of Corporate Social Responsibility on which companies advance beyond legal compliance, to encompass social responsibilities beyond the factory gate. SCR proposes:

1. A supply chain commitment to achieving social (and environmental) benefits.
2. The legitimacy and possibility of all links in the chain to have a voice.
3. Genuine partnership approach.
4. Acknowledgement of different approaches to ethics by different organisational form within the supply chain.

(Spence & Bourlakis, 2009, p. 295)

A local food supply chain which delivers the greatest benefit to those most disadvantaged by disengagement to local food, thereby gaining the additionality required as indicators by both the previous and current Rural Development Plans for England, could present a perfect test and development platform for the concept of SCR and a modified TOC, supported by a willingness to change and the public purse.

8.1 Comment and advice to policy makers, practitioners and managers

The research recognises the existence of alternative schemes of food provision to the poor such as 'FareShare' (<http://www.fareshare.org.uk>) and 'Swapathon' (<http://www.swapathon.co.uk>) the latest Government backed venture for healthy eating as part of the Change4Life initiative, as well as at a

smaller scale, altruistic donation schemes of allotment surpluses through 'FoodShare' (<http://www.foodshare.co.uk>)

FareShare is a UK charity which collects surplus food from retailers and distributes it in schemes which aim to address food poverty, through donation, education and training. In this respect, it may be argued that this represents a new, alternative model of food localisation linked to some of the activities of Case Study Partner L. The charity conducts important work for those most at risk of food poverty which extends beyond the giving of food, to include programmes aimed at healthy eating and living, whilst raising awareness of environmental impacts, and indeed, reducing environmental impacts of food that would have gone to landfill if an alternative did not exist for its end of shelf life scenario. Nevertheless, this researcher contends that the very nature of 'giving' by multiple retailers does not address the underlying problems around food poverty and adds little to the debate around an emerging model food localisation contained within this research. Indeed, when a retailer uses FareShare as a final option, but purports this strategy as social responsibility within in its own Corporate Responsibility Report:

If we are then left with excess food, we sell as much of it as possible at a discount, which keeps waste to a minimum. The final step is to re-use what we can by donating surplus food to local charities such as FareShare

(J Sainsbury; 2010; p.46)

It further suggests that not knowing which type and what amount of food you may (or may not) be getting on a daily basis from your suppliers places significant operational and strategic constraints upon your organisation⁴⁸. Although, this type of operation may also possibly benefit from the introduction of the alternative 'Theory of Constraints' model mooted herein, for possible future collaborations with similar charitable organisations.

⁴⁸ This also invites further inevitable questions around the collection and distribution of surplus food linked to geographical and socio economic factors, with stores in more affluent, urban areas likely to generate more 'rich food' waste.

We should not think of J Sainsbury acting alone in this respect, other multiple retailers have similar strategies, as do other food supply sectors. At the recent launch of the CILT Food Logistics Forum (28th February, 2011) a senior executive from Brake Brothers gave a presentation around its long term strategic relationship with FareShare, identifying that 112,000 meals, or meal equivalents in the form of pre-prepared vegetables / portion control desserts had been donated during the previous financial quarter. Going forwards, the company look to increase this to a base level of 50,000 per month (16.5% of their food waste) as a strategy to offset against landfill costs. However, from a supply chain / operations perspective, it seems bewildering that an organisation should be strategically planning to waste food; it would appear to be more prescient and efficient not to produce it in the first instance. Once again, regardless of opinion around the subject, it would appear more likely than not, to face operational constraints when there is no guarantee of supply volume, where that supply point will be, or what are the constituent parts of that day's supply. In view of these factors, it is essential that we do not view tonnages saved from landfill as a public good, to do so merely covers up operational decisions which Goldratt (1992) described as institutional and operational constraints.

On advice for Policy Makers; this research suggests that those that are most disadvantaged by a lack of access to local, fresh food - the urban poor - are most likely to receive most benefit from an alternative model of localisation. This does not seek to reduce any of the benefits derived by farmers in short food supply chain scenarios, but looks to increase their derived benefit through access to a broader, more repeatable customer base.

In recognition of these factors, it is inevitable to conclude that in their current manifestations, both the Rural Enterprise Scheme (RES) and the Process and Marketing Grant (PMG) schemes of the current Rural Development Plan for England (2007-2013) and its predecessor; The England Rural Development Programme (2000-2006), have broadly failed to deliver against their requirements: to deliver against public priorities linked to additionality factors in the development and introduction of short, local food supply chains.

This research calls upon policy makers and managers of grant schemes for immediate change to the RDPE funding structures under RES and PMG schemes, whereby future fund applications are based on their individual merits to deliver against the requirement to additionality for the public, not their ability to have a baseline project cost of £70,000. Further to this, as an alternative, the researcher suggests that smaller grant applications should be allowed to be grouped together at a Metropolitan Council or Unitary Authority scale, whereby a number of small project applicants can submit an umbrella application which is guaranteed by that Authority or Council, and which addresses food localisation initiatives at several places within their boundaries simultaneously.

Allowing umbrella applications brings potential further benefits consequently linked to larger scale operations, under which new supply chains would fall under a single point of control, thereby being better positioned to administer 'last mile' scenarios and urban consolidation. The researcher further proposes to policy makers that incremental changes made to funding application criteria, which are not based upon rural land use and activities, but on the disposition of value in local food systems, removes barriers to assess many of the motives for scheme investment made in the first place, where purposely restricted application models stand counter to the wider policy objectives. To this end, repeat applicants who view the scheme as another part of their funding jigsaw (Ilbery *et al.*, 2010) should be actively directed away from these schemes.

However, it is important to recognise that there should be an equal amount of effort made by those seeking to access these and other funds in the development of local food initiatives also. Irrespective of political ideology, the launch of the 'Big Society' by the incumbent government at the time this thesis was nearing completion may be coincidentally well timed to deliver change, aiming:

“to give citizens, communities and local government the power and information they need to come together, solve the problems they face

and build the Britain they want”

(Cabinet Office, 2010)

Within this strategy, there is a call for localisation, collaboration, empowerment and engagement. Nevertheless, it is of tantamount importance to recognise that any policy driven by social capital and social networks recognises the strong levels of correlation between deprivation and volunteering rates, which suggests that wealthier sections of society with higher levels of social capital, are more likely to volunteer and therefore benefit from ‘Big Society’ initiatives, further exacerbated by the current rounds of public spending cuts, which potentially raise barriers rather than remove constraints.

To counter this, in terms of the food localisation identified in this research, and the aforementioned policy changes, strong local leadership and action to access the identified funds needs to be developed in which:

- Support and guidance is readily available to both individual and umbrella applications to funds for projects which can deliver those additionality factors required in the development of local food supply chains.
- Small groups are allowed to aggregate projects to create a leverage effect on both PMG and RES fund allocation.
- Established food interest groups are also brought together; these may typically include Regional Food Groups, NHS bodies, Councils, Local Education Authorities and producers / producer co-operatives etc, in order that each party can recognise why levels of food localisation are low, and more presciently, forearmed with the common pool of knowledge, what can be done to overcome current constraints, by shortened and more direct lines of communication.
- Key actors from both urban and rural areas are encouraged to form a community in itself which works towards commonly agreed goals of food localisation, which in turn, removes barriers and constraints by the valuation of different perspectives, direct face to face engagement

across communities and the reintroduction of more direct communication channels with food producers.

- This previous point can potentially be further developed and extrapolated by the use of 'result areas' and 'performance indicators' within a project management perspective, to extract further value beyond direct supply and shortened chains, to help urban communities re-engage with food sources.
- Longer term, sustainable benefits can challenge some of the current views of food localisation as modern day philanthropy (Dowler & Caraher, 2003; J Sainsbury, 2010 etc.). By changing both behaviours and values across the sphere of food localisation, perceptions by suppliers of where the market lies can be challenged, whilst behaviours and values of food localisation held by the urban poor can be addressed with regards to the wider benefits to their families and communities. This may empower them to engage in action related to environmental and societal sustainability.

It is recognised that this research, or its advice to policy makers and managers, does not contain short term 'overnight' fixes to the manifest problems encountered. Established maps and blueprints must be challenged in their current form; farmers' markets for example, must be challenged in their ability to address food localisation across society. In not doing so, the potential exists that a deficit model of supply remains unchallenged.

Successful collaboration takes time to develop, nowhere more so than in supply chains, and especially in consideration of communities where superficially at least, it could be argued that different sets of social networks and capital are at play. Rowson *et al.* (2010) suggest that social capital will be the currency of the 'Big Society'. Further to this, they argue by understanding the differences and perspectives of social capital across communities, particularly in relation to urban communities, that this knowledge can be used to promote participative actions and behaviours. Notwithstanding, this research both records and identifies the sociological differences between rural and poor urban communities as well as their

attendant buying behaviours. Crucial to the successful and sustainable management of food localisation initiatives will be a need to value each group's motivations and drivers, as well as a pooling of resources. As with good sustainable supply chain collaboration in other areas, sharing of information is as important as sharing of risk and the development of trust to overcome constraints, in ways which are adapted to local conditions and require innovation, rather than a formulism driven approach to remain with conventional systems.

Whilst the Curry Report (DEFRA, 2002) called for a niching of products as a central notion for adding value, it overlooked some stark realities of farming, economics and supply chains, in which the market price is not set by intra-UK availability of products and trade. If farms are not part of cooperatives, and even to some extent, if they are members, farms neighbouring each other are ultimately competitors in the same market. A fundamental floor in the reasoning of the report in calling for creation of value in more direct streams, therefore lies in their ability to create 'value' rather than simple pecuniary gain. This is particularly so if there is no inducement to collaborate in historically adversarial markets. If there is already a perceived 'value' of local food, either explicitly or implicitly in the marketplace, driven by a perceived customer demand, how can further value be created beyond basic satisfaction? It is the opinion of this researcher that it cannot in its present 'local' guise. It is further argued that from a policy and development view, that it is not only the focus of where the current market lies, but also the positional locus on a socio-economic curve which is misplaced, both in terms of sustainability and value, suggesting that a greater degree of abstraction is required to inform upon future policy.

