University of Newcastle upon Tyne

THE USE AND MISUSE OF CLUSTERS IN ECONOMIC DEVELOPMENT POLICY: A CASE STUDY OF TWO CLUSTER POLICY INITIATIVES IN THE NORTH EAST OF ENGLAND

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Abstract

This thesis examines the development of cluster policy and considers the extent to which difficulties in implementing cluster policy can be attributed to a lack of understanding of the concepts that underlie clusters. In order to move beyond the work of Michael Porter's (1990, 1998) and to provide a conceptualisation of clusters that considers the notion that traded transactions may be more efficiently conducted when spatially concentrated, but also allows for an understanding that economic processes are path dependent, influenced by their institutional and cultural context and shaped by the motivations and behaviour of individual actors, this thesis uses Storper's (1997) 'holy trinity' of 'technologies-organisations-territories' as a framework to examine a wide range of concepts that underlie our understanding of clusters. The conclusion is that clusters are highly context dependent, and that multi-layered explanations for their existence and evolution are required.

The way in which cluster policy has developed is also highly context dependent and each element of Storper's triumvirate has implications for cluster policy. Given a lack of agreement as to the definition and nature of cluster policy, this thesis proposes that cluster policy development be understood as a process and a five-stage cluster policy model is developed. This model is used both to consider the literature regarding cluster policy and also as a framework to examine the development of two cluster policy initiatives in the North East of England and their impact on actors within one particular cluster in the region. These case studies indicate that the level of understanding of cluster concepts amongst policy makers, and issues throughout the cluster policy making process, impacted on the development and the outcomes of the policy initiatives, but that the development and outcomes were also influenced by the nature of the particular cluster. The thesis concludes that a better understanding of the scale and boundaries of clusters and the distinct theoretical elements making up cluster concepts may lead to a better conceptualisation of clusters and cluster theory. A series of policy recommendations is then drawn.

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1 Introduction

1.1 Research Background

There is no doubt that clusters are on the policy agenda. From Whitehall (Department of Trade and Industry, 2001) to Warragul (Clusters Asia Pacific Inc, 2001) cluster based policies are being pursued. Since the 1990s, organisations as diverse as the World Bank, the Organisation for Economic Cooperation and Development (OECD) and the United Nations International Development Organisation (UNIDO); national governments of many political colours; state and regional authorities in many nations; and numerous local economic development agencies have adopted a diffuse range of cluster based economic development strategies, looking to develop localised economic specialisation as a source of competitive advantage. *This research aims to analyse the development of two policies taking a cluster based approach to economic development in the North East of England and to consider the impact of both policies on firms and organisations within the marine and offshore technology industries in the region in order to draw out some conclusions about the conceptualisation of clusters and cluster policy and to provide some practical lessons for policymaking.*

What are clusters and how do we account for their existence and development?

In order to consider the use of cluster concepts in policy it is necessary to examine the contentious literature around clusters that seeks to explain why, at a time of increasing globalisation (Ohmae, 1990), and the purported death of distance (Negroponte, 1995, Cairncross, 1997), localised concentrations of specialised activity are apparently achieving great economic success. Although exemplar concentrations of economic activity and their geographical environments, – Silicon Valley (Saxenian 1991; Scott 1988), Baden-Württemberg (Cooke and Morgan, 1993), Third Italy (Bagnasco, 1977, Piore and Sabel, 1984) – have provided volumes of material for academics, and inspiration for policy makers, there is no consensus even as to the definition of a cluster. As Rosenfeld (1997) concludes, 'criteria for clusters have proven exceedingly difficult to pin down, and there are as many definitions are there are types of organisations using the term' (ibid. p.8). A common starting point is Michael Porter's 1998 book, *On Competition,* in which he defines clusters as 'geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example, universities,

standards agencies, and trade associations) in particular fields that compete but also cooperate' (1998, p. 197). This definition highlights certain aspects of a cluster that are generally accepted, but the definition of clusters remains contentious. Clusters are economically specialised and geographically concentrated, although I will show that there is little agreement as to the scale at which such concentrations exist, the way in which boundaries can be drawn or the role which spatial proximity performs. There is a systemic element and a relational aspect to clusters, in that they encompass not only a range of firms, but also the wider environment in which those firms operate. The dynamics of performance are driven by the connections and links within the cluster although, once again, I will demonstrate that there is no consensus as to the components of a cluster, the nature of the linkages between firms or the processes by which clusters evolve and, in some cases, ultimately decline.

Even if we can come closer to a definition of clusters, there is little agreement as to the explanation for the existence and evolution of such phenomena of localised concentrations of specialised activity. In order to provide a conceptualisation of clusters that considers the notion that traded transactions may be more efficiently conducted when spatially concentrated, but also allows for an understanding that economic processes are path dependent, influenced by their institutional and cultural context and shaped by the motivations and behaviour of individual actors, I take Michael Storper's (1997) 'holy trinity' of regional economics – technologies-organisations-territories – as a framework to incorporate theories that have developed around transaction costs; social capital and relational assets; knowledge and learning, and innovation. From this analysis I conclude that, while there is not one cluster theory, a cluster approach permits a multi-layered explanation and rich understanding of such phenomena.

Given the contentious literature around clusters it is not surprising that the range of policies to promote clusters and clustering behaviour is diffuse. However, I identify common features of a cluster approach to policy and show that, while much of the literature accounting for clusters does not give clear pointers theoretically, or practically, for policy intervention, theories from each element of Storper's holy trinity do have implications for policy, even if these implications are not taken into

account in practice. However, the existence of a wide range of disparate policies raises a host of questions outlined below:

Why have cluster concepts proved so appealing to policy makers?

Inspired by the success of exemplar locations and regions, policy makers worldwide have sought to create and nurture clusters in their own localities. The publication in 1990 of Porter's *The Competitive Advantage of Nations,* and the weaknesses of previous industrial, regional and technology policies, further encouraged many countries and regions to pursue a cluster based policy. However, it has been the ability of policy makers to 'enrol' the concept for their own purposes that has ensured its popularity (Lagendijk and Cornford, 2000). Bergman and Feser (1999) point out that the availability of a new 'policy hammer' has the tendency to make every issue look like a nail, and a cluster approach to policy has been implemented in many different forms at a range of geographical scales. However, I argue that, not only should policies be context dependent, but also the nature of policy should vary depending on the scale at which it is implemented, because the nature of relationships varies with scale. In addition, there has been little research into the way in which cluster policies undertaken at different scales within the same country are coordinated and it is apparent that this is an area meriting further research.

How can we best understand a cluster-based approach to policy making?

Through an analysis of the literature, which demonstrates a diversity in both academic conceptualisation of cluster policy and in approaches to cluster policy making in practice, I conclude that a cluster based approach to policy making can best be understood as a policy making *process* and I develop a model of the cluster policy making process comprising five stages: – the decision to take a cluster approach; identification, selection and analysis of clusters; participant mobilisation, relationship building and cluster animation; selection and implementation of policy instruments; and evaluation and policy learning. This model is important because I use it firstly, to analyse the literature around cluster policy and later, as an analytical framework for discussing and comparing the development and implementation of the cluster policy

initiatives in the North East of England that form the basis of the empirical work for this thesis.

If policy makers follow a cluster policy making process similar to that outlined above, the result should be a tailor made, context specific policy that is differentiated firstly, by taking as its starting point the existing resource base of a territory, secondly, by taking an approach which is holistic, inclusive and focused on synergies, and thirdly, by the intended outputs which are cluster specific assets available for exploitation by actors within the cluster. However, Enright (2000) points out the irony that cluster policies may become 'one size fits all', with policy makers pursuing the same clusters with similar policies, and I highlight areas in the literature showing that there are substantial lessons to be learnt, and pitfalls to be avoided, in choosing to pursue cluster-based policies.

1.2 Main Objective

The main objective of this research is to analyse the development and impact of two policy initiatives that have taken a cluster based approach to economic development in the North East of England. I use a case study approach to firstly, examine the development of the two cluster policy initiatives, which operate at different geographical scales, and secondly, to consider their impact upon firms and organisations within a particular area of economic activity – marine and offshore technology and engineering. At the local level, the case study is that of the Regional Service for Clustering, an organisation which was initiated by North Tyneside Council and is the non-academic partner in the Economic and Social Research Council CASE collaborative studentship from which this thesis results. At the regional level, the research examines the cluster policy of the regional development agency for the North East of England, One NorthEast.

The context in which the research came about, the methodological approach and the research design for the project are discussed further in Chapter 4. I aim to use the cluster policy process model, outlined above, to critically assess cluster based strategies both as they are developed and as they are implemented and I seek to answer three main research questions:

- **How have two examples of cluster policy that impact upon the North East of England been developed?**
- **How have those policies impacted on the marine and offshore engineering cluster in the North East of England?**
- **What lessons can be learned?**

Given that the development of cluster policy and its subsequent outcomes are highly context dependent, I examine the cultural, social and economic context, and policy background, against which the policies were designed. I then describe the development of the policy using the cluster policy process model. Having described the development of each cluster policy, I consider the impact of those policies on firms and organisations within one particular 'cluster' – the marine and offshore engineering cluster. Again it is important to understand the context in which the cluster policies are implemented and therefore background information on the industries, relationships and institutional framework is given. It is difficult to isolate the impact of the cluster policy from other influences, but the research emphasises the particular issues faced in developing a cluster policy for the marine and offshore industries in North East England, and also allows some general lessons to be drawn about the problems and challenges of adopting a cluster approach to economic development. The results highlight the relevance of viewing cluster policy as a process, the significance of the scale at which cluster policy is implemented and the role of cluster organisations, and raise further questions about the role of individual actors within the cluster policy process.

1.3 Thesis Layout

The structure of the thesis follows the composition of this chapter and is outlined in figure 1.1 below. Chapter 2 provides a review of cluster theory literature. Chapter 3 is a review of the literature relating to the use of cluster concepts by policy makers. From this literature the cluster policy process model is developed and this model is subsequently used in Chapters 5 – 8 to analyse the development, implementation and outcomes of the two cluster policy initiatives.

Chapter 4 outlines the research questions, detailed above, that have arisen from the literatures reviewed in Chapters 2 and 3 and breaks them down into their constituent parts. It also outlines the context in which the research came about, and discusses the methodological approach and research design, before looking at the methods utilised to answer the research questions. The chapter concludes by outlining the limits of the study and the nature of the results that are set out in the following four chapters. Cluster policy in practice in the North East of England is the theme of Chapters 5 and 7, which analyse the development of One NorthEast's cluster development programme and the Regional Service for Clustering initiative respectively. These two chapters draw strongly on the literature outlined in Chapter 3 and outline the cultural, social and economic context and policy background against which the policies were designed. Each policy initiative is analysed using the model of the cluster making process and the final section of both chapters draws out some generic lessons from each case study.

The theme of Chapters 6 and 8 is the impact of the two cluster policy initiatives, from One NorthEast and the Regional Service for Clustering, on the marine and offshore engineering cluster in the North East of England. These two chapters draw on the literature discussed in Chapter 2 and provide some background to the marine and offshore industries in the North East, highlighting some of the relationships that exist between actors. The institutional framework and range of cluster organisations within the cluster is also outlined. The cluster policy process model is then used to analyse the impact of the two policies on firms, organisations and other actors within the cluster.

Chapter 9 is a discussion chapter drawing together the experiences of both cluster policy initiatives and their varying impacts, particularly on the marine and offshore engineering cluster. This chapter considers the implications of this research both in theoretical terms, because through investigating individual clusters and the application of cluster policy, the usefulness and 'fit' of different concepts employed to explain clusters and cluster policy can be examined, and in practical terms, because lessons in respect of utilising the cluster approach in economic development policy can be identified. Chapter 10 concludes the thesis and makes some suggestions for future research.

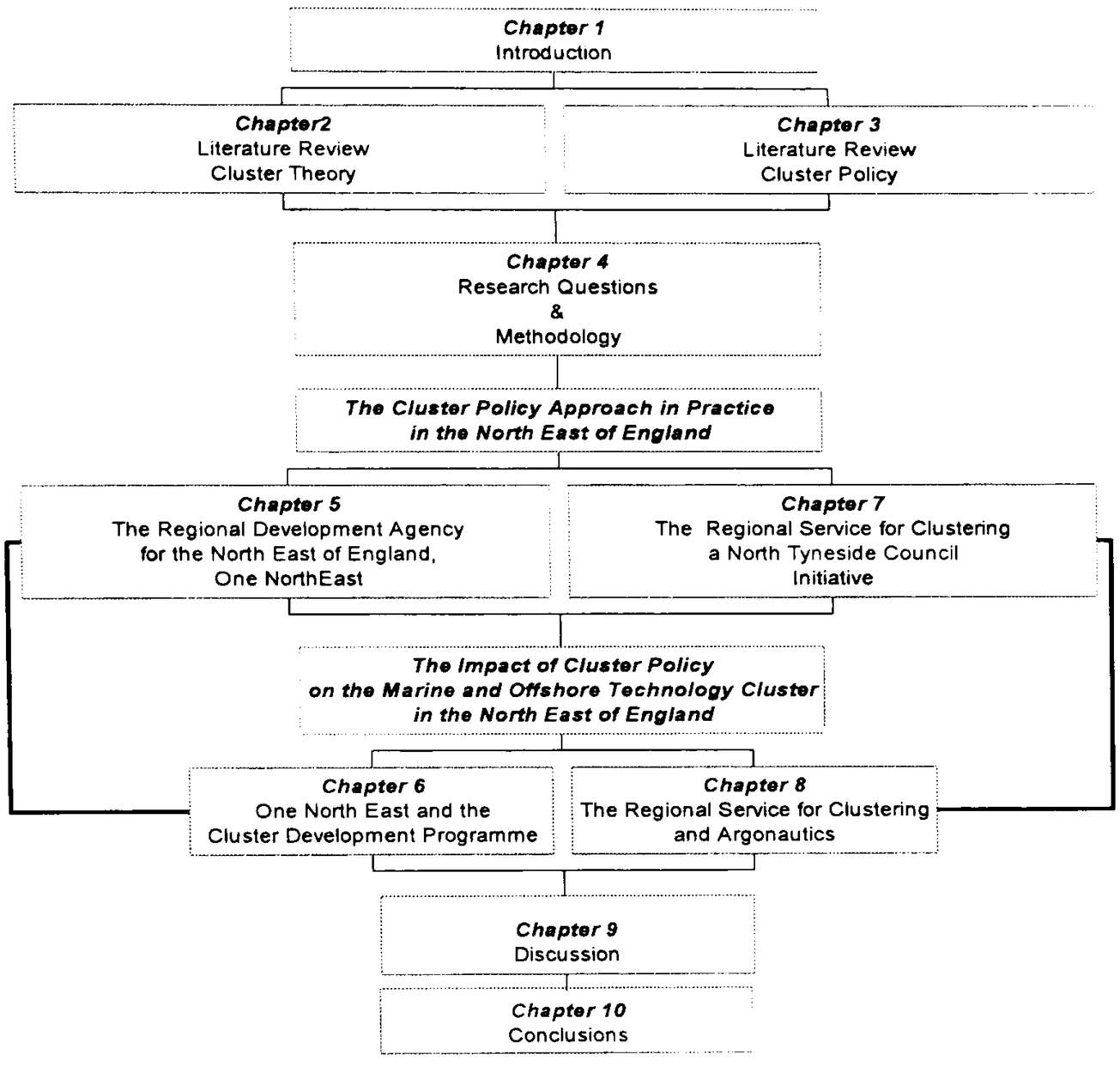


Figure 1-1 Thesis Layout

2 Theories of Clusters: Transactions, Territories and Technological Change

2.1 Introduction

Geographical concentrations of specialised economic activity are widely observed – the Dolomites account for half the world's production of ski boots (Rosenfeld, 1995), finance is concentrated in London, and Hollywood dominates film production. Historically, cutlery was associated with Sheffield and coal with Newcastle. There is an equally long academic tradition, stretching back to the economist Alfred Marshall, of seeking to explain why such patterns of economic specialisation are observed and why there are apparent benefits from operating within such concentrations - be they termed filières (cf. Raikes et al., 2000), development blocks (Dahmén, 1988), neo-Marshallian agglomerations (Amin and Thrift, 1992), industrial districts (Becattini, 1990, Brusco, 1990), innovative milieu (Maillat, 1995) or clusters (Porter, 1998). However, there is little agreement as to the processes that give rise to these phenomena or the processes by which they evolve.

Clusters, in particular, have become the dominant, and increasingly contested, discourse in both economic geography and economic development policy during the past decade. As Bergman (1998) points out 'it is difficult to identify another equally obscure concept that appeals to such a broad spectrum of academic disciplines, professions and even lay people' (ibid. p.92). This appeal largely rests on the notion that clusters of firms and associated organisations, at various geographical scales, facilitate learning and innovation, which in turn are seen as the basis of competitiveness in the 'new economy'. However, there is a suspicion that the concept of clusters, and especially the work of Porter, has 'gate crashed' the debate about economic concentrations (Martin and Sunley, 2003), leading some to question whether a cluster approach adds anything to existing theories that seek to explain spatial agglomeration (Cumbers and MacKinnon, 2004).

I would argue that the cluster approach is valuable in understanding spatial agglomeration. Those who use the term 'cluster' are not solely inspired and influenced by the work of Porter, but draw on much deeper and richer veins of

thought. Indeed the concept of clusters has a long career path that both pre-dates and runs concurrently with the popularity of Porter's work. In tracing the career path of the concept it becomes evident that a number of literatures from different academic traditions can usefully be drawn together to shed light on the processes that underlie clusters. This drawing together may be controversial – each approach has different theoretical foundations, with consequent implications for the methodologies used to study the phenomena. Each approach identifies different sources of advantage from operating within clusters (Newlands, 2003) and each approach leaves different issues unresolved. However, by tracing the development of these literatures, it is possible to gain a clearer understanding of the substance of clusters and the processes that give rise to them, even though these processes will give different outcomes at different times and places because of the highly context dependent nature of the phenomena. Benneworth and Henry (2004) advocate this approach, arguing:

> Each of these different theories might imply a different understanding of a cluster, an accepted methodological foundation and 'rules of evidence and argument' [...] We regard each of these approaches as a lens with which to look at the same situation to produce knowledge which contributes to how we understand both 'that cluster' as well as 'clusters' (ibid. p.1019).

Gordon and McCann (2000) identify four strands of literature relating to 'localised spatial growth' or clusters. Firstly, there are those within neo-classical economics, most notably Paul Krugman, who have gained an interest in geographical issues through the application of modern trade theory. Secondly, within business and management literature, there are those with an interest in the optimal spatial relationship between producers, customers and suppliers. It is within this strand that Gordon and McCann place the work of Porter. Thirdly, there is an interest within geography and spatial planning literature in explaining so-called new industrial districts observed in areas such as northern Italy and California. Finally, and intertwined with the geography literature, there is a sociological dimension to the debate around clusters with concepts such as embeddedness (Granovetter, 1985). Gordon and McCann identify that each of these strands comes from a different academic background, but also, importantly, that each strand has a different research agenda. Gordon and McCann's article is valuable not only in setting out the different

literatures pertaining to the debate around clusters, but also in clarifying the types of processes occurring in clusters. However, it is the work of Michael Storper that I have chosen to provide a framework for considering the strands of literature relating to clusters. Storper, in *The Regional World* (1997), identifies three schools of thought participating in the debate regarding the rediscovery of the region as a fundamental basis of economic and social life. The first school of thought looks at institutions, the second examines industrial organisation and transactions, and the third emphasises technological change and learning. While Storper's focus of interest is the role of the region, rather than specifically the role of clusters, these literatures also form the background to much current thinking and debate around clusters. Storper (1995;1997) identifies the emergence of a new heterodox paradigm in regional economics and economic geography that can be used to break down the issue of economic development and build up a multi-layered explanation for it. He terms this heterodox paradigm the 'holy trinity' of regional economics, with the three elements being technologies-organisations-territories.

Given the criticism of theorising with academic writing on clusters (Martin and Sunley, 2003; Benneworth and Henry, 2004) it is particularly important to choose a framework that permits the development of a clear notion of clusters and Storper's holy trinity serves as such a framework. Storper is undoubtedly a significant figure in economic geography. Bathelt and Glückler describe Storper's holy trinity as '[t]he most sophisticated attempt to reformulate the foundations and goals of economic geography' (2003, p.129), Cumbers et al. identify Storper's work as 'one of the most sophisticated and influential contributions to the development of institutional and evolutionary ideas in economic geography (2003b, p.329) and Lovering (1999), an ardent critic[1] of the weak theorising of 'New Regionalism', within which much

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[1] Lovering (1999) describes New Regionalism as 'a set of stories about how *parts* of a regional economy *might* work, placed next to a set of policy ideas which *might* just be useful in *some* cases' (p.384, italics in the original) and 'a rather vague framework which licenses speculation on possible relationships between hypothetical actors at an imprecisely specified level of ideal-typical abstraction' (p.392).

cluster theorising has taken place, sees the theorising of Storper in *The Regional World* (1997) as 'particularly clear and careful' (Lovering, 1999, p.385).

Storper's 'new heterodoxy', according to Pinch and Henry (1999), provides a new metaphor for regional economies as 'sets of relations' as opposed to the old metaphor of 'economic systems as machines with quantifiable inputs and outputs' (ibid., p.820). Storper's work enables us to give a conceptualisation of clusters that considers the notion that traded transactions may be more efficiently conducted when spatially concentrated, but also allows for an understanding that economic processes are path dependent, influenced by their institutional and cultural context and shaped by the motivations and behaviour of individual actors, and that the transmission and accumulation of knowledge are socially embedded processes. It is also important that any methodological approach taken is consistent with the theoretical basis of research and this conceptualisation enabled me to take a relational approach (cf. chapter 4). Storper (1997) concludes that clusters might be viewed as 'stocks of relational assets' (ibid. p. 28) arising from untraded interdependencies within the cluster and I will return to the concept of relational assets in section 2.6, but for the time being, Storper's three fold schema of technologies (and processes of knowledge and learning), organisations (and associated transactions) and territories (and their associated institutions) form a useful framework for considering the career path of the cluster concept.

Storper's holy trinity is not without critics. Bathelt and Glückler (2003) point out two areas where they believe Storper's work can be misinterpreted. Firstly, given that territory is identified as a distinct element of the triumvirate, they believe that there is a risk that, contrary to what they believe was Storper's intention, spatial processes could be treated in the same way as social and economic processes. This would run contrary to Massey's (1995) caveat that '[t]here are no such things as purely spatial processes; there are only particular social processes operating over space' (ibid., p.11, quoted in Bathelt and Glückler, 2003). Their second, related, criticism is that treating territory as a separate entity could lead to the other two entities (organisations and technologies) being viewed as *non*-spatially specific. In order to avoid these two misinterpretations, Bathelt and Glückler seek to analyse economic and social processes through a geographical lens, rather than treating territory as a separate

entity. They go on to develop a framework around the 'concepts of organisat*ion*, evolut*ion*, innovat*ion*, and interact*ion*' (ibid., p. 131, italics in the original), terming this conceptualisation 'the four ions of a relational economic geography'. Notwithstanding these criticisms of Storper's 'holy trinity' framework and suggested improvements, I decided to adopt it, taking into account, and attempting to avoid, the potential criticisms.

Having asserted that cluster theorising runs much deeper than the work of Porter, I will, paradoxically, first look at the work of Porter because, although it is flawed, it is undoubtedly significant and particularly relevant to the popularity of the concept in policy circles. Then, in order to illustrate that cluster theorising does have deeper roots than Porter, I will consider the literatures that have sought explanations for concentrations of specialised economic activity and innovative behaviour in elements of Storper's 'holy trinity' of technologies-organisations-territories. Each approach has merits and shortcomings, however, by considering both the claims made by each strand of theorising and the criticisms each strand has attracted, it is possible to obtain a better understanding of clusters and the unresolved issues in this area.

