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Abstract

This dissertation examines how the potential for cooperation within an industry can be affected by non-economic factors. These factors are assessed in terms of trust and networks, which together form the mainstay of the concept of social capital. This research is important as cooperation within industries is seen as a method of business working which is seen to more beneficial in an economic and social sense than pure competition. The research entailed the use of in-depth interview methods which were analysed through a thematic framework. The investigation revealed the motivations for cooperation and also underlying issues surrounding the competence of networks between the public and private sectors of the woodfuel industry and the lack of trust between these sectors. It was established that trust and networks appear to have a bearing on the level and type of cooperation within the industry. Further to this recommendation were made on how to remedy the problems encountered.

Chapter 1: Introduction

This dissertation is a study of the social aspects of the woodfuel industry in the North east and their possible implications for the formation of woodfuel producer groups. The general development of the woodfuel industry and the formation of producer groups within the woodfuel industry are of relevance to the North East as the area, like many areas across the UK, is experiencing renewed interest in renewable energy, with a particular interest in the North East towards biomass. This dissertation has been carried out in conjunction with Northwoods, the northern woodland initiative, whose interest in this work stems from the desire to better understand the potential for application of producer groups to the woodfuel industry in the North East in order to help stimulate increased management and use of woodlands.

The study will firstly detail the present situation of the woodfuel industry in the North East in terms of the potential for growth and the policy context at the local, national and global levels. It will then look at producer groups and the relevance of social capital to producer groups, before looking at how social capital is affecting the potential for cooperative action in the woodfuel industry. The dissertation will then finish by assessing the levels of social capital available and making recommendations on how cooperation and the establishment of producer groups can best be achieved.

The principle research questions of this study are, “What levels of social capital exist in the woodfuel industry in the North East and do they affect cooperation?” and, “Can social capital be applied to encourage woodfuel producer groups in the North East”. Social capital will be examined in terms of networks and trust and cooperation in order to try and ascertain an idea of the levels present in the North East. Comparison

will be made to an already established woodfuel producer group in order to try and understand why the present situation exists.

Due to the level of detail needed and the potentially sensitive nature of the issues covered, the principle method of research used was in-depth interview with actors throughout the woodfuel industry. It was hoped this would provide a detailed understanding of their particular perspective and involvement with the issues at hand. In addition the research was accompanied by secondary data sources on social capital and producer groups in order to allow a more comprehensive understanding of the issues.

The relevance of this study can be seen first in relation to the current policy direction for the biomass industry as a whole in the North East, as producer groups are seen to play a role in the growth of the industry (TNEI 2003b). Secondly, this study was meant to have an application in the 'real world' and it is felt to a real relevance to the woodfuel industry in particular as the issues it raises are felt to need to be addressed before the industry can move forward. It is further hoped that this work can add something to the academic subjects of social capital, cooperation and producer groups.

Chapter 2: Background

2.1 The Study Area

The North East is an area that stretches from the northern boundary of North Yorkshire all the way to the border with Scotland. It covers several counties, the main two of which are County Durham and Northumberland. Within this area are large metropolitan areas such as Newcastle upon Tyne, Middlesbrough, and Durham, but also has large areas of rural and peri-urban space, and these rural and peri-urban areas will be the focus of the study. The total area of forest in the region covers 96000 hectares (TNEI 2003a) and plays a vital role in the well-being of rural economies throughout the North East. The study also includes a case study from outside the North East; this is used for comparison.

2.2 The Present and Potential Markets for Woodfuel

Before talking about woodfuel markets it is necessary to briefly define woodfuel and detail the supply chain. For the purposes of this research woodfuel shall refer to the use as a fuel of sawdust, wood shavings, wood off cuts, waste wood, chipped or pelletised wood, logs and energy crops (excluding Elephant Grass). Wood is harvested from trees in two main forms which both can have an application to woodfuel; these are green logs, which are the main trunks and large branches of trees, and 'lop and top', which are the smaller branches and very top of the tree. Wood is then either processed into smaller units either on site via mobile processing units or more often is transported in large log form to be processed at a sawmill, where various products are made from the wood (e.g. sawdust, wood chips, small roundwood etc). Processing can also occur at the small scale, this often the case for

the less-easily marketable parts of the wood, such as the lop and top. The product is then transported to retail outlets to be sold or delivered directly to customers to use.

Presently the woodfuel market only amounts to use of about 3000 Oven Dried Tonnes (ODT) per year (TNEI 2003a). Given that the region could actually provide over 298000 ODT per year (www.woodfuelresource.org.uk) there can be seen to be a large disparity between the actual and potential usage of this resource. Within the region it is felt that local markets for woodfuel could be grown to 20000 ODT within 5 years, so clearly there is a potential for expansion of the industry. There are 4 main markets; these are small domestic (single houses use logs for fires), small commercial (small individual commercial users, e.g. schools), medium commercial (larger commercial users such as industrial estates) and large commercial (for example a woodfuel powered power station). The medium market is considered key to local market growth (TNEI 2003 a).

2.3 Global, National and Regional Policy

The effects of global warming are forcing governments to look for ways of reducing their atmospheric emissions of greenhouse gases (specifically carbon dioxide). This has led to agreements such as the Kyoto Protocol, which committed the UK to cut it's greenhouse gas emissions by 12.5% by 2008-12, and since then that figure was subsequently increased to 20% by 2010 for carbon dioxide (TNEI 2003a). This reduction will be mainly met by the use of gas-fired power stations but has also resulted in a more prominent role for renewable energy; this was most recently encouraged at the national level in the Energy White Paper (DTI 2003). Within this

developing role biomass (of which woodfuel is a major component) is seen as the second most significant energy source behind wind power (DTI 2003).

The White Paper also highlighted the regional and partnership aspects of renewable energy delivery and these have been demonstrated through the production of the North East Biomass Action Plan (BAP). The BAP shows the potential for domestic, small, medium and large-scale commercial usage of woodfuel throughout the region and beyond, which far outstrips the amount that of woodfuel that could be supplied. Part of the BAP talks of the need to develop local fuel producer groups and franchises to supply local small-scale domestic and commercial woodfuel needs. When combined, these policy changes seem to point to a growing role for woodfuel production and use within the North East region and the UK as a whole.

2.4 Economic Considerations

Although the policy developments indicate that woodfuel has the potential to be a 'fuel of the future' the economics of producing woodfuel are presently not sufficiently positive to convince many landowners that afforestation or management of existing woodland are cost-effective, for example there are presently approximately 25,000 hectares of privately-owned unmanaged woodland in the North East (TNEI 2003b). Capital costs associated with the establishment of woodland are especially high, especially in relation to the low price timber fetches for traditional commercial uses (TNEI 2003a). There are existing suppliers of woodfuel within the region however, so there are markets that it is assumed can be supplied at an as yet unknown level of profit.