Of future policy developments, which are also discussed in the conclusions, it is important to remind ourselves that policy tends to be driven by political will and to a degree, ideology. This inevitably impacts upon longer term planning for a more holistic good. For example, we have witnessed the birth and stagnation of the Food Chain Centre (<http://www.foodchaincentre.com/>); its last press release came some five years ago. At a time of financial turmoil it appears to be a missed opportunity by both the Food Chain Centre

and the Institute of Grocery Distribution, not to determine a market and then subsequently 'pull' products to the market, if there is no understanding of potential markets, as a result of a closed view of the ultimate consumer.

Data gathered from the Case Study Partners and arguments made by the researcher in the discussion chapter, indicate a desire for access to systems and software, which those smaller partners believe to be too costly to be supported by the relative scale of their operations, such as production planning, route mapping and access to live pallet exchange systems. This indicates that there is a willingness to collaborate, despite other evidence emerging of an "it's my cake, why should I give you a slice" mindset with some of the companies.

This willingness to collaborate strengthens the arguments that the proposed adaptation of the Theory of Constraints for local food is of potential benefit to the sector. In view of this, it is further suggested that if some of these business tools are made available, managers of such projects should not be disappointed after an initial surge of uptake is followed by periods of suppressed activity and lower engagement. Further investigation may prove that the tools have allowed contacts and relationships to be established which have developed as less formal collaborative activity, which nevertheless, has the effect of increasing efficiencies and resource utilisation occurring in local food supply chains.

When a political will is potentially no longer than one term of office, there are inevitable consequences and impacts on longer term projects, such as 'Food 2030' which now bears the caveat, 'this item was published under the previous Government. It does not necessarily reflect the views of the current Government'. Many of the issues around food localisation and its sustainability are complex and require longer term policy support from Government departments other than DEFRA. A clear precedent of this lies in failed local purchasing initiatives, which should be enforceable, rather than recent schemes which have proven to be only as effective as an individual's enthusiasm for participation in that scheme.

The research has shown that from time to time companies fail, or face significant operational and cash flow barriers (Cases G and I) because incorrect judgements have been made in the expected behaviours and values of their customers, as well as perhaps more significantly, the value of their own operational activities. This again suggests that the creation of value within local food supply networks in their present state can no longer be created, or given the crossroads that farmers' markets (Heron, 2010) find themselves standing at, be sustained. The market must accordingly adjust in terms of the extended values, both tangible and intangible, which may exist in different socio economic sectors of the consumer market.

As final concluding thoughts, and in review of the original research questions:

RQ1. Does a continuing lack of regulation and definition around the term 'local food' stymie both sustainability and enhancement of local food supply chains?

RQ2. How might our understanding of the Theory of Constraints allow for the evolvement of local food supply chains?

RQ3. Do potential markets and scenarios exist in addition to established channels, for the distribution of 'local food'?

It is the belief of the researcher that having explored the literature and identified both issues and gaps, the remainder of this thesis, through the application of appropriate methodologies, has revealed multifarious constraints around 'local food' and food localisation. The constraint outcomes recorded can be broadly described as the nature of the market; the scale and nature of products; institutional constraints; supply chain relationship constraints; policy, certification and regulatory constraints; employment and skills, as well as constraints around personal beliefs and a modern anthropomorphism.

An analysis of the Theory of Constraints and its contemporaries has not only revealed a willingness to add layers of complexity to 'improve' theory, but also that a clear gap exists in the application of TOC to food supply chains

and localisation issues. By taking a realistic view of the resources available to those operating in micro and SMEs agri-food and food manufacturing companies, and in view of the literature, scale and time are frequently determinant factors in the uptake of management improvement tools in this sector, thereby suggesting that an adapted TOC based on a four stage model (Table 25 and Fig 46), which requires less time commitment but generates more immediate results is more likely to succeed, although without empirical testing and analysis, this remains conjecture.

Finally, in revealing the existence of potential new markets which do not erode current derived benefits in these supply chains, but add to them and bolster sustainability, this body of research also suggests advice to policy makers about the changes required and the strategies that can be employed to drive meaningful and measurable change forwards.

8.2 Contributions to the current body of knowledge

The researcher acknowledges that this research does not represent a panacea, but that in emergence; it represents tacit knowledge, which may lead to further development of explicit knowledge in the alloying of an adapted TOC and a re-examination of food and its localisation, whilst mindful on the words of Gummesson (2007, p. 236) who records of qualitative case study research, that sometimes “*demanding immediate clarity is the kiss of death before birth.*”

The reviews of the existing bodies of knowledge concerning TOC and UK centric ‘local food’ wherever possible, have revealed in the case of TOC, a steady development of complexity in its execution, and a call for more empirical research to counter the amount of conceptual papers. It would appear to be beyond coincidence that the more complex the base theory has become, the less evidence based practice research has emerged.

The ‘local food’ literature reveals a willingness to conflate ‘local’ with ‘regional’ all the way along the supply chain and by many of the actors. The term itself remains highly ambiguous due to its lack of formal definition, and the customer base for its products is constrained as much by perception of those customers as it by scale and scope. Therefore, in their present state local food systems in England are not as embedded as people like to think they are. The factor of embeddedness itself is as much about marketness and instrumentalism on behalf of the producers as a sales device, as it is as a social construct on behalf of the customers.

The research is of potential value in its recognition that a simplified and adapted TOC could be prospectively offered as an organisational improvement tool in small businesses, initially within the ‘local food’ sector. A tool which initially identifies what is right rather than a tool that is focussed upon what is wrong, is as least as likely to engage the user beyond its inaugural use.

In terms of the 'local food' aspects of this research, it has clearly identified a gap in 'local food' which extends beyond the willingness by actors to conflate terms at will, and a continued ambiguity perpetrated by a perpetual lack of definition. A constrained view of the marketplace and customers stretches further than subjective idiosyncrasy, to impact negatively upon those who are most disadvantaged by a lack of access to fruit and vegetables, which in many cases could be locally sourced, whatever that source may be.

During this research, the researcher has talked about the emergence of dichotomous positions in supply chain management, sociological perspectives of 'local food' and animal welfare, but perhaps the most significant dichotomous position of all is a political manifestation, where one arm of government has demanded immediate action to address diet-related ill health through social inequality, whilst another arm of government presides over grant allocations worth many millions of pounds, which are supposed to prove additionality and public benefit in the development of local food systems, which is not necessarily the case.

8.3 Limitations

It is both recognised and conceded that the research is limited in its analysis. Although the template analysis was a highly iterative process, as a whole body of data it can only be classed as a single iteration, which would benefit further from a second iteration of data from one of the suggested future research topics. Thus, whilst the research has identified operational phenomena occurring amongst the case study partners, it has not considered knowledge transfer to overcome these phenomena, but has instead suggested a conceptual framework derived from the adaptation of existing theory.

The research methodology employed here does not readily support generalisability, something of which this researcher has identified in Chapter 4 and hopes to have adequately addressed. However, the research does not reveal evidence that can only be described as unique in this sector or scale, therefore some level of generalised application into other sectors, to inform rather than to proselytize may be possible, although this remains no more than a prospect for further research.

Inevitably, the extent to which one researcher can achieve results within a given time frame will invite questions as to the scope of the case study cohort, although I believe that the breadth encapsulated in the cohort has allowed for the emergence of themes from which to inform future research. The research is further limited by the limits of my own erudition and knowledge, although as a fervent Gestaltist I hope I have addressed these limits, gained insight, and learned during this research journey's process of reflexivity.

8.4 Suggestions for further research

The researcher hopes that he has been able to present this research as a contribution to the current body of knowledge in the subject areas, in its review of the literature and analysis of the case study partners. Nevertheless, it has also generated further questions which require additional and supplementary research in their own right.

The following three research propositions are not presented as an indicator to their hierarchal importance, but as a list of possible future researches:

- An identified gap in both application and literature invites further research into the possible application of TOC in humanitarian and crisis relief logistics. Theoretical modelling research may be possible in the first instance based on data generated by aid agencies. It is suggested that as a gatekeeper organisation, UNHCR would be an appropriate first point of contact. However, the research could be further validated by a bottom up approach to its data sources also.
- Given the current levels of complexity in TOC applications, and an acknowledgment that TOC in itself indicates you are doing something wrong, could the adapted TOC model discussed earlier be presented to a small scale 'local food' company and tested as a suitable business improvement tool?
- Are both the Processing and Marketing Grant (PMG) and the Rural Enterprise Schemes suitable vehicles to deliver the public priorities of additionality and development of local food supply chains? Or is fund allocation in the North East influenced by a cabal of well networked serial grant applicants?

8.5 Reflections

It has been said several times during my studies that a PhD today is no more than an apprenticeship. Well, as an apprentice Millwright released from indenture by Michael Heseltine during the early part of the Westland affair, I feel I am better positioned than most to argue that there is no similarity at all. To serve one apprenticeship in a lifetime is a considerable undertaking in itself, to serve a second at the age of 44 is just poor planning! The acquisition of repeatable skill and the acquisition Gestaltist awakening of understanding, to see, understand and value the world of others, do not compare at any level, other than at the end of the process, the release from indenture hopefully heralds another, better informed and holistically rewarding chapter in one's life.

I do have a personal conviction that the choice of methodology has successfully allowed me to achieve the aims of the research, in ascertaining that a re-evaluation of 'local food' is required for it to be more beneficial to both producers and consumers, therein lies the potential for development of adaptation of existing TOC theory into a more contextually relevant organisational development tool.

If I was to start this process from scratch tomorrow would I do anything differently? In the main, I stand by my methodology and project management strategy, although the pilot study acted as a timely reminder and a lesson to carry forwards that I should not be lured by scale; the big fish may have the most flesh, but the smaller fish move just as quickly and have the more intriguing skin patterns.