To gain a clearer understanding of those locations with evidence of economic specialisation or 'clusters' is an important research area in its own right, but its importance is heightened because, as mentioned above, clusters have been used not only as a tool to describe and explain concentrations of economic activity, but have also been seized upon by policy makers as a 'new' approach to economic development. The literature pertaining to the use of clusters in policy is considered further in Chapter 3 and my empirical work looks at the way in which cluster concepts have been employed by policy makers in the North East of England and considers the impact of cluster policy, conceived and enacted at different geographical scales, on one particular cluster. These detailed case studies shed further light on the processes underlying clusters and on the use of cluster concepts by policy makers.

2.2 Towards a Definition

Before moving forward it is worth considering what is meant by the term 'cluster'. This is not a straightforward task because, as Rosenfeld (1997) points out, 'there are

as many definitions as there are types of organisations using the term' (ibid. p.8). Others go further still, asserting, and accepting, that there is 'no possible consensus on what is a cluster, because each application of the concept is specific in place and time, and the general term is defined through the act of investigating individual clusters'(Centre for Urban and Regional Development Studies, 1999, p. 2). For others, this is problematic and the concept has become 'chaotic' (Martin and Sunley, 2003).

2.2.1 Clusters: functional or geographical?

For Malmberg (2003) the main confusion relates to whether clusters are a functional or spatial phenomenon and he seeks to distinguish functionally linked economic activity, which he terms 'an industry cluster' and which he considers to be the subject of Porter's (1990) *The Competitive Advantage of Nations*, from geographical concentrations of similar or related economic activity, which he terms a spatial or localised cluster and which he considers to be the subject of Porter's later works on clusters (Porter, 2000).

However, in a similar way to the way in which Bathelt and Glückler (2003) seek to take a geographical perspective, rather than treating geography as a separate entity (cf. s.2.1), Malmberg subsequently suggests that we take geography out of the definition of a cluster. I would argue that, if this were done, it would not be necessary to distinguish between industry clusters and spatial clusters. Geographical proximity becomes a variable attribute of a cluster rather than part of the definition. Clusters operate in geographical space, relationships within them may be strengthened by geographical proximity, but they are mainly defined by their function.

Key geographical questions remain however. Is it the case that '[t]he geographic scope of a cluster can range from a single city or state to a country or even a group of neighboring countries' (Porter, 2000, p. 254), or does it follow that '[if] the same externalities and networks that typify clusters do indeed operate at a whole variety of spatial scales, this surely weakens the empirical and analytical significance of the cluster concept' (Martin and Sunley, 2003, p. 12)? Over what geographical scales do these functionally defined clusters operate? If clusters do operate at differing geographical scales, are the processes fundamentally different depending on scale

and, crucially, what are the relationships between the scales? How does proximity (cultural, social, organisational, but specifically, geographical) influence the processes occurring within clusters?

Malmberg and Maskell (2002) argue that the processes within clusters do vary with scale and conclude that 'it seems reasonable to allow the scale to vary according to what type of phenomenon is emphasised in the analysis' (ibid. p. 443). They suggest that, if the focus is on formal institutions (for example, the legal system or cultural and linguistic norms), the national scale will be relevant; if the emphasis is on business transactions, a continuum of geographical scale will be under consideration; and, if the interest is in the mundane, every day exchange of information and ideas, the appropriate scale will be much more local.

Asheim (1999) points out that we can distinguish between national clusters concentrated in a particular region, and regional branches of a national cluster, and regional clusters. Bunnell and Coe (2001) provide a useful summary of the geographical debate around the meaning of scale and conclude that scales are fluid, relative and socially constructed. Actors operate, and events occur, simultaneously across different scales. As Asheim (1999) points out, clusters at a regional level can be part of larger clusters at a national level. However, we do not need to presume that the nature of the linkages and relationships within the cluster will be the same at different scales.

2.2.2 The Quandary of Boundaries

An associated question is how geographical boundaries can be drawn around clusters. In policy terms, this has often been achieved artificially by beginning with a predefined territory and looking for clusters within those bounds. Bunnell and Coe (2001) challenge us to bound research, not by territorial boundaries, but to look at social networks embedded in particular places and to look at relationships operating between and across different scales. Such an approach necessitates a shift in focus from the different scales at which, in their case, innovation may be interpreted, to the key actors who construct and utilise the networks through which innovation is enacted. Porter's conceptual view is also to start with the firm and trace the linkages

and interactions outwards from there, although the practices of his consultancy firm. Monitor, tend to involve the identification of clusters within given territories.

If we do start from key firms and trace their interactions, then drawing the boundary of the cluster *is* a subjective process – not least because, as The National Governor's Association (2001) point out, the geography of clusters is in part determined by the distances and times that people are willing to travel for work and meetings. Even within industries there can be different patterns within, and between, different countries. Research has shown that in the United States biotechnology clusters tended to be thought of as covering locations that could be visited in a business day, whereas in the United Kingdom they were thought of as covering areas that could be visited in around an hour (Department of Trade and Industry, 1999). In turn, these views are determined by cultural and social norms, transportation systems and personal preferences. Functional interactions inevitably have a tendency to tail off in intensity with distance and at some point, if a boundary is required for analytical purposes, a decision has to be made (by those examining the cluster) as to a boundary which encompasses the key actors. It is unlikely that the firms operating within and across clusters feel the same need to delineate boundaries. To some, this element of creativity and construct is a problem and is tied to the question of geographical scale (Martin and Sunley, 2003). However, if we accept that the boundaries of clusters are inevitably drawn by the geography of the interactions of those involved, and that an element of creativity is therefore required, and justified, in considering their boundaries, we can look separately at how different processes may work at different geographic scales and how sub national clusters may relate to clusters at a larger geographic scale. That is, we can accept that cluster boundaries are drawn by a creative process, without accepting that the same processes operate at a whole variety of geographical scales.

We can conclude that the geographical scale of relationships varies between industries and between countries. A national cluster may be composed of regional clusters and regional clusters may contain smaller groupings. However, we should not necessarily expect to find evidence of the same type of relationships at different scales, and the nature of the relationships will vary at different geographical scales.

2.2.3 The Components and Linkages within Clusters

Even when geographical boundaries have been drawn, taking into account the different scales at which clusters exist, there is disagreement as to the elements within a cluster. Some would restrict the term clusters to denoting concentrations of interconnected firms, preferring to use the concept of a regional innovation system to describe the wider notion of firms *and* supporting organisations (European Commission, 2002). I would agree with others who include many more elements within the cluster. Porter (1998, p. 199) includes 'associated institutions' in his definition, and the OECD concludes that 'in some cases, clusters also encompass strategic alliances with universities, research institutes, knowledge-intensive business services, bridging institutions (brokers, consultants) and customers' (OECD, 1999, p. 9).

If we return to the functional nature of clusters, another key area is the nature of linkages in clusters and the level to which they involve economic specialisation. How economically specialised should clusters be? Are the linkages vertical, horizontal or both? Are clusters more than supply chains? What are the key linkages and drivers in the cluster? Some stress both horizontal and vertical dimensions, describing clusters as '[g]eographically proximate firms in vertical and horizontal relationships involving a localised enterprise support infrastructure with a shared developmental vision for business growth, based on competition and cooperation in a specific market field' (Cooke, 2002, p. 121). Others implicitly concentrate on the vertical aspect, characterising clusters as 'networks of production of strongly interdependent firms (including specialised suppliers) linked to each other in a value-adding production chain' (OECD, 1999, p. 9).

The nature of the linkages is fundamental to the distinction between a cluster and a sector. In the policy arena, former sector initiatives have often been relabelled cluster initiatives with little, if any, change in substance. However, clusters are a wider phenomenon. Clusters are to do with the linkages and interdependencies that arise when producing and marketing products and services, or creating innovations. These linkages can be horizontal or vertical and may be based around using the same skills sets, similar technologies or a similar supply chain, but are more likely to encompass

a group of sectors or industries, or an amalgam of parts of sectors or industries, than to comprise of a single sector or industry.

Clusters can also be distinguished from networks. Cooke (2002) sees clusters as operating at a large scale, with networks operating at a smaller scale, but some of the other differences that he highlights are more significant. Clusters have open membership and, although individuals, firms and organisations exert a conscious choice to partake, or otherwise, in organised cluster activities, their very existence in a particular location may make them part of a given cluster. Formal business networks, on the other hand, require conscious action to obtain membership. Networks can, however, exist within clusters. Networks tend to work towards agreed objectives, whereas clusters encompass exchange relations and represent a shared identity, which may translate into economic value (Cooke, 2002, Rosenfeld, 1997).

2.2.4 Stage and Age

A further way of classifying clusters is by considering their stage of development. Enright (2000) identifies four categories of 'cluster' – working, latent, potential and wishful-thinking. It should be noted at the outset that Enright dismisses wishful-thinking clusters as areas chosen for government support, rather than meaningful clusters. Working clusters are characterised by a critical mass of competitors, suppliers, customers and institutions, with dense interactions and interdependencies, where those interactions and interdependencies, along with agglomeration economies produce competitive advantage. In this category reside Silicon Valley and Hollywood. Latent clusters are characterised as having a critical mass of firms, but without the interactions and flows to truly function as a cluster. Potential clusters are those with some, but not all, elements of a critical mass of competitors, suppliers, customers and institutions. Potential clusters, like latent clusters, lack interaction and self-awareness. This might be seen as an attempt to encompass all territories and all firms within the cluster mantra, but a more careful reading shows that only working clusters are considered by Enright to actually be clusters. Other groupings have the possibility of becoming clusters, but only with intervention. Enright's main purpose in adopting the four-fold classification is to guide policy makers in deciding their focus for cluster development.

While Enright's classification mainly applies to the precursors of clusters and how they might become 'working' clusters, others have focused on how clusters are likely to evolve once established. Pouder and St. John (1996) introduce a three-stage model for the evolution of clusters. The first phase is 'origination' during which the cluster or 'hot spot' identity emerges. This is followed by 'convergence' and finally 'firm reorientation', during which the performance of the cluster declines. This evolutionary process takes place because agglomeration economies diminish and firms within the cluster become inward looking and ignore competition from outside the cluster, so that 'hot spots' become 'blind spots'. For each stage they identify three forces affecting competitive behaviour and innovation performance: resource conditions; institutional processes and management mental models. Interestingly, they model the performance of non-clustered firms as well as clustered firms and identify a different performance cycle for non-clustered firms.

Tichy (1998) also develops a cluster life cycle. Drawing on theories of product life cycle, Tichy postulates that, at the early stage of its life, a product is produced within an agglomeration because of the flows of information that are required at an uncertain time of development. Economies of agglomeration then come into play, signalling the 'growth phase'. Further specialisation occurs, because the cluster drives out non-cluster activities. However, as the product matures and processes are standardised, the cluster faces the 'critical maturity phase' before cost pressures result in 'declustering', as lower cost production locations are sought. Tichy anticipates that the cluster will have become inward looking and unable to respond, therefore causing serious difficulties for the region in which it is located. Tichy acknowledges that there are policy interventions to avoid such petrification, and Pouder and St John also call for further research in this area. However, as with many cycles, these models are too deterministic and stylised, and there is a tendency to ignore institutional differences between clusters and the actors involved (Tödtling and Trippl, 2004).

A more nuanced model is developed in the work of Chapman et al. (2004). Cluster approaches to policy have often been attempted in lagging regions, but much of the literature focuses on dynamic and growing clusters. In focusing their research on the oil complex in Aberdeen, Chapman et al. have attempted to redress the balance by considering a more 'mature' cluster and the processes occurring within it. Their

model of evolution and change within clusters considers both the micro (firm) level and the meso (cluster) level, accounting for the fact that change within both levels may range from incremental to radical and will be through different mechanisms of re-orientation. The mechanisms of reorientation range from cost-reduction and copying (associated with minor change) to innovation and diversification (associated with major change). This model of cluster evolution is less deterministic, because the prevalent mechanism will depend on firm responses, which are in turn influenced by conditions within the cluster.

Theories regarding cluster life cycles and stages of development are therefore useful for understanding and describing individual clusters and depending on the stage of the cluster we will see different processes occurring. As will be seen in Chapter 3 this has implications for policy, as policy measures to influence the cluster policy cycle can be envisaged.

2.2.5 Multiple Dimensions

I have suggested that clusters be understood as a form of functionally linked economic activity. They embody relationships between firms and other related bodies, and I have suggested that those relationships will vary depending on the geographical scale at which they exist and the stage of the cluster. Clusters are highly individual and context dependent, but in an attempt to sharpen cluster terminology Enright, (2000) suggests that clusters can be characterised along different dimensions as set out in Table 2.1 below.

Table 2-1 Dimensions of Clusters

Cluster Dimensions	Range		
Geographic Scope	Localised	→	Dispersed
Density (number and economic weight of firms)	Dense	→	Sparse
Breadth (range of horizontally related industries)	Broad	→	Narrow
Depth (range of vertically-related industries)	Deep	→	Shallow

Activity Base	Activity-rich	→	Activity-poor
Growth Potential			
Industry	Sunrise	→	Sunset
Within Industry	Competitive	→	Non-competitive
Innovative capacity	High innovation	→	Low innovation
Industrial organisation	Flat	→	Hierarchical
Coordination mechanisms	Formal relationships	→	Spot Market

Source: Adapted from Enright 2000

It is important not to characterise everything as a cluster. Iconic clusters, such as Silicon Valley, where a type of economic activity is overly represented in the region, and significant nationally and internationally, are rare. However, the ability to describe clusters along these lines is useful and is particularly significant when designing policy using a cluster approach.

2.2.6 Closer to a Definition?

Clusters are undoubtedly difficult to define, but it is possible to identify particular territories where groups of firms and industries are concentrated and in certain cases, as mentioned at the beginning of this chapter, they have come to dominate world markets – finance in the City of London, film production in Hollywood, ski boots in the Dolomites. Such clusters comprise a pronounced and recognisable mass of firms and associated support organisations and research and education establishments, who, by their interactions, create cluster specific assets available for exploitation by actors within the cluster, depending on the actors' capabilities and strategies. Clusters are often associated with particular places, but there is no pre-determined geographical scale within which their boundaries are drawn, and clusters at a local level may exist within broader clusters at a regional, cross-regional or national scale. Clusters evolve over time, although this evolution is again context dependent. We therefore need to be able to describe and understand such groupings or 'clusters', even if we cannot expect a common set of processes, measurable boundaries or comparable structures

(Centre for Urban and Regional Development Studies, 2003). In describing such clusters it is useful to be able to categorise their dimensions and development stage using taxonomies such as those developed by Enright (2000).

However, being able to describe these places and clusters does not explain how the interactions between actors and the specificities of place can create advantage, what processes contribute to these diverse outcomes, how the processes vary at different geographical scales, how these scales interact and how clusters can become more than the sum of their parts by creating additional assets. Therefore, as outlined in the introduction to this chapter, I will look at the different literatures that shed light on these questions. First, I will consider the work of Porter and then, using Storper's holy trinity as an organising framework, I will consider how concepts developed in the literature can be applied to clusters to provide a multi-layered explanation for clusters that avoids being 'chaotic', but provides for differing outcomes in differing places and gives a deeper understanding of the processes occurring within clusters.

2.3 Porter: Clusters and the 'Diamond' Model

The publication in 1990 of Michael Porter's *The Competitive Advantage of Nations* and his subsequent work on clusters have undoubtedly been influential amongst policy makers and academics. According to Cooke (1995) some academics 'have taken a snobbish view that here is yet another piece of corporate graffiti to emanate from Harvard Business School' (ibid. p.9), but Porter's influence should not be ignored. Porter's background is clearly one of strategic management and his stated interest is in competitiveness. In *The Competitive Advantage of Nations* he sets out to understand the national attributes that foster competitive advantage in particular industries and illustrates his theories with detailed case studies of ten nations.[2] Clusters are not tightly defined in *The Competitive Advantage of Nations,* but the term is introduced

> a nation's competitive industries are not spread evenly through the economy but are connected in what I term *clusters* consisting of industries related by links of various kinds (1990, p. 131 italics in the original).

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[2] Denmark, Germany, Italy, Japan, Korea, Singapore, Sweden, Switzerland, United Kingdom, United States of America

The argument is that the wealth of a nation is governed by productivity, taken as the efficiency *and* value of output produced by a unit of labour or capital. Productivity is seen as being determined by the environment in which firms compete. That environment is the product of four main forces (firm strategy, structure and rivalry: factor input conditions; demand conditions; and related and supporting industries) depicted in a framework, see Figure 2-1 below, now commonly called 'Porter's diamond'. Two further influences are chance and government.

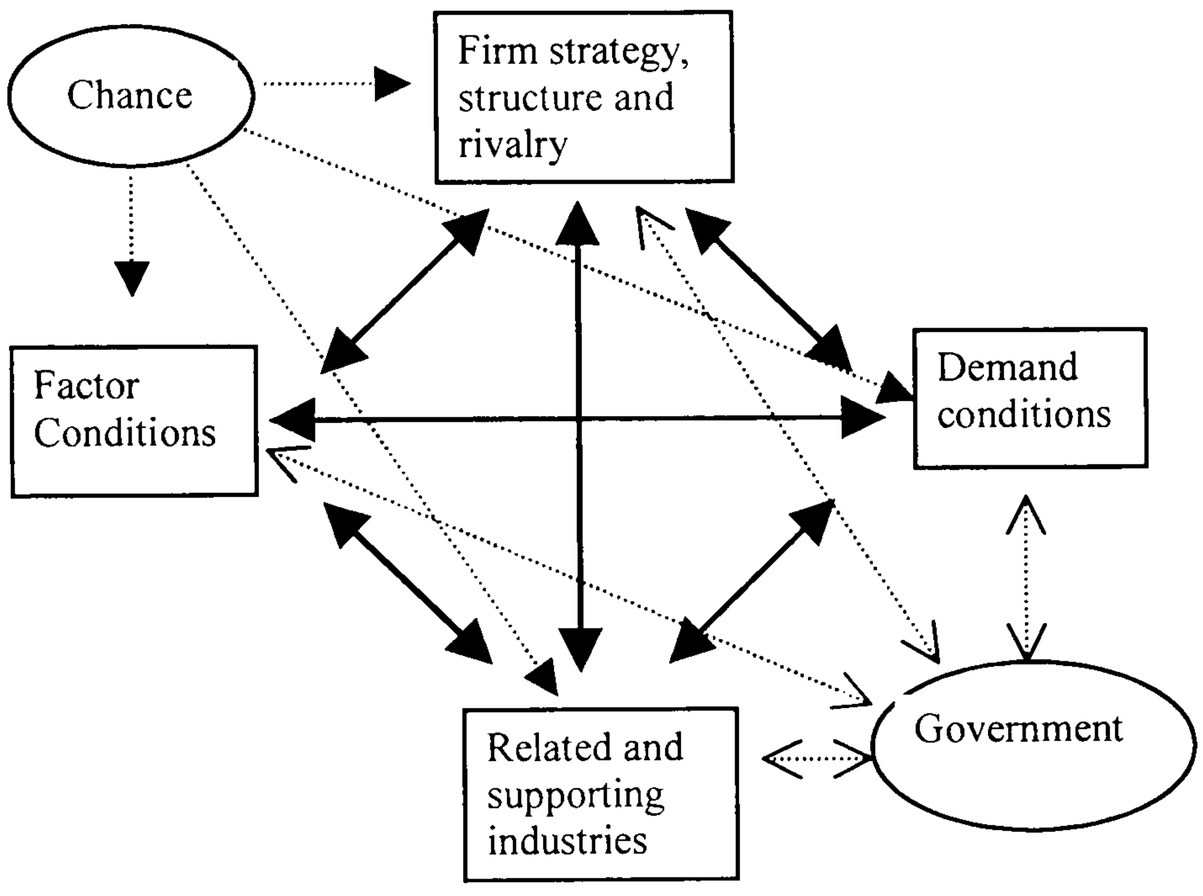


Figure 2-1 Porter's Diamond Model

The four attributes at the points of the diamond, individually *and as a system*, create the environment in which firms compete.

Factor Conditions. A firm's ability to compete is affected by the availability of factors of production including skilled labour, capital, physical infrastructure, knowledge infrastructure and natural resources. Porter points out that it is not only the stock of these factors that is significant, but the rate at which they are created and

upgraded, and the way in which they are deployed. The geographic specificity and immobility of these factors also varies, most obviously in terms of natural resources. However, sometimes it is the scarcity of a factor that spurs on competitiveness. Porter cites the example of the cut flower industry in Holland, which has had to innovate to make up for its lack of a warm, sunny climate. The significance of different factors varies according to the nature of the cluster and there is a distinction between basic and advanced factors of production, with the latter including highly trained personnel and advanced communications infrastructure. Generalised and specialised factors are also distinguished and Porter argues that it is the presence of specialised and advanced factors that is most likely to lead to lasting competitive advantage.

Demand Conditions. The quantity of home demand is significant as it can lead to economies of scale. However, it is the quality of home demand that spurs productivity and innovation. If local customers are demanding customers, there is pressure to continually upgrade products to meet their exacting needs. Proximity heightens the process because of cultural similarities and the advantages of exchanging information over smaller distances. If home demand anticipates demand elsewhere, it is a source of competitive advantage because home firms will have already developed a product to meet sophisticated needs.

Related and Supporting Industries. A local supply chain brings advantages in terms of responsiveness, with less need to hold stock while retaining flexibility. Local equipment suppliers offer early access to new models. Easier communications over shorter distances lead to improved trust, which is expected to lower transaction costs. Additionally, where suppliers and industry are based in close proximity the innovation process is enhanced. The presence of related industries is also beneficial as there are opportunities to jointly develop technologies and use shared marketing channels.

Firm Strategy, Structure and Rivalry. Porter sees domestic rivalry as one of the most powerful determinants of competitive advantage. Different countries tend to have different managerial styles and different ownership structures, which favour performance in different industries, and the strategy of publicly listed companies depends on the goals of the nation's stock exchange markets. However, firms are spurred on to compete by the visibility of their local rivals and the inability to

attribute less successful performance to local conditions. As local firms compete with the same basic factor inputs, they have to seek to compete in more innovative ways. Firms are also able to learn from their local rivals, even without their rivals' explicit consent, as information leaks through observation of their rivals' actions, staff mobility and even gossip. Lundvall (1992) points out that this is akin to Marshall's notion that knowledge of an industry is 'in the air'. Some authors highlight that many of Porter's case studies reveal the significance of cooperative relationships within clusters (Lazonick 1993; Cooke et al. 1997), but the importance of competition should not be ignored. If we ignore the role of competition, we fail to understand the operation of clusters. As my empirical work will show, this is a mistake that has been made by some policy makers.

Chance. One of the additional variables in the 'diamond' model is chance. Chance events are largely outside the influence of firms or governments, and include technological discontinuities, change in input prices, wars and other actions by foreign governments. Chance events disrupt the forces within the diamond and offer both opportunities and threats for firms.

Government. Each of the diamond determinants is influenced by (and can influence) government. Government has a role as a significant purchaser, and influences other buyers' behaviour by its policies on product standards and regulations. Government influences factor conditions by its expenditure programmes. Firm strategy and rivalry are influenced by tax and competition policies. Government's influence can be positive or negative.