Chapter 3: Literature Review

3.1 Producer Groups

There are many terms that are used to describe groups that collaborate for mutual benefit, for example both the terms ‘cooperative’ and ‘farmer-controlled business’ (Plunkett Foundation 2003) relate to such groups. The term producer group similarly relates to such a type of group, but it is felt that it denotes a certain level of flexibility in organisation and focus within the supply chain, which is felt to make it most useful for this study. The literature on producer groups and similar organisations is varied, though most relates to agricultural production. However throughout it all one thing is key; producer groups work on the basis that cooperation among members will be much increased on what it would be without the group and this produces benefits for those involved.

The Plunkett Foundation (2003) has recently released a guide to the setting up of farmer-controlled businesses. In this it is suggested that a farmer-controlled business could be of benefit as it would allow farmers, “

- to provide continuity of supply through planned production
- to improve the consistency and quality of their product
- to establish better methods of growing, processing, storing, and delivering product of a given specification
- to develop new added value product lines
- to promote their products to their customers
- to integrate their businesses more effectively with other sectors of the food chain both vertically and horizontally

- to systematically reduce costs within all aspects of their business."

  (adapted from Plunkett Foundation 2003, p.3)

It can be seen that most of these benefits could be applied to most small businesses, especially those involved in primary production supply chains such as woodfuel, where growing, harvesting and processing materials and methods are broadly similar. These benefits would seem attractive to most businesses and as such suggest producer groups could be of benefit to the woodfuel sector.

The Plunkett Foundation (2003) report also recommends a series of steps to help a farmer-controlled business a success. These include making the business a formal and legal entity with a Memorandum of Association and an elected board of Directors, making the farmers involved invest some of their own money to give them an incentive to make the business work, and having service agreements with all farmers supplying the group. These recommendations preclude some forms of group though, such as the less formal supplier association studied by Izushi (1999) and are felt to be too prescriptive for this study to focus solely upon producer groups based on them, but they do suggest a method of ensuring a successful farmer-controlled business, where the business acts as an agent for the farmers who constitute it. Mohn and Devaney (1986) suggest that in any cooperative group the decision-making flows tend to be dynamic, and shift with the changing personalities and leadership styles of those in the group, even if the structure of the group does not also change. This suggests that a rigid structure such as that recommended by the Plunkett Foundation (2003) may not be able to cope with such changes, however it could also be argued that it may help to counteract them by maintaining responsibility with certain positions rather than on the basis of personality alone; it is felt that overall the

structure may help to reduce uncertainty within the group. In summary producer groups work through cooperation to produce benefits for all those involved, though there is no consensus on the form a producer group should take. This section did not aim to be comprehensive, as it is felt that the issues relating to producer groups would be best addressed through looking at cooperation, as this is at the heart of a producer group. In turn people's ability to cooperate is said to be represented and dictated by social capital (Svendsen and Svendsen 2000), so this shall be the focus of the literature review.

3.2 Social Capital

Social capital seems to be a diverse concept, and academic opinion seems to be divided over it's form, how it is created and how it is harnessed. Social capital is said to be of benefit as it works to reduce transaction costs by minimising the need for costly external regulation of a transaction (Svendsen and Svendsen 2000). It is said to do this by introducing the possibility of social sanctions against defaulting parties, (Putnam 1993) and by facilitating cooperation, so that any default on a transaction can be seen to be to the detriment of all parties involved. Social capital can also be seen to generate externalities-benefits that are not necessarily specified in a transaction but that are a product of it. An example would be the better management of a woodland as a result of renewed coppicing for woodfuel production. Social capital will now be explained further, before some facets that are felt to be key to social capital are examined in greater detail.

Though there may be differing definitions of social capital, in all definitions networks play a role, either as the focus (Putnam 2000) or as an indicator of social capital

(Svendsen and Svendsen 2000). If in a network the nodes represent organisations or individuals then the connections represent interactions, which could be for example learning (Falk and Kilpatrick 2000) or knowledge transfer (Raco 1998) or a business transaction. This then suggests that the interactions between nodes in networks are where social capital is generated (Falk and Kilpatrick 2000) or used to lower the cost of transactions (Svendsen and Svendsen 2000). So social capital can be argued to be produced and used through networks and interactions.

If interactions are repeated then social capital can help to form dense networks, such as those in traditional Chinese families (Fukuyama 1995). Such networks can be beneficial to those in them as they offer high potential levels of benefits for people within them through collaborative action. However such dense networks can also act to exclude those external to the networks and drive collaborative actions with negative outcomes, for example the Mafia have dense networks in which social capital can be seen to be high within the group, to the detriment of those who are not a part of it (Fukuyama 2001). Where interactions are less regular (Putnam 1993) or not to as high a quality (Falk and Kilpatrick 2000), as could be the case between two groups with dense internal networks, then weak ties (Granovetter 1973 cited in Flora 1998) are formed. These weak ties may allow wider cooperation and positive outcomes to occur, but on a more irregular basis, and according to Falk and Kilpatrick (2000) the quality of an interaction has a large bearing upon any level of social capital present. This suggests that there is no need for interaction just for the sake of it, but rather that it must be meaningful. So social capital can be seen to act in a number of ways that facilitate cooperation among individuals and groups, and the regularity and quality of

interactions between groups or individuals can be seen to affect the level of social capital available.

There is no clear agreement on the role of trust in relation to social capital. Trust is seen by Putnam (2000) as a product of social networks, with these networks as the basis of social capital, as they carry the information on whether or not to trust another party. To Svendsen and Svendsen (2000), trust is the operational level and focus of social capital, and is the aspect of social capital that becomes used in transactions. I contrast to Putnam, Fukuyama (1995, p.26) sees trust as the basis for social capital, "Social capital is a capability that arises from a prevalence of trust in a society or in certain parts of it". Though they differ in their placing of trust within the social capital framework, trust always has a central role in the realisation of social capital as a useful form. So one can argue that to talk of either social capital or trust causing or being the basis for the other is counterproductive and that perhaps the focus should be on levels and types of trust.

Social capital is often described in terms of shared norms and values, especially in relation to trust (e.g. Putnam 1993; 2000 and Falk and Kilpatrick 2000). Norms and values are analogous to expectations and ideals, where a norm indicates an expected type of behaviour in a certain situation, and a value refers to the ideal that dictates what that behaviour is. An example of a value may be the sustainable use of woodland, with a linked norm that dictates that for every tree that is cut down another is planted. So it can be seen that norms and values are the parts of social capital that allow individuals to form together around a common interest or belief and make cooperation easier through the shared interest. Some authors use this to argue that

social capital is more easily generated and harnessed where people have shared values and norms and say that these norms and values are ingrained in an area through it's history and culture– the embeddedness concept of social capital (Putnam 1993). Other authors argue that to generate and use social capital nothing more than rational self-interest and a benefit to all involved is needed – the rational choice concept of social capital (Flora 1998). This literature review will not go into depth on the embeddedness versus rational choice but will briefly recount the main differences.