I have intentionally placed this following comment in the reflection section as it represents a personal view which has developed during the research and not the research findings itself. Of course I would say that as it is unlikely I will have to defend reflection at viva! Whilst I do admittedly paint with the broadest of strokes here, it may be due to the fact that living in a society which no longer functions under a Keynesian Beveridgean consensus, it is more difficult to see the longer term goals when in search of more immediate gratification. Of course, it can be further argued that a refusal to change at

an operational level, or contextual application, or refusal to change the comfortable status of serial adopters and grant allocation, merely indicates that whether change may be beneficial to others or not, perceived threat of the status quo indicates that individuals have the ability to learn from the experience of others and derail change in their own self interest whether perceived or actual.

I will remain truly grateful for the remainder of my life to my supervisors, for guidance, oversight and superintendence on the journey they have helped me to undertake these last three years, despite their somewhat dodgy and wholly misplaced allegiance to Newcastle United, I am forever in their debt.

Finally, I propose that as much in business as in life, you have to learn to let go, in order to gain a stronger hold.

~ End ~

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10 Appendix

10.1 The template of analysis

The template is presented in landscape orientation to aid inspection and commences on the next page.

	<p>Constraint Points</p>	<p>Second order code</p>	<p>Headline Constraints Points ~ Recorded as Actual</p>	<p>Third order code</p>	<p>Prior exposure to large organisations can leave some smaller producers of local and regional food unwilling to engage with the large multiple retailers or specialist brokers (Cases G, N, P, A).</p> <p><i>“I have supplied high end hotels and restaurants before, could do so tomorrow if I wanted, but I don’t, they are simply too much trouble” (Case N)</i></p> <p><i>“Most of the people I buy goods off have supplied to major multiples over the years and have become heartily sick of them, standing around at back docks, unsigned POD’s, invoice queries, damaged stock, missing crates and pallets, they have been subjected to it all and don’t want any part of it anymore” (Case G)</i></p> <p><i>“We had just won an international award for one of our products, Asda came along and promised the earth, what followed was orders that we struggled to meet, followed by months of cancelled or amended orders, then insistence that we held stock for them. I was glad to see the back of them” (An interview with a small independent brewery which is included although it occurred after the point of saturation, but serves to reinforce the evidence.)</i></p> <p><i>“I will not, under any circumstances, supply Tesco’s, I have done it twice and they are bastards. They call me and approach me at shows, tell me everything is different now, but I would sooner throw my stuff away” (Case P)</i></p> <p>Previous research indicates that a key barrier amongst urban consumers and therefore constraint around local food is accessibility and lack of access to a ‘one stop shop’ scenario (SERIO / DEFRA 2008).</p>
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					<p>Aggregations of constraints are likely to become more than ‘a sum of its parts’ in smaller companies, typically with less sophisticated management systems. (Cases A, I, N.)</p> <p>Farmers’ markets allow ‘face to face’ engagement with customers and increased margins per product / kilo. Notwithstanding, this market framework in itself is a constraint point, although this research clearly records that they are an important route to market (Cases A, B, D, P & S.) Farmers’ markets form one third of annual sales by Case P however;</p> <ul style="list-style-type: none"> • The profile of produce does not readily reflect the profile of foods available locally; • Emphasis is placed on regional aspects of the produce on offer; • Entrance criteria for potential stall holders restrict freer access to possible market outlets, although this has been offset recently by the introduction of ‘guest stalls’ to address seasonality and variety factors; • All stall holders must undergo a scheme accreditation process and audit from the market manager, as well as hold a current SALSA certificate. Even amongst established stall holders, this is regarded as an obstacle. <p>Farmers’ markets have a core clientele profile which ultimately stagnates sustainable development and growth (Cases A, D, P, S).</p> <p><i>“It’s an old boys club” (Case R)</i></p> <p>Emergence of alternative ‘unofficial’ Farmers’ markets where stallholders are not scrutinised or subject to levels of accreditation / membership / audit inevitably raise questions about quality and provenance, but undoubtedly offers a route to market for these products, whereby short term constraint can be alleviated, but does not address underlying constraints.</p> <p>Diseconomies of scale require higher margins per unit of output, which may be more readily achievable in products that ‘regional’ rather than ‘local’.</p> <p>Decisions to participate in niche specialisation e.g. rare breed s livestock restrict potential end</p>
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				<p>markets for produce (Cases R & S).</p> <p>Levels of detour are often overlooked when 'local' produce is offered for sale at multiple retailers, degrading much of the 'received benefit' of customers specifically choosing to buy 'local' (Case B).</p> <p>Seasonality restricts choice, whilst strategies to overcome seasonality in 'fresh' produce can significantly increase environmental impact and / or cost per product (Cases A, B, C, H, I, O).</p> <p>Further diseconomies of scale and scope inevitably lead to greater environmental burdens including waste management, which can be linked to constraints arising through lack of collaboration throughout the supply chain.</p>
			<p>Headline Constraints Points ~ Recorded as Institutional</p>	<p>Recorded constraint phenomena were not restricted to the small case study partners. In some of the larger organisations, more traditional constraints as described by the Theory of Constraints, were observed as a result to adherence to business models and a 'silo' mentality even across different manufacturing and process divisions of the same company: (Cases E, F & U)</p> <p><i>"No, we had never thought about batch traceability and closing the loop for their (Case J) cereal to go back to them as the animal feed they order"</i> (Case U)</p> <p><i>"The blood (red corpuscles) is processed off and goes to the ground as fertiliser but we have not considered who's ground, it's just a commodity to us, not something we have specifically contemplated from a vertical integration point of view"</i> (Case E)</p> <p><i>"Our fleet runs at 94% efficiency"</i> (Case E) Further questioning revealed that the fleet did not engage in backhauling, reverse logistics, or factory gating. As the business model did not call for this, they considered</p>

			<p>the fleet to be within operation targets.</p> <p>Like for like operational activity at Case F was considerable less resource efficient that a contractor undertaking the same operations (Case W.) The difference in resource efficiencies had not been considered as the site at case W is run as a cost centre and operates within the operation parameters and targets it has been set.</p> <p>Absolute costs and resource inefficiencies can be offset to some degree by the nature of the marketplace, and willingness of the buyer to engage in purchasing behaviour which supports comparative price advantage, although acceptance of this 'status quo' may constrain further development of routes to market (Cases A, D, G, R, S).</p> <p>An analysis of like for like product costs between Case N and a major multiple retailer located 900 metres away recoded negligible differences in cost (November 2008.)</p> <p>The relative range of produces and fulfilment mechanisms displayed in smaller case study partners increases risks which may have otherwise been addressed by developing economies of scope within scale (Cases I & R).</p>
		<p>Headline Constraints Points ~ Recorded as</p>	

		Perceived	<p>The concept of local food per se, is constrained as a device by an ongoing lack of government regulation relating to geographical indicators as designations of origin. This lack of clear consensus definition leads to mutable interpretations by key actors and stakeholders yet restricts emerging interpretations.</p> <p>A common trait which is readily liked to the relative scale of operation of the case study partners is a perception that they alone are best at placing their products and they alone know and understand it better than anyone else (Cases A, B, I, N, P, Q, & R):</p> <p><i>“I would never dream of letting anyone delivering any of our cuts, what could a delivery driver do for us? I see every chef personally, at least once a week, in fact, I’m going out delivering after we have had this chat” (Case R)</i></p> <p>It is recorded here that Case R and their business partner worked extremely long hours as they stopped and started butchery and processing around delivery demands, which were addressed in ways which did not necessarily reflect good distribution planning and execution, this also included products not readily defined as prime cut meats from rare breeds, but included pies, sausages and burgers.</p> <p><i>“I know fine well that it is important for me to make the deliveries and speak to the chefs personally, and I need to do that as soon as possible, whether they are in the town (Newcastle) or out towards Durham. It’s what I think they need, and it’s what they get. They never complain about the service.” (Case R)</i></p> <p><i>“I have a 90% success rate in placing our glass products in local hotels” (Case Q)</i></p> <p>Companies acting as classic intermediaries (agents, distributors, food service groups and brokers) in food supply chains are often regarded in low esteem (Cases A, P, Q):</p>
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			<p><i>"We know that we would not be in Ireland or other parts of the country without them, but we do not like distributors and wholesalers, we are just a number for them and they always want it cheaper and quicker"</i> (Case A)</p> <p><i>"I struggle to convince myself that they (distributors) do little more than erode my margins"</i> (Case Q)</p> <p><i>"You show me a cheese broker, I will show you the devil incarnate, they are not interested in you, they want your product for their portfolio. I have to constantly chase them and badger them into placing orders"</i> (Case P)</p> <p>Niche characteristics and positioning of local food are regarded as a constraint which is also ultimately driven by consumer behaviour and the relative exposure of products to those consumers either as retail, for profit food service sector, niche positioning or direct sale (Case Q).</p> <p>Larger companies in this research consider that regulatory compliance and adherence to their own developed models of corporate social responsibility addresses their 'local' agenda, thus absolving them of obligation or burden of food localisation (Cases E, F, H, U). An exception to this 'stance' within the case study cohort is Case L, which leads to an emerging adaptation of perspectives of local food for further research.</p> <p>Lack of promulgated rules at unregulated markets, potentially constrains and impacts upon the sustainability and further development of Farmers Markets. Negative publicity linked to a food hygiene or health scare linked to a Farmers Market would not discriminate between the two types</p>
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					<p>initially (Lack of HACCP frameworks / traceability).</p> <p>Retail outlets in rural communities tend to support local employment. However this may be considered as a constraint point within a wider context of social and employment mobility (Case T).</p> <p>Perceptions of local food are often linked to relatively unsophisticated raw / fresh produce.</p> <p>A lack of access to 'local' fresh food is readily identified as a reason which underpins poor dietary habits linked to social inequalities.</p> <p>In some cases, supply and demand for artisan skill sets leads a view of vulnerability. Short term measures to import artisan skills place longer term constraints upon these businesses unless they choose to invest in training and development.</p> <p><i>Inter alia</i>, derivation of implied social capital within the context of local food is subjective, and acts as a constraint to better understanding of 'local' by wider cross sections of society. Resultantly, this may impact upon potential increases of both customer base profiles and growth of sales (Case N).</p>
A priori theme	Commercial, Operations & Logistics	Second order code	Development of customer base	Third order code	<p>Local produce is often associated with added value products and relatively unsophisticated low levels of product and logistics packaging. Evidence exists which identifies the peculiarities and identifiers of the groups of buyers most likely to purchase 'local food.' A common recorded constraint is a relative lack of sophistication in their marketing and fulfilment strategies. Inabilities to develop their markets, address seasonality and effectively deliver to target customers, are constraints which can be readily linked back to a prior constraint proposition which identified unwillingness to 'let go.'</p>