It is significant that the diamond works as a *system* with the four factors, supplemented by the role of government and chance, mutually reinforcing each other. For example, factor conditions can influence demand – Denmark has a harsh climate, dependence on imported energy and government support for alternative energy. Therefore there was an early demand for wind turbines, resulting in Danish leadership in that market. Clusters are both a part of the diamond, in the form of related and supporting industries, and an outcome of the diamond due to the interplay of forces within the diamond. Porter (1998) makes it clear that he sees clusters as a framework for understanding the economy, as 'a distinct way of organizing economic data and

viewing the economy' (ibid. p.204). Therefore clusters in Porter's work play two roles – clusters offer a lens through which to examine economies, and clusters are a source and location of jobs, income and export growth (Waits, 2000).

2.3.1 Porter and Geography

In Porter's early work geography plays a limited role. Spatial proximity is seen to strengthen the effects of the diamond factors and Porter observes that many national clusters are concentrated in specific regions or cities within that nation. However, clusters are defined by their economic function, as I have suggested they should be (cf. section 2.2.1). Geographical proximity is seen to heighten the interactions within the 'diamond' – concentration promotes efficiencies through external economies, akin to those identified by Marshall at the turn of the twentieth century, such as a pool of skilled labour (one of Porter's factor conditions) and the supply of intermediate goods (part of Porter's related and supporting industries). However, much more importantly, geographical proximity drives innovation because customers and suppliers interact and competitors vigorously and visibly compete. Geographical concentration attracts new entrants, and spin-offs tend to locate near their original location. Porter identifies that, within the concentration, information flows freely, but it is slow to leak out of the concentration. As will be seen in section 2.7.3, this aspect is also explored by other authors.

In *The Competitive Advantage of Nations,* Porter raises the possibility that the diamond could apply at smaller geographical scales than the national scale (1990, p. 158), but it is not until his later work that this idea is developed. In *On Competition* the geographical nature of the phenomena comes to the fore and clusters are defined as

> geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also cooperate (Porter 1998, p. 197).

The elevation of the geographical nature of a cluster to a more significant role than the economic functionality of the cluster is at the heart of the confusion in defining clusters highlighted by Malmberg (2003), and also relates to Martin and Sunley's (2003) concerns with regard to cluster boundaries, as discussed in section 2.2.2. Clusters should be identified by tracing the linkages between firms and between firms and other actors, not by searching for linkages within a predetermined territory. If the geographic element of the definition is placed ahead of the economic functionality of the cluster, as Porter appears to do in this definition, the concept becomes more problematic.

2.3.2 Clusters and Competition

In Porter's later work the process by which clusters are linked to competition is more clearly articulated. It is assumed that clusters increase productivity, increase innovation and increase new business formation.

The processes are very mechanistic, however, the idea is that firms within a cluster have the opportunity to increase their static (current) productivity and to increase their capacity to innovate. Transaction costs are lower; trust is engendered, facilitating information flow; public and semi-public institutions arise, giving access to public goods such as training; new products can rapidly be developed with local suppliers, and rivalry generates the ability to benchmark and pressure to innovate. The cluster supports new business formation due to the better signalling of opportunities and lower barriers to entry (Porter, 2000). Porter also recognises a social dimension to the clustering process in that 'social glue binds clusters together, contributing to the value creation process' (Porter, 1998, p. 225). However, this social dimension, which I will argue is fundamental to the operation of clusters, is not elucidated further.

It is the benefits that clusters bring in terms of innovation that are significant to Porter. While Porter accepts that concentrations of firms have been evident historically, and that this phenomenon has been explained with recourse to 'economies of agglomeration', he argues that the nature and focus of those economies of agglomeration have altered over time (Porter, 2000). Transport costs have fallen and most material goods can be sourced worldwide. However, 'knowledge goods' are more significant and are arguably best sourced within clusters.

2.3.3 Placing and Evaluating Porter

Porter's work is important not only because of its controversial popularity, but also because it does provide insights relevant to the study of specialised economic activity. Malmberg (2003) highlights that Porter's work provides a way to describe the systemic nature of an economy and also points out that elements within the diamond are novel, including the role of *specialised* factors and factor *upgrading*; the importance of factor disadvantages; demand as a qualitative, not solely quantitative, factor and the significance of local rivalry.

The work of Porter has, however, been open to much criticism. Porter's diamond is very functional and mechanistic, and does not offer insights into the social processes occurring within clusters. Davies and Ellis (2000) highlight conceptual confusion over the terms 'competitiveness', 'nation' and competitive versus comparative advantage; concerns over methodology; and the existence of empirical work that refutes the main propositions set out in *The Competitive Advantage of Nations.* However, it is Martin and Sunley (2001b, 2003) who, in offering a detailed critique of clusters, which they see as a 'chaotic concept', provide the most detailed polemic against the cluster theorising of Porter. Martin and Sunley ascribe the popularity of the cluster concept to three main factors. First, that Porter equates clusters to competitiveness, which chimes well with the interests of policy makers. Second, that Porter has a reputation within business strategy and a style of presenting that is attractive, and third, that the very vague and generic nature of the concept makes it appealing, but problematic. The criticisms relating to the policy implications of the cluster concept are discussed further in section 3.7, but the critique mainly takes the form of a polemic against the work of Porter and the success of his cluster 'brand', although the criticism is broadened in places to include the work of economic geographers, even though Martin and Sunley maintain that Porter largely ignores that body of work.[3] In theoretical terms, Martin and Sunley's criticisms relate to some of the issues that I have addressed: the universalism of the cluster concept; the inability to define boundaries around clusters in both geographical and industrial terms: the vagueness of typologies used to classify clusters: and the tendency for clusters to be artificial constructs abstracted from the surrounding economic landscape. The article

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[3] Although cf. Porter 1990, pp.790-1

provides a useful exploration of some of the debates surrounding clusters and poses considerable challenges to those studying clusters, but weaknesses in Martin and Sunley's critique have been highlighted (cf. Malmberg, 2003; Benneworth and Henry, 2004).

Malmberg (2003) argues that Martin and Sunley's critique both overshoots the mark and ignores some the genuine advancements that have arisen from Porter's work as outlined at the beginning of this section, including the provision of a method of describing the systemic nature of economies and a novel acknowledgement of the role of *specialised* factors and factor *upgrading*; the importance of factor disadvantages; the understanding demand as a qualitative, not solely quantitative, factor and the significance of local rivalry. Benneworth and Henry (2004) agree with much of the critique offered by Martin and Sunley, but in deconstructing Martin and Sunley's deconstruction of the cluster concept they also highlight weaknesses in the critique. They highlight an ambiguity in Martin and Sunley's critique in that, on the one hand, clusters are treated as a 'brand', solely associated with the work of Porter, but, on the other hand, the cluster concept is berated as chaotic due to the divergent range of theoretical perspectives it incorporates. Benneworth and Henry argue that Martin and Sunley are calling for a singular, universal, geographical theory of clusters from a perspective of 'epistemological theorising', whereas hermeneutic theorising (cf. Benneworth and Henry, 2004 pp. 1011-1013), characterised by 'the recognition that theory is a social practice engaged in by reflective and situated practitioners' (ibid., p.1020), permits theoretical 'conversations' between different theoretical frameworks (each associated with a suitably rigorous methodology) and a multiperspectival explanation for phenomena such as clusters. They also point out that Martin and Sunley's criticism that clusters only exist in the eye of the beholder could be applied to other research objects such as the 'urban', the 'region', 'rural' and conclude that we should accept that all knowledge is both situated and partial. Finally, and I would argue most significantly, they criticise Martin and Sunley's tendency to centre the debate around Porter's cluster 'brand' and recommend that cluster theory is rather seen as a series of multiple debates, which are not necessarily incoherent.

2.4 The Holy Trinity of Regional Development

Porter's work is open to criticism but, like Benneworth and Henry (2004), I maintain that the cluster concept extends far beyond the work of Porter. To equate clusters solely with Porter ignores a much deeper range of perspectives that can contribute to our understanding of concentrations of specialised economic activity. We need to understand how the interactions between actors, and the specificities of place can create advantage; what processes are operating within clusters; how those processes operate at, and between, different geographical scales; and what it is that enables clusters to become more than the sum of their parts. Using the elements of Storper's holy trinity as an organising framework to consider other theoretical threads in the cluster debate, and applying his concept of relational assets and associated concepts such as untraded interdependencies, trust and social capital to the issue of clusters, moves us away from polemics against the Porter 'brand' and deepens our understanding of clusters. If we consider different theories used to explain clusters and similar phenomena, we can see that they usually seek their explanation either in the firms and their transactions (organisations); or in the territorial and institutional context in which the firms operate (territories) or in the processes of knowledge and learning which lead to innovation (technologies). These approaches can be used as the lenses through which to study clusters. The ensuing results provide multi-layered explanations for clusters that can allow for different outcomes in different places, and different processes at different spatial scales, without being 'chaotic'.

2.5 Organisations

Storper (1997) refers to organisations as 'most importantly firms and groups or networks of firms tied together into production systems' (ibid. p. 26) and in this section I will concentrate on literatures that account for clusters with reference to transactions between atomistic firms and networks of firms within the market.

At the turn of the twentieth century, the economist Alfred Marshall (1907) identified three mechanisms within agglomerations that give rise to external economies of scale. Scale economies exist where the average cost of producing a commodity reduces with the numbers produced and they are therefore linked to the size of the productive unit.

External scale economies arise where it is the industry, rather than the firm *per se*, that is sizeable.

The first mechanism promoting external economies of scale is *a thick labour market* that favours employers and employees. Employers benefit from having a larger supply of skilled labour, and specialist training can be provided efficiently to the whole pool. Employees benefit because there is demand for their skills from a large market and, as they gain qualifications, they can demand higher wages from competing employers.

The second mechanism is *the production of intermediate goods*, which enables outsourcing because specialist suppliers spring up in the locality to meet the needs of the local industry.

The third mechanism is *information spillovers* whereby research and development capacity exists because of concentrated demand; labour market movement leads to knowledge transfer and knowledge 'leaks' through more informal exchanges.

Although certain benefits arise somewhat ephemerally, '[t]he mysteries of the trade become no mystery; but are as it were in the air' (Marshall 1947, p. 271), businesses are still perceived as operating in an atomistic manner, interacting solely through the market.

Malmberg and Maskell (1997) point out that the first mechanism, the thick local labour market, benefits horizontally linked firms as they have similar requirements for skilled employees. The second mechanism, the provision of specialised inputs and services, is more relevant to the vertical linkages in the agglomeration, and emphasises the role of a local supply chain in supporting superior performance, even though such linkages have been difficult to demonstrate empirically (Phelps 1992; Malmberg and Maskell 2002). The third mechanism, knowledge spillovers, is relevant to the horizontal and vertical linkages, and suggests it is the learning advantages of the agglomeration that promote superior performance.

Much subsequent theorising on clusters draws on Marshall's work (Becattini 1990; Krugman 1991) and, although his theorising is based on a very different industrial era, his insights into the significance of the labour market and concept of knowledge spillovers, without active collaboration between firms, are useful in considering the functioning of current clusters.

2.5.1 Transaction Costs and the Californian School

More recent approaches, particularly those associated with 'the Californian School', have also sought to explain locational patterns and agglomeration in a way that concentrates on the market, and firms' actions, within a changing market. The assumption is that certain market conditions, including the recent rapid rise in new technology, give rise to uncertainty. To deal with that uncertainty, firms seek vertical disintegration of production, which in turn leads to increased traded interdependencies, with associated transaction costs. Transaction costs are 'all the costs involved when a transfer of goods takes place from one unit to another' (Lundvall, 1993, p.52). These costs, originally highlighted by Coase (1937) and Williamson (1975), range from transportation costs to information costs (for example, searching for suppliers, negotiating over the price and quality of items, and concluding contracts). These costs increase with the distance over which the transaction is conducted, especially where there are no economies of scale, where there is no standardisation or where there is need for face-to-face intermediation. Agglomeration of firms in a vertical production chain, and the subsequent agglomeration of like firms at a horizontal level to meet the requirements of the vertical production chain, is seen as an attempt to minimise these transaction costs. The greater the transaction costs, the more likely it is that producers will agglomerate to try to reduce them.

Unlike the processes identified in the Industrial Districts literature (cf. section 2.6.1), these processes are not dependent on historical context. Indeed, new agglomerations can arise in 'windows of locational opportunity' and sustain themselves through a series of cumulative effects, particularly by the development of a local labour market (Scott, 1988). Drawing on the French Regulation School's notion of regimes of accumulation and modes of social regulation, the early Californian School. and

particularly Scott (1988), identified a series of new industrial spaces marked by social division of labour, the presence of SMEs and re-agglomeration of production. Scott argued that, in the 1970s and 1980s, a new dominant regime of production was emerging, characterised by flexible forms of production, fragmented units of economic activity, fluid labour markets and a dismantling of the Keynesian welfare state. This new regime of production was seen as a response to increasing uncertainty, as a result of changing markets and rapid technological development, which made a structure of vertical integration both more risky and less able to exploit internal economies of scale and scope. The production sectors involved were craft and design intensive, 'high-tech', and business and financial services. They were springing up in new locations during, what Scott terms, 'windows of locational opportunity', because the dominant Fordist mass production environment was hostile to such changes in production.

Phelps (1992) adds clarity to this analysis by distinguishing *external economies*, which are created by the social division of labour, and are not an inherently spatial phenomenon, from *agglomeration economies*, which are a necessarily spatial phenomenon and which arise from the subsequent development of specialised labour markets and facilitating institutions. This means that 'external economies are not necessarily locationally bounded whereas agglomeration economies are' (ibid. p.39). Agglomeration economies are the cost savings to the firm resulting from the concentration of production at a given location (Parr, 2002), and are distinguished from the related concept of urbanisation economies, which arise from the concentration of unlike firms at a given location (cf. Harrison et al., 1996).

2.5.2 Criticisms and Critiques of the Transaction Cost Approach

The transaction cost approach rests on the assumption of vertical disintegration of production and re-agglomeration in vertical production chains. Storper (1995) himself admits that the Californian School approach was inadequate to explain agglomeration in industries without dense input-output relations, and several authors have pointed out the lack of empirical evidence of localised input-output linkages of a traded nature within clusters (Phelps 1992; Malmberg and Maskell 2002). Phelps also points out that, even if the flexible accumulation thesis of Scott and Storper correctly

identifies the externalisation of activities by firms, there is no reason why these should be undertaken by *local* suppliers, given that reducing transaction costs would not be the only consideration in externalisation. Others point out that, even where traded transactions could account for agglomeration, the Californian School was unable to distinguish between 'good' and 'bad' agglomerations (Newlands, 2003) and 'it provides a locational logic that is divorced from particular institutional contexts' (May et al. 2001, p. 365).

Storper (1995) also acknowledges that transactions, which would normally be expected to operate within the market, can fail in the absence of institutions and therefore the role of institutions became important in his work, as it is in the work of other theorists, as will be seen below in section 2.6.3. Lundvall (1993) points out that, although transaction cost economics is an improvement on standard neo-classical economics, it does not go far enough as it continues to emphasise the exchange of commodities, rather than the processes of change that lead to *new* commodities. Camagni (1991) points out that the transaction cost approach looks at allocative efficiency and the design of organisational structures, rather than to the problems of dynamic efficiency and innovative behaviour.

Therefore, while traded transactions should not be overlooked in explaining patterns of economic activity, the 'rational economic premises and reasoning [of the transaction cost approach] proved too narrow' (Lagendijk, 2001, p. 5) to explain the formation and performance of clusters. The transaction cost approach does not adequately explain variations in patterns of economic concentration and performance, and it is therefore necessary to also consider the institutional context and innovative potential of clusters. However, before moving on to look at institutions and innovation, it is worth considering the work of another academic who has sought an explanation for agglomeration in the transactions between firms.

2.5.3 Paul Krugman and 'New Geographical Economics'

Paul Krugman is one of a band of economists who has discovered geographical space. if not the specificity of place. and he also seeks to explain agglomeration by reference to external economies. Krugman merges ideas from 'new trade theory' with

traditional location theory (Lösch, 1954; Weber, 1929) to create the 'new geographical economics' (Martin and Sunley, 1996). At the heart of traditional Ricardian trade theory is the assertion that nations and regions trade in goods due to some natural comparative advantage. However, most trade actually occurs between trading partners with similar factor endowments. Porter (1990) ascribes competitive advantage to geographical concentration and specialisation and similarly Krugman asserts that we do not specialise in that at which we are good, but are good at that in which we specialise. Therefore, rather than taking the Ricardian assumptions of perfect competition, constant returns to scale and comparative advantage, Krugman, and other advocates of the 'new trade theory', ascribe importance to increasing returns, imperfect competition and economies of scale.

Krugman is above all one who seeks to explain by way of mathematical models. He takes a real world issue and then builds a model, taking what he sees as the key variables and excluding variables that cannot be modelled. He therefore attributes lack of progress in explaining agglomeration satisfactorily, prior to his intervention, to inadequacies in modelling techniques, which meant that increasing returns could not, until now, be modelled.

The model at the heart of his explanation of agglomeration is the core periphery model. This model is an interaction of increasing returns, transportation costs and demand. Krugman assumes that there are centripetal forces encouraging agglomeration, counter balanced by centrifugal forces. The former include market size effects (backward and forward linkages), thick labour markets, and pure external economies, which would include information spillovers. The latter include immobile factors, i.e. land, natural resources and labour,[4] land rents, and pure external diseconomies e.g. congestion. However, in the core periphery model Krugman chooses to focus on only one factor from each type of force, these being market size as a force for concentration, and immobile resources as a force for dispersal.

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[4] Although Krugman has been criticised for underestimating the immobility of labour within Europe (Martin and Sunley, 1996)

In this model there are two types of production, agriculture and manufacturing. The former is subject to constant returns to scale and relies on the use of land, which by its very nature is immobile. Manufacturing, on the other hand, is characterised by increasing returns to scale and is assumed to make modest use of land. Because of economies of scale, manufacturers will want to produce in a small number of large plants, but this does not explain why these plants will agglomerate. Krugman argues that activity will be geographically concentrated because of market size effects. In a process termed 'circular causation' (Myrdal, 1957) firms will choose to locate near a large market, which is large precisely because other firms have located production there. Transportation costs are key in this model because plants are agglomerating to minimise transport costs. Also, very high transport costs combined with a low level of industrialisation would preclude this model from operating, Krugman (1991) notes that these were the conditions prevailing in a pre-railroad, early nineteenth century America.

From the core-periphery model Krugman develops a localization model. Krugman draws on the work of Marshall, as does the literature on Industrial Districts (Becattini, 1990, Wilkinson and You, 1992), and he identifies the same three Marshallian elements, a thick local labour market that favours employers and employees, forward linkages (production and supply of intermediate goods) and information spillovers, as promoting external scale economies and ensuring the self-reinforcing nature of the process.

Of the Marshallian trio only the first two externalities, the thick labour market and intermediate goods, which are pecuniary in nature, enter into Krugman's models. In his labour market pool model there are two firms who will produce at one of two locations. Labour market pooling is presumed to occur because of a combination of increasing returns **and** uncertainty. Increasing returns and economies of scale mean that it is beneficial for production to be concentrated in one location. Uncertainty in respect of the level of demand for labour means it is beneficial for the two firms to be at the same location because, while average demand equals supply, there will be some times when one firm's good times will be the other's bad times and the additional workforce will be available (Krugman, 1991).

The provision of a large supply of intermediate goods, Marshall's second externality. is also dependent on increasing returns. Provided that there are economies of scale it is beneficial for the suppliers of these goods to be near a large market to minimise transportation costs. This is operable unless the costs of transporting intermediate goods are particularly low compared with those of transporting final goods.

The third externality is technology spillovers, or as more eloquently put by Marshall (1907), '[t]he mysteries of the trade become no mystery; but are as it were in the air'. However, Krugman discounts these as being impossible to model because they are invisible (Krugman, 1991), as tending to be international in nature and therefore irrelevant in a regional situation (Krugman, 1993), and as peripheral to agglomeration because clusters exist in low technology sectors too (Krugman, 1991). Notwithstanding that there is no such thing as a low-tech industry, but only low tech companies (Porter, 1998), in ignoring technology spillovers Krugman is ignoring an area which other researchers consider to be absolutely key.

A type of history, the history of accident, matters to Krugman's theory. Such accidents, or chance events, include a girl in Dalton, Georgia making a quilt as a wedding present, which, according to Krugman, was the origin of the carpet-manufacturing cluster in that region (Krugman, 1991). However Krugman tends to ignore long-term structural processes in favour of playing 'spot the accident' (Pinch and Henry, 1999). A region does require some initial advantage, but this is likely to be of a more structural nature than in Krugman's account. Once this advantage, however achieved, reaches a certain point a threshold is crossed and the process becomes self-reinforcing.

2.5.4 Criticisms and critiques of Paul Krugman's New Geographical Economics

The economic geography community has not embraced Krugman's work – his 'new geographical economics' 'represents a case of mistaken identity: it is not that new, and it most certainly is not geography' (Martin, 1999a, p.67). While Martin and Sunley (1996) note that an exchange of ideas between Krugman's work and economic geography would be beneficial, there are many difficulties in drawing Krugman's work into contemporary economic geography. not least his disdain for the genre

which, according to Martin, he views as an 'anti-model, anti-quantitative backlash' (Martin, 1999a, p.82). Krugman rejects non-market linkages and therefore, although his policy prescriptions may be similar to those of the flexible specialisation school (Martin and Sunley, 1996) he is not interested in the interconnections and interactions between firms which is the main emphasis of that literature and much other literature regarding clusters. Therefore 'messy social, cultural and institutional factors involved in spatial economic development are neglected' (Martin, 1999a, p.75). Also, the intermediate goods argument, that firms in the supply chain locate near to each other to minimise costs, is weakened by the aforementioned lack of empirical evidence of traded links in some clusters.

Krugman's theory is not truly tested empirically. He does calculate locational Gini coefficients which, allowing for weaknesses in the data, give an indication of geographical concentrations in manufacturing employment (Krugman, 1991). However, he ignores all other possible explanations for this observable effect other than the variables in his models. As Amin (1999) concludes, the New Geographical Economics gives solid economic reasons for local agglomeration in a globalising economy – reduced transaction costs, economies of specialisation, externalities - but it fails to properly investigate the sources of these factors.

Krugman does acknowledge that his models are vastly oversimplified, but this is as a result of his ontological and epistemological background. His theory is driven by considerations of modelling strategy and he seeks universal factors applicable at all times and in all places (Pinch and Henry, 1999), whereas 'new economic geographers' are concerned with context and specificity. Most importantly, Krugman fails to model the dynamic external economies relating to information spillovers, yet it was those that Marshall linked to learning and innovation. That said, Krugman's focus on the labour market is of interest and the significance of the labour market is highlighted in other work, additionally his focus on market size effects should act as a reminder that trade and markets are important to clusters.

2.5.5 Organisations: Some Conclusions

As with the transaction cost approach, Krugman's approach generates a limited set of simplistic factors that ignore the socially embedded character of local economic systems. Therefore, neither the transaction cost approach nor Krugman's 'new geographical economics' offer a sufficient explanation for the formation and continuation of clusters. Both focus on transactions in the market rather than the processes of innovation, although it is processes of innovation that result in new and enhanced products and services being available in the market. Neither considers the differing institutional settings in which transactions take place. However, as Sayer (1997) points out '[e]conomic forces continue to dominate contemporary life, and thus, however unfashionable, economic analysis cannot be sidelined' (ibid. p. 16). Any analysis of a cluster should consider traded transactions and the functioning of the labour market, but should also consider the innovation process and the institutional setting of the cluster. In terms of Storper's holy trinity – organisations do matter, but it is not necessarily the traded transactions between them that cause and sustain clusters, other relationships between firms influence cluster performance and we can now turn to the other elements of Storper's triumvirate – technologies and territories.