3.2.1 *Embeddedness versus Rational Choice*

The embeddedness approach rests on the assumption that the social capital of an area is dependent to large extent on the existing networks and beliefs of an area (Putnam 1993). It focuses upon the norms and values that are present in communities, especially those norms and values linked to trust and reciprocity (Flora 1998) and as such may be seen to be more descriptive than the rational choice approach. It also suggests that social capital levels are hard to change, as much rests on the social contexts and traditions already in place.

The rational choice approach works on the assumption that all that is needed to generate social capital is self-interest, that is an individual or a group will act in the way that maximises the benefit accruing to themselves; this means that historical traditions of cooperation or strong feelings of belonging are not needed for social capital to be present (Flora 1998). It also works on the assumption that norms such as trust and reciprocity are taken more as a given and so are included in any decision (Flora 1998). The rational choice approach focuses more on interactions and states that repeated interaction will generate social capital as, "...if individuals interact with

each other repeatedly over time, they develop a stake in a reputation for honesty and reliability" (Fukuyama 2001, p.16).

The differences in the rational choice and embeddedness approaches are marked, but they are still talking about the same phenomenon and both have the same outcome; increased cooperation and collaborative action that is of benefit to all parties involved. It is felt by the author that the rational choice approach is of more use in the context of this work, but that the limited attention this pays to trust does not fully explain what is felt by the author to be the operational level of social capital.

3.3 Trust

Trust, defined as an expectation or belief that the individuals or groups involved in a transaction will behave in a certain manner in a certain situation, is something which does not always sit easily in a competitive economic world. If it did, contracts would never need to be drawn up and property rights would not be a necessity. The self-interested nature of pure competitive markets exists at least to some extent in the 'real' economic world and as such self-interest may limit the amount of trust and create an over-cautious approach to cooperation, with a resultant loss of greater economic benefit than that to be gained from uncooperative behaviour (Izushi 1999). This suggests that trust is in the best interests of all, yet it does not always exist; this has provided the stimulus for the extensive literature relating to trust, the main ideas of which shall now be briefly discussed.

Though trust can be seen to have many theories relating to it (Lane 1998), all theories have some basic assumptions in common. Firstly they all assume a degree of

interdependence between trustor and trustee, as trust only becomes relevant where the actions of one party depend on prior action or cooperation of another (Lane 1998). Secondly theories further assume that trust provides a way of coping with risk or uncertainty in an exchange relationship, as delays in responses necessitate a risky pre commitment for one party (Lane 1998). An example of this is ordering a CD off the internet; the money is paid in advance of the CD arriving, and then one trusts that it will be delivered safely. The third assumption follows on the second; where trust exists there is a belief that the vulnerability arising from the acceptance of risk in the exchange relationship will not be taken advantage of by the other party (Lane 1998). The theories of trust then diverge along similar lines to theories of social capital, so that again the difference between action based on rational utility maximisation and action based on social phenomena exists.

3.3.1 *Calculative Trust*

This theory works on the basis that expectations about the behaviour of another are based on calculations which weigh the costs and benefits of certain actions in an exchange relationship (Lane 1998). It assumes trusting behaviour only occurs where the benefits from trusting behaviour and reciprocated trust are higher than the potential losses from betrayal of trust. This can be seen to epitomise the rational utility maximisation approach to trust, where trust is based on an assessment of risk (Anheier and Kendall 2002). However as trust assumes some delay in responses and any cost-benefit analysis becomes more uncertain as future actions become more of a factor (Hanley and Spash 1995) then it can be seen that calculations may not yield accurate answers. Furthermore it discounts any notion of altruism or longer-term calculations, such as those made by German banks when a large German car

manufacturer was in financial difficulties and the banks chose to trust the company to overcome these difficulties eventually, when the short term calculation would have been to foreclose on the manufacturer and regain most of their money (Fukuyama 1995). So this approach to trust can be criticised on the basis that any calculations are likely to be inaccurate, and that trust is felt to be more than just a risk assessment (Anheier and Kendall 2002).

3.3.2 *Value-Based Trust*

This approach states that trust comes from shared values and feelings of solidarity within communities, and that when these values are broken a social control function such as ostracism is exercised within the community (Lane 1998). This is the same as Putnam's (2000) vision of social capital's function and form within voluntary organisations. However this view would result in very narrow radii of trust (Fukuyama 2001), so that there would be little trust in a society if this were the only means of trusting.

3.3.3 *Common Cognition as a Basis for Trust*

This approach works on the basis that trusting behaviour comes from common expectations between actors based on previous actions. It includes process-based trust, where trust is built incrementally and is tied to past exchanges and direct and indirect accumulation of knowledge (for example through brands, company image or by reputation) of the other party (Lane 1998), and also includes characteristic based trust, where trust rests on social similarity and cultural congruence (Lane 1998). The common cognitions related to process-based trust, suggest a useful way of building trust where common ground may be found such as exists in a producer group, where

everyone produces a similar product. It further suggests that affirmative exchange relationships involving members would be a way to increase trust among members, both towards each other and towards the producer group as an entity.

3.3.4 *Institutional-Based Trust*

This form of trust is based on parties trusting an institution or organisation based on their perception of the institution rather then the people that constitute it. This type of trust is said to work where common ground cannot be assumed between actors, but where they can both trust in the institution (Lane 1998).

All of the above theories suggest possible ways in which trust can be developed through their various approaches, and the following discussion looks at the welsh Regional Development Agency's attempts to foster cooperation through increasing trust, as reported in Izushi's (1999) study of supplier associations in Wales. The Welsh Regional Development Agency set up associations made of a customer firm and a group of supplier firms, so that information would be passed more efficiently between suppliers and a customer and also between suppliers. This project appears to have been a success to a certain extent, as 68% of supplier firms involved said that supplier associations helped them better understand the customer firm and build mutual trust with it, and 72% of supplier firms said it helped to build mutual trust with other supplier firms, with the associations also helping to facilitate knowledge sharing (Izushi 1999). However, Izushi (1999) shows that there is no significant difference between firms taking part in the supplier associations and firms not taking part when it came to the possibility of trust between firms. But there is a significant difference in suppliers' concerns over risks of losing competitive advantage, and of becoming dependent upon other firms (Izushi 1999), such that supplier associations can be seen

to reduce worries of exploitation by other firms; a precursor to trust? Also it should be noted that in this example knowledge sharing and cooperation were made easier without increasing trust, suggesting firms can realise some benefits without fully trusting. Izushi (1999) suggests that the access to previously inaccessible networks such as those of the regional development agency, prestige, possibility of increased orders and fear of being perceived as uncooperative were all reasons for suppliers to join the supplier associations, which suggests self-interest is enough for increasing cooperation. So supplier associations are an example of how to encourage cooperation and possibly trust through knowledge sharing between similar companies, and this appears to have worked by developing process-based and using institutional trust in the regional development agency. As such it suggests a possible way for a cooperation to be improved on an informal level, as opposed to the formal level suggested by the Plunkett Foundation (2003). This discussion of trust has covered some of the various types present in the literature and though they have been looked at in turn but it must be remembered that in practice types of trust may be used together and may be used out of a mixture of rational self-interest and the influence of social phenomena (Lane and Bachmann 1996, cited in Deakin and Michie 1997).