				<p>Potential markets identified by the case study partners, Regional Food Groups and business development agencies such as cruise line port terminals, stations and airports face traditional hurdles of significant price, volume and economies of scale factors to overcome where local and regional attributes of food are rated significantly lower than price in purchasing models (Cases B, P & R).</p>
			<p>Perceived lack of complexity</p>	<p>Whilst local foods are regarded as wholesome, trustworthy and of known provenance, the relatively low level of processed and more complex food products will hinder access to all but a small share of the total food market, when considering tinned, frozen, dries and ready meal products.</p>
			<p>Business to business sustainability</p>	<p>Some of the smaller producers when interviewed described a feeling of 'worth' when dealing with one particular multiple retailer. Notable comments were that they knew who they were going to speak to. That they has seen the same technologists and category buyers for years on end. That if someone was moving jobs or retiring they would be informed well in advance and be introduced to the new point of contact. The same case study partners also appreciated that the particular retailer under consideration would take time to invest in their products by having some of the store colleagues visit their operation to find out more about their products (Cases A, C & P.)</p>
			<p>External Business Targets</p>	<p>Evidence has emerged of logistics service providers that do not necessarily treat smaller companies on an equal footing to larger companies, despite the smaller company pushing more 'volume' through the company. This is a trait which was also encountered by the researcher during his career in supply chain management. Smaller companies are usually the first to be subjected to price increases, the last to benefit from price decreases and in the least likely to be able to negotiate (Cases H, I & Q) :</p> <p><i>"Listen, I know that John up the road pays less per pallet than me but is constantly hassled by the rep about getting into other parts of the business. We tell them how many pallets, on which days and to where, we are steady and reliable customers but can't get a lower price because we don't have a bigger carrot to wave at them"</i> (Case Q)</p> <p>This evidence is further supported:</p>

				<p><i>"I'm pushing out about eighty loads a week excluding the factory gated stuff, I split it across three companies to keep them on their toes" (Case L)</i></p> <p><i>"Everything is 3PL across the three manufacturing sites, we tell them what we are paying, they know that there is always someone else who wants it" (Case H)</i></p>
		Homogeneity of products		<p>Small and local producers can be disadvantaged when their products are considered in the main ,as a price lead commodity which is readily available through multifarious retail points (Case I)</p>
		Operational Growth		<p>A decision to 'remain in situ ' can act as a constraint on a business. Case C records its only access road and its requirement to collect all of its operational waste water arising in tankers for removal and remote treatment as its key constraints.</p>
		Development within scale		<p>Development of de-scaled networks and hubs can result in opportunities to remove or alleviate constraints linked to relative scales and scopes of logistics operations in local food supply chains (Case G).</p>
		Business to business elasticity		<p>Local Producers and retailers can suffer from inelasticity within their own local business to business supply chains. When this occurs, previous cycles of virtuous local collaboration are broken (Cases A, B & G):</p> <p><i>"They just told us when we rang up to order, that it was not worth their while supplying us any more" (Case A)</i></p> <p><i>"We have had to source vegetables for further afield now, we would call to place an order and be told, sorry we can't do that this week. We also have to consider seasonality factors both in our customer demands and the availability of local produce." (Case B)</i></p> <p><i>"You call people and tell them that their product is going really well, you would be surprised how many tell you that they can't give you more." (Case G)</i></p>
A	Collaboration	Informal collaboration ~	It has been identified by several of the smaller case study partners that there has been a gradual	

			logistics	<p>reduction of informal supply chain networks once common in rural areas, which were typified by loose trading systems, mutual benefits and common need.</p> <p><i>“We firmly believe that the demise of these informal networks has a wider impact upon rural communities and local food distribution” (Case S)</i></p> <p>Informal networks develop as a result of shared values linked to the integrity and provenance of products. This in turn has allowed development of a more diverse portfolio of products simultaneously represented at market and for delivery over a wider geographic area (Case P & two others).</p> <p><i>“I can take some of their stuff on some days and they can take some of mine on others, but the girl down the road, we fell out with her so she can take her own now” (Case P)</i></p>
			Formal collaboration ~ logistics	<p>Ultimately, the system of transport and the relative utilisation per load are the most important factors in overall analysis of the environmental efficiency of moving ‘local’ goods to market. Collaboration and the development of smaller hubs acting as feeder points into spokes of larger hubs can act to decrease relative burdens and increase resource efficiency (Case G):</p> <p><i>“I have vans which are mostly free and in their area on an afternoon, I have approached them and offered ambient or chilled delivery of their goods for lower than they can do it themselves but they are just not interested and think there is a cat away somewhere” (Case I)</i></p> <p><i>“We are happy to help and would look to do more in the future, it is a commercial no brainer for us, they are charged £50 per part pallet, we let them slave the same category goods onto our part pallets going to the same address for less than a third of that. Over the year it works out at about 75 free trailers for us and that is a canny saving against budget” (Case L)</i></p> <p><i>It has worked well for us, we started out supplying meals to him, it turned out that he had to move his cake</i></p>

				<p>manufacturing, so he has moved it down here (Hampshire.) The cost of the modifying the facility was split as is the delivery costs, we are still making the same amount of runs to London, but we are taking a lot more in the same vehicle and bringing more back with us. We are very happy.” (Case B)</p>	
			Formal collaboration ~ purchasing	<p>Evidence drawn from case study partners whose operational activity was principally, or included farming aspects, indicates that collaborative and cooperative activity occurs as part of their purchasing strategies for farm inputs: Resources used in farm production typically grouped as seeds, feeds, chemicals, capital equipment & energy. Prices for farm consumables are susceptible to wider market impacts creating cost – price squeezes. Collaborative purchasing activity can offset price squeeze and retain balance in parity ratios. The evidence gathered in this research and in supplementary ‘off record’ interviews with key stakeholders, suggest that opportunities exist for reasonably easy adaptation of input purchasing schemes to address many of the needs of smaller, more rural producers typically regarded as being ‘local’, ‘regional’ or ‘artisan’ which are not being developed, which links back to earlier constraint observations as well as potentially hindering production processes from becoming lean and agile.</p>	
			Formal collaboration ~ wholesale & distribution	<p>Development of box schemes in themselves, do not address other key issues linked to availability of produce, business to business inelasticity and seasonality.</p> <p>Collaborative activity can help overcome constraints. Although regional food groups would be well placed to develop and deliver an integrated system, conflicts arise due to issues identified in the policy section. The best example to date [within this research] is a result of sole entrepreneurial activity (Case G).</p>	
A priori	Policy	Second order	Development of alternative accreditation & compliance schemes	Third order	<p>Whilst some Regional Food Groups continue to support the Safe & Local Supplier Approval Scheme SALSA, evidence is emerging of other Regional Food Groups developing their own compliance schemes whilst parallel schemes are also currently being developed by food service companies. This</p>

		<p>(SALSA / LEAF / HEFF standard) & provenance of goods</p>	<p>proliferation of schemes leaves smaller, local producers with bewildering choices and a future possibility that they may have to members of more than one scheme to satisfy their customer base. This in turn links back to a fundamental constraint linked to size and scale, where it is more difficult to overhead the costs of specialist managers controlling quality, environment and health and safety.</p> <p><i>"I'm a member (SALSA) but they just want more & more, especially since Waitrose have backed them." (Case P)</i></p> <p><i>"Neither will bring me nothing in terms of new business, only I can do that" (Case R)</i></p> <p>It is also recorded that the existence of the schemes is dependent upon repeating membership fees and new members.</p>
		<p>Compliance with legislature throughout chain (IPPC for example encapsulating farm & processing operations.) Salmonella regulations, feed hygiene regulations etc</p>	<p>Evidence drawn from case study partners whose operational activity was principally, or included farming aspects, indicates that a common thread of 'over regulation' and compliance. This was recorded as the single perceived constraint in Cases F & J whose intensive farming operations were subject to IPPC pollution prevention and control regulations.</p>
		<p>Food Miles</p>	<p>Food miles are the reverse to popular thought [see localisation also. Economic scale efficiencies as a result of collaboration can support efficiencies in transport miles and assist in removing constraints linked to scale. Decreased constraints and increased collaboration will inevitably lead to increased efficiencies and decreased environmental impacts during logistics phases.</p> <p>Evidence from the research also suggests that rather than reduce or displace overall transport miles, decisions by consumers to travel to 'local' produce in addition to their standard purchasing activity may increase overall mileage (Cases D, N, R, S & T).</p>

			Government funded business support initiatives		<p>Evidence that it is difficult to access funding through these business initiatives, in part due to advisors and consultants not readily matching with the relative scale or type (food & drink) of production under consideration.</p> <p><i>"Waste of time, he was unable to see what we needed to do to was stabilise, he was only interested in growth, to where, I don't know" (Case R)</i></p>
			Rural Development Plan 2000-2006 & the Rural Development Plan for England 2007-2013		<p>The two grant allocation funding schemes specific to this research are the Rural Enterprise Scheme (RES) and the Processing & Marketing Group (PMG) are flawed in their pre-requisite requirements to access funds A key barrier to adoption is a minimum projected cost per application of £70,000 and a requirement for 'new' capital equipment purchases where required in an application, which decreases the likelihood of smaller scale individual projects going ahead, regardless of PMG or RES funding availability. This implicitly suggests a loss of additionality in the awarding of grants to smaller schemes which may be more likely to deliver against the public priorities of additionality and local food programme development.</p> <p><i>"I wanted to build a little classroom for both the kids and the adults, it was going to cost 25k and they just weren't interested at all." (Case P)</i></p> <p><i>"Oh they said I could apply but it would have to be for a new filling line, I'm a tenant farmer, where am I supposed to get that sort of money from to match fund?" (Case Q)</i></p> <p><i>"I applied, but they said that they weren't convinced that it would bring local benefit, so me & Alec (name changed) had to fund the whole thing ourselves." (Case B)</i></p> <p>By extension, it is more likely that those who have overcome operational constraints and are able to</p>