2.6 Territories (and their institutions)

Storper (1997) points out that, traditionally, territory has been seen as the 'outcome' of economic activity. With theories involving the 'resurgence' of the region, territory is seen as contributing *to* economic outcomes as well as resulting *from* them. Two particular bodies of work are of relevance in this respect, that relating to Industrial Districts and that of the body of researchers known as Groupe de Recherche Européen sur les Milieux Innovateurs or GREMI. From those works emerge concepts of particular relevance to understanding clusters, including notions of collective learning (Capello, 1999), institutional thickness (Amin and Thrift, 1995) and innovative milieu (Maillat, 1996).

2.6.1 Industrial Districts

During the 1980s there was an increasing interest in patterns of economic development that appeared to run contrary to historic patterns of economic success

and relative failure. While Baden Württemberg (Cooke and Morgan, 1998) and Silicon Valley (Saxenian, 1991) were also studied, one of the areas most documented was North East Central Italy, often called 'Third Italy'. Third Italy had undoubtedly seen some extraordinary successes. In 1970, Modena, one of the main provinces of the area, was ranked seventeenth in terms of per capita wealth of the Italian provinces, by 1979 it was second highest (Piore and Sabel, 1984).

Third Italy is a region characterised by industrial districts. Brusco (1990) defines industrial districts as comprising 'a cluster of firms producing something which is homogeneous in one way or another, positioning themselves differently on the market. Thus, the district could be defined as being a cluster, plus a peculiar relationship amongst firms' (ibid. p. 14). While the industrial districts have many differences, characteristics identified as common to all districts include the presence of many small, or very small, firms, the use of flexible production methods, a tendency towards technological dynamism, and relations between firms that are characterised as a mixture of competition and cooperation. Although the notion of industrial districts has been used to describe many areas outside of Italy, it should be noted that the original notion usually refers to very limited geographical area that is specifically characterised by a form of dominant production (Capecchi, 1990).

Piore and Sabel (1984) saw industrial districts as a new paradigm of flexible specialisation, emerging as a viable alternative to crisis-hit mass production. While the move to a post-Fordist utopia of small firm production was undoubtedly over-stated, what was important was the recognition of the production system as being embedded within the 'culture', 'social structure' or 'community' (Piore, 1990), and the notion of industrialisation as a territorial process (Asheim and Cooke, 1999). The Industrial District approach does involve an appreciation of the significance of traded transactions. Many small firms are involved in production along a value chain, and the success of districts has been partially ascribed to the Marshallian externalities resulting from a thick local labour market and the production and supply of intermediate goods. Industrial districts tend to be sectorally specific and benefits of proximity come from regularly repeated interaction at different stages on the supply chain. However, more sociological mechanisms, whereby knowledge of the local industry is 'in the air', are significant. Firms within industrial districts are not the

atomistic firms of Krugman or the early Californian School, as they actively collaborate. Collaboration is built upon high levels of trust, thought to emanate not only from close geographical proximity, but also from a specific social framework characterised by close political, religious and familial ties.

The dynamism of the industrial districts is held to result from a balance of cooperation and competition. The cooperation takes two forms – first, the provision of collective goods, often provided through local trade and civic associations, and second, adherence to norms of reciprocity, such as subcontracting to less busy firms and refraining from labour poaching and wage competition (Lawson and Lorenz, 1999). Theses rules of behaviour are reinforced by the community – by family and social ties and by more formal aspects of the community such as the church and political parties (Keeble and Wilkinson, 1999). Although these close networks can lead to technological dynamism and an ability for very small firms to play a role in global markets, Lawson and Lorenz (1999) point out that the industrial districts literature does not theorise how territorial clustering contributes to a firm's ability to learn or generate knowledge (ibid. p. 306). Also the closeness within the industrial district can foreshadow lock-in and decline (cf. section 2.7.6).

2.6.2 Criticisms and Critiques of the Industrial District Approach

Storper (1995) highlighted that generalising from experiences of the Italian industrial districts is problematic, because production systems so dominated by small firms are few and far between, and rarely as closed as the systems seen in Third Italy. It is highly unusual that a territory should be so wholly devoted to the production of one type of product. The production systems in Italy, and similar examples from Germany, have very deep historical roots, politically and socially, and are not easily transferable to elsewhere. Even where similar phenomena are observed in an Anglo-American setting, such as film production in Hollywood (Storper, 1989), they tend to be restricted to craft style production or the early stages of new industries. There has also been a tendency to concentrate on successful industrial districts, although this has to an extent been redressed in recent works (cf. Staber, 2001). Therefore the experiences of the Italian Industrial Districts may have restricted relevance in understanding clusters elsewhere.

Most importantly, Lawson and Lorenz (1999) point out that industrial district theorising does not account for how clustering contributes to processes of knowledge generation and learning, and therefore, does not explain the differentiation between a technologically dynamic industrial district and one displaying the same characteristics in terms of flexibility and specialisation, without the technological dynamism. As with the Californian School, with Industrial District theorising, we are unable to account for the difference between 'good' and 'bad' districts.

2.6.3 Institutions and Institutional Thickness

Industrial District theorising does, however, recognise the importance of socio-cultural factors in economic production. Martin (2000) notes that there has been an 'institutional turn' throughout economic geography, through which there is an understanding that social institutions shape economic activity, rather than purely being shaped by economic activity, and during which terms including 'institution' and 'institutional thickness' have emerged in economic geography. Martin identifies an assumption within the institutional approach that institutions, 'enable, constrain, and refract economic development in spatially differentiated ways' (2000, p.79). Institutions are seen both as informal conventions, customs and norms, akin to untraded interdependencies (cf. section 2.6.8), which Martin terms the 'institutional environment' and as the particular organisational forms which arise from that environment, which he terms the 'institutional arrangements'. Institutions evolve incrementally, and in a path dependent way, and as will be seen in discussing the role of clusters in innovation, certain institutional frameworks are seen to be much more favourable to innovation and economic development. Martin (2000) goes on to outline a distinction between *rational choice institutionalism*, which views institutions as mechanisms to reduce transaction costs and increase economic efficiency; *sociological institutionalism*, which highlights the significance of the way firms are embedded in their environment and acknowledges that trust is significant in economic development and that it is fostered by networks and associations and *historical institutionalism*, which addresses issues of how institutions evolve and change, or alternatively how they fail to change and become characterised by 'lock-in' (cf. section 2.7.6).

One element of institutional theorising, which draws on the sociological and historical notions of institutionalism, has been the notion of 'institutional thickness' and the industrial districts are said to demonstrate many of the factors incorporated in this notion. According to Amin and Thrift (1995), 'institutional thickness' 'amounts to a combination of features including: the presence of many institutions; interinstitutional interaction; a culture of collective representation; identification with a common industrial purpose; and shared norms and values which serve to constitute the 'social atmosphere' of a particular locality' (ibid. p.104). Institutions are again taken to include, on the one hand, formal organisations of varying kinds from trade unions to firms and clerical bodies (institutional arrangements) and, on the other hand, informal conventions, habits and routines (institutional environment). These informal conventions, habits and routines will be seen to be similar to the untraded interdependencies, which Storper (1995; 1997) considers to be highly significant to the performance of territories. Amin and Thrift (1995) see institutional thickness as supporting the local economic system by providing continuity of local institutions; ensuring an archive of commonly held knowledge; giving organisations the ability to learn and change; supporting a high level of innovation capacity; enabling the extension of trust and reciprocity and giving the sense of a common project which serves to mobilise the whole economic system. This final aspect, a sense of common purpose, is seen as particularly unique and will be seen to link to the work of GREMI, where the milieu is seen to 'valorise' the players within the milieu (cf. section 2.6.6).

The nature of institutions is however highly-context dependent. Raco (1999) points out that regions have developed successfully with different models of institutions from the Californian models of Silicon Valley and Hollywood, characterised by loose, informal co-ordination, to the more formalised model in Baden-Württemberg, where there is an innovation system comprising collaborating organisations with a strong regional government presence.

2.6.4 Criticisms and Critiques of Institutional Thickness

There are issues with the concept of 'institutional thickness', not least that it 'lacks definitional and theoretical precision' (Martin, 2000. p.88). Martin questions why institutional thickness arises in some locations and not others and also points out that

the link between institutional thickness and economic development is not clear. Indeed, Amin and Thrift, in citing the example of watch making in the Swiss Jura (cf. Glasmeier, 1994), recognise that, as well as 'thick but works' (for example, the City of London), there is the possibility of 'thick, but does not work'. Henry and Pinch (2001) raise the possibility, based on their observations of Motor Sport Valley, that it might equally be possible to have 'thin but works', and by implication there is the possibility of 'thin and does not work'.

Martin (2000) also questions how, and by whom, the common purpose mobilising the economic system is decided upon and this echoes concerns from Raco (1998) that institutions are at times politically constituted and favour the elite rather than under-represented communities.

Henry and Pinch (2001) concur with Amin and Thrift's observation that it is important to stress, not institutional thickness *per se*, but the process of institutionalisation. Equally, they draw attention to Amin and Thrift's point that it is not necessarily local institutional thickness that matters, but having access to institutional thickness. This once again raises questions for the geographical scale at which clusters operate and highlights the need to look at extra local relations rather than reifying local processes alone. Raco (1999) also cautions against focusing on characteristics internal to the region and viewing regions as isolated entities, arguing that, '[r]egional success must be seen as relational, constructed from a complex interaction of local and wider processes operating over space' (ibid., p.963). He also points out the concern that institutional cohesion does not always lead to growth (cf. section 2.7.6) and also that spatial proximity does not necessarily lead to 'mutual understanding, shared norms and values and collaborative agendas' (ibid., p.964). Cumbers et al (2003b) also caution against neglecting issues of power, suggesting that regions should not be seen as unified and coherent, but instead that differences in power and ideology between different groups should be recognised. They also, like Raco, call for a recognition that regional economies are bound up in wider processes of uneven economic development.

Therefore, while institutions are undoubtedly significant for the conduct of economic activity and for understanding the processes occurring within clusters, offering 'both

opportunity and constraint' (Amin, 2001, p.1238), local institutions alone cannot account for economic success[5] and the concept of 'institutional thickness' is flawed.

2.6.5 GREMI

Since the 1980s a group of researchers with the collective title of GREMI, (Groupe de Recherche Européen sur les Milieux Innovateurs) has sought to explain the role played by territory in fostering innovative development, and has introduced the concept of the 'milieu' as an explanation. In a paper reviewing the origins of the concept, Maillat (1995) points out that, as with those studying Third Italy, GREMI researchers such as Aydalot, studying his native France, observed patterns of development inexplicable by existing theories. This led them to the assumption that there was some 'autonomous dynamic', enabling certain territories to drive improvement from within. The starting point is that companies are not separate from their milieu, rather they are a product of it. Territory is not given *a priori* but is constructed from within and that process of construction influences the development of the territory. In the same way as the Californian School had found the mere presence of locational factors inadequate to explain economic development, particularly high tech development, Maillat (1995) concluded that 'what is important is the grouping together of economic players and non-physical resources (training, research) which, *by their interactions*, develop specific skills, know-how, rules and so forth' (ibid. p. 159, italics added).

Maillat identifies three different approaches to understanding the role of the milieu: the milieu and uncertainty; the milieu as process; and the milieu as system. There are overlaps between the approaches, but each has a different emphasis and I will look at each of the approaches in turn.

The Milieu and Uncertainty – Between Market and Hierarchy

Camagni (2002) argues that to deal with uncertainty, which is seen as ever increasing with the rapid pace of change in technologies and markets, firms develop the functions of search-signalling-selection-transcoding-transforming-control (SSSTTC

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[5] Amin (2001) acknowledges that institutional thought should not be reduced to such normative assertions

functions) (cf. Camagni 1991, p.126; Raines, 2002). Camagni challenges the assertion of Krugman and others that the concept of competitiveness is not applicable to territories by arguing that, while it *is* individual companies (or combinations of individual companies) that compete and act in markets: companies and entrepreneurs are influenced by their local context. The local environment or 'milieu' is able to supplement, and therefore enhance the effectiveness of, the SSSTTC functions for the firm as outlined in Table 2.2 below.

For Camagni, the 'milieu' is 'a collective operator reducing the degree of static and dynamic uncertainty for the firms by tacitly or explicitly organising the functional and informational interdependencies of local actors and informally performing the SSSTTC functions' (1991, p. 132). While this may appear to elevate the territory to having an agency role, Lawson (1997) points out that it is the *interactions* within the milieu that lead to benefits for the firms operating therein. The elements of the milieu include labour mobility in the local labour market, innovation imitation, inter-firm cooperation and linkages, common codes and conventions and a common sense of belonging (Camagni, 2002). The operation of the 'milieu' is a *localised* process because of local labour markets, networks of contacts amongst local actors and synergy effects from common cultural roots. The role of the milieu in reducing uncertainty accords with Storper's (1997) notion that untraded interdependencies take 'the form of conventions, informal rules, and habits that coordinate economic actors *under conditions of uncertainty'* (1997, p.5, emphasis added).

Table 2-2 Uncertainty Reducing Functions at Firm and Milieu Level

Uncertainty Reducing Function	Operation within the Firm	Contribution of the 'Milieu'
Search/Screening	Collection, monitoring and organisation of information. Need to be aware of characteristics, often hidden, of inputs and equipment	Informal or formal interchange of information. 'Memory' and repeat experience of information sources and markets and technologies
Signalling	Quality certification of outputs	Product image or reputation, brand or cooperative advertising. Standards of quality certification
Selection	Adoption of a decision-making process and firm-specific management style	Transfer of practices through managerial mobility, imitative decisions, cooperative decision making through formal organisations, complementary innovation processes
Transcoding	Translating external information into firm specific language of use to that firm	The collective learning process achieved by labour mobility, observation and imitation, information 'leakage'. The provision of specialised services and information services
Transforming	Matching of competencies with demand	Channelling of generic production factors to meet actual and potential demands of the local structure.
Control	Reducing the complex environment in which the firm operates by increasing its power limits to overcome uncertainty over others' actions	Interpersonal linkages reduce complexity, similar cultural backgrounds. Coordinated decision making

Source: adapted from Camagni (1991)

While the concept of reducing and dealing with uncertainty offers promise in terms of considering the beneficial role of clusters, which may be considered as an economically specialised milieu, it is again less clear why specific locations or

territories have been more amenable to assisting the SSSTTC functions of firms than others.

The Milieu as Process: a Cognitive Approach

Maillat identifies a second approach to the milieu, related to notions of learning, know-how and technical culture. There is a constant process in the milieu of perception, understanding and action. Information, while not necessarily emanating from the milieu, is quickly and easily exchanged. Knowledge, or the ability to absorb and use that information, is seen as being influenced by the local environment. Knowledge is exchanged through informal and formal links between firms; through the local labour market; through spin-offs from existing firms and research establishments, and through interactions between both suppliers and customers, and makers and users of capital equipment (Keeble and Wilkinson, 1999). The milieu therefore has a particular role in the exchange of knowledge and from this aspect of the milieu has come the notion of 'collective learning' (cf. section 2.6.7).

The Milieu as System: an Organisational Approach

Within the third approach to the milieu, the main thrust of the approach is to identify the components of the milieu, which Maillat (1995) lists as

- a collection of players with relative decision-making independence
- physical elements (firms, hard infrastructure), non-physical elements (know how) and institutional elements (local authorities or organisations with authority to make decisions)
- an interaction logic, whereby better use is made of resources through cooperation
- a learning dynamic, whereby players learn to adapt to changes in their environment

This 'system' aspect of milieu chimes with work on regional innovation systems (cf. Cooke et al. 1997; Braczyk et al. 1998) and is a significant, but less recognised, contribution of GREMI thinking. This concept of 'system' differs from Porter's diamond 'system' because it emphasises interaction and learning, both of which may

be fostered by a milieu or cluster. This notion of 'systemness' is explored further in section 2.7.9.

The Innovative Milieu

Maillat (1995) also distinguishes the innovative milieu, which focuses on the innovation process, from the general milieu, which relates to the efficient management of productive resources. The concept of 'innovation networks' is introduced in the GREMI literature to describe how formal networks are developed, outside of the milieu, to further innovation. The innovative milieu is receptive and open to ideas from outside, and is characterised by the formation of formalised extra-local innovation networks. This appears to negate the role of the milieu, but Camagni (1991) sees the milieu and the innovation network as complementary, enabling firms to be linked into their local environment and into wider extra-local networks. Lawson (1997) concludes that there is an unanswered question as to whether the ability to develop linkages is a skill learnt in the milieu that can be put to good use in developing links elsewhere. Again this appears to be a useful insight into a possible similar role for clusters in linking local firms into much wider circuits and, as will be seen in section 2.7.4, this idea has been developed in the concepts of 'local buzz' and 'global pipelines' (Bathelt et al. 2004).

2.6.6 Criticisms and Critiques of the GREMI Approach

Although it appears to be regaining some popularity, the GREMI concept is often criticised as vague (Storper, 1997). Lawson (1997) questions whether the 'milieu' is only relevant to early stages of a product cycle, where the needs for information and knowledge exchange are most significant. More problematically, the concept is somewhat circular - innovative milieu exists where there is innovation and innovation takes place because of the innovative milieu.

Cooke et al. (1998) and Newlands (2003) see the problem as one of confusion between institutions and organisations. Is the milieu the set of conventions. practices and rules within which a group of innovators operate (the institutional environment of section 2.6.3)? Or is the milieu the network of firms, research institutes and policy-

making organisations that establish the framework conditions for innovation (the institutional arrangements of section 2.6.3? To answer this, Cooke et al. take a sporting metaphor and compare institutions to the rules of the game, with organisations being the teams that play the game. Organisations are embedded in institutions, but impact back upon those institutions. To Cooke, the milieu is an institutional setting of norms, rules, routines and conventions, but it is the organisations that enable us to conceive of the milieu.

When considering the relevance of milieu thinking for understanding clusters, it should be remembered that innovative milieu are not necessarily economically specialised, and milieu can demonstrate linkages without being innovative (Malmberg and Maskell, 1997). However, elements of the milieu approach do appear relevant to explaining the functioning of clusters. Territory is seen as both a resource and a system. Interactions are seen as significant, and these interactions are seen as being facilitated by spatial proximity. There is a movement away from considering solely traded input-output relations and the concept considers the role of learning, particularly collective learning. The significance of the institutional context is recognised, as is the role of the milieu in developing extra-local linkages. Maillat (1995) rightly concludes that non-physical resources and 'relational capital' are significant and contends that the territorial context has the ability to 'valorise the players' proximity', although it is unclear how the valorisation process works and particularly unclear why the process works better in some locations than others.

2.6.7 Collective Learning

The work of GREMI drew attention to processes of collective learning. Capello (1999) highlights the need to differentiate between *collective* learning and learning, giving the general definition of collective learning as 'a social process of cumulative knowledge, based on a set of shared rules and procedures which allow individuals to coordinate their actions in search for problem solutions' (ibid. p. 354). Drawing on the work of Lorenz, Lawson (1997) seeks to elaborate on the processes by which the milieu facilitates knowledge transfer using the concept of collective learning. Collective learning is seen as being achieved through a social process and results in a club good available to be exploited by local firms. The mechanisms by which

knowledge is transferred include labour mobility, the spin-off of new firms from the existing firm base and interaction between suppliers and customers (Capello, 1999). Whether the knowledge is exploited depends on the internal capacity of firms to exploit the collective learning, and the firms' private strategies. Collective learning is not necessarily collaborative learning and knowledge is transferred independently of the will of the firms holding the knowledge. Therefore collective learning is an externality, not a cooperative mechanism. The use of the knowledge by other firms crucially depends on their abilities and strategies and Lorenz draws particularly on theories of the capabilities of firms (Keeble et al., 1999).

Keeble et al. also point out that there are preconditions for collective learning. including regionally and culturally specific rules of behaviour and tacit codes of conduct between firms. These preconditions, which are analogous to untraded interdependencies, enable trustful relations, and trustful relations are seen as imperative for collaborative innovation, even though, as noted above, not all collective leaning is explicitly collaborative.

Camagni (1991) suggests that the synergy effects in the milieu, which result in these preconditions for collective learning, are sometimes enhanced by a local 'collective agent' (ibid. p. 133). He does not expand upon the concept of a 'collective agent' but the role of individuals appears interesting in understanding how clusters are sustained, and is an area that is under explored in the literature.

Keeble et al. (1999) draw attention to similarities between the concept of regional collective learning and the concepts of 'the learning region' (Morgan, 1997a) and 'regional innovation systems' (Braczyk et al., 1998). However, Keeble et al. (1999) point out that the latter two concepts stress the role of non-firm organisations (for example, universities), whereas the concept of collective learning focuses on interactions between firms.

2.6.8 Untraded Interdependencies

I have suggested that the preconditions for collective learning, the role of the milieu and an institutional approach are all related to the concept of untraded

interdependencies. It was in response to dissatisfaction with existing explanations for the differing performance of regions that Storper (1995; 1997) looked to the notion of 'untraded interdependencies' as a way of explaining differential performance amongst regions. Dosi (1988) had identified untraded interdependencies as existing between sectors, technologies and firms in the form of 'technological complementarities, 'synergies', and flow of stimuli and constraints which do not entirely correspond to commodity flows' (ibid. p. 226) and he suggested that they formed a 'collective asset' available for firms to exploit. Untraded interdependencies, according to Storper (1997), 'take the form of conventions, informal rules, and habits that coordinate economic actors under conditions of uncertainty' (ibid. p.5) and include 'labor markets, public institutions, and locally or nationally derived rules of action, customs, understandings, and values' (ibid. p. 19). As will be seen in section 2.7.5, Storper particularly links untraded interdependencies to technological progress. Storper sees untraded interdependencies as relational rather than material assets and, because untraded interdependencies are both scarce and hard to imitate or recreate, territories and clusters with favourable untraded interdependencies are at an advantage.

2.6.9 Social Capital

The concepts of untraded interdependencies and relational assets are closely associated with that of social capital, defined by Putnam (1993) as 'features of social organisation such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions' (ibid. p. 167). Cooke (2000b) defines social capital as 'an attribute of societies from which individuals or collectivities may benefit, derived from community-like relationships of reciprocity, favor-exchange, trust, dependability, and open communication' (ibid. p. 2). Cooke and Wills (1999) distinguish between an individualistic approach to conceptualising social capital in the work of Coleman (1990) and Burt (2000), and a collective approach which they associate most closely with the work of Putnam (1993; 2000).

Social capital has two dimensions – it is both part of the process by which economic activity is conducted and a result of the process, building over time through ongoing economic relationships. Anderson and Jack (2002) point to a third and fourth dimension. The third dimension, which they identify in the work of Nahapiet and

Ghoshal (1998), is a cognitive dimension by which social capital provides rules of appropriate behaviour. The fourth dimension, which they identify from the work of Leana and Van Buren, (1999), is a willingness to subordinate individual desires to group objectives.

Social capital can be exploited by individuals, but it cannot be owned individually – it is a club good and immovable, being a result of complex interactions and relationships between individuals. Social capital is often seen as applying to regions and localities, but clusters can be perceived as an environment in which social capital can both play a part in facilitating relationships between actors, and exist as a club good available to be exploited.