3.4 Cooperation

Cooperation can be defined as, "…a joint action of at least two agents (or parties) aimed at achieving a beneficial outcome for them as a whole. Since the outcome would not take place through an individual action, each agent depends on the action of the other(s) to attain it." (Izushi 1999). This definition suggests interdependence and reliance upon others to attain goals, and as such the role of trust can be seen to be central in cooperative action. One of the classic studies of cooperation is Axelrod's

(1984) look at cooperation strategies through iterative Prisoner's Dilemma (PD) games. Through this he concludes that the best strategy for any agent is to always cooperate as long as the other agent cooperates, but to retaliate if cooperation is suspended. Further to this forgiveness is also important, so that cooperation can be resumed if the other agent indicates they would like to. However this has one major caveat, and that is that the future has to matter enough to make any future repercussions from uncooperative behaviour in the present not worthwhile. Axelrod (1984) then suggests that this can be done by making interactions between agents more durable and frequent and giving those involved a stake in a reputation that can be of benefit to them. So this gives a strategy for the encouragement of cooperation and suggests that interaction is the key to cooperation. The only problem with cooperation based on the results of PD games is that in such games the benefits and costs of an action are clear, whereas in real life this is not the case. This is thought to lead to over-cautious behaviour and a lower level of cooperation than is possible without harming self-interest (Izushi 1999). So perhaps further interaction and information sharing are needed to maximise cooperation, creating a chicken and egg situation, where cooperation needs prior cooperation to be fully realised. However Humphrey and Schmitz (1996 cited in Izushi 1999) suggest that effective demand from the market is the driving force to initiate changes towards cooperation, with government connecting firms to such demand, so that the market will break the chicken and egg situation.

Though cooperation has so far been said to be of benefit in theory it shall now be shown to have a role in the success of regional economies. Studies of the economic success of areas such as central Italy, Silicon Valley in California and Baden-

Württemberg in south west Germany have attributed the success of these regions (known as New Industrial Districts or NIDs) as,

> "...not only through the existence of advantageous physical assets or resources, but also through the emergence of socially and institutionally mediated forms of selective co-operation between actors" (Raco 1999, p.951).

This is set in a context of post-Fordist modes of production and regulation which give advantage to "...flexible, specialised, small producers able to serve markets, and supply other firms, rapidly and efficiently" (Amin and Thrift 1992, quoted in Raco 1999, p.955), with such small producers working best in geographical clusters, allowing access to tacit knowledge (Mackinnon *et al* 2002) not easily transferred over distance, thus enabling an NID to develop and maintain competitive advantage (Raco 1999). Much is made of the capacity of regions to support processes of learning and innovation, such that in order to develop a region or locality the institutions it contains must be sufficiently 'thick' (Raco 1999), whereby thickness represents the level of organisation of social, economic and political practices, networks and a feeling of common enterprise (Amin and Thrift 1995 cited in Raco 1999). However the NID thesis has been criticised for not paying enough attention to extralocal networks of knowledge and capital (Mackinnon 2002), and has difficulties in terms of a lack of transferability of ideas to disadvantaged localities, and in terms of environmental degradation caused by NIDs (Raco 1999).

The processes and practices credited with the success of NIDs are congruent with those of social capital, such that the success of NIDs can be said to be at least partly due to the social capital of that region, as it creates the conditions conducive to knowledge transfer and collaboration, and it is these processes that are said to be

behind the success of NIDs. As such NIDs may give an indication of how a region should be in order for social capital to be most effectively utilised, and also gives an example of how cooperation and collaborative action can contribute to the economic success of a region. So for this study the NID literature works as an example of the positive benefits of cooperation but also identifies other facets of social capital (networks in the form of institutional thickness and interaction through information transfer) as key to the success of NIDs. This suggests that institutional 'thickness', in terms of public and private sector networks, and processes of information transfer through interaction should be addressed in the data collection and analysis.

3.5 Conclusions

This literature review should have demonstrated the form and outcomes of social capital, and their value to this study. To summarise social capital as used in this study and it's relevance to producer groups it will now be simplified by the author into a series of statements:

- Interactions occur between individuals through social networks.
- These interactions generate information which leads to trust.
- Trust breeds cooperation.
- Cooperation produces positive outcomes.
- Positive outcomes can be economic and social development.

Thus social capital has worth to the study of producer groups, as it provides a mechanism for the generation of desired positive economic and social outcomes through greater cooperation, which is the aim of a producer group. Furthermore social capital theory demonstrates that people need to interact meaningfully in order to develop social capital and collaborate. It also suggests that the focus of analysis for

data collection and analysis should be networks, trust and cooperation, as these can be seen to be the precursor, utilisable characteristic and product of social capital respectively.

Chapter 4: Methodology

4.1 Introduction

Due to the potentially sensitive nature of the research and the issues it covers, in-depth qualitative interviews were selected as the most appropriate way of attempting to understand perceptions of producer groups and the issues surrounding them. Where necessary, secondary data sources were also used to support primary data.

4.2 Evaluation of the Interview Method

4.2.1 *Justification for selecting the method*

As one of the most insightful and revealing research methods, qualitative interviews were selected for several reasons. Firstly, the use of in-depth interviews allows time for the researcher and respondent to develop a level of rapport and explore issues that would not be possible in a shorter interview (May 2001). Due to the fact that the issues being dealt with were potentially sensitive this rapport was necessary to get a full and honest response. Furthermore it was hoped this method would provide data which is, "…rich, detailed and multi-layered." (Valentine 1997, p.111). The interviews were semi-structured in nature as this acts as a guide to the issues and questions that need raising, but also allows for the potential to explore different issues with different respondents within the same interview framework (Punch 1998). The questions used were designed to be open-ended and were tailored to each individual based on knowledge of their role in the woodfuel sector, though all were from the same interview framework based on the issues raised in the literature review. All interviews were tape recorded; this decision was a conscious one, as it was felt to give accuracy through precise recording of the conversations for later analysis, but it also allowed the interviewer to concentrate on the conversation and help to engage the

interviewee. All recordings had prior permission from the respondents. The number of interviews was limited to thirteen and these were a mixture of public and private sector individuals, all of whom were directly involved in the woodfuel sector. The majority of interviewees were woodfuel suppliers or were directly involved in large organisations who supplied woodfuel. As their perceptions were felt to be crucial this mix was purposely engineered; the exact mix is in table 1 below.