				<p>'step back' are more likely to be successful in the grant application process (Case O).</p>	
			Regional Food Groups	<p>All of the case study partners are located in England which has eight regional food groups.</p> <p>The eight regional food groups are held in loose alliance, but given the nature of their funding, which is drawn in the main from their attendant regional development agencies, each food group has its own strategy, which to some extent, is informed by the relative position of each of the RDAs. Although this cannot be recorded as an institutional constraint, it is emblematical of wider constraints which ultimately link back to a lack of definition surrounding 'local' and localisation.</p>	
			Regional Development Agencies	<p>The regional development agencies, from which the regional food groups attract their funding, have a broad remit to create and safeguard jobs and business by focussing on the specific needs and priorities that stimulate and support economic growth in their area. Regional imperatives drive specific strategies, which in turn drive and inform the relative positions of each regional food group.</p> <p>Evidence subsequent to the case study interview has emerged (Case O) of specific intervention by a regional development agency. This intervention, drawing on public funds from the Rural Development Programme for England & DEFRA clearly addresses constraints identified by the case study partner, but is not a free market solution.</p>	
A priori theme	Localisation	Second order code	Employment & skills	Third order code	<p>After public sector employment, food manufacturing is the major manufacturing sector in local areas containing case study partners E, H, K, L & M.</p>

				<p>Assessment of underlying long term unemployment trends are required to indicate the stability of these manufacturing and processing bases.</p> <p>Continuous development of staff and transferability of skills in these areas should be linked into long term food security programmes, Food 2030, for example. To date, there is a general theme which calls for appropriate research, skills, knowledge and technology, but requires much further contextually relevant development.</p> <p><i>"We place emphasis on training and development, many of our supervisory and management posts are held by internal candidates."</i> (Case L)</p> <p>Training, development and skills acquisition are important, but take up is minimal with smaller companies, this links back to propositions within other areas of the research which indicate that the smaller you are, the more difficult it is to free up time and resources on a day to day basis, even though there is an acknowledgement that this training and skill acquisition benefits in the medium to long term, and, in many cases, it can support the acquisition of accreditation schemes, which in turn, significantly increase the potential market into which you can sell.</p> <p>Evidence of skills shortages appear throughout the research. Case P reported that significant problems with training and retention in skilled roles, resulting in them having to bring in people with the required skill sets from the wider EU community, despite extensive local advertising.</p> <p>Recognition and cogitation of sustainable supply of artisan skills is required by all concerned parties.</p>
			<p>Perceptions and market devices around 'local'</p>	<p>The research evidence indicates that 'local' without the aforementioned government regulation is mainly notional, and may be regarded in some quarters as a market construct. Cases B, G, J, P, Q, R, S & T display traditional 'local' credentials in their activity. Nevertheless, the recorded 'local' enterprise forms only a small proportion of overall activities undertaken by these enterprises at large,</p>

				<p>typically farming.</p> <p>Boundaries and perceptions around the term 'local' and small are blurred. Artisan production can also fall into this scenario (Cases A, C, D & T.) Further blurring occurs as a result of 'slow food' organisations and mass media programming [Local Food Heroes etc] which positions 'local' food as a device.</p> <p>The owner of the company Case C who employed a team of six considered the operation to 'local' despite identifying an almost complete dependence on raw materials sourced globally, and no local requirements for the company's range of products.</p> <p>Accepted views of 'local' and localisation ignore the role of medium and large enterprises in urban areas beyond employment and production / distribution benefits linked to economies of scale and scope (Case L).</p> <p>Conversely, constraints around the adaptation and possible emergence of developing alternative food localisation systems can be linked to strategic business models and shareholder imperatives.</p>
			Local / Localisation	<p><i>"We fight to stay here, it is a constant battle with buyers telling me it is much cheaper to buy similar products from Brazil at 60% of the price"</i> (Case M)</p> <p>The articles of the foundation record its purpose to contribute much more to communities beyond taxes and employment (Case L).</p> <p>The research suggests the emergence of an alternative view of 'local' which is recorded in the</p>

			<p>template for further analysis. Cases L & M's relative positioning of food processing factories in urban areas of high unemployment, the training, attendant transferability of skills and the possible impact of withdrawing from these communities, as well as targeted altruistic activity for the management of short coded stocks.</p>
		<p>Altruism / Education</p>	<p>Reengagement of urban customers to the source of their food (within context.) Case study partners I, P, S & T have all developed links with local education authorities, which has lead to the development of extracurricular activities, some of which are legacy projects form the Year of Food & Farming project. They see this as a long term strategy to remove barriers, by extension this strategy could be as an attempt to remove a constraint, but leads to further debate as to the nature of the constraint as perception or reality or even one of necessity.</p> <p><i>"it is vital that children from urban communities, regardless of background, are encouraged to connect with farming and develop greater understanding of their food chain, including livestock rearing, crop growing and countryside stewardship"</i> (Case S)</p> <p><i>"We were the regional winner of a Local Food Hero award by way of us establishing and maintaining links with the local communities we serve, we also arrange educational trips for schools and encourage customers to visit us."</i> (Case I)</p> <p><i>"Visiting the farm is an experience that gives the children inspiration and information about parts of the curriculum that are sometimes difficult to teach in a classroom environment. A visit allows children to see themselves how a modern farm works in a safe and enjoyable environment."</i> (Case T)</p> <p>This desire to re-engage extends beyond farmers' markets:</p> <p><i>"We also organise educational visits as well as public visits and employees of the major multiple we supply, with particular emphasis on those who might come into contact with our products at the point of sale."</i> (Case P)</p>

A priori theme	Animal Welfare / Anthropomorphisms	Personal perspective	<p>A naturally occurring human tendency towards anthropomorphism lends itself towards constraint.</p> <p>Non intensive, sustainable farming system in which livestock is slower to mature (Case S).</p> <p><i>“We give the best life we can to the animals and it is reflected in the meat they give to us”</i> (Case S)</p> <p><i>Animals are taken to the local, rural abattoir ‘just a few at a time’ and are processed at the start of the day before stock from other farms arrives</i> (Case S)</p> <p><i>“This is a significant reduction down from 9000 litres per head (down to 6500 litres per head) and is being introduced with the express intention of extending the life cycle of the cattle”</i> (Case I)</p>
		Business perspective	<p>When strategic and operational decisions are taken without anthropomorphised considerations, the case study partners were more likely to be able to overcome operation constraints.</p> <p>Case O employs a perpetual, integrated system which allows flocks to be continuously replaced as yields start to decrease below optimal production targets.</p> <p><i>“The pigs will only ever see daylight going up the ramp or down the ramp of the trailer. Intensive indoor pig breeding and rearing is the most resource efficient system for us”</i> (Case J.)</p> <p>Case W employs intensive systems for duck rearing which lead to significant resource utilisation efficiencies per finished weight bird. This is confirmed by analysis of operation data from Case F & W.</p> <p>However, there is evidence that case study partners have to react to public perception of their</p>

			<p>operating models and change accordingly. This has been magnified in the poultry sector by recent campaigns by the 'celebrity chefs', Hugh Fearnley Whittingstall and Jamie Oliver.</p> <p>Case O is introducing 'artificial jungle' colony systems in new poultry sheds as it moves away from cage systems ahead of schedule, primarily to satisfy public perception [See also the section on Regional Development Agencies.] But opines that:</p> <p><i>"Cage systems are the best way to manage feeding, watering, medication and egg collection."</i></p>
	Abattoir issues		<p>Case study partners B, I, J, R & S all record within this research that they are limited to abattoir choice as a result of the closure of local, small abattoirs. Whilst it would be expected that some small and medium sized abattoirs would have closed as a reflection of the changes in the ways in which we shop, there is still a strong feeling some 12 years after their introduction, that smaller abattoirs are significantly disadvantaged by disproportionate costs of meat inspection charges. Upon reflection, this constraint appears to overarch institutional, actual and perceived constraint analysis.</p>
	Distance travelled by livestock & dead stock		<p>Linked to these abattoir constraints is a theme common to the same cohort, which is concern over the distances some livestock travels to abattoirs and related to this (and the cost structures of abattoirs in dealing with regulatory compliance) the survival of remaining small abattoirs. Here we record constraints about current government legislation linked to abattoirs and importantly also, emerging constraint propositions linked to perceptions around animal welfare, which within this research are linked to scales of production.</p> <p><i>"There is meat for sale in the local town (Alton, Hampshire) which comes from farms hereabouts but travels to Wetherby for slaughter and butchering, how is that local?" (Case B)</i></p>

10.2 Example of Consent Form



Newcastle Business School

Informed Consent Form

Title of Research	Exploring Alternative Models of Localisation in Food Supply Chains
Name Researcher	Graeme Heron
Name of supervising academic (where appropriate)	Prof David Oglethorpe
Address for correspondence	Room 212, Newcastle Business School City Campus East Newcastle Upon Tyne NE1 8ST
Telephone	Office: 0191 227 3321 Mobile: 07890 803359
E-mail	Graeme.heron@northumbria.ac.uk
Description of the broad nature of the research	The purpose of this research is to analyse food supply and localisation at different scales of organisations, and to comprehend the type of constraints occurring in these supply chains and upon these case study partner actors.
Description of the involvement expected of	The researcher will be available to answer

participants including the broad nature of questions to be answered or events to be observed or activities to be undertaken, and the expected time commitment

queries from the case study partners throughout and will remain in contact for the duration of the research. This contact may include any face to face meetings deemed and agreed as necessary by both parties.

The owners of the case study partner businesses or colleagues acting freely upon their consensual instruction.