Trust is a particular form of social capital and is seen as a precondition and result of networking (Tödtling and Trippl, 2004). Morgan (1997a) identifies five benefits of trust: it saves time; reduces transaction costs; helps agents cope with complexity; facilitates thick information exchange and abbreviates the learning curve. Cooke (2002) maintains that social capital and associated concepts, such as trust, have become more relevant as economic relations have become more complicated. The role of trust within knowledge exchange is expanded in Maskell and Malmberg's (1999) taxonomy of ways to exchange knowledge. In the first stage, knowledge is exchanged by barter; in the second; through a dyadic relationship between two players who have exchanged knowledge previously; in the third, partners act as if they trust each other and in the fourth, that network is extended so 'your-friend-is-my-friend' (ibid. p. 17). By the fourth stage, infringement of trust is unlikely, due to the close network, and therefore the exchange of knowledge can more easily take place. The link to clusters is that that kind of network is more likely in a territory where individuals from different firms know each other and may belong to the same industrial organisations and associations, and where new firms will already be used to the unwritten rules of conduct. Once again, therefore, the transfer of knowledge is related to territory and institutions. Maskell and Malmberg (1999) go on to point out that, for the network to function, active cooperation is not necessary, what is necessary is acceptance of the local rules of the game and the potential sanctions for non-compliance. This establishment of shared trust and the notion that 'your-friend-

is-my-friend', enables firms to benefit from trustful relationships without having to invest in building individual trustful relationships.

The concept of social capital can, like the concept of the milieu become rather circuitous - social capital is 'the origin and the expression of successful network interactions' (Cooke and Wills 1999, p. 224). However, the concept opens up meaningful questions in relation to clusters. Is social capital the club good which enables clusters to flourish? How is social capital developed and used within clusters? What is the role of individual actors in the formation of social capital? What are the implications for policy?

2.6.10 Territories – Some Conclusions

The interactions that take place within territories are both influenced by and influence the social, cultural and political context of the territory. Certain concepts, including institutions, untraded interdependencies and social capital, have been used to describe the club goods that facilitate traded transactions and also, due to processes of collective learning, facilitate the transfer of knowledge. Club goods are available for exploitation by those comprising the club (the club can be a region or a cluster and should not be taken to have connotations of formal membership). The ability to draw on those club goods depends on the capabilities of the firm. These club goods are both hard to create and imitate, and confer advantages on certain territories and clusters. Untraded interdependencies encompass both soft institutions (rules, conventions and norms of behaviour) and hard institutions (public organisations) that bolster the soft institutions. The role of hard institutions is particularly important when looking at policy. However, what makes territories innovative? What makes the technologically dynamic industrial district technologically dynamic? What makes an innovative milieu innovative? Having concluded that clusters are sustained both by the traded transactions of firms and by the ability of interactions within territories to influence the way in which those firms operate, I now want to examine the literature that links clusters with innovation and technological change.

2.7 Technologies

For Storper (1997), 'the essence of the process of technological change is now the tissue of relations by which asymmetric, non cosmopolitan knowledge is generated, applied, and further evolved' (ibid. p. 34). Clusters are frequently associated with technological change and innovation (OECD, 1999) and most commentators would agree that innovation is important to economic development.[6] To Dosi (1988) innovation 'concerns the search for, and the discovery, experimentation, development, imitation, and adoption of new products, new production processes and new organisational set-ups' (ibid. p. 222). Cooke et al. (1998) suggest that innovation in that wide sense accounts for 80-90% of the growth of productivity in advanced economies, and productivity growth accounts for over 80% of total gross domestic product growth. Innovation is seen as crucial means of competing in an era of 'New Competition' (Best, 1990) and is inherently linked to learning.

Lundvall (1992) makes two assertions in respect of knowledge and learning. The first is that knowledge is the most important resource in the modern economy and that learning is, consequently, the most important process. The second is that learning is an interactive, and therefore socially embedded, process that cannot be explained without considering the institutional and cultural context in which it takes place. Clusters are therefore significant because they can provide an advantageous context for learning.

The understanding that clusters may provide a favourable context for learning arises from a new understanding of how innovation occurs. Cooke et al. (1998) point to the rise of a distinctive *evolutionary* economic theory to challenge neo-classical economics. Evolutionary economic theory incorporates a critique of the linear model of innovation, where innovation was seen to proceed from laboratory to shop floor in a linear, sequential manner, and innovation is no longer solely equated to R&D intensity. Camagni (1991) identifies seven foundational elements of evolutionary economics: there is an interest in processes of growth and change in different contexts; the non-natural resources responsible for comparative advantage (for example, knowledge, information, learning) are considered; the mechanisms involved

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[6] For a more cautionary note see Lovering (1999 pp.386-387).

in the process of agglomeration are taken into account (including issues relating to labour markets, inputs, innovation); innovation is of key interest; disequilibria and cumulative causation are recognised; the approach is non-mechanical, if not fully biological; and finally, providing a link back to the concepts that I have considered in section 2.6, institutional and organisational matters are emphasised (for example, institutional interactions, learning, trust-building, network management, social capital, cooperation, trajectories, path dependence and lock-in).

Storper (1997) points out that within transaction cost economics, cost minimisation is significant, whereas, the innovation process in evolutionary economic theory is about changing the rules, so that costs are not the most significant aspect of competition, and untraded interdependencies come to the fore.

The innovation process is interactive and systemic in that it includes different steps of the process; different firms and organisations in the supply chain; different knowledge producing infrastructures and different departments within firms. It is cumulative, in that innovations rarely come 'out of the blue' and are not extraordinary, exogenous events, but build on existing knowledge, combined in new ways. It is path dependent in that choices, once made, cannot necessarily be reversed and the choices that are made constrain the opportunities to further develop the technology. Firms and regions, once embarked on a particular technological trajectory can, therefore, be subject to lock-in (cf. section 2.7.6 and Grabher, 1993b).

Innovation is therefore seen to involve the production and use of knowledge, and to be the result of an interactive, context dependent, systemic process. I want to look at these two aspects in turn – firstly, the nature of knowledge and its production and use, and secondly, the systemic nature of the process from which innovation results. In both respects it can be seen that clusters can provide a particularly favourable context for innovation and learning.

2.7.1 The Nature of Knowledge

Knowledge is not like other resources. It does not reduce in value with use and transference of knowledge is not easily achieved in the market place, partially because

knowledge is not easily appropriated privately (Lundvall, 1992). Competitive advantage is not just about using existing knowledge efficiently and effectively - it is about continuous learning and innovation. Lawson and Lorenz (1999) observe that innovation in high technology product development is often the result of multidisciplinary knowledge and is therefore facilitated by the cooperation of individuals with overlapping tacit knowledges. I have already considered the concept of collective learning and I now want to consider other aspects of knowledge and learning, and their link to clusters.

2.7.2 Tacit vs. Codified Knowledge

Clusters are seen as being appropriate sites for the transfer of tacit knowledge and this has been linked to the success of local agglomerations. Codifiable knowledge can be recorded and transmitted easily and quickly across long distances, particularly given advances in information and communication technologies. Maskell and Malmberg (1999) term this process 'ubiquification'. Tacit knowledge, which is embodied in individuals, rather than recorded in transmissible form, is considered to be related to specific ways of doing things in certain places and is presumed to be more easily exchanged over shorter geographical distances. Malmberg and Maskell (1997) attribute this firstly, to the need to exchange tacit knowledge by way of frequent and direct face-to-face contact, which is more likely in geographically proximate situations, and secondly, to the need for mutual trust and understanding, which is more likely to arise with shared language, values and culture. Maskell and Malmberg (1999) assert that, as tacit knowledge becomes codified and therefore ubiquified, it becomes ever more important for firms to either shield their tacit knowledge from becoming transmissible or to acquire tacit knowledge more quickly than their competitors. Therefore, tacit knowledge is considered to be significant for learning, and clusters are an appropriate site for the development and transmission of tacit knowledge because they usually benefit from geographical proximity and are likely to incorporate shared language, values and culture.

It is important, however, to avoid presuming that tacit knowledge is superior to codified knowledge (Amin and Cohendet, 1999). Maskell and Malmberg (1999) point out that codified knowledge remains significant in at least three ways:

codification can lead to economic gain by the packaging of knowledge in such a way that it can be sold; codification reduces the cost of training staff; and codified knowledge can result in further technological progress because the existence of codified knowledge makes it easier for ideas to be progressed and subsequently codified. Amin and Cohendet (1999) highlight the importance of a dense educational, science and technology base undertaking diverse, high quality research and with deep links between schools, universities and industry.

Undoubtedly, to emphasise the significance of tacit knowledge alone would be a mistake. However, tacit knowledge, and its link to clusters, remains important and can be illuminated by more nuanced theorising. Lawson and Lorenz (1999), drawing on work by Nonaka and Takeuchi (1995) on product innovation in Japanese firms, develop the idea of a cycling between tacit and codified knowledge. Nonaka and Takeuchi develop a product innovation cycle of four stages. In the first stage, tacit knowledge is shared. In the second, and key, stage, individuals with diverse tacit knowledges come together to articulate new ideas. The process of articulating those ideas forces the individuals to clarify their concepts. In the third stage, these new concepts are combined with existing knowledge to produce a product prototype. In the fourth stage, production has started and new tacit knowledge is developed around that production, providing a foundation for further product developments. The link to clusters is that Lawson and Lorenz suggest that this process may occur not only within firms, but also in technology producing regions or clusters. Spin-offs and labour mobility would provide the context for the cycling between tacit and codified or 'articulated' knowledge to take place.

Drawing on insights from management studies, Pinch et al. (2003) also develop a model linking knowledge to the competitive success of clusters. They point out both the multi-dimensional nature of knowledge, which is often lost in the simple tacit versus codified split adopted in much of the literature, and also point out that the transfer of knowledge depends not only on the nature of that knowledge, but also on the capacity of the recipient of the knowledge to absorb and utilise it. Pinch et al. take the distinction between component knowledge and architectural knowledge, which has been used to shed light on differences in competitive advantage between firms, and apply it to industrial agglomerations. This links to Malmberg and Maskell's

(1997) work, where they point out that, in the resource based view of the firm, there are resources internal to the firm and resources available from the market and the agglomeration or cluster provides a third category of resources – those external to the firm, but internal to the cluster.

2.7.3 The Knowledge Community and Knowledge Pools

From their empirical work on the British Motor Sport Industry (BMSI) and its spatial agglomeration in an area of 50-mile radius, centred around Bicester in Oxfordshire, and termed Motor Sport Valley, Henry and Pinch have considered whether concepts such as 'institutional thickness' (Henry and Pinch, 2001), untraded interdependencies (Henry et al., 1996) and the work of Krugman (Pinch and Henry, 1999) apply to the British Motor Sport Industry and Motor Sport Valley. They have also developed the analytical concept of 'the knowledge community' to explain why the spatial organisation of knowledge production and dissemination often takes the form of a regional agglomeration or cluster (Henry and Pinch, 2000). The knowledge community, a geographically concentrated node of knowledge production, is formally defined as 'a group of people [...] often in separate organisations but united by a common set of norms, values and understandings, who help to define the knowledge and production trajectories of the economic sector to which they belong' (Henry and Pinch 2000, p. 194). This definition has similarities to the notion of Communities of Practice (Seely Brown and Duguid, 2000a), but the particular focus of Henry and Pinch's work is how knowledge is not only accumulated, but spread, within clusters. One particularly interesting element of their methodology is the way in which they seek to demonstrate empirically the processes by which knowledge is transmitted by tracing the career histories of key individuals in the industry to show the mobility within the industry and its particular geography.

Knowledge is especially important to the motorsport industry because it is the key asset in the industry where firms have few tangible assets and innovation is very rapid. As is often posited for other industries, knowledge is developed and moved through relationships with suppliers (Gertler, 1995), however, the labour market plays a particular role in this case, with the production of motor racing cars characterised by a highly mobile labour market, spatially concentrated in Motor Sport Valley (Henry

and Pinch, 2000). The frequent movement of staff between an ever-shifting stock of firms causes the knowledge embodied in individuals to be circulated. The circulation of knowledge improves the knowledge core by allowing ideas to be combined, evolved and adapted, and therefore Motor Sport Valley acts as a 'knowledge pool' raising the knowledge base for the whole agglomeration, not just changing the pecking order (Henry and Pinch 2000, p. 199). In line with Capello's (1999) analysis, the processes within the knowledge pool result in a club good. Motor Sport Valley may be exceptional in the spatially concentrated nature of its labour market, but Henry and Pinch do demonstrate that the labour market is one way in which knowledge becomes accumulated and transmitted within the cluster.

2.7.4 Local vs. Extra- Local Linkages

In much of the literature there has been a tendency to underplay extra-local networks (Cumbers et al., 2003a). Contrary to this tendency, Amin and Cohendet (1999) dispute the claim of 'the superiority of relational and geographic proximity (for example, intense face-to-face contact, local industrial clusters and districts) as a unique source of grounded knowledge over formally constituted and distantiated networks of knowledge and learning based on universally available fruits of science and education' (ibid. p. 88) and Cooke (1998) points out that the very close internal interaction of the industrial districts model will not necessarily work in the absence of links into global networks. Tacit knowledge, which is associated with clusters, is transferred by way of learning-by-doing and imitation, and is associated with incremental innovation. Particularly in peripheral areas, attempting to play 'catch up', radical innovations and the creation of new knowledge are needed in order to move onto a more advanced technological trajectory. The origin and character of knowledge creation does vary between industries, but there appears to be a need to link in to sources of radical innovation and not to depend solely on incremental adaptation from within the cluster.

An important question is therefore how local clusters develop valuable external links (Keeble and Wilkinson, 1999). Amin and Thrift (1995) conceive of neo-Marshallian nodes, territorially embedded but acting as 'forcing houses for the construction of worldwide networks of social relations' (ibid. p. 101), and Keeble and Nachum's

(2002) empirical work shows that there is a strong link between local clustering and global networking. This also links back to the GREMI concept of innovation networks and the role of the milieu in forging external links.

In recent works 'buzz' has become the buzzword (Storper and Venables. 2004). Bathelt et al. (2004) describe the concept of buzz as 'the idea that a certain milieu can be vibrant in the sense that there are lots of piquant and useful things going on simultaneously and therefore lots of inspiration and information to receive for perceptive local actors' (ibid. p. 38). This local buzz, which can be participated in by just 'being there' (Gertler, 2003), is contrasted with the need for 'pipelines', which have to be consciously constructed, through which knowledge external to the cluster is sourced. Just as Camagni (1991) suggested that the local milieu could assist in the formation of external innovation networks, Bathelt et al. (2004) suggest that local buzz and global pipelines are reinforcing. As Power and Lundmark (2004) highlight, the concept of buzz is vague, and it appears that there is a requirement to consider the mechanisms by which buzz is accessed, because it appears likely that these may be different in different sectors, and possibly different countries.

2.7.5 Innovation and Untraded Interdependencies

Where knowledge is particularly uncodifiable and tacit, as is often the case in the early stages of innovation, communicational clarity and common interpretation are, however, particularly important (Storper, 1997). Untraded interdependencies, as well as 'buzz', are significant because they provide the norms and routines, which assist communication, and therefore permit actors to travel more quickly along superior technological trajectories (Storper, 1997). However, ease of communication and clarity of understanding are facilitated not by geographical proximity alone, but by closeness in practice, although that may in turn be improved with geographical proximity.

2.7.6 Strong vs. Weak Ties

Closeness of practice is no guarantee of success. Amin and Cohendet (1999) point out that ties can lead to inertia, parochialism and inward-looking behaviour. It is more beneficial to have a range of loose ties where the chances for interaction are heightened and the possibilities for innovation greater.

Grabher (1993b) recounts the decline of the steel industry in the Ruhr region of Germany. He identifies three types of lock-in that contributed to the region's inability to adapt in the face of the decline of its core industry. Functional lock-in arose because the previously stable relationships between the core steel firms and their suppliers meant that suppliers invested less than they would have otherwise done in R&D and marketing, and became locked into specific exchange relations. Cognitive lock-in ensured a particular worldview that rendered firms less able to adapt. There was little room for developing personal relationships outside of the established relationships and, as a result, no new perspective was gained. Both functional and cognitive lock-in were re-enforced by political lock-in, because the political and administrative system supported the industry and militated against reform and reorganisation. Recent work has sought to broaden the concept of lock-in and points firstly, to additional types of lock-in, secondly, to the role of particular structures that affect the strength and weakness of lock-in, and thirdly to the need to consider the different spatial scales to which the lock-in concept pertains (Hassink & Shin 2005). Clusters could be particularly prone to lock-in, because of their network of ties and relationships within a geographically proximate area, again reinforcing the need for clusters to develop linkages external to the cluster, and external to the local region. Grabher (1993b) theorises that 'loosely coupled networks' may be particularly conducive to the development of an ability to adapt in the face of change.

2.7.7 The Nature of Knowledge: Some Concluding Remarks

Therefore the nature of knowledge is such that it is more easily transferred where conversations are facilitated by untraded interdependencies in the form of routines, conventions and behaviours, which assist communicational clarity, and where trust is fostered and openness is encouraged. Geographical proximity can assist the process, but it is not sufficient, proximity in other senses – cultural, social and organisational – is also required. However, the close relationships that permeate clusters, because of the geographical, cultural, social and organisational proximity that exists, can lead to inward looking behaviour and, therefore, the need for extra local linkages, both to enable new ideas to flow into the cluster and to obviate against lock-in, should not be overlooked.

2.7.8 The Systems Approach to Innovation

In the remaining sections of this chapter I will suggest some links between systems and clusters. Writing about clusters, Cooke (1998) points out that 'it is the systemic rather than simply aggregative nature of the phenomenon that is of potential interest' (ibid. p. 10)

The National System of Innovation approach is particularly associated with the work of Lundvall (1992) and Freeman (1995). It explores the extent to which differences in innovation performance between nations can be ascribed to a nation's institutional setting and the innovation system in which innovation processes take place. Institutions are taken to be norms, habits, rules, routines and conventions: the system is made up of the public and private organisations, economic, political and educational, involved in innovation and the structure of relations between those organisations.

The National Systems of Innovation research was partly prompted by the debate over whether nation states remain significant in the face of globalisation (Ohmae, 1990) and, therefore, the focus is very much on the national level. Cooke et al. (1997) suggest that such a focus ignores the equally valid question of how the innovation process is organised *within* regions.

2.7.9 Regional Innovation Systems

According to Cooke et al. (1998), early work in the area of innovation was 'remarkably spatially unsophisticated' (ibid. p. 1564). They ascribe this lack of spatial awareness in innovation studies to the national approach taken in the concept of 'national innovation systems'. As a result of dissatisfaction with this national focus, a body of work on Regional Innovation Systems was developed (Braczyk et al., 1998). Cooke (2000a) identifies key dimensions at infrastructural, institutional and organisational (firm) level that provide for a strong or weak regional innovation system. This work is inherently more geographical as it takes a region and considers the system operating within that region. An interest in Regional Systems of Innovation drew partly on the National Systems of Innovation work but also draws on concepts around institutions, norms, routines, conventions and local conditions for

learning. As with the GREMI research into innovative milieux, Regional Innovation Systems research concludes that the innovation process is both interactive and dependent on linkages within the region and outside the region. However, Regional Innovation Systems research has a strong policy orientation. In both National Systems of Innovation and Regional Innovation Systems literature a key area of interest is to identify the most appropriate institutional framework in terms of training. finance and inter-firm networking that will enhance the innovative potential of a given territory (Lawson and Lorenz, 1999). The link between clusters and innovation systems is not clear. Some see clusters as a sub-system of the innovation system, comprising predominantly firms, with a separate but linked sub system of R&D organisations, universities and technology transfer organisations (Tödtling and Trippl, 2004). Others would include the R&D infrastructure within the cluster and view clusters as 'reduced-form innovation systems'(Centre for Urban and Regional Development Studies, 2003), focusing on particular economic specialisations.

Tödtling and Trippl (2004) point out that the 'systems' of the innovation systems literature are 'conceptualised in a rather simple and traditional way as being constituted by elements and their relationships' (ibid. p. 1177). Drawing on modern social system theory, Tödtling and Trippl seek to understand how system building takes place. They highlight different stages including, selective communication; boundary-drawing; building-up of structures; coordination of processes, structures and resources; self-themisation and reflexivity; and the developing of strategic and generative abilities. They suggest that looking at these aspects ensures that we can consider the 'systemness' of clusters, which they define as 'the level of integration of their actors by networks, institutions for coordination and a collective identity and reflexivity' (2004, p.1177). The notion of system building is particularly useful when considering the policy implications of the cluster approach.

Camagni (2002) also uses the notion of systems to explain the role of territories in economic performance. He distinguishes between three kinds of system: a system of localised technological externalities – material and immaterial factors which, because of proximity and the reduction in transaction costs, can become pecuniary advantages: a system of economic and social relations resulting in relational or social capital; and a system of local governance to bring together a collectivity.

The concept of 'systemness' therefore appears promising in considering the processes at work within clusters as it combines notions of interactions with notions of collective identity and purpose, and also provides a framework for considering the role of hard institutions (non-firm organisations, unions, trade associations), non-tangible institutions such as the local labour market, and soft institutions such as language, conventions, habits and norms of behaviour.

2.8 Conclusion: Holding the Strands Together

There are examples across the world of specialised concentrations of economic activity where the interactions between actors have brought benefits to that concentration, and we might term these phenomena 'clusters'. Given that these 'clusters' exist, we need language and tools to describe and explain them. Porter's definition may be useful in describing clusters and his analysis has some insights, particularly in his understanding of the role of government, but his analysis is too functional and devoid of the social and historical context to explain the dynamism of clusters.

However, Porter's analysis, and the use of clusters as an analytical tool to describe concentrations of specialised economic activity, is only one aspect of current cluster theorising. Storper (1997) notes the emergence of a new heterodox paradigm in economic geography that breaks down issues of economic development into three separate domains - the 'holy trinity' of technologies-institutions-territories. This has provided a useful framework for marshalling the literature relating to clusters and enabled an exploration of the different kinds of processes that may occur within clusters.

In the introduction I raised the question, posed by Cumbers and MacKinnon (2004), of whether the cluster approach adds anything to existing theories that seek to explain spatial agglomeration. There are two very different responses to the question of whether clusters are a useful, coherent concept. One, promulgated by Martin and Sunley (2003) is that the concept of clusters is ambiguous and chaotic, and not a model to be rigorously tested and evaluated, but a 'way of thinking'. However, by taking a multi-layered approach to clusters, akin to Storper's (1997) holy trinity, the

strands can be separated and evaluated individually. This leads to a second more supportive response from those, like Raines (2002a), who sees the cluster concept as bringing together different strands of theory and 'promot[ing] a wider discussion of the sources of local competitive advantage' (ibid. p. 2). For Benneworth and Henry (2004) '[t]he 'clusters' approach can be thought of as the act of holding together [...] dissonant threads in conversation' (ibid., p. 1017) and Chapman et al. (2004) argue:

> instead of simply 'dropping' clusters as rapidly and uncritically as the term was adopted (Martin and Sunley 2003), we need to assess and 'unpack' the underlying concept, stepping back from the clusters label and the specific Porterian assumptions and claims that underpin it. In moving beyond such 'deconstruction' to 'reconstruction', what seems to be required is not a single, overarching theory but the conceptual abstraction of key notions and relations which can then be subjected to detailed empirical scrutiny (ibid. p.394).

For Chapman et al (2004) the key notions and relations are proximity, learning and evolution. For Storper (1997) phenomena such as clusters are conceived as 'stocks of relational assets' and 'the *economic process as conversation and coordination'* (ibid. p. 28 italics in the original), with economic accumulation relating to relational assets as well as material assets. Others see clusters as involving processes of institutional thickness (Amin and Thrift, 1995), knowledge communities (Pinch et al., 2003), innovation systems (Cooke, 1998), collective learning (Capello, 1999) and notions of systemness (Tödtling and Trippl, 2004). For Malmberg and Maskell (2002) the ability to emphasise these different aspects in analysing clusters is related to the issue of spatial scale and they call for more discussion of spatial scale in empirical work.