Description	Number
Private Sector Woodfuel Supplier	7
Public Sector Woodfuel Worker	4
Private Sector Consultant	1
Public Sector Woodfuel User	1

Table 1. *The cross-section of people interviewed.*

4.2.2 *Positionality*

As this work was done in conjunction with Northwoods, and all the contacts were provided by them there was a concern that some of the interviewees may have a perception of myself as a part of Northwoods or as someone from a part of the public sector involved in woodfuel. This was countered by dressing fairly casually for all interviews so as to make it clear I was not, "just another suit" (private sector woodfuel supplier 4). This point was further addressed by re-iterating that this was a piece of academic research and that all interviews would be kept anonymous throughout the reporting stages of the project. The interviews were carried out in people's places of work and so were all fairly relaxed, as the interviewees were in familiar surroundings, this may also have helped interviewees to answer frankly.

4.2.3 *Quality of Responses*

This was not perceived to be a problem, as all interviewees seemed to be happy to talk about the issues until all issues were felt to have been fully covered during the interview. There was only one exception to this, where the public sector woodfuel user was reticent to answer questions relating to problems that had been encountered during a project, and asked for the comments to be kept 'off the record'. An awareness of the potential for bias to be introduced from the interviewer was kept, as interviews are not a "one way process" (May 2001, p. 102). This was done by keeping responses as neutral as possible, but in order to develop a rapport and obtain detailed responses neutrality was sometimes difficult to maintain. As such analysis of the data has had to be done with any potential bias borne in mind, though this was not felt to be a major issue through the analysis. A problem was encountered when asking about cooperation and producer groups, as many individuals associated them closely and would talk about one and then switch to the other. This has led to problems with data analysis.

4.2.4 *Limitations*

If repeated, the interviews would be carried out in a similar manner, as taping was felt to have worked well. If more time had been available, transcriptions would have been made of all conversations, but as this was not possible in the timescale available and is not essential to data analysis (Ritchie *et al* 2003) then it was not done in this research, but would be under a longer timescale. The problem of association of cooperation and producer groups has led to the data for these having to be analysed together, if done again the distinction between these would be made clearer. The interviews were felt to produce a balanced sample set for analysis, as their focus

matched that of the project as a whole, but not at the complete expense of other parts of the woodfuel sector. Follow-up interviews with some of the suppliers would have been useful after a preliminary analysis in order to hear their views on the findings, but again time did not permit this.

4.3 Analysis and Presentation of Results

The data has been analysed according to the thematic framework recommended by Ritchie *et al* (2003). Data was analysed by looking for emergent themes (bearing in mind the themes suggested by the literature) and sub-themes, and then the data was summarised under the themes and sub-themes. There is also a case study of a producer group, the data for which have been analysed separately, as the group falls outside of the main study area, and also to allow comparison with comparison with those not already part of producer groups. The data has then been used to form descriptive accounts, which form the basis of the Results and Analysis section of this work. Then the data relating to producer groups and configurations was analysed further to try and establish typologies. As this last step requires a higher level of abstraction it is considered separately in the Results and Analysis section. Secondary sources from the Literature Review will also be used to support the primary data. Where used quotes or citation will use a description and numbering system to denote the individual's status within the woodfuel industry, based on the descriptions in table 1 above. This is to preserve anonymity but allow analysis of data in the context of their status in the woodfuel industry. Where a third party is mentioned in quotes, the term person X will be used to preserve anonymity.

Chapter 5: Results and Analysis

5.1 Introduction

As the thematic framework process described in the methodology is likely to ascribe meaning to themes and sub-themes during the process of creating descriptive accounts (Ritchie *et al* 2003) the results and analysis sections have been presented together. The main themes from the data were the same themes that were highlighted in the literature review as being of importance, but as the questions were based around these themes this was likely to occur, and is also necessary if any inferences about the levels of social capital in the woodfuel industry are to be made. The woodfuel producer group encountered through the work has been made into a case study, to make comparisons with other woodfuel suppliers easier.

5.2 Networks

Throughout the interviews the concept of networks was always understood in terms of individual actors with linkages between them, with interactions between actors forming the linkages. This was without any prompting or explanation from the interviewer and suggests that this is a common perception of networks within the North East. As such it suggests any actions regarding networks may be best taken in this context to aid successful implementation.

5.2.1 *Embedded Networks*

Within the woodfuel industry there appeared to be embedded networks that relate to regular interaction, along which ties are strong and appear to be well developed, "…you see the same [public sector] people at the [biomass policy] meetings and you know which ones to talk to for one thing or another" (public sector woodfuel user).

This was further evident as, "…I can pick up the phone and talk to my customer or my contractors and know that I'll get an answer, and that's that." (private sector woodfuel supplier 5).

Both of the above quotes relate to people who have regular interaction within different networks, one being in the context of public sector biomass policy/strategy meetings for the North East, and the other being in the context of a private sector supply chain, with both of these networks being sufficiently developed to allow both individuals to use them to gain timely information and access to those they need to interact with. The private sector supply chain had changed little in years and contact had been developed over a similar timescale and so can truly be though of as embedded, with exchange relationships being the catalyst for interactions and development of the network. The public sector network found in the sphere of biomass policy was different, as it had been developed over the past two or three years in relation to national policy guidance on biomass, rather than developing through exchange relationships. Previous interaction in different contexts helped these networks as, "I know person X from other work I've done with Northumberland County Council so I know he's about regeneration." (public sector woodfuel user) Furthermore the emphasis in the public sector network appeared to be more on information and access to resources rather than exchange of goods and money, as, "…you know that if you talk to person X they might be able to signpost you to someone who could give you funding, or tell you who to contact if you have a quality problem." (public sector woodfuel user).

The key differences appear to be in the context of the interaction that the relationship is built on, as there can be seen to be a marked difference between a supply chain network and a public policy network. This could be an issue as contexts for interactions between individuals from these networks would have to be well defined in order to be able to manage expectations from the interaction and make it meaningful. Also the embedded nature of these networks may provide a possible hurdle to forming new networks (Putnam 1993), however private sector woodfuel supplier 5, who was involved in the embedded supply chain did say, "I wish they [public sector actors involved in a feasibility study] had come to me at the time because we could have had a [woodfuel] project off the ground by now.", which suggests a willingness to work outside existing contexts.

5.2.2 *Networks Between the Public and Private Sectors*

The above discussion of embedded networks can be applied across the all results, so that there can be seen to be two sets of networks, so that those in the public sector appear to work in embedded networks based around public sector biomass policy and implementation networks, and those in the private sector work in networks based around exchange relationships. There are exceptions to this, and these shall be discussed now.