These case study partners were originally engaged as a result of participating in the DEFRA FO 0104 research.

The research is conducted by Graeme Heron a Graduate Tutor and second year PhD student at Newcastle Business School, Northumbria University. The researcher has extensive supply chain management experience and is also a chartered member of the Chartered Institute of Logistics & Transport.

Research Methods

The research has a multiple case study construction which builds on from the initial researches undertaken as part of the DEFRA FO 0104 research project. Further interviews and observations will occur as well as a second round of supply chain mapping to check for growth or shrinkage of the businesses.

Interviews and questionnaires will be used to construct a business narrative and supply chain / process flow map. The drafts of these narratives and maps will be sent to the case study partners as printed documents, memory stick contents and email for approval or mutually agreed additions / deletions / amendments.

Location of Research

Interviews will take place at a location and time of the interviewees' choice.

Work place observation and supply chain mapping exercises will take place at the individual business premises, again this will be at a time of the case study partner's choice.

	<p><u>Timescale</u></p> <p>The data collection timescale is from Autumn 2007 to Spring 2009.</p> <p><u>Time Commitment</u></p> <p><i>Case Study Partner</i></p> <p>Initial contact has already been made.</p> <p>The interviews are semi structured, they are also open ended around the time constraints of the individual, but are planned not to last less than an hour.</p> <p>A second round of interviews, observations and supply chain mapping will occur as either requested or required. Once again the interviews and / or supplementary questionnaires will be used to construct a business narrative and supply chain / process flow map. The drafts of these narratives and maps will be sent to the case study partners as printed documents, memory stick contents and email for approval or mutually agreed additions / deletions / amendments.</p>
Additional information about the research	<p><u>Anonymity</u></p> <p>All data information relating to this research will be anonymised.</p> <p><u>Confidentiality</u></p> <p>All data held electronically will be held under password accessed 28 bit encryption. The password will be limited to the researcher and principle supervisor. Hard copies of transcripts ./ supply chain maps will be held under lock and key in a secure cupboard, within a secure academic office. Access to the corridor to this room is also controlled by security card.</p> <p>This anonymised data may be reviewed by the principle and second supervisor. This hard data will be ‘booked out’ and ‘booked back in’ to the secure storage cupboard.</p> <p>The research may lead to the development of an</p>

	<p>adapted Theory of Constraints which would be specifically aimed at small and medium size enterprises which were engaged in the growing, rearing,, processing, manufacturing and delivery of food, principally in local food supply chain networks.</p>
--	---

Information obtained in this study be anonymous (i.e. individuals and organisations will not be identified *unless this is expressly excluded in the details given above*).

Data obtained through this research may be reproduced and published in a variety of forms and for a variety of audiences related to the broad nature of the research detailed above. It will not be used for purposes other than those outlined above without your permission. Participation is entirely voluntary and participants may withdraw at any time.

Northumbria University is the data controller under the Data Protection Act (1998)

By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study on the basis of the above information.

Participant's Signature

Date

Please keep one copy of this form for your own records

10.3 Example of Organisational Consent Form



RESEARCH ORGANISATION INFORMED CONSENT FORM

Newcastle Business School

University of Northumbria

Completion of this form is required whenever research is being undertaken by NBS staff or students within any organisation. This applies to research that is carried out on the premises, or is about an organisation, or members of that organisation or its customers, as specifically targeted as subjects of research.

The researcher must supply an explanation to inform the organisation of the purpose of the study, who is carrying out the study, and who will eventually have access to the results. In particular issues of anonymity and avenues of dissemination and publications of the findings should be brought to the organisations' attention.

Researcher's Name: Graeme Heron

Student ID No. (if applicable): D102710

Researcher's Statement:

Research Purpose

The purpose of this research is to analyse food supply and localisation at different scales of organisations, and to comprehend the type of constraints occurring in these supply chains and upon these case study partner actors.

Parties Involved?

The owners of the case study partners business or organisational management of these case study partners and colleagues within these companies acting freely upon consensual instruction and invitation.

The research is conducted by Graeme Heron, a Graduate Tutor and PhD student at Newcastle Business School, Northumbria University. The researcher has extensive supply

chain management experience and is a chartered member of the Chartered Institute of Logistics & Transport.

Research Methods

The research has a multiple case study construction which builds on from the initial researches undertaken as part of the DEFRA FO 0104 research project. Further interviews and observations will occur as well as a second round of supply chain mapping to check for growth or shrinkage of the businesses.

Interviews and questionnaires will be used to construct a business narrative and supply chain / process flow map. The drafts of these narratives and maps will be sent to the case study partners as printed documents, memory stick contents and email for approval or mutually agreed additions / deletions / amendments.

Location of Research

Interviews will take place at a location and time of the interviewees' choice.

Work place observation and supply chain mapping exercises will take place at the individual business premises, again this will be at a time of the case study partner's choice.

Timescale

The data collection timescale is from Autumn 2007 to Spring 2009.

Time Commitment

Case Study Partner

Initial contact has already been made.

The interviews are semi structured, they are also open ended around the time constraints of the individual, but are planned not to last less than an hour.

A second round of interviews, observations and supply chain mapping will occur as either requested or required. Once again the interviews and / or supplementary questionnaires will be used to construct a business narrative and supply chain / process flow map. The drafts of these narratives and maps will be sent to the case study partners as printed documents, memory stick contents and email for approval or mutually agreed additions / deletions / amendments.

Anonymity

All data information relating to this research will be anonymised,. All names of companies and participants will be changed.

Confidentiality

All data held electronically will be held under password accessed 28 bit encryption. The password will be limited to the researcher and principle supervisor. Hard copies of transcripts ./ supply chain maps will be held under lock and key in a secure cupboard, within a secure academic office. Access to the corridor to this room is also controlled by security card.

This anonymised data may be reviewed by the principle and second supervisor. This hard data will be 'booked out' and 'booked back in' to the secure storage cupboard.

Research Dissemination

Some data generated through this research may be reproduced for peer reviewed journals, institute publications and suitable conferences.

Queries

Please direct any queries regarding this research to Graeme Heron on 0191 2273321 or 07890 803359 or graeme.heron@northumbria.ac.uk

Any organisation manager or representative who is empowered to give consent may do so here:

Name: _____

Position/Title: _____

Organisation Name: _____

Location: _____

Anonymity must be offered to the organisation if it does not wish to be identified in the research report. Confidentiality is more complex and cannot extend to the markers of student

work or the reviewers of staff work, but can apply to the published outcomes. If confidentiality is required, what form applies?

- No confidentiality required
- Masking of organisation name in research report
- No publication of the research report

Signature: _____ Date: _____

This form can be signed via email if the accompanying email is attached with the signer's personal email address included. The form cannot be completed by phone, rather should be handled via post.

10.4 Example of Questionnaire from Pilot Study (Sausage Production)

Please note that due to a change in page orientation from landscape to portrait, so that the text of the questionnaires are sufficiently large enough to read, the remainder of this page and the following page are intentionally blank, as are pages 413 and 422.

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Sausage Production Size: L



Investigating the practicalities and benefits of local food production and identifying any unintended effects and trade offs

Case Study Identifier

CASE STUDY PARTNER 2a (PS)

Case Study Reference Number

GH/PS2a

Case Study Description

Sausage Production Factory in Central Lincolnshire

Please answer the questions below, this information is required so that we can complete the supply chain analysis for this particular case study

Question 1

What is the average annual production of sausages (tonnes)? Please also identify one of your products by name, the average production volumes for this product and the target pack weight.

Answer

Question 2

What are the average annual staffing levels both direct and indirect, at this factory?

Answer

Question 3

What are the average utilities consumption figures for this factory : Electricity / Natural Gas / Gas Oil / Diesel / Petrol / Fuel Oil / LPG ?

Answer

Answer

--

Question 4

What is the average water consumption at this factory?

--

Answer

--

Question 5

On average, how many pallets and packing cases are despatched annually

--

Answer

--

Question 6

What proportion of transit packaging and pallets can be classed as 'multi trip' typically drawn from rental companies such as CHEP?

--

Answer

--

Question 7

On average, how much finished product has to be 'scrapped' at site? This may be typically be as a result of variances between a customer's forecast orders and their actual orders

--

Answer

--

Question 8

On average, how much material is recycled each year (by type / weight)

Answer**Question 9**

What weight of wastes arising from both direct and indirect activities enters landfill and specialist weight streams?

Answer

GH/PS2a

Sausage Production Size: L

Question 10

Is your laundry operation on site or off site?

Answer

Question 11

What proportion of your colleagues at this site wear laundry controlled garments as part of their everyday duties?

Answer

Question 12

What is the cycling regime for the laundry garments?

Answer

Question 13

On average, how many transport despatches do you make annually?

Answer

Question 14

What is the total mileage for the vehicles leaving the site with deliveries?

Answer**Question 15**

What is the average MPG?

Answer**Question 16**

What proportion of finished goods are "factory gated" and collected by your customers?

Answer**Question 17**

Does any material leave the factory for further processing?

Answer

Question 18

If the answer to Q17 is yes, please describe the further processing activity.

Answer**Question 19**

On average, how much primary packaging is purchased per year? (Tonnes)

Answer**Question 20**

On average, how much secondary packaging is purchased per year? (tonnes)

Answer**Question 21****Answer**

GH/PS2a

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10.5 Example of Questionnaire from Main Study Case K (Sausage Production) &Field Notes etc

The remainder of this page is intentionally blank, please refer to note on page 405.

Sausage Production Size: M



Investigating the practicalities and benefits of local food production and identifying any unintended effects and trade offs

Case Study Identifier

CASE STUDY PARTNER K

Case Study Reference Number

GH/CS19 WEST MIDLANDS

Case Study Description

Sausage Production at bespoke sausage processing facility in West Midlands.

Please answer all of the questions below, this information is required so that we can complete the supply chain analysis, economic, environmental & social attributes for this particular case study

General Guidance Note

If you have any issues, queries or are seeking further information or clarification about any of these questions, please do not hesitate to contact me. As a case study partner, you retain intellectual rights to all of the information supplied. Anonymity if required, and confidentiality are assured.