The explanations of clusters will be specific to the territory and cluster involved and can only be uncovered by detailed empirical work. Cumbers and MacKinnon (2004) berate the lack of such detailed empirical research with limited exceptions (Cumbers et al., 2003a), (Keeble et al., 1999) and (Swann et al., 1998). My empirical research into the marine and offshore engineering cluster in the North East of England touches on some of the key notions and relations within the cluster, but my main focus is on the way in which policy-makers have implemented a cluster approach to policy at different scales and the way in which policy has impacted upon the assets and

relationships within the cluster. Through such empirical work we can seek to add to the theoretical understanding of clusters and cluster policy by further unpacking the cluster concepts and considering the usefulness and fit of existing theories that have sought to explain clusters and the processes within them.

My empirical work has two elements – firstly, a study of the way in which two cluster policies were conceived, developed and implemented and secondly, an examination of the impact of those policy initiatives within a cluster. However, before going on to outline the detailed research questions I sought to answer and the methodology I adopted, I want to look at the literature regarding cluster policy theory and the use of cluster concepts in policy circles. I consider how, and why, clusters have become so influential in economic development policy, I outline the implications for cluster policy of the concepts discussed in this chapter and I suggest that cluster policy making be best understood as a process.

3 Cluster Based Economic Development Policies

3.1 Introduction

In the previous chapter the competing explanations for the workings and success of clusters were explored, and it was concluded that the cluster concept is not accounted for by one universal theory, but is composed of different theoretical strands, which contribute to our understanding of how particular places exhibit particular patterns of economic specialisation and how the firms located in those places apparently benefit from being so located. In particular, concepts such as relational assets (Storper, 1997), institutional thickness (Amin and Thrift, 1995), knowledge communities (Pinch et al., 2003), innovation systems (Cooke, 1998), collective learning (Capello, 1999), and notions of systemness (Tödtling and Trippl, 2004) were identified as being of use in explaining the types of processes occurring within clusters.

I now want to look at the way cluster *policy* has developed and whether, and how, policy makers have picked up the theoretical strands identified above. In section 3.2, I consider the implications of the concepts discussed in Chapter 2 for cluster policy theory. In section 3.3, I seek to define cluster policy. In section 3.4 I outline the reasons why a cluster approach to economic development policy has appealed so strongly to policy makers. In section 3.5 I outline a cluster policy process model and examine the ways in which cluster policies have been put into practice. In section 3.6 I consider what is new about cluster policy and in section 3.7 I conclude that, although there are caveats, a cluster approach to economic development can be a useful aspect of policy making.

3.2 Cluster Policy Theory: Academic Antecedents

The theoretical basis for cluster policy has been little explored, with much work on cluster policy being descriptive and offering preliminary evaluations of what are relatively new initiatives (Raines, 2002). The lack of a 'universal theory' to explain clusters and the multiple threads of explanation for the phenomenon partly explain the popularity of the concept for policy makers, but also mean that the theoretical basis for cluster based policy must be teased out of a complex web of discourses on clusters. In trying to tease out that theoretical basis the following caveat is significant: '[i]t is important not to over intellectualise the cluster approach [to policy]

into a coherent philosophy, because the ideas have been driven by policy-makers and consultants, giving a very pragmatic feel to much of the work'(Benneworth, 2002, p.314). In section 3.4 of this chapter I will return to the pragmatic reasons for the appeal of clusters to policy makers, but in the meantime I want to draw out the implications for cluster policy theory of the literature examined in Chapter 2.

The predominant theories used to explain the performance of clusters do not tend to focus on policy (Raines, 2002). Marshall, one of the earliest theorists in this area, saw little role for public intervention (Keeble and Wilkinson, 1999). However, the work of Porter has inspired many cluster policies and I want to start by looking at its policy implications. In Chapter 2, I sought to move Porter from the centre of the debate around understanding clusters by emphasising the significance of other theoretical contributions. In the same way, the other theories discussed in Chapter 2 have implications for policy and this will be discussed subsequently.

3.2.1 Michael Porter

Given the widespread association of Porter with cluster policy it is interesting that Porter's earliest and most heralded work in relation to clusters, *The Competitive Advantage of Nations* (1990), foresaw little role for direct government intervention. However, by 1998 Porter is much more explicit about the role of government in the economy as a whole, envisaging five roles for government: providing macroeconomic and political stability; improving general-purpose inputs (for example, workforce, infrastructure and information collection and provision); ensuring rules and incentives favour rivalry, investment and innovation; facilitating and upgrading *all* clusters and implementing a long term economic change plan.

In terms of cluster policy it is his recommendations for facilitating and upgrading clusters that are of interest. These recommendations are framed in terms of the four factors comprising the 'diamond' of influences on local competitiveness (cf. section 2.3). For each of the diamond factors Porter identifies actions that governments can take to upgrade clusters. The actions can be grouped into five categories: providing infrastructure, encouraging dialogue, information collection and provision, dealing with regulatory issues, and marketing.

Porter is adamant that government should look to upgrade *all* clusters, with those clusters being identified by mapping exercises, which have always played a significant role in Porter's academic and consultancy work. Porter's work tends to identify that a large proportion of an economy is clustered and the implication is that a large part of the economy will benefit from a cluster approach. While Porter accepts that projects will have to be sequenced, the avoidance of selectivity runs contrary to other academic discourses (Raines, 2002) and much policy practice. This highlights the significance of the methodology used to identify clusters and also leaves open the question of what to do if clusters cannot be identified in a given economy, a situation faced by some more peripheral areas.

As noted in section 2.3.1, Porter leaves open the question of the scale at which clusters exist and notes that clusters can be embedded within broader clusters (for example, wine within agribusiness). Porter also leaves open the scale at which policy should be implemented, but maintains that government has a role in upgrading all clusters, with that role varying depending on the maturity of the cluster and being a matter of removing barriers and obstacles to development and actively participating in privately led initiatives, rather than running the initiatives themselves. It is implied that different functions are carried out at different levels of government and he introduces an idea that is key to cluster policy – that of opening dialogues and generating conversations between a wide range of actors. He also highlights the need for a long-term perspective and recommends the institutionalisation of a cluster approach.

Although Porter leaves many questions with regard to policy open, it can be argued that his work 'should be used as a starting point or a catalyst to undertake cluster development and not as some manual which has to be rigidly followed' (Brown, 2000b. p.5). Other literatures may not have had the same appeal to policy makers, but they do have implications for our conceptualisation of cluster policy and practical implications for the implementation of cluster policy.

3.2.2 Storper's Holy Trinity

In Chapter 2, Storper's holy trinity of technologies-organisations-territories was used as an organising framework to consider the theories that contribute to our understanding of clusters and we can use the same framework to explore the implications of those literatures for cluster policy theory and I want to look at the policy implications of each element in turn.

Organisations

Certain schools of thought, including Marshallian economics, the Californian School and the New Geographical Economics of Krugman, rely on the actions of atomistic firms (organisations) operating via markets to explain clusters. The benefits of co-location, clustering or agglomeration are taken to arise automatically through external economies or reduced transaction costs. It is implied that policy intervention should therefore be limited to resolving market failures (Newlands, 2003) and the implication is that such intervention will be appropriate at a national scale.

Territories (and their institutions)

A key understanding from the literatures encompassed under the heading 'territories' is that a firm's performance is affected, not only by the markets in which it operates, but also by the environment in which it operates. The question in policy terms is whether, and how, that environment can be affected by policy. Maillat (1995) identifies two aspects of the milieu, or environment, amenable to policy intervention - the *interaction logic* and the *collective learning dynamic*. By classifying regions along both axes, policy makers can identify whether they should focus on increasing cooperation between players or on developing learning processes, but in both cases the focus is on creating regionally specific resources to promote development. To these aspects I would add a further interconnected dimension potentially amenable to policy intervention – the *institutional framework*. Each of these three aspects is now examined in turn.

The original Italian industrial districts demonstrated strong *interaction logic* and were based on close inter-firm cooperation, including adherence to norms of reciprocity

and the provision of collective goods, such as training, by local trade and civic associations. Although the original industrial districts had little role for public intervention, policy makers, looking to emulate the districts' success, sought to identify mechanisms to facilitate cooperation between firms and to provide 'real services', whereby services, such as marketing, were provided directly by public authorities. The provision of such 'real services' is particularly appropriate for cluster policies addressing the needs of small firms, because it involves the provision of services that a small firm would otherwise find too difficult or too expensive to provide. Cluster policies have therefore often concentrated on collaboration and improving the *interaction logic*, although this ignores the non-collaborative mechanisms that are also necessary to explain the success of certain industrial districts.

Because geographical proximity is seen to be beneficial for knowledge transfer and learning (although cf. section 2.7.4), policies to support a *collective learning dynamic* at a spatially and sectorally (or cluster) focused scale are justified and a network approach to encouraging learning amongst SMEs is popular. Additionally, as knowledge is exchanged both through links between firms, and by movement of individuals through spin-outs from existing firms, the popularity of policies to promote links between firms and to support spin-outs is understandable. However, the functioning of the local labour market and interactions between suppliers and customers have also been seen as significant for knowledge transfer, but may be less amenable to policy intervention.

The cluster approach can be criticised for a tendency to focus on interactions within regions, and within clusters, at the expense of acknowledging the importance of external linkages (cf. section 2.7.4). However, Camagni (1991) sees the milieu as a way of linking local firms into extra-local innovation networks and Bathelt et al. (2004) see a role for policy in forging these extra-local linkages.

While acknowledging a role for policy in fostering an interaction logic and collective learning dynamic, I would argue that those two attributes are likely to be more effective in an environment with an institutional framework including shared cultural and social norms and routines, and a key question is whether the literature supports

the assertion that the *institutional framework* is amenable to policy intervention. As discussed in section 2.6.3, the term 'institutions' comprises a number of facets ranging from formal organisations to informal habits, routines and conventions. As discussed in section 2.6.8, Storper refers to these institutions as untraded interdependencies and, because untraded interdependencies are hard to imitate or recreate, territories and clusters with favourable untraded interdependencies are at an advantage.

I have suggested that untraded interdependencies are related to the concept of social capital and that both concepts are linked to notions of trust. The key issue for policy makers is therefore, if social capital, untraded interdependencies and trust are territorially specific, can they be nurtured and developed by policy interventions? In certain areas social norms of trust and reciprocity result from of a long history of trustful relationships (Sabel, 1989). Putnam (1993) maintained that the social capital that enabled areas like Third Italy to flourish was centuries old. However, in *Bowling Alone* (Putnam, 2000) he cites the example of Tupelo, which was one of the poorest counties in the poorest state in the USA in the 1940s, but a national model of community and economic development by the 1990s. Putnam ascribes this success to the community pursuing collective goals under the exceptional leadership of one individual. Social capital developed in the town over decades, rather than centuries, offering hope for currently lagging areas. However, the significance of one individual appears key to this example and is an area of interest in research.

Lorenz (1992), discussing the United States, points out that policy makers can appeal to firms' self-interest, by demonstrating the benefits of collective action. Once collective action is undertaken, a virtuous circle is created whereby communication increases and trust builds, leading to the sharing of information. Policy-makers need to ensure that this behaviour does not evaporate at times of economic downturn. Asheim (1992) cites studies by Lorenz (1990) and Sabel (1990). both showing that what Sabel calls 'studied trust' can be intentionally created. Cooke (1997) agrees that trust can be promoted by an appeal to self-interest, but argues that individuals do in any case prefer to operate within trustful relations rather than in isolation. Both Ceglie et al. (1999) and Altenburg and Meyer-Stamer (1999) suggest that trust can be established between actors by running small, low risk projects first before moving on

to more complex relations. Boekholt and Thuriaux (1999) point out that informal contacts need to precede formal contacts and that building trust takes time. If social capital is amenable to policy intervention the regional level is seen as relevant because that is where interaction is easiest (Morgan, 1997a) and clusters, sharing common linkages and language, become a policy focus.

Untraded interdependencies are seen as more important than ever because firms operate in an increasingly uncertain environment. The role of uncertainty is also relevant to the work of GREMI and, as discussed in section 2.6.5, firms develop functions of search-selection-transcoding-transforming-control (SSSTTC) to enable them to operate in this uncertain environment. Camagni (2002) envisages the milieu as supplementing and enhancing the SSSTTC functions and, while a policy role cannot be envisaged in certain aspects (for example, managerial mobility), there are other aspects (for example, setting of quality standards, provision of information and provision of specialised services) that could be undertaken by policy makers. What is less clear is how policy can contribute to the intangible synergy effects that ensure that certain territories or 'milieus' are better able to reduce uncertainty.

In addition to the soft institutional framework, the institutional framework of formal organisations is significant and the functioning of the formal institutions depends on the functioning of the softer institutions. As outlined in section 2.6.3 the term 'institutional thickness' has often been used to describe this framework. Amin and Thrift (1995) point out that policy-makers have found it possible to create institutions, and even encourage interaction between them, but that the other two aspects of institutional thickness – collective representation and sense of mutual awareness have been much harder to foster because institutional thickness is the product of 'a complex set of institutional conditions, which are not ubiquitously available' (ibid. p.105). Not only is it difficult to generate the combination of conditions to result in a favourable form of institutional thickness, but also in less advantaged areas there may be an institutional structure that militates against change and 'locks in' the area to an unfavourable institutional culture. That said, clustering can be seen as a form of institution building and often leads to forums that may develop further. This can be particularly important in areas where formal institutions are weak (Lagendijk and Charles, 1999). Additionally, Grabher (1993b) envisages a role for policy makers in

avoiding lock-in and promoting adaptability by linking together specialist support organisations because 'linking different institutions may uncover potentials for cooperation between firms of different sizes and technological specialisation' (ibid. p.274).

Technologies (and innovation systems)

Having considered the ways in which policy makers might intervene to influence 'territory' I now want to look at the involvement of policy makers in the third element of Storper's holy trinity – technologies. As discussed in section 2.7, recent work on innovation has focused on the 'system' within which innovation occurs. Policy intervention to provide elements missing from the system, and particularly to facilitate the operation of the linkages within the system so that it functions in a systematic, networked manner, is justified.

The change in understanding of the innovation process to one informed by evolutionary economics, leads to a change from a policy of provision of physical and functional infrastructure, to a policy focusing on knowledge infrastructures and the creation of innovation networks (Asheim and Cooke 1999). Emphasis is placed on the ability to develop and exploit linkages outside the firm's boundaries (Nauwelaers, 2001). Nauwelaers also points out that emphasis moves from the provision of inputs to the innovation process, to the innovation process itself. She suggests that the focus of policy has moved from hardware and physical capital (infrastructure, R&D etc) to software and human capital (trained workers and knowledge) to 'orgware' and social capital (norms and institutions, culture and ethics). She notes that the visibility, measurability and speed of effect of the policies declines with a move from providing hardware to 'orgware'.

Locally and regionally based formal institutions to support innovation are also seen as significant in facilitating innovation and the collective learning process (European Commission, 1999b) and policy can play a role in supporting or developing institutions such as service centres or technology centres as part of a cluster. Crucially, Asheim and Cooke (1999) note that different industrial sectors have different requirements in terms of innovation systems. Consequently innovation

policy should be tailored and clusters can be seen as an appropriate focus for innovation policy.

3.2.3 Conclusion: A Theoretical Basis for Cluster Policy?

While the work of Michael Porter has undoubtedly been significant, both in popularising the term clusters and in encouraging policy makers to take a cluster approach to economic development policy, to equate clusters and cluster policy solely with Porter's work ignores the work of many economic geographers. The theoretical basis for cluster policy lies within the complex web of theories, discussed in Chapter 2, about the operation of markets, the way in which a firm's operating environment impacts upon its performance and the way in which innovation takes place. The different literatures suggest different instruments and therefore the choice of policy instrument is influenced by the policy makers understanding of cluster concepts. Three particular issues of relevance to the design of cluster policy can be highlighted as emerging from this group of theories.

The first aspect is that most of the literatures that have been discussed – the Italian industrial district literature, GREMI research, work on collective learning, untraded interdependencies and institutional thickness – stress the place specific and historically bounded nature of the processes underlying clusters. Porter's work, on the other hand, views clusters as more functional and, although he mentions the importance of social relations, his work appears to have been interpreted by policy makers as suggesting that the benefits of clustering are aspatial and replicable in other areas (European Commission, 2002). If policy makers ignore the socio-cultural and place specific reasons for the success of clusters, they underestimate the difficulty of designing policies, and the policies they design are unlikely to succeed.

The second aspect to consider, highlighted by Newlands (2003) is that it is a mixture of cooperation and competition drives clusters. Policy makers should not neglect the competition aspect. Collaboration alone does not explain the functioning of the Italian industrial districts or Silicon Valley and a policy of encouraging cooperation and collaboration is not sufficient for cluster development.

The third aspect is that cluster theories increasingly stress the value of external links in addition to local links, and the need to avoid functional, cognitive and political lock-in (Grabher, 1993b). Policy makers have not necessarily picked up this aspect of cluster policy theory.

The theories that contribute to our understanding of clusters suggest that policy-makers should ensure satisfactory framework conditions for clusters and can intervene to improve the 'systemness' of clusters. However, they also provide theoretical justification for intervention to improve the untraded interdependencies within clusters by encouraging cooperation to promote localised collective learning processes, promoting the building of social capital of a favourable nature and facilitating the development and linking of formal organisations. Clusters, because of their perceived advantages in terms of agglomeration economies and collective learning processes, are seen as an appropriate focus for the design of policy interventions of this nature. However, in section 2.2.1, we have seen that different processes occur at different cluster scales and the implication is that cluster policy should also vary with scale.

Before considering the ways in which the theoretical implications of our understanding of clusters have been put into practice by policy-makers, I want to consider what we mean by cluster policy, and why policy-makers have adopted such a complex and contested concept as clusters so widely.

3.3 Towards a Definition: Common Aspects of a Cluster Policy Approach

Just as in Chapter 2 the meaning of the term 'cluster' was discussed, it is worth considering what is meant by the term 'cluster policy'. Again this is not an easy task, particularly given that '[i]n essence, cluster policy is not an isolated, independent and well-defined discipline. It embraces all policies that affect the development of clusters, taking into account the synergies and interchanges between these policies' (European Commission, 2003, p.10). Cluster policies have proliferated since the 1990s across Western Europe (Raines, 2000), North America (Rosenfeld, 1995) and increasingly the developing world (Schmitz and Nadvi, 1999). However, initiatives vary from those supporting small, non-sector specific business networks to much

larger programmes focusing on a specific industry in a particular locality (Hallencreutz and Lundequist, 2003) and policies have been initiated by supranational organisations such as the United Nations International Development Organisation (UNIDO), by national governments of many political colours; by state and regional authorities in many nations and by numerous local economic development agencies. Consultancies, most famously Michael Porter's Monitor Company, have sprung up worldwide seeking to advise policy makers on their cluster strategies.

There are some very broad similarities across the approaches. There is a tendency to deal with the needs of firms on a collective basis, rather than individually. There is an element of selectivity in terms of choosing clusters to support, although on occasion clusters have been defined very broadly to ensure political acceptability. There is a tendency to act in a cross-sectoral manner and. the clusters selected for assistance are often more widely defined than would be the case for sectors. There may be a move to cross-departmental working because a cluster approach encourages a more holistic approach to policy. A more participatory method of policy making may be encouraged by the involvement of actors not usually involved in designing policy. There may be a shift towards stimulating social processes rather than concentrating on financial incentives and formal programmes. Public or semi-public organisations may act as mediators in encouraging inter-firm networks and joint projects. There is frequently an emphasis on improved business cooperation and networking. There is often an emphasis on the need to improve innovation capability and an emphasis on the linking of firms to the regional technological infrastructure. There may be an attempt to stimulate the creation of specialised factors, particularly knowledge.

As Enright (2000) posits, '[with] such different governments all adopting cluster-based strategies, it is easy to conjecture that we have either stumbled across universal truths, mass delusions, or the same words used to describe very different programmes' (ibid. p. 309). So what have we stumbled across: what is cluster policy? As a starting point, I want to draw attention to a paper by Benneworth et al. (2003) that contributes to a clarification of terminology. The paper dissects the cluster approach into five theoretical elements:

- The cluster – the concentration of activity characterised by interactions between firms,
- Clustering – cooperative interaction to gain advantage, which may or may not take place within a cluster,
- Cluster activities – the events and activities at which clustering takes place,
- Cluster organisations – the organisations which organise clustering activities,
- Cluster policy – policies from government to support cluster development.

This typology is useful in allowing us to distinguish between different components of the cluster approach to policy and, having isolated cluster policy from the other four elements, I now want to consider why a cluster approach is so popular amongst policy-makers.

3.4 A Cluster Approach: Why the Appeal?

To many academics the cluster concept appears fuzzy and chaotic (Martin and Sunley, 2003). This fuzzy nature appeals to some commentators and Jacobs and de Man (1996) suggest '[t]here is not one correct definition of the cluster concept, but [...] different dimensions are of interest. The practical situation facing policy-makers and business strategists will lead them to emphasise some of those dimensions over others. In our view, this is not a drawback of the cluster concept' (ibid. p. 425). Raines (2002) concurs, 'the ambiguity of the cluster concept – often cited as a weakness – has surprisingly allowed a range of different economic development ideas to be combined in new configurations' (ibid. p.2). However, for others, '[t]he very openness of the cluster concept is at the same time its weakness' (Nauwelaers, 2001, p.98). To policy makers, given the proliferation of cluster initiatives, the appeal appears more universal and there are many practical 'how to' type guides to cluster development, including those produced for the European Commission (1999a), US Department of Commerce, (1997) and the Department of Trade and Industry (2004). In fact, it is partly the multitude of facets to clusters and hence to cluster policies that is appealing, as they enable policy makers to stress the aspect that is relevant to their particular issue or locality (Jacobs and de Man, 1996).

Enright (2000) sees the failure of previous policies as being the most important reason for the appeal of cluster strategies but also identifies five other causes of their popularity – globalising and localising forces; perceived difficulties with development through large firms; trends towards outsourcing and downsizing among larger firms; case studies on successful clusters and the tendency to push economic policy making from the national to a subsidiary level in some nations. Some of these aspects are considered in more detail below.

3.4.1 Previous Industrial, Regional and Technology Policy

Cluster policy has been described as being on the boundaries of industrial, regional and technology policy (Boekholt and Thuriaux, 1999). Therefore it is necessary to look at trends in each of these policy fields in turn, accepting that there is some overlap between them, in order to understand the increased interest in the cluster approach.

Industrial policy has tended to be narrowly sectoral and consisted of subsidising certain industries. In the 1960s, policies tended to support mature industries against increasing and inevitable international competition. This policy of 'backing losers' (Jacobs and de Man, 1996) was aimed at protecting employment but was not successful. In the 1970s, policy became more offensive and attempted to 'pick winners' by supporting industries which it was hoped would be future economic successes. This was no more successful because 'picking winners' is a pursuit at which governments are notoriously poor and many countries and regions pursued the same potential 'winners', leading to considerable duplication of effort (although the same pitfall can apply to cluster based policies). The policies were prohibitively expensive and fell foul of international fair trade agreements.

Regional policy has tended to follow this sectoral approach and used the tools of industrial policy, subsidies and state aids, in an attempt to even out regional disparities. In the United Kingdom regional policies were only applied to lagging regions and state aid was given to firms to locate in depressed areas in the hope of providing employment growth. However, these 'branch plant' jobs were often low skilled and low paid. Indeed such policies may have been counter-productive in that

they encouraged grant dependency and a continuing employee culture. thus stifling entrepreneurial activity. Growth pole policies attempted to attract large companies to kick start economies (Enright, 1996) and in the 1980s there was an attempt to attract foreign direct investment, leading to bidding wars between different UK regions. While there have been successful cases of inward investment, there has been increasing disillusionment in the face of a wave of factory closures (Pike, 1999). In any case, within the EU, despite decades of regional policies, significant territorial disparities within countries remain. Indeed disparities between regions within each Member State increased between 1990 and 2000,with only Germany, France and Austria seeing reductions in the variation of GDP per capita across regions (HM Treasury et al., 2003).