The biomass policy process has attempted to include some private sector individuals; three of the suppliers interviewed were regularly attending the meetings. However the pace of decision and implementation of policy was seen as a problem, "…all that seems to get decided is that there should be another meeting" (private sector woodfuel supplier 4), as was the lack of attention paid to private sector views,

> "…we're there, and we're telling them what we think of their ideas and why they might not be the best way…but they don't seem to take it on board you know, and we're the ones who do it for a living." (private sector woodfuel supplier 3).

Furthermore the time needed to attend meetings was seen as a problem,

> "It's actually quite difficult for private firms because there are so few of them who know anything about the [woodfuel] industry, that the same people get asked to go to meeting after meeting and at the end of the day you get fed up and say 'I've got work to do, I can't do anymore!'" (private sector consultant).

As well as issues with private sector individuals included in public sector networks, there were also problems with those who weren't included,

> "…and they said that there wasn't enough wood in the area to supply enough fuel for the school, and here I am sat at the other end of the village. It took me five years to find out that study had happened…and now I hear they're doing another study, well I hope the same doesn't happen." (private sector woodfuel supplier 5).

So it can be seen that present networks are not satisfactory from the point of view of the private sector, as there are feelings of frustration firstly with the lack of involvement for some individuals, and also, once involved in public sector networks, with the amount of time needed for input to the networks and apparent lack of importance accorded to suggestions. From this it seems that the problems come firstly from a lack of engagement with a wide cross-section of the private sector and then, once engaged, expectations do not appear to be being met, which is leading to disillusionment with the public sector. It would seem that to improve this situation

involvement in the public sector networks would need to become of a greater benefit to the private sector so that interactions within public sector networks could be justified in terms of their continued economic success. The situation where, "…it seems easier for them to commission another feasibility study than to do something about the last one." (private sector woodfuel supplier 2) must be remedied if linkages between private and public sectors of the woodfuel industry are to be kept and utilised to the benefit of all involved.

There was an exception to this though, where one of the private sector woodfuel suppliers (number 2) was involved in an embedded network with a public sector organisation (DEFRA) as a result of previous contact through farming. He was able to utilise this network in the new context of energy crops, which both DEFRA and the supplier were now involved in. However this was considered separately to other public sector network linkages made purely through woodfuel. This suggests networks between public and private sectors are possible but as DEFRA and farmers have a long history of cooperation with many benefits (i.e. subsidisation) to farmers this may not be applicable in the policy of context of woodfuel, which is not accorded the same status in government policy that farming has enjoyed for the last 50 years.

5.3 Trust

Trust was viewed differently between the respondents, both in terms of awareness of it's existence and in terms of the role it played. Further to this trust was often instinctively thought of in different contexts by different people, for example in relation customers or contemporaries, or in terms of where levels were high or low.

5.3.1 *Public Sector Trust*

Trust within the public sector was felt to exist at the local and regional level. The level of familiarity developed through interactions from the biomass policy process appears to have developed trust so that public sector actors feel confident in their knowledge of others and the roles they play in relation to woodfuel, for example "…for any information relating to woodchip quality levels you should see person X, they know all you need to know and all you don't need to know about it." (public sector woodfuel worker 2). This can be seen in relation to the strong linkages in public sector networks and suggests that these may be the basis of trust through regular interaction within the context of biomass policy and related issues. The form of trust most apparent was process-based trust, as previous affirmative experience appeared to play a role in building the existing trust. The only potential area of distrust came with national levels of government,

> "…there are times when the left hand might not know what the right hand is doing, especially with the big boys, for example the DTI approved funding for six or seven biomass-fired power stations without checking whether the fuel resource to power them was there." (public sector woodfuel worker 1).

There were no feelings of distrust towards the private sector, if anything trust existed *in potentia* as, "…this process [of policy development and implementation] is aimed at helping the private sector and the economy of the North East as a result." (public sector woodfuel worker 2).

5.3.2 *Private Sector Trust*

Trust within the private sector existed in two forms. The first of these was in relation to embedded networks based on exchange relations, where trust was evident as,

> "…my contracts only exist over the phone, I tell him [the customer] how much I've got and what quality it is and he tells me how much he'll pay me for it and I tell him when it'll be there…and I always get paid what we agree." (private sector woodfuel supplier 5).

This was an example of trust being used to reduce transactions costs, as it negated the need for actual contracts to be drawn up. The same supplier also gave an example of how social sanctions could work if trust was broken,

> "…word soon gets round if a mill is a being a bit dodgy with suppliers, you know trying to fiddle them by saying the wood isn't of a high quality and then paying less. If you hear this you don't deal with them and the mill soon runs out of wood." (private sector woodfuel supplier 5).

This suggests trust is high within supply chains, but trust was also found to be high where competition might be expected to exist, i.e. between two suppliers of the same product with potentially overlapping markets. This was not the case as,

> "…for the most person X is too far north for any problems, but once I found his product at a garden centre I supply, so I rang him and he said the garden centre hadn't mentioned that I supplied them. He stopped supplying them so we didn't undercut each other and I'd be expected to do the same for him, and I would." (private sector woodfuel supplier 1).

This is an example of cooperation already happening and benefiting the producers by stopping prices being driven down by competitive behaviour. This was felt to be an example of common cognition as the basis of trust, as it was called a 'Gentlemen's Agreement' and seemed to rest on the empathic basis that they were both small businesses in the same industry and with similar goals. Thus trust can be seen to be high within the private sector and appeared to be based on a feeling of shared values

and a level of empathy, especially between small businesses. However awareness of this trust and it's utility did not seem to match the levels present, it is felt that more could be made of this.

5.3.3 *Trust Between Public and Private Sectors*

Though it has already been stated that trust towards the private sector from the public sector existed, the same does not appear to be true from the private sector to the public sector,

> "…we go to all these meetings and sit there and nobody takes any notice of what we say…we're getting fed up and we feel like telling them to take a running jump." (private sector woodfuel supplier 4).

This is obviously indicative of frustration with the public sector and could be based on unrealistic expectations,

> "…we have been going to these [biomass] meetings wanting help, but we haven't had any…that's all we need is help, we don't want to become part of an ESCO [Energy Supply Company]." (private sector woodfuel supplier 4).

Feelings of distrust towards public sector policy and it's ability to help the woodfuel sector were also aired, "It isn't going to be the public sector that takes woodfuel forward, it'll be one or two businesses who take the initiative and run with it." (private sector woodfuel producer 3) and , "The ESCO won't work, but it's their baby and they can't see it's a non-starter." (private sector woodfuel supplier 4). These all point to a serious lack of trust between the private and public sectors, which appears to be based on the lack of support for existing businesses, a lack of influence on the direction of policy and further to this on the perceived inability to be successful in aiding the growth of the woodfuel industry. This perception of inability to aid the

growth of the woodfuel industry was based on previous experience, especially the lack of 'real world' action taken so far as a result of the policy process; remember private sector woodfuel supplier 4, "…all that seems to get decided is that there should be another meeting".