Contact Details

Name: Graeme Heron
Email: graeme.heron@unn.ac.uk
Tel: 07890 803359

Address: Room 202
Newcastle Business School, City Campus East,
Newcastle Upon Tyne. NE1 8ST

Question 1 Production & Processing							
On average, how many sausages are produced at this site?							
Answer A*				Notes			
Cumberland Sausage				For question 1, we are looking for 1 identified, specific product, for example it could be a pack of pork and apple sausages. A* You need to identify the product, record how many packs you produce on average per yearB* (15,000 for example) & C* how much each pack weighs (250g for example)			
72500	B* Avg Packs P.A.	0.454	C* kg				
	Total avg weight	329.15	tonnes				
Question 2 Production & Processing							
On average, what is the annual total production weight / volume at this site?							
Answer				Notes			
Avg annual prodn / proc volume		Avg annual prodn / proc wghts					
	Units	5195	tonnes				
Question 3 Utilities							
What are the average fuel / utilities consumptions for gas, electricity, fuel oil, diesel and propane etc at this site?							
Answer			Net CV Basis		Gross CV Basis		Notes
			kg CO2 per kWh / unit	Total kg CO2	kg CO2 per kWh / unit	Total kg CO2	
Electricity	kWh	387727	0.523	202781.221	0.523	202781.221	
	Natural gas	kWh	75068	0.206	15464.008	0.185	
	therms	0	6.023	0	5.421	0	
Gas Oil	tonnes	0	3190	0	3190	0	
	kWh	0	0.265	0	0.251	0	
	litres	0	2.674	0	2.674	0	
Diesel	tonnes	0	3164	0	3164	0	
	kWh	0	0.263	0	0.249	0	
	litres	0	2.63	0	2.63	0	
Petrol	tonnes	0	3135	0	3135	0	
	kWh	0	0.253	0	0.24	0	
	litres	0	2.315	0	2.315	0	
Fuel Oil	tonnes	0	3223	0	3223	0	
	kWh	0	0.281	0	0.267	0	
LPG	kWh	0	0.225	0	0.214	0	
	therms	0	6.608	0	6.277	0	
	litres	0	1.498	0	1.498	0	
			Total kg CO2 Net Basis	218245.229	Total kg CO2 Gross Basis	216668.801	

Question 4 Utilities	
What is this sites' annual average water consumption?	
Answer	Notes on water treatment, recorded COD etc
<div style="border: 1px solid black; display: inline-block; padding: 5px; margin-right: 20px;">700.000</div> Cubic Metres p.a.	

GH/CS19

Sausage Production Size: M

Question 5 wastes				
Please briefly describe your wastes and approx waste volumes / weights per year				
Answer				
Waste Volumes approx 120 tonnes per year				
Unit Type	Volume m3	Frequency	Amount	Please briefly describe wastes you think may be readily recycleable but you are unable to find a waste processor for this / these material(s)
Open skip	10	daily	1	None
Question 6 wastes				
On average, how much finished product has to be 'scrapped' at site? This may be typically as a result of variances between a customer's forecast volumes and their actual orders.				
Answer				
We scrap very little at site other than production wastes arising. Most cancelled orders can be used as components of other orders within our finished stock shelflife criteria.				

Question 7 wastes / recycling

Please briefly describe any recycling or value extension activity occurring and weights / volumes by type.

Answer

No recyclin occurring at present, all waste is sent to landfill via a liscensed waste carrier

Recycled Material Description	Annual wgts/ units	Recycled Material Description	Annual wgts/ units	Notes
Material		Material		
Material		Material		
Material		Material		
Material		Material		
Material		Material		

Question 8 primary and secondary packaging

Please identify the different types of packaging you use annually for storage, transport and display of products e.g. tray, shrink wrap, carton, single trip pallet, multi trip pallet etc

Answer	Annual wgts/ units	Answer	Annual wgts/ units	Notes
Pkg type Plastic	25t	Pkg type		
Pkg type Paper / cardboard	150t	Pkg type		
Pkg type		Pkg type		
Pkg type		Pkg type		
Pkg type		Pkg type		

Question 9 primary and secondary packaging

Do you use 3PL multi trip packaging companies such as CHEP, LPR, Teacrate etc? If so, please identify the types and volumes used, there is no need to identify the supplying company.

Answer

None used at present.

Question 10 logistics

How many customers / NDCs / RDCs do you or your logistics partners deliver to annually?

Answer

1200

Question 11 logistics

Do you operate your own / leased fleet? If so, please give brief details of fleet, identify annual mileage and average annual m.p.g by fuel type.

Answer

We own and operate our own fleet of vehicles, it is difficult to separate / split mileages as the fleet serves the whole of the company. We do use some external contractors for some of our deliveries. We do have some collections made by customers from our own distribution depot, which is not at the same address as the sausage processing factory.

Question 12 logistics

If you have answered 'no' to answer 12 and/or you utilise 3rd party logistics companies, please give a description of the logistics operations that they undertake on your behalf

Answer**Question 13 logistics**

Is any of the Product X 'factory gated' and collected from the site by your customers? If so, please give a brief description of these activities and volumes annually

Answer

Some customers pick up their orders from our own distribution centre which is at a different location to our sausage processing factory.

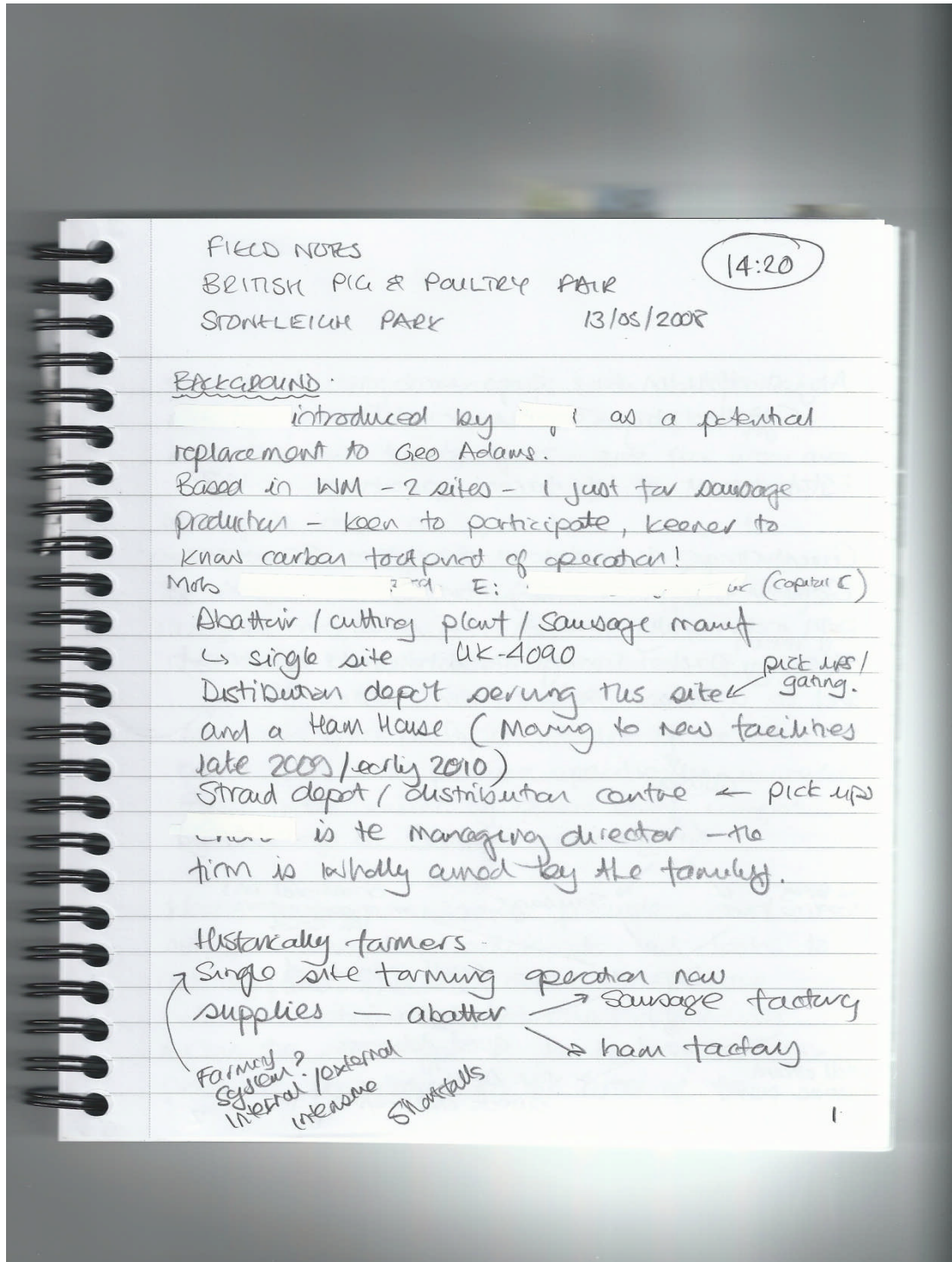
Sausage Production Size: M

Question 14 HR			
What are the average annual staffing levels at this site?			
Answer			Notes
Production, processing & QC colleagues	36	Engineering colleagues	1
Stores, supply & purchasing		Logistics colleagues	
Management colleagues	2	Indirect colleagues	1
Operational Head Count	40.00		
Question 15 HR			
How many of your colleagues wear laundry controlled garments as part of their normal day to day activities?			
Answer			
All staff use laundered garments.			
Question 16 HR			
If you have answered Q15, what is the cycling regime for the garments, and is your laundry service on site or off site?			
Answer			
Daily and laundered off site by a specialist laundry company.			

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The following field notes were made after a conversation with a director of Case K at the British Pig & Poultry Fair, May, 2008, which in turn led to the development of the questionnaire shown at the start of appendix 10.5, the questionnaire itself had been developed for the pilot study questionnaire 10.4.