Science and technology policy has historically been based on the linear model of innovation, with a focus on knowledge production at a high-level within research institutes and universities. In the 1980s there was a move to support more applied and pragmatic research. With some notable exceptions, such as the Science Park in Cambridge (Segal, 1985) the high-tech industrial parks that appeared to offer promise in the early 1980s have not been successful either. It has been claimed that these policies failed to look at the socio-economic context in which the science parks operated and ignored factors to do with embeddedness, community and social capital, (Asheim and Cooke, 1999). UK Government policy on technology in the past two decades, both spatial (technology parks) and non-spatial (technology transfer centres), has been criticised for being too supply driven, failing to meet the needs of (potential) customers, too short term in funding terms, politically driven and operating in isolation from other institutions (Lagendijk and Charles, 1999). Policy has been seen as being too narrowly technologically focused and there is now a wider focus on innovation.

These failures in policy led to what Sabel (1989) has called 'a new orthodoxy of endogenous local development'. The stress on development from within lends itself naturally to the use of clusters as the focus for policy intervention.

3.4.2 SME Development

A second reason for the popularity of cluster approaches is their suitability as a means of support for small and medium enterprises (SMEs). SMEs have become of increasing interest to policy makers. Not only are they increasingly significant in employment terms, they tend to be more rooted to their environments, making them a particular target for policy-makers wishing to develop the endogenous assets of their locality, and increasingly disenchanted with their ability to support large firms. SMEs have been badly served by policy makers. Although the number of initiatives has been abundant, the take up of services is notoriously low (Henderson and Morgan, 2002), suggesting a picture of confusion and disillusionment. However, SMEs face particular problems that can be ameliorated by a cluster approach. Their small size and isolation means that they can benefit from an approach that builds their capability to develop linkages. Small firms tend to learn well from other firms (Curran and Blackburn 1994; Morgan 1996). The benefits of economies of scale, purported to arise from clusters, are especially relevant for SMEs and it is easier for policy makers to intervene at a cluster level than attempt to reach SMEs individually. A cluster approach has also been perceived as a way of combining support for SMEs while also embedding inward investment projects (Lagendijk and Charles, 1999).

3.4.3 Change in Economic Development Governance

A third reason for the appeal of the cluster approach to policy-makers relates to a change in the nature and governmental scale of policy intervention. The move towards a cluster approach has varied from country to country and the way in which the approach has been adopted depends on the policy-making history of the country. However, the appeal of cluster policy has tended to coincide with a change in the role of the state to one of indirect, rather than direct, intervention. Morgan (1997a) highlights the role of government as one of 'animateur'. There is a trend away from direct intervention, towards creating mechanisms and incentives for indirectly facilitating the network process.

Cluster policy is often seen as a low cost option in three respects: it tends to involve indirect intervention rather than direct subsidy; it leverages private sector resources: and there are scale economies in delivery. Given limits to budgetary expenditure

worldwide, this notion of achieving substantial results from limited financial input is appealing and is of particular relevance to the European Union given its substantial enlargement with inestimable budgetary implications. Therefore a cluster approach has fitted well with moves towards low cost, indirect government intervention. For example, it has been noted that local authorities in the United Kingdom pursued cluster policies at an early stage in the popularity of the cluster approach to policy, due to a need for European funding (often linked to partnership working) and private money, at a time when the Conservative administration was curtailing local authority spending (Lagendijk and Charles, 1999).

The appeal of cluster policy has also coincided with a move, certainly in the United Kingdom, to the devolving of regional policy to a more local level. The assumption that significant interactions occur at a regional level fits especially well with a move to supporting *regional* economic development. However, a cluster approach has an appeal at a range of geographical scales as will be explored further below.

3.4.4 Conclusion: The Appeal of the Cluster Approach

In an influential article, Lagendijk and Cornford (2000) trace the career of the cluster concept from its introduction by Michael Porter in his 1990 seminal text *The Competitive Advantage of Nations.* They show how the linking of clusters with competitiveness in Michael Porter's work ensured its *initial* appeal to policy makers. Undoubtedly this was heightened by the readability of his work, 'couched in the [...] accessible verbal language of business strategy' (Feser and Luger, 2003, p.12), his background in business strategy, and his reputation as an international management 'guru'. Lagendijk and Cornford (2000) then recount the 'journey' of the cluster concept from its origins in the work of Porter. Picking up on the way the 'baggage' of networking (not found in Porter's original work), the concept 'travelled along different routes' and during its travels, the concept became popular with different audiences who all sought to apply it to their own needs and circumstances. However, Lagendijk and Cornford point out two paradoxes – first that, although clusters are specifically intended to be cross-sectoral, a cluster approach allowed policy makers to revisit their sectoral policies and second that, despite Porter's outright criticism of networking in his initial work, clusters quickly became associated with networking.

They go on to show how this networking variant of the cluster concept was easily aligned both with the increasing tendency for regional development to focus on indirect measures of support, and the need for partnership working to secure funding from the European Structural Funds. Clusters then became linked with economic restructuring, a role not envisaged by Porter, with policies to embed footloose foreign investments on the one hand and to develop indigenous development on the other. Clusters have also become widely associated with the notion of innovation. The theoretical justification for this has been explored in Chapter 2, but, given the popularity of concepts of innovation with policy makers, the association of clusters with innovation again 'sells' the cluster approach to policy makers. Lagendijk and Cornford conclude, as I have done in Chapter 2, that 'there is perhaps not sufficient justification to perceive clusters as a singular 'black box' (2000, p.215), but they maintain that the concept is powerful in that its 'career' has taken it down many different routes, in academic and policy terms, with different actors 'enrolling' the concept for their own purposes.

3.5 Putting a Cluster Approach into Practice

Not only is the use of clusters within policy warranted by a number of different theoretical strands, but also cluster policies have been designed in varying policy contexts and the cluster concept has followed a very varied career path in policy terms, becoming associated with different priorities and policy interests. However, even if clusters cannot be perceived as a singular 'black box', an analysis of cluster policy making suggests a distinctive policy making process. Before outlining my model of the cluster making process I want to clarify some further definitional issues and look in more detail at the question of the geographical scale of policy intervention.

Feser (1998) distinguishes cluster specific from cluster-informed policies. A cluster specific approach uses tailored demand side and supply side initiatives to develop a distinct, identified cluster. The interventions will not always be traditional economic development tools and may incorporate aspects of regulation and education for example. A cluster informed perspective aims to improve an individual policy initiative by applying an understanding of the economic and spatial interdependencies

that constitute clusters. Porter (1998) similarly maintains that there is a role for government in upgrading specific clusters (cluster specific) and that cluster based thinking should be used to guide all aspects of policy, including science and technology and education policies (cluster informed). This dual role for government as, on the one hand, having a role in upgrading individual clusters, but also, on the other hand, taking a holistic approach to economic development by applying 'cluster thinking' to all aspects of government is also recognised by the European Commission (2002). In discussing the cluster policy process I am predominantly referring to cluster specific policies, but my empirical work touches on the extent to which policy in the United Kingdom has been cluster informed.

Just as clusters can be distinguished from clustering, as discussed in section 3.3, so policies designed to support clusters on the one hand can be distinguished from those that seek to promote clustering on the other. Policies impacting upon *clusters* can either be direct and intentional cluster policies (for example, provision of infrastructure for a specific cluster) or policies which indirectly or unintentionally have an impact upon given clusters, where that impact can be positive or negative (for example, defence procurement policy intends to acquire the best equipment for the armed services, but the way in which it does so has an impact on defence related clusters). Policies to promote *clustering* are almost always direct and intentional and include promoting networking and the formation of small groups of businesses working in coordination for mutual benefit.

3.5.1 The Scale of Cluster Policy Intervention

The scale of policy intervention depends on the level at which clusters are analysed, although in practice this is partly dependent on the institutional context in which cluster policies are designed. We have seen in section 2.2.1 that clusters exist at different geographical scales and that the processes that characterise clusters vary depending on the scale at which they are analysed. Roelandt and den Hertog (1999) also examine how the focus of analysis, and indeed the cluster concept, depends on the level of analysis. A national (macro) level of analysis looks at overall patterns of economic specialisation and clusters are conceived of as 'broad industry groups linked within the overall macroeconomy' (Feser, 1998, p.20). A branch or industry

(meso) level of analysis conceives of clusters as comprising inter-industry and intra-industry linkages, horizontal and vertical, around a value adding production chain. At a firm (micro) level, clusters are seen to comprise a small number of linked enterprises and their immediate supply chain. Roelandt and den Hertog (1999) conclude that the scale at which clusters are analysed implies the need for different types of policy initiative, from framework conditions at a national level to small scale networking at a micro level. Boekholt (1997) points out that the micro-meso-macro split does not necessarily correspond with geographical, national-regional-local levels of intervention (for example, a national networking programme can impact at a micro level).

Lagendijk (1999) develops a typology based on the instruments used to develop clusters and relates these back to the literatures used to explain clusters. He identifies four approaches:

- *The industrial cluster*. Drawing on the work of Porter, this approach involves improving the cluster specific framework conditions incorporated in the 'diamond'. Policies include integrating policy along cluster lines and supporting cluster based innovation systems.
- *Institution-building*. Drawing on institutional and associational economics, this approach looks at building capability in firms and clusters. Policies include developing cluster-based service centres or associations.
- *Network-building*. Drawing on networking literature, this approach considers the advantages of collaborative attitudes amongst firms, and between firms and business support organisations. Policies include the facilitation of business networks and learning to cluster.
- *Learning-oriented*. Drawing on notions of learning regions and learning organisations, this approach involves learning though a cluster. Policy initiatives include focus groups or initiatives developed around 'mentor' firms and may be supply chain based.

The different approaches are scale dependent and Lagendijk suggests that the industrial cluster model is oriented to a national or regional scale, the institution-

building model is oriented to a regional or local scale, and the last two approaches are oriented to a local level.

However, although theory suggests that the nature of policy should vary depending on the scale of cluster to which it is applied, once again the context dependent, pragmatic way in which cluster policy has developed is in evidence. Nauwelaers (2001) lists nine uses of the term cluster in policy approaches, operating at different geographical scales and ranging from private strategic alliances between a restricted number of companies to very broad sectors accounting for an important share of the national economy. The scale at which cluster policies are designed also varies from country to country and depends on the political structure and policy-making history of the country, and indeed the size of the country. In the Netherlands a national, top down approach has been utilised (Roelandt et al., 1999). In Sweden cluster initiatives have emerged on a regional basis and the national government has subsequently tried to take a more systematic approach.[7] In countries where there has been a tradition of strong regional government, for example, Germany and Spain, cluster policy has been designed and implemented at that regional level. Some would argue that in areas like the Basque Country and Scotland this has been a conscious effort to assert independence (Benneworth and Henry, 2004).

A key area of interest, and one that has been little explored (Brown, 2000b), is the way in which cluster policies undertaken at different scales within the same country are coordinated and I will return to this in my empirical work.

3.5.2 The Cluster Policy Process

Academics have used cluster policy process models as frameworks for examining and analysing cluster policies (Benneworth and Charles; 2001; Raines, 2002). Drawing upon these, I propose to discuss five broad components of a cluster policy process; the decision to take a cluster approach; identification, selection and analysis of clusters; participant mobilisation, cluster animation and relation building; selection and

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[7] NUTEK, the Swedish Development Agency, has formed *Klustergruppen,* an initiative to link together regional cluster initiatives to learn from each other and to provide assistance to other regions wishing to implement cluster policy.

implementation of policy instruments and evaluation and policy learning. While broadly sequential, in practice these categories should and do overlap. The categories should form a continuous loop in which the experiences gained in the policy process are fed back into the process. In order to illustrate the cluster policy process I draw on examples from cluster policies in Europe and elsewhere.

3.5.3 The Decision to Take a Cluster Approach

Benneworth and Charles (2001) highlight that the first stage of the process is the very decision to employ a cluster approach at all. The decision to take a cluster approach is context dependent and, on occasion, influenced by funding considerations and determined by policy decisions at a higher level. However, clusters have usually emerged via a market-led process with little government interference. Even where government influence can be observed it has often been, as in the case of Silicon Valley (Cooke, 2002), in the form of government expenditure, often related to defence, rather than in the form of conscious policies to develop clusters. Therefore what is the justification for pursuing a cluster strategy?

Traditionally government intervention in economic development is justified by market failures. However, given that the innovation systems approach indicates that innovation arises through a system and given that policy makers are tasked with seeing 'region economies whole' (Bergman, 1998), intervention can also be justified to correct system imperfections or to enhance systems. Boekholt and Thuriaux (1999, 2000) tabulate the rationales for cluster policy in terms of market and system failures and identify the policy actions and instruments associated with each kind of failure and an adaptation of their table is reproduced in Table 3-1 below.

Table 3-1 Cluster Policy Rationales, Actions and Instruments

Policy Rationale	Policy Actions	Policy Instruments
Government regulations may impact on particular clusters	Organise cluster specific discussion groups to identify regulative problems and take actions to resolve them	▪ Cluster platforms/focus groups ▪ Tax reforms ▪ Regulation reforms
SMEs do not take the opportunity to collaborate with other firms and therefore do not reap the potential benefits due to lack of awareness or due to knowledge bases not overlapping (ie. cognitive distance)	Encourage and facilitate inter-firm networking Encourage joint research Purchase innovative products through collaborative tender procedures	▪ Networking programmes ▪ Brokerage training ▪ Websites ▪ Public procurement ▪ Subsidies for joint research
Firms do not have access to information/knowledge when they operate in isolation	Support cluster based retrieval and spread of information Organise dialogue on strategic cluster issues	▪ Set up cluster specific information and technology centres ▪ Establish platforms to explore market opportunities ▪ Foresight exercises, technology roadmaps
Firms do not access knowledge from public providers, who in turn do not market their knowledge satisfactorily	Collaborative R&D actions and cluster specific R&D facilities	▪ Set up cluster specific technology and research centres/initiatives ▪ Subsidise collaborative R&D and technology transfer

Clusters may lack self awareness and therefore be unable to market themselves as clusters	Identification and public marketing of clusters	▪ Mapping exercises ▪ External promotion of regional clusters ▪ External/internal promotion of cluster members' competencies
Clusters may lack certain components	Attract or promote growth of firms in cluster	▪ Targeted inward investment ▪ Targeted public R&D investment
	Attract/establish major R&D facilities	▪ Support start-ups, spin outs and spin offs
Lack of demanding customers	Act as demanding customer to stimulate innovation in areas where government is a key purchaser	▪ Public procurement policy

Source: adapted from Boekholt and Thuriaux (2000, pp.14-15) and Gilsing (2001)

Boekholt and Thuriaux (2000) also point out that different countries have different rationales for government intervention and in each country cluster policy has to fit with the individual country's policy framework. The Dutch government have three rationales for government intervention: removal of market imperfections hindering interactions within the innovation system; providing input where the social rates of return on R&D investment exceed private rates of return; and matching public research funding to private needs by improving cooperation between firms and the public knowledge infrastructure. All of these rationales are related to the Dutch understanding of innovation as a product of an 'innovation system' and influence the adoption of cluster policies (Roelandt et al. 1999). Benneworth and Charles (2001) point out that in England the decision to implement regional cluster policies was partly as the result of the introduction of Regional Development Agencies. These agencies provided an appropriate mechanism for delivering cluster policies and a remit to deliver cluster policies for their regions has existed since their initiation.

The Aims of Cluster Policy

An EU study (European Commission, 2002) identified two general aims of cluster policy: to strengthen inter-firm collaboration and business networking and to build up, or strengthen, organisations for technology transfer corresponding to firms' needs. However, this appears to offer a very narrow view of cluster policy and it appears useful to consider that different policies have a different focus, be that spatial, SME, innovation or industry. Boekholt and Thuriaux (1999; 2000) identify four broad 'cluster policy models' – National Advantage Model, Inter-firm Networking Model, Regional Development Model and Industry-Research Link Model.

The National Advantage Model. In this model clusters of national importance are identified and framework policies, in areas such as education, regulation and applied research, are developed at a national level, so that the cluster can sustain or improve its competitive position. The Danish Resource Area Initiative is cited as a clear example of this policy approach.

Inter-firm Networking Model. This model usually focuses on the use of networking schemes to improve the capabilities of SMEs. Cluster policy approaches often

include an element of SME networking. The networking is usually amongst geographically proximate firms, but the policy can be implemented by a national government (for example, the USNet programme in the United States or the Danish Networking programme), or it can be initiated at a much more local scale.

The Regional Development Model. Policy makers at a regional level, wanting to improve the attractiveness and economic performance of their region, may focus on certain economic specialisations or regional clusters. Within each region there may be particular goals and priorities such as the embedding of foreign direct investment or improving networking between SMEs (Lagendijk and Charles. 1999). Lagendijk and Charles also point out that cluster policies have a role both at a business level and at a structural level, where cluster policies can be used to reorient economies, and therefore policy instruments will vary and include attraction of inward investment. supply chain development and SME networking. Boekholt and Thuriaux (2000) mention Wales and Scotland as cases of this kind of cluster policy approach.

The Industry-Research Link Model. In this model policies are used to intensify the links between research and industry in certain fields, particularly where there are emerging technologies. Policies are used to try to attract research funding, inward investment and new firms. The Bio-Region initiative in Germany is cited as a good example of this approach.

Each model implies a varying geographical scale of policy intervention and each focus suggests the use of different policy tools to fulfil different aims (Boekholt and Thuriaux, 1999). Therefore the decision to take a cluster approach is justified by a variety of rationales and the decision is highly context dependent. Equally, the aims of cluster policy are varied and are again related to the context in which the policy is designed.

3.5.4 Identification, Selection and Analysis of Clusters

Most academics would concur that clusters cannot be built from scratch by policy intervention, but must build on some pre-existing combination of elements, which

might include firms in inter-related industries, the presence of supporting organisations, research expertise and particular skills within the workforce. Therefore, having chosen a cluster approach, a key aspect of the policy process is to identify clusters of activity where policy intervention may be beneficial. However, the differences between such clusters of activity are substantial and therefore a 'one size fits all' policy is inappropriate and likely to be ineffective. Cluster policy should be specific to the cluster involved and therefore, not only identification, but also detailed analysis of individual clusters is required before policy can be designed. It is particularly important to note that analysis of clusters should be an ongoing process and not a one-off exercise, given that clusters are dynamic and changing (Lagendijk and Charles, 1999).

There are many ways to identify a cluster ranging from complex statistical exercises to pure wishful thinking on the part of policy makers. Porter`s methodology has been detailed in section 2.3 and many articles detail complex statistical methodologies for identifying clusters (cf. Hill and Brennan (2000) on cluster and discriminant analysis, Held (1996) on a combined quantitative and qualitative method, De Bresson and Hu (1999) on the use of innovative interaction matrices compiled from innovation surveys and Bergman and Feser (1999) for a general review). Rosenfeld (1996b) prefers a qualitative approach asking questions in areas including R&D capacity, workforce skills, specialised services and suppliers, social infrastructure and shared vision and leadership.

There are problems with technical methodologies both quantitative and qualitative. There are well known deficiencies in SIC code data (Brown, 2000b), not least that the cross-sectoral nature of clusters cannot be captured. Input-output data and employment data are rarely available at regional level and quantitative analysis can neither capture the soft linkages, the untraded interdependencies that characterise clusters, nor usually detect emerging clusters. Qualitative data has the equally well-known problems of respondent bias, limited sample size and the difficulty of clarifying concepts.

We can conclude therefore that there are methodological difficulties in identifying and understanding clusters but, as Benneworth and Charles (2001) point out, 'the designation of clusters is a highly politicised process, often heavily dependent on the prior existence of sectoral groups to lobby and press government to support particular sectors' (ibid. p.393). Drejer et al. (1999) point out that in Denmark 'the majority of the cluster studies were carried out with specific policy aims as a major driving force' (ibid. p.310).

Feser and Luger (2003) make the point that cluster analysis as a mode of inquiry is fundamentally different from cluster analysis as a technical methodology. Their point is that cluster analysis is inevitably flexible given that there are varying definitions of a cluster, different technical methodologies, different assumptions about spatial scale and different views about the process of cluster development. They point out that the choices made about how cluster analysis is undertaken, and the results from that analysis, cannot be separated from the policy concerns and policy background that led to the cluster analysis being undertaken. At best, cluster analysis exposes interdependencies within economies and challenges existing assumptions about strengths and weaknesses, prospects and challenges: at worst, it contributes to 'naïve boosterism'. Feser and Luger therefore call for a methodology that varies with policy objectives, and transparency in cluster studies with the 'goals, objectives, definitions, indicators, weights, data sources, and models [...] all [...] clearly laid out and the limitations and likely biases of the selected approach explicitly discussed' (2003, p.15).

The Observatory of European SMEs report on Regional clusters in Europe tabulates national studies to identify and map clusters at different geographical scales in ten European countries. The policy background and policy experience have influenced the way in which clusters are identified, but Table 3.2 below highlights the range of results obtained for the same country by employing different methodologies. Using a mixture of quantitative and qualitative data may be the best approach to identifying clusters, but the political nature of the choice of method and scale of analysis cannot be ignored. Enright (2000) also makes the important point that non-recognition within a policy framework does not mean a cluster does not exist.

Table 3-2 Cluster Analysis and Mapping Exercises

Country	Criteria used to identify clusters	Number identified	Examples of clusters identified	Reference
Austria	Technological clusters identified on the basis of patent applications	11 clusters found within 5 groups	Telecommunications, construction, sports equipment	Peneder (1999)
	Trade performance supplemented by in-depth case studies	21 clusters	Wood and paper	
Denmark	Porter studies (1987-1991) following on from work on industrial complexes	5 clusters	Agro-food, shipping	Drejer et al. (1999), Dalsgaard (2001)
	Resource areas dividing whole country into 8 areas covering broad industry domains interrelated across branches and sectors	8 resource areas and a residual	Agro/food, construction	
	Mega clusters emerging from resource area work	12 mega clusters	Construction	
	Qualitative interviews of 75 informants and quantitative indicators relating to growth and exports	29 Clusters of competence at regional and national level	Children's play and learning	

Finland	Porter inspired analysis supplemented by qualitative data	10 national clusters	Forestry, telecommunications	Rouvinen and Ylä-Anttila (1999)
	Input output analysis	5 clusters (incorporating some of the previously identified national clusters)	ICT, metals, forestry	
France	Studies commissioned by DATAR (the French regional policy ministry) to identify local production systems (LPS)	144 existing LPS and 82 emerging or virtual LPS	Mainly small firms in craft-based industries	Raines (2001), European Commission (2002)
Netherlands	Porter inspired monographic case studies	Cover 60 industry groups	Construction	Roelandt et al. (1999)
	Input/output analysis	12 national clusters	Agro-food, energy, health	
Norway	Porter study	8 national clusters	Petroleum, maritime, fishing	Isaksen (1997), Brandt (2001)
	Quantitative identification of regional clusters using location quotients and further criteria relating to a minimum no. of establishments and supply chain relationships	41 regional clusters	Ship building, fish processing, furniture	
	Input output analysis	6 national clusters	Agrofood, oil and gas extraction, construction, paper and graphical, transport, and information-intensive activities	

Scotland	Scottish enterprise/Monitor study – identification of 'high point' sectors, identification of linkage through input-output analysis, identifying associated organisations	30 potential clusters re-aggregated into 13 broad clusters	Oil and gas, semiconductors, food and drink	Learmonth et al. (2003)
Sweden	Original Porter study (Advantage Sweden)	5 national industry clusters	Transportation industry, forestry, materials/metals	Ivarsson (1999), Lundequist and Power (2002), Eklund et al. (2002)
	Ministry of Industry study	10 national clusters	Similar to Porter study	
	'Klustergruppen'	13 regional cluster initiatives	Aluminium, medical and health, telecoms	
United Kingdom	DTI/Trends Business Research predominantly based on employment data	154 regional clusters	Agriculture, biotechnology, aerospace, ceramics	Department of Trade and Industry (2001)

Source: adapted from European Commission (2002)

Cluster analysis can be used to obtain a detailed understanding of the cluster in order to tailor policy measures (Brown, 2000a). Cluster analysis can also be used as part of the dialogue process, rather than being expected to give one 'right' answer. Roelandt et al. (1999) point out that, in the Netherlands, cluster analysis and cluster studies have moved from being analytical devices to gain insights into individual clusters, to being the starting point for discussions on potential policy interventions.

3.5.5 Participant Mobilisation, Cluster Animation and Relation Building

Lagendijk and Charles (1999) point out that cluster initiatives come from a political structure showing a tendency towards governance forms based on networking and partnerships and, as discussed in section 3.4.3, this highlights a new role for policy makers – that of 'animateur' (Morgan, 1997b). There is a suggestion that, within cluster policy, the public sector should act as a catalyst only (European Commission, 2003). However, there is a need for a balance between waiting to be industry led and needing to intervene (Cooke, 2002). Cooke goes on to point out that, in the context of regional cluster policy making, it takes time for regional administrative bodies to develop the competencies to design such policies and also that they do not necessarily have the financial or political power to influence, for example, university research agendas.

Therefore cluster policy making suggests a new role for the public sector and involves a participatory approach leading to the use of the term 'business led', but what does this actually entail? If support is more demand led, the requirements very quickly become sector or cluster specific and specialised, and public authorities do not have this expertise. An associational trend is therefore required to involve the private sector and other parts of the public sector (Lagendijk, 2000). Business involvement should be, and is often, part of cluster analysis, even of a quantitative kind, as local actors can reinforce or rebut results. However, the role of businesses and other organisations is even more significant when it comes to designing policy interventions because the cluster approach implies a demand led approach to designing policy, rather than the supply driven approach that has gone before. A cluster approach is about identifying problems and then reaching a consensus as to solutions. Altenburg

and Meyer-Stamer (1999) highlight the importance of benchmarking exercises in drawing attention to the need for action. A key element is to mobilise all the actors in a cluster and identify the common issues that are of concern to them. It appears that, at this stage, the role of policy makers should be to facilitate discussions and draw out the true nature of the problems. Held (1996) points out the role of focus groups in contributing to the analysis of clusters, but also in developing an identity and generating policy options. Therefore actors from the cluster should be involved in the analysis of the cluster, the identification of issues and the design of solutions, and their role in the process should continue beyond the policy design stage.

If there is a new role for public policy makers as catalyst and animateur, and a role for the private sector in the design of cluster policy, there is also a new role for the private sector in the implementation of cluster policy. Andersson et al. (2004) conclude that 'to underpin successful policy intervention a better understanding of the role of different players is required' (ibid. p. 8). They identify four types of players – firms, policy makers, academia and finance and also highlight the relevance of what they term 'clusterpreneurs' and 'glue organisations'. The role of finance is certainly significant in the development of clusters and cluster policy, but has not been the subject of this thesis. The role of firms, organisations, policy makers and, to a lesser extent, academia, will be examined in my empirical work and the literature particularly in respect of individuals and organisations is considered below.

Porter and Emmons (2003) highlight the role of what they term, 'institutions for collaboration' or IFCs. IFCs are those organisations that are not government entities, regulatory agencies, companies or universities, but do have an effect on the environment in which firms operate. IFCs include 'industry associations, professional associations, chambers of commerce, technology transfer organisations, quality centers, non-profit think tanks, university alumni associations, and others'. Such organisations can play an important role in cluster policy and provide important services to the cluster. Given the time constraints for those operating businesses, these organisations have an important role in understanding the needs of the business community, expressing these to policy makers and can potentially deliver policy initiatives. They can provide industry knowledge without bias from individual

commercial interests; undertake competence audits to add to the analysis of the cluster; identify cluster activities; encourage interest in cluster activities amongst cluster actors; coordinate and implement cluster activities; promote the cluster initiative externally; gather and share information, and provide meeting places and networking opportunities (Andersson et al., 2004). Bathelt et al. (2004) see these institutional arrangements as contributing to the local 'buzz' (cf. section 2.7.4) by providing meeting places and opportunities for social interaction and argue that '[o]ver time, these structures of social relations stimulate fine-grained information transfer, joint problem-solving arrangements and the development of trust and reciprocity' (2004, p.39). Interestingly, although they note that different kinds of agglomeration will generate different kinds of buzz, Bathelt et al. (2004) do not see a particular role for policy makers in generating local buzz, considering that 'it largely takes care of itself' (ibid. p.48). They recommend that policy makers instead consider support for the development of 'pipelines' to link clusters to external sources of knowledge. However, it does appear that policy-makers could also have a role in fostering and linking organisations that might contribute to a local buzz.

Given the potential number of actors involved in cluster policy it is not surprising that Eklund et al. (2002) conclude that there is a need for a cluster 'animator', charged with initiating and implementing cluster policy measures. These animators can be from the public or private sector and can be organisations. Their role is to communicate and maintain unity. This role may be akin to that of the 'collective agent', identified by Camagni (1991) as increasing the synergy effect within a milieu. Andersson et al. (2004) go further and identify eight competency groups (leadership; integrity; enabling capabilities; interpersonal skills; knowledge and vision; management skills; analytical skills; and resources) that they see as being required, in varying measure, at different stages of the cluster development process (cf. Andersson et al., 2004, pp.84-85). They also discuss the role of the 'clusterpreneur' who is seen as combining many of these competencies and is described as being '*visionary, facilitative, analytical* and *excelling in networking*' (ibid. p. 100, italics in the original). What is less clear is how this individual emerges and how policy makers can identify them.

Storper (2002) considers a mechanism by which policy-makers can identify key individuals. He concludes that coordination is the key problem in economic life and conventions are a key mechanism for achieving coordination: coordination exists because of conventions, and conventions arise through coordination. He concludes that such a circular relationship poses particular problems for policy makers and recommends two unorthodox policy strategies – 'talk' and 'confidence'. Both are related to my notion of participant mobilisation and relation building. Policy makers can play a role in 'getting low cost talk going' (2002, p.140). The talk must involve deep communication and there must be confidence that it will be an ongoing process. Storper indicates that talk can be encouraged by incentive, but suggests that this is only a short term solution, preferring 'small, repeated, experimental interactions' (ibid., p.142) which echo the discussion of trust in section 3.2.2 and the policy recommendations of Altenburg and Meyer-Stamer (1999) and Boekholt and Thuriaux (1999). Through talk, the actors who are key within clusters can be identified or, as Storper explains, '[t]he second step is the definition of the capacities for action and identities of actors which are associated with the world(s) of production to be assisted by policy' (2002, p. 154).

However, while policy makers can play a positive role in encouraging interaction and talk, Andersson et al. (2004) note that 'the active involvement of policy makers [can] impact, positively *or negatively*, on the scope for, and direction of action by, private sector representatives, such as Institutions for Collaboration (IFCs), individual entrepreneurs and businesses, and also civil society' (ibid. p.11, emphasis added).

Therefore the private sector and other bodies such as universities have such a key role in designing and implementing cluster policy, that considering participant mobilisation, cluster animation and relation building as a discrete stage of the policy making process is justified, even though their involvement is necessary throughout the other stages. As was mentioned above, in the analysis stage, participation of cluster actors, with their in-depth knowledge, strengthens analysis. And as will be seen, the drawing up of action plans and their implementation is more finely tuned and effective with private sector involvement and commitment. Evaluation is also more

effective with the involvement of stakeholders. Relation building is also seen as a key part of this stage and it is part of the intended outcome of the cluster policy process.

3.5.6 Selection and Implementation of Policy Instruments

While relation building is a key objective of the cluster policy process, it may also be possible to design, again in conjunction with cluster actors, policy interventions that may assist in the development of the cluster. There is no specific cluster policy instrument, but the potential policy interventions link back to the rationales for government intervention (see Table 3-1) and depend both on policy makers' understanding of clusters and the specific policy making environment in which policy is being designed. For example, Enright (2000) categorises cluster strategies by the extent of government intervention, which can either be *catalytic* with government playing a facilitating role in encouraging private led clusters or *interventionist* with a more active role for government.

Also, and crucially, a cluster approach should involve tailoring initiatives to meet the requirements of individual clusters. Jacobs and de Man (1996) stress the need to consider the geographical coverage of the cluster; the horizontal, vertical and lateral linkages; shared technologies; any central actor (for example, key firm or research establishment) and the quality of the network. Altenburg and Meyer-Stamer (1999) in their work on Latin American clusters highlight the need to formulate policy responses appropriate to the *type* of cluster under consideration. They identify three types of cluster in Latin America: survival clusters of micro and small scale enterprises; advanced and differentiated mass producers; and clusters of transnational corporations. They conclude that for the survival clusters, policy should concentrate on generating dialogue, identifying joint problems and ensuring successful pilot projects to demonstrate the benefits of cooperation. For the mass producer clusters, the emphasis should be on upgrading capabilities, improving regulatory frameworks, using inter-firm cooperation in non-core activities such as environmental protection, providing information and advisory services, ensuring training provision is adequate and relevant and taking a step-by-step approach to build relations between firms and technology providers. For the clusters based around Transnational Corporations,

policies should aim at embedding and deepening the cluster by attracting additional foreign investment, undertaking supplier development and ensuring technology transfer to local firms. Brown (2000b) also makes the point that policy must be sensitive to the stage of development of the cluster (cf. Enright, 2000 and section 2.2.4). Different policy instruments are important at different stages of the cluster.

Roelandt et al. (1999) identify different innovation styles within clusters and note that the significance of different actors and relationships vary within different styles. They categorise clusters as *self-creating clusters* which are knowledge-intensive. and where firms and research institutes generate research within the cluster; *absorptive* where little research is conducted and innovation is dependent on the supply base: *self-sufficient* where research is not conducted by firms but is generated within the cluster by research institutes and *knowledge–intensifying* where research and technology are used to increase the knowledge intensity of their products which are then supplied into other clusters. Policy initiatives need to take into account such varying innovation styles.

Therefore cluster policy initiatives will vary according to the policy makers' goals and understanding of clusters, and should also vary according to the specificities of the clusters selected for policy intervention. All the studies mentioned above emphasise the significance of the second stage of the cluster policy-making process – identifying, selecting and *analysing* clusters. It is necessary to understand the cluster before attempting to design policy interventions.

However, having argued that there is a need for a tailored approach, it can also be concluded that a particular range of policy instruments is often associated with cluster policy. As discussed in section 3.2.1, Porter identifies five categories of actions for upgrading clusters – providing infrastructure; encouraging dialogue; information collection and provision; dealing with regulatory issues and marketing. Raines (2002. pp.28-29) highlights three broad objectives of cluster policy, which he relates to three aspects of a cluster, and for each objective he details associated policy measures and these are tabulated below in Table 3-3.

Table 3-3 Types of Cluster Policies

Aspect of a cluster	Objective of policy	Policy Measures
Interactions amongst cluster actors (firms, trade associations, universities)	Increase interaction by creating conditions for cooperation and increasing or highlighting incentives for cooperation	• Incentives for joint R&D • Provision of business premises to encourage interaction • Network brokering
Presence of common competitive advantages in the form of specialised labour markets, research expertise, specific tacit knowledge	Development of common resources to improve competitiveness of the cluster	• Provision of information • Technological and business infrastructure • Technology transfer • Tailored skills training • Venture capital provision
Collective awareness and understanding of the cluster, and sense of belonging to the cluster	Building internal awareness of the cluster (identity building) and projecting the identity of the cluster (identity projecting)	• Cluster mapping • Marketing and brand building • Foresight and benchmarking exercises • Setting up cluster representative organisations

Source: adapted from Raines (2002a)

I want to highlight that while there is no single cluster policy instrument and the design of cluster policy initiatives is influenced by policy making traditions and the goals of policy makers, certain themes and policy tools are particularly relevant within cluster approaches. This can be illustrated by considering Table 3-4, which tabulates some of the different processes that have been used worldwide to develop clusters.

Table 3-4 International Cluster Policies

	Cluster Policy process	Policy instruments	References
Austria	• Policies mainly taken forward at a regional level by regional governments and regional development agencies • Some national initiatives 'cluster-informed'	• Styrian automotive cluster – establishment of brand name, cooperation amongst local suppliers, joint research, attracting FDI • Competence Centre Programme to establish collaborative research institutions	Peneder, (1999), Brown (2000b)
Denmark	• Resource Areas with policy aims of regulation, access to knowledge, access to capital, public-private partnership and international competitiveness • Networking programme	• Reference group of representatives from firms, ministries and organisations created for each resource area. Working groups established for particular tasks. Overseen by steering committee of the Danish Ministry of Trade and Industry • In 1989 Danish Technology Institute designed a networking programme consisting of a publicity campaign, training for brokers, competitive grants programme for groups to design and implement activities together.	Drejer et al., (1999), Brandt (2001).
Finland	• Cluster analysis and cluster-based policies applied at national and regional levels • Cluster thinking applied to industrial policy and technology policy	• Creation of economic vision for the nation through 'Advantage Finland' • Framework policies to increase national advantage in key areas e.g. telecommunications, forestry • Inter-ministerial cluster based programmes to gather key stakeholders to plan and execute projects and create platforms for cross-disciplinary networking • Cluster specific, collaborative R&D programmes to link university research, R&D laboratories of large companies, suppliers and start up firms. • History of networking programme built on Danish model	Korhonen, (1996), Rouvinen and Ylä-Anttila (1999), Luukkainen (2001), Cooke (2002).

Netherlands	• Three stage process with' gates' to pass through • Information – gathering of strategic information to identify clusters of strategic importance • Initiation –interactive collection of information with stakeholders involved to assess cluster and potential role of government • Implementation–actions to overcome imperfections identified as the rationale for intervention. Crucially the policy role depends on the individual cluster	• Framework policy • Competition policy and deregulation • General technology policy • Macroeconomic policy • Solid and reliable physical infrastructure • Broker policies/organising stakeholders • Providing strategic information • Establishing dialogue between firms and research institutes to identify new market opportunities • Public procurement policies and acting as demanding customer to stimulate innovation particularly in the areas of health, construction and infrastructure	Roelandt et al. (1999), Gilsing (2001)
Norway	• No clearly articulated national cluster policy	• REGINN (regional innovation programme) has cluster characteristics. • Some regional policies are of a cluster type. • Emphasis on SME networking	Brandt (2001)
Scotland	Clusters categorised as existing and emerging. Pilot clusters chosen to undertake a one year process involving • Industry review with partners in each cluster • Drawing up of action plan with partners • Agreeing implementation, roles and responsibilities • Obtaining targeted results Ongoing feedback loops to ensure the securing and maintaining of industry and partner support	• Forums to identify needs • Tailored initiatives • Skill development and technology policies linked to cluster strategy	Lagendijk and Charles (1999)

Sweden	• Process mainly related to regional cluster initiatives. • Circuitous process involving • Strategic decision making process • Current status analysis of prerequisites for the cluster project • Project planning and project organisation • Implementation and evaluation • Aiming to create a management group of key individuals and creating engagement and participation.	• Mapping studies undertaken did not strongly influence national policy, although competence centres established • RDAs in Sweden taking a cluster approach, especially East Sweden Development Agency • NUTEK the Swedish Development Agency established *Klustergruppen* in 2000 to link together regional cluster initiatives • Cluster approach used by Invest in Sweden to promote Sweden as an attractive location for FDI • Cluster approach often present in the 'Regional Growth Agreements' signed by each Swedish county	Brown (2000b), Brandt (2001), Eklund et al. (2002), Lundequist and Power (2002), Hallencreutz and Lundequist (2003).
UNIDO	• Clear process model comprising, • Cluster diagnostic analysis • Identify vision • Prioritise actions • Implement and monitor	• Cluster development projects carried out in Latin America, Africa and Asia since 1995. • Emphasis on fostering collective efficiency of small scale enterprises and improving their support system	Ceglie et al. (1999), Russo (1999), Clara et al. (2000)

No matter which policy instruments are utilised, Eklund et al. (2002), from a review of Swedish regional cluster initiatives, identify seven general requirements, which they see as being necessary for successful cluster development – the presence of cluster animators; support for competence and skills development; the availability of meeting places; division of labour in cluster development; brand building and a vision for the cluster. These aspects will be discussed further in the chapters detailing my empirical work, but before drawing some conclusions about what makes the cluster policy process distinctive, I want to consider the last stage of my stylised cluster policy process – evaluation and policy learning.

3.5.7 Evaluation and Policy Learning

The aims of evaluating economic development policy are three fold. They are firstly, to assess the *efficiency* of policy in terms of the operation of delivery mechanisms; secondly, to assess the *effectiveness* in terms of whether policies have had the anticipated impact and finally, through assessing the efficiency and effectiveness, to enable *policy learning* via a feedback loop into the policy making process. In undertaking an evaluation of any economic development policy there are certain generic problems. These include questions of *additionality* (would the impact have been seen anyway?), *displacement and substitution* (has the effect been achieved at the expense of another area or organisation ineligible for assistance?), ascertaining the *counter-factual position* (what would have happened in the absence of policy?) and considering the *multiplier effect* of the policy (what are the knock-on effects?). However, there are particular problems with evaluating cluster policy because the situation is complicated by firstly, the need to consider the unit of evaluation given that benefits should arise at a cluster level, as well as at a firm level, and secondly, the need to define success given the focus on 'softer' social and institutional measures as well as 'harder' targets such as job creation.

Level of analysis. Economic development policy traditionally has a dual purpose – the development of individual firms and the development of the region or other territorial area under consideration and, not only is the way in which the two are related key (Lagendijk, 1999), but it can be harder to assess the wider benefits than to discern advantages for individual businesses (Rosenfeld, 1996a). When using a cluster

approach there is a triple focus – the development of the individual businesses, the development of the cluster and, as a result, the development of the wider territory. Again this highlights the importance of mapping and analysing and understanding the cluster in order to identify the object of the evaluation and illustrates that the lack of availability of cluster level statistical information can be problematic, both in identifying clusters and in evaluating policies towards them. Additionally the cluster is a fluid entity and over time the firms and organisations that comprise the cluster will change. Raines and Tsagdis (2002) therefore discuss the notion of 'collectives'– identifiable groups of interacting actors, and propose that they could be the objects of evaluation.

What is success? Measurables and deliverables. Given that cluster policy is not a single instrument, but an amalgam of separate initiatives and regulatory reforms, not only is the object of policy and level of analysis hard to define, but also the outcomes of cluster policy can be difficult to single out. Cluster policy has wider and more intangible objectives than can be captured by traditional indicators of economic policy development success. The more intangible objectives may include changed behaviour and attitudes of actors within the cluster, and increased levels of innovation. Henderson and Morgan (2002) distinguish between linear indicators, which focus on 'hard' outputs (patents, R&D expenditure, workforce qualifications) and interactive indicators, which aim to measure 'softer' indicators (institutional linkages, network formation, information flows). Despite attempts to develop proxies, such as patenting activity and headcounts at network meetings, the more intangible objectives cannot be captured by quantitative methods and require in depth qualitative observation and analysis (Diez, 1999). Strict targets with measurable indicators are therefore not only difficult to identify, but may be counter-productive as they force the pursuit of particular targets, which may not have been the most appropriate way to tailor support (Lagendijk and Charles, 1999). However, the political reality and funding regimes for many cluster initiatives, especially those financed through European structural funds programmes, mean that, in many cases, specific targets, including the number of jobs created, are imposed. Evaluation is then of an accounting kind to ensure funding has been applied correctly. While those given public money must be accountable, this focus on short-term measurable achievements may distort project design.

Given that I have suggested that cluster policy should be viewed as a process, I would argue that the cluster policy process itself, as well as the outcomes, should be evaluated. Diez (2001) advocates a holistic approach so that the essence of the cluster approach is captured rather than each policy strand being considered in isolation. She also points out the highly contextualised nature of cluster policies which are deeply rooted in their social and economic environment and calls for these factors to form an integral part of the evaluation.

Raines (2000) suggests a method for evaluating cluster policies by both measuring cluster activity (for example, by benchmarking with comparative clusters in terms of growth) and also linking cluster activity, particularly that initiated by policy makers, with economic development (for example, linking brand building with increased export sales). He stresses that, given the resource intensive and expensive nature of such detailed evaluations, it is more important to identify positive progress than to be able to quantify it. He expands on this in a later paper where he argues that there is a need to focus on directionality and sustainability (Raines and Tsagdis, 2002). The cluster should be showing progress on many fronts and these improvements should be sustainable. Diez (2001) also doubts the applicability of very quantitative, objective evaluation arguing that 'when attempting to evaluate complex policies involving broad interrelated aims, the objective of the evaluation must be to create practical knowledge, instead of mechanistic judgements concerning the results' (ibid. p. 918). Rosenfeld (1996a) similarly raises the example of the Michigan Modernization Service programme of grants for collective activity, which was evaluated not in terms of measurable outcomes, but in terms of lessons that could be learned for subsequent programmes.

Diez (2001) argues that not only is the use of qualitative indicators indispensable, but also suggests that an assessment of the effects of policies should be obtained from the beneficiaries and intermediate organisations involved. She outlines a method of participatory evaluation resulting in collective learning for all the actors involved in the process and argues that such a participatory approach is a natural extension of the idea of involving all stakeholders in the policy making process. That said, Rosenfeld (1996a), writing about network programmes amongst SMEs in the United States, notes that 'network members do not report (or may not even realise) all of the ways in

which working more closely with peers affects their operations' (1996a, p.248). Henderson and Morgan (2002) suggest that continued participation may be a mark of success for networking programmes and certainly business people are unlikely to continue to participate if they do not obtain any benefit from so doing, but the effectiveness and value of such participation is harder to measure. Another measure would be whether firms had engaged in new, similar, collaborative arrangements.

Therefore there are particular issues when evaluating cluster policy and there needs to be clarity with regards to the unit of analysis or level at which evaluation takes place. The many different strands of a cluster policy approach need to be taken into account, suggesting a holistic approach to evaluation. Such an approach may necessitate a focus on the general progress of the cluster, rather than on strictly quantifiable measures. In many cases evaluation frameworks have not been established for cluster policies, partly because many such policies are relatively new and experimental. However, there is an increasing recognition of the need for appropriate evaluation and attempts to design evaluation frameworks and Andersson et al. (2004) point out that the actors involved in the cluster policy will have a better sense of direction if the evaluation framework has been established in advance. Learmonth et al. (2003) are developing, and have documented, the evaluation framework for Scottish Enterprise's cluster policy. The evaluation framework will measure the impact of cluster policies at the macro, meso and micro (firm) level. It will account for the long timescale over which cluster policies have an impact and it will seek to measure tangible and intangible outputs. Similarly Pickernell et al. (2005) have documented a multi-method framework for understanding, reviewing and monitoring sectors in the Welsh economy and Cassidy et al. (2005) have outlined a pilot method of cluster evaluation in Canada.

In the same way as cluster policy should be context dependent, it can be argued that cluster policy evaluation must also be context dependent and that 'evaluators must use the models and techniques that adapt best to each situation' (Diez, 2001, p.915). While this may appear to suggest that 'anything goes', it should rather be seen as suggesting a new role for evaluation as a participatory process used throughout the policy making process as a way of policy learning, rather than as an independent add-on at the end of the process. Evaluation should