5.4 Cooperation and Producer Groups

The responses to questions on cooperation were varied, especially amongst private sector woodfuel suppliers. On a societal level the UK was felt by some to be lacking an ethos of cooperation, "…if you go to Denmark or Scandinavia and see the way their woodfuel industries and other industries are set up, then you see it's completely different to here, over there they're used to cooperating, and it's something we don't do." (public sector woodfuel worker 1). An interesting finding in the data related to cooperation was that individuals closely associated cooperation and producer groups, and talked about both at the same time, for example "I think cooperation will happen, and cooperatives could be the way forward for woodfuel." (private sector woodfuel supplier 3). This seems to set cooperation only in the slightly formal context of a producer group and seems to preclude awareness of any present levels of cooperative action as was described above, even though these were not in any sense done through a producer group. This could possibly be investigated in further research.

5.4.1 *Motivation for Cooperation*

Amongst those in the private sector the main incentive needed for cooperation was money, "For cooperation to work, it has to make a difference to people's bottom line." (private sector woodfuel supplier 2), and this sentiment was echoed in the public sector, "…businesses need a reason to cooperate, and that reason is money."

(public sector woodfuel worker 4). So self-interested behaviour was felt to be the main motivation for cooperation. The role of trust in cooperation was acknowledged, "…sure trust helps cooperation, but you can have all the trust in the world and still you need to make a difference to people's pockets." (private sector woodfuel supplier 2), but it seems the overriding factor is still money. Some of the private sector woodfuel suppliers could not see any benefits from increased cooperation, for private sector woodfuel supplier 1 this was due to a sense of satisfaction at the size of business already achieved and for private sector woodfuel supplier 5 it seemed to be related the presence of already-strong levels of networks and trust in existing supply chains. As such for these two private sector woodfuel suppliers there was no motivation to cooperate further, even though both were used earlier to demonstrate the high levels of trust within the private sector of the woodfuel industry. This suggests that high levels of trust and strong networks do not lead automatically to cooperation.

5.4.2 *Public Sector Involvement*

It was not felt by the private sector that the involvement of the public sector was necessary to stimulate cooperation and producer group formation, "the markets will say whether we cooperate or not, if there's a demand producer groups or cooperatives…will form to supply the demand." (private sector woodfuel supplier 3). Further to this, "all it needs is a spark, just one person to start it off and then it will snowball and there'll be producer groups." (private sector woodfuel supplier 2). So it can be seen that there was a feeling within the private sector that key actors could take producer groups and cooperation forward, indeed two of the businesses were independently considering establishing producer groups. It is felt that this

independence of the private sector is linked to the problems relating to the lack of trust and network linkages with the public sector. It is felt that the potential for cooperation is presently being damaged by the lack of trust and networks between the private and public sectors.

5.4.3 *Configurations of Producer Groups*

This section has been built upon people's preferences for producer groups as expressed through the data to try and build typologies/configurations based on their responses. Before this the stage in the supply chain for the typologies to be focused on is discussed. Producer groups were felt to be most useful in parts of the supply chain that suppliers did not already operate in, with marketing and processing/distribution as the two main areas of interest. The reasons for this were not always clear, but seemed to relate to expansion of a business in to a new area, or to a feeling that increasing market demand through increased marketing of woodfuel was the best way to drive the woodfuel industry forwards. So the following configurations may be best viewed in relation to processing and marketing:

- Configuration 1: The Agent. This configuration is semi-formal, as suppliers have the right to take their supply elsewhere if a better price can be gained, but membership of an association (which would constitute the group) would be necessary. One of the members of this association acts as an agent to customers, giving them a central point to bargain with, but the agent negotiates on behalf of the whole association and has their combined supply as a bargaining tool. The agent would have to have high levels of trust with the other members of the association and would have to be a focal point for networks. This configuration was from private sector input.

- Configuration 2: The ESCO. This configuration would be formal and would exist within a wider biomass framework as envisaged in the biomass action plan (TNEI 2003b). The suppliers would supply a legally formed company, most likely limited by guarantee, which would hold the franchise for the ESCO. They would also be members of the franchise company and would invest a proportion of their own capital into it. The company would be run for their benefit and would preferentially take their supply of woodfuel. The ESCO idea was viewed sceptically by most of the private sector suppliers due partly to the issues of public sector distrust, so this configuration would also most likely be viewed in a similar light.
- Configuration 3: The Classic. This configuration would follow similar lines to the case study model and that suggested by the Plunkett Foundation (2003), having a memorandum of association, supply service agreements, a level of necessary capital investment to join and a good level of product feedback, all of which would help ensure a level of commitment and transparency within the group. This would be used in the context of the processing/distribution and marketing parts of the supply chain. This configuration came from the perceived success of the case study.
- Configuration 4: The Listener. This configuration would be the easiest to set up, as it would work on an informal basis and could be used to help develop networks and trust between the public and private sectors. This would involve a person from the public sector who had access to public sector woodfuel networks creating a set of linkages with private sector woodfuel suppliers, and then providing intensive support on an informal basis. This person would act as a point of contact with the public sector for private sector individuals who

would have to use their public sector networks to help private sector individuals gain more meaningful interactions with the public sector. This would not be a producer group, but it is based on the requirements of some of the private sector woodfuel suppliers.

5.5 Case Study: A Fledgling Producer Group

In order to allow for a comparison, data relating to those involved in a producer group has been analysed separately. The producer group will first be described and then analysed. The group is situated outside the main study area of the project and falls within the boundaries of a National Park. The group is made up of 11 woodfuel suppliers and a company secretary, who is public sector woodfuel worker 3. It also has an elected board of directors, of which the chairman is private sector woodfuel supplier 6. One of the members acts as a processor and packager for the woodfuel and is responsible for quality control. The group has been granted Sustainable Development Fund money from the National Park Authority in order to cover administration and start-up costs for the first 18 months, at which point the group will be self-funding and public sector woodfuel worker 3 will hand over the role of secretary to someone else. The group has been officially running since April 2003.

5.5.1 *Networks*

These were well-developed within the group; group meetings are every three months but, "…if there's ever anything that needs doing then he'll [public sector woodfuel worker 3] be on the phone to sort it out." (private sector woodfuel supplier 6). Further to this there was well-developed product quality feedback from the member who

processed the woodfuel, which was felt to be very important by private sector woodfuel supplier 6, "…it lets you know where you stand.". It was felt that the work of the processor and public sector woodfuel worker 3 were very important to these networks as they were the main sources of communication within the group. Informal connections also appeared to be strong, the morning of our interview private sector woodfuel supplier 6 had been on the telephone to the processor in a mainly social context.