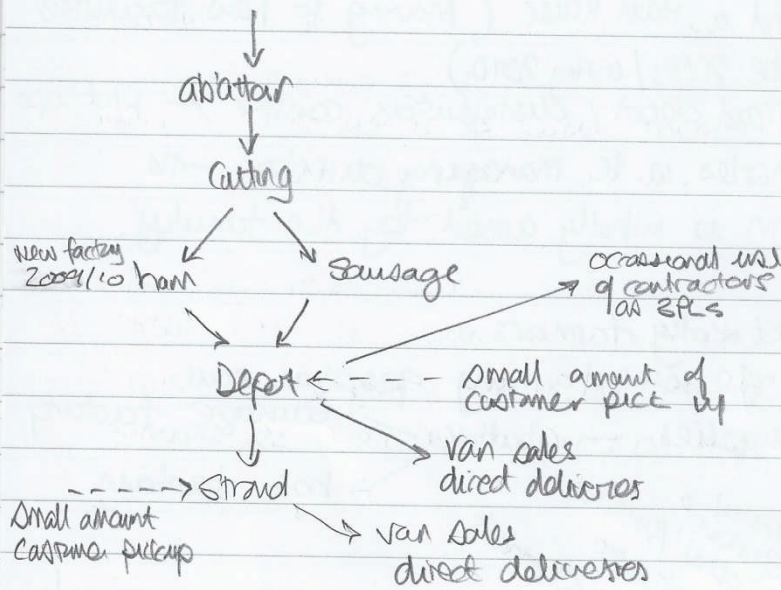
The field notes, questionnaire and background data and points arising in the field notes which had been raised in consequent email led to the development of the case study narrative for Case K.



Any shortfall in live pigs →
Supplied by _____ is on another basis

Establishment of 'off farm' operations in 1938

Current range of products other than Sausages
Gamman, Hams (various), Pork shoulders sold
both individually through van sales and as
^{at retail} catering packs through the wholesale operators
and to a lesser extent, van sales.



Sausage factory shares site with abattoir and cutting plant. Very low turnover of staff - some here over twenty years - quite poor urban area.

Most of the staff are full time, ... to confirm numbers/splits for sausage operation. There are both fresh and individual quick frozen ranges.

↳ holds current offers accreditation.

BMFA — Red tractor

Also sells into multiple retailers in the area, but not as local produce specifically - unlike GA! Process made easier by offers stuff. Caught by PNR regs etc (Valpak membership)

Waste: minimized wherever possible - does suffer from cancelled orders etc, but looks to use them to fulfill other orders which have not been satisfied at that time, depending upon the stock type & location of the products in relation to the area of the

Cancelled orders - Anything that is beyond salvage through short shelf life etc transit damage / customer returns etc is dealt with by the factory waste contractor - they have a feel for the market based on their trading time - can plan for peak / low demand quite effectively but can get caught out sometimes.

No metal scrapped at Strand, it travels back to the central depot for disposal into the main waste streams.

Considers the company to be fully integrated in terms of supply, manufacturing and delivery / order satisfaction

Packaging has no local focus in terms of supply - left to purchasing / admin to buy against spec / customer spec / demand.

Nothing despatched directly from either factory -
Head/sales office control bottle direct orders from
customers as well as those collected by van
drivers on delivery runs. No orders are collated
and picked from the central depot.

↳ Whilst a small amount of stock is
held in Stroud, this is constantly rotated
and replenished → again fairly accurate
forecasting based on mixture of historical
sales and new orders.

He likes to think he pulls, but based on
what he says, he pushes as he is at
the mercy of the distributor, which is ultimately
at the mercy of the flow of pigs. The only chance
to pull as such occurs when there is a sudden
spike in demand ^{or new order of customer} which has to be addressed in
the short term by bringing in pigs from another
source to satisfy shortfall.

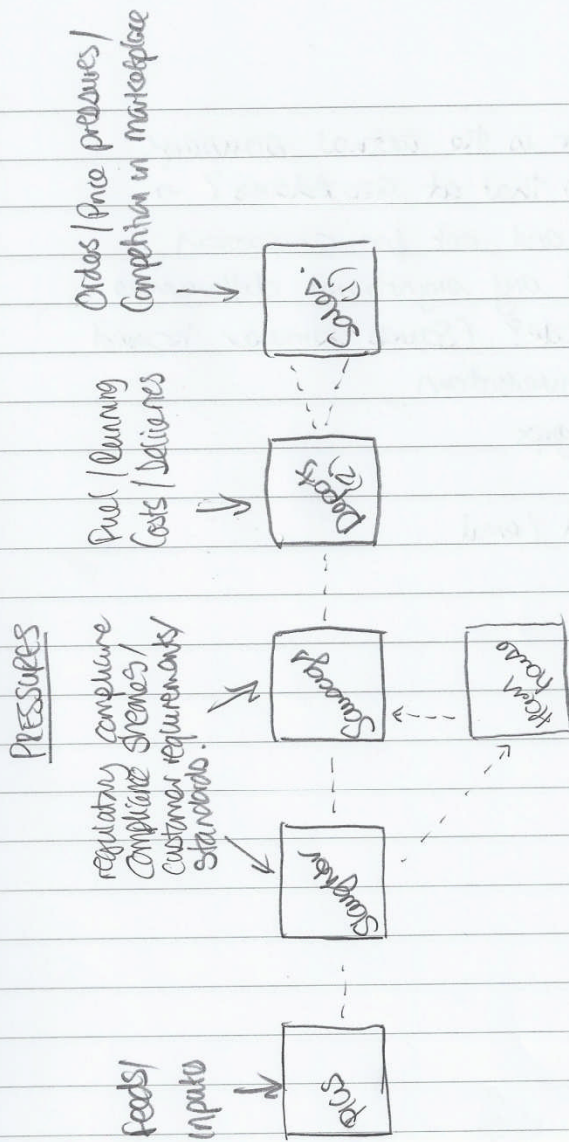
↳ I suppose there is an argument that
Stroud pulls against demand, but

ultimately, it is still pulling from stock at the main depot which has largely been pushed

When asked about constraints: we are who we are

Identified pressures throughout the chain but talks about from quite objectively and trades them off against the benefits of being a long established company which has changed as the market has changed, but whose van sales also allow both and the customers to have a more traditional aspect of supply & demand

EFSIS - Not cheap but does recognise that it opens doors more easily, something they just have to get on with. Meat hygiene regs level to playing (Counter to ..., etc → a scale thing?)



* How similar is the actual sausage production to that at Geo Adams? → send map and ask for comparison
NOTE - Would any significant differences be due to scale? (Sounds similar based on today's conversation)

* Draft up - gaps

* Questionnaire

* Follow up call / email / thanks / pot

* Contact [redacted].

-----Original Message-----

From: '[REDACTED]@so.uk]
Sent: Mon 01/09/2008 14:27
To: Graeme Heron
Cc: [REDACTED]
Subject: RE: Questionnaire email 06/08/08

Dear Graeme, Thanks for the feedback. Now that I am back at work after my holidays I have been able to look at your latest queries.

1. Q1 a product. I suggest by way of example Butchers Sausages. Approx 16,000 packs of 454g / 1 LB sold each week which is approx 380 tonnes per year. It is packed in bunch wrap film and then boxed 14 x454g per outer case 6.356Kg per case so approx 1140 cases per week. I hope this helps.
2. Q3 Since we have no motor vehicles based or allocated to the Sausage Factory it is not possible to give details for Petrol/ Diesel etc.
3. Q4 The 700 cubic metres is based on the data from Severn Trent the water and sewerage service provider to the site.
4. Q6 Yes there are examples of products being scrapped. The weight of products for disposal are included in the figures provided for waste.
5. Q8 We do not use GLASS or Metal just paper labels/ cardboard (paper) cases and boxes, plastic bags and films. I hope this helps.
6. The mapping of the sausage making process looks broadly similar and I would not feel that the differences are material enough to itemise, other than to note that we freeze sausages with a NITROGEN tunnel not a spiral freezer. Please note that this is why we consume 1,411,355 kWh of Nitrogen per year see responses to energy Q3 from 06/08/2008.

I am sorry that I will not be able to attend the meeting on the afternoon of Monday 6th October 2008 with you and [REDACTED]. Please pass on my apologies to all concerned.

I hope that this will assist you to make progress with this project. With best wishes [REDACTED] il Director [REDACTED] Ltd
01/09/2008

Tel [REDACTED]

From: Graeme Heron [mailto:graeme.heron@umn.ac.uk]
Sent: 12 August 2008 18:46
To: [REDACTED]
Subject: Questionnaire email 06/08/08

Hello [REDACTED]

Thank you for your email of 06/08/08. I have used the information to populate a questionnaire which I am attaching to this email for completion and return.

The additional answers I require are identified by the yellow background colour on the questionnaire. They are specifically;

- * Q1 We need to identify a single product from within your product range and record how many of that product / package you would produce in an average year. This could be Cumberland sausage for example.

- * Q3 Please also record any other fuel types you use, petrol, diesel, LPG etc.
- * Q4 Just a quick check that this is the correct figure for average annual water consumption at the sausage making facility.
- * Q6 Are there any instances of product having to be scrapped at site, typically as a result of variations between planned and actual demand over a short production cycle?
- * Q8 Are there any other types of packaging to consider? Or has everything been included.

I would also like to meet with you for a short interview so that I can build a more holistic view of the business as I construct the supporting narrative for the case study. I will email you a number of dates I can visit and would greatly appreciate an hour of your time.

This email also includes a PDF of our understanding of a sausage processing facility, I would like you to look at this and either discuss the differences at our meeting, or alternatively you could email me with a list of differences and I could create another supply chain map of your business for you to check and verify.

Kindest regards,

Graeme Heron.

<<Case Study Questionnaire GHCS19 , Sausages.xls>>

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This message has been scanned for viruses and dangerous content by the NorMAN <<http://www.mailscanner.info/>> MailScanner Service and is believed to be clean.

The NorMAN MailScanner Service is operated by Information Systems and Services, Newcastle University.