5.5.2 *Trust*

Trust was also felt to be high within the group, "I don't think we could have got this far if we didn't have good levels of trust among the members." (public sector woodfuel worker 3) and , "…yes I would say that trust was high amongst the members.". Trust was felt to have developed through rational self-interest, "…people joined mainly to help their businesses, but now they're involved they see they have to make it work." (public sector woodfuel worker 3). There was also felt to be a lot of trust put in the processor, as this role included decisions on quality which affected payment; if the woodfuel was not of a certain quality then a payment was not made, "…person X has a lot of responsibility, and we have to trust that they don't abuse that responsibility" (private sector woodfuel supplier 6). Trust in the group as a business proposition appeared to be being developed incrementally, as individuals were being allowed to keep their own retail outlets and their own brands for the first year in supplement to those of the group, but these were expected to be handed over next year so that all woodfuel supplies and more importantly retail outlets would go to the group. This was felt to be a potential problem, "there will need to be a lot of confidence in the group to convince people to hand over their business to the group."

(private sector woodfuel supplier 6). The success or failure of the first year's trading was felt to have a large bearing on whether the complete hand-over of supply and retail outlets to the group would occur.

5.5.3 *Cooperation*

Cooperation appeared to be working well within the group; there had been no problems as yet, this was felt to be partly due to the formal status of the group, which consisted of a memorandum of association and service agreements in the form of maximum amounts of woodfuel that could be supplied. These were felt to lead to transparency and to help maintain trust at an early stage. Both private sector woodfuel supplier 6 and public sector woodfuel worker 3 were positive about the continuance of cooperation, though both acknowledged that the first year would be crucial in determining this.

5.5.4 *Issues*

The only issues mentioned were the need for success to provide continued motivation for cooperation within the group as described above, and a feeling that perhaps the most had not been made of the first six months; it was felt that improved marketing may have helped. The main issue was the need for success, but this is not surprising as all businesses need to be economically successful to survive fro any period of time.

5.5.5 *Comparison*

It can be seen that similarities between the group and the wider woodfuel industry occur in several places, though there is a major dissimilarity. The first similarity is that where interactions are of a high quality and include useful information such as

product feedback, the networks are strong and trust is high. The second similarity is that rational self-interest is seen as the basis for formation and continued success of producer groups.

Dissimilarities occur most notably through the strength of networks and trust between the public and private sectors; both are working in a trusting partnership to make the case study successful, whereas this does not appear to be the case in the wider woodfuel industry. This dissimilarity is suggested by the author to be due to the quality of interactions between the public and private sector actors involved in the case study, and in particular to the affirmative experience of gaining support and funding from the public sector. The role of public sector worker 3 and their organisation as the driving force behind the establishment of the group is seen as vital; they appear to have been the key actor described earlier by private sector woodfuel suppliers, which suggests that the formation of producer groups may be easier where the public sector is involved, as one has been formed where they are involved. Their roles can be seen to be coordinating the group and granting access to resources at the disposal of the public sector.

Chapter 6: Conclusion and Recommendations

From the above discussions it can be seen that within the North East, the levels constituent parts of social capital (networks and trust) are low between public and private sectors of the woodfuel industry but high within sectors. From this it can be inferred that levels of social capital follow similar patterns. As the product or capability of social capital, cooperation would be assumed to be affected by low levels of social capital and this does appear to be the case, as at present the type of public and private sector cooperation that ultimately resulted in a producer group in the case study could not be envisaged occurring in the North East. However the high levels of trust within private sector networks, would then suggest cooperation in these networks, and whilst there is talk of this, nothing concrete has occurred. This, when coupled with the indifference shown towards cooperation and producer groups by private sector individuals in particularly high-trust relationships, suggests that inferred levels of social capital are not able to fully explain the lack of cooperation at present.

This means that the answer to the research question, "What levels of social capital exist in the woodfuel industry in the North East and do they affect cooperation?" is that levels of social capital vary within the industry and that whilst they do appear to have a bearing on cooperation, they do not appear to tell the full story, as they cannot explain why cooperation is not occurring where trust levels are high and network linkages are strong. This partial answer may of course be due to the use of inferred levels of social capital, as if the proxies used are part of an incomplete set then a crucial explanatory variable may be missing. Or it could suggest that there are other factors involved in cooperation, and that social capital may only be partly responsible for levels of cooperation. The other obvious factor from the data is money, as

increased profits were felt to be the main motivation behind cooperating. This suggests that levels of social capital are part of a suite of factors involved in cooperation, with the other suggested factor from this research being increased economic benefit to business. As such the conditions necessary to start cooperation, and in turn producer groups, based on this research are high levels of the constituents of social capital and money.

This leads into the second research question, "Can social capital be applied to encourage woodfuel producer groups in the North East". It is the belief of the author that this is the case, but as discussed above it seems to only be part of the answer. However this does the beg the question, how can social capital be applied to encourage woodfuel producer groups in the North East? The use in this work of trust and networks as the main constituents of social capital and to frame the analysis, has identified the problems that exist in relation to the lack of trust and durable networks between the public and private sectors. So already social capital theory has identified areas of concern that need to be addressed in order to allow cooperation and producer groups to utilised fully. Further, it suggests ways of dealing with these issues; these recommendations are as follows:

1. Networks need to be based on repeated meaningful interactions to be durable. For an interaction to be meaningful to all the expectations of how the interaction will benefit those involved must be clearly understood by all involved and must also be realistic. In the case of present public and private interactions the expectations of how interactions will benefit all appear to be unclear to those involved so that the private sector feel they are not benefiting from the interactions. Also as the some of the private sector is presently

feeling overlooked, perhaps a more conscious effort to establish networks may be needed.

2. Trust is built through repeated interactions and affirmative experiences (Lane 1998). This means that actions taken as a result of interaction in networks must be successful if they are to build trust. In the context of this study this could relate to the perception that no useful actions are being taken as a result of public-private interaction. The policy process may need to be seen to be more active; actions taken could perhaps feature more prominently at meetings in order to demonstrate this.

These issues are felt to be crucial if the full benefits possible from producer groups are to be realised within the woodfuel industry, and throughout the wider rural economy that the woodfuel industry is a part of.

Chapter 7: Limitations

The major limitations of this work relate to the fact that only some of the actors involved in the woodfuel industry were interviewed. This limits the applicability of the research across the whole of the woodfuel industry in the North East, however sample selection was considered to be representative of most of the main components of the woodfuel industry. Interviews with more of the actors involved would provide for a richer understanding of the issues involved and may help provide more detailed recommendations to help solve these issues. As an emerging issue within the region the research had little in terms of examples of producer groups to draw upon from within the region. This will probably change in the coming years as producer groups are formed under policy and market stimuli.

Future research could focus upon an assessment by the main actors involved of the findings in terms of the producer group configurations. Also further work would like to be carried out into the success or failure of the case study producer group and the reasons for this, and also upon the expectations that both private and public sectors of the woodfuel industry have for each other.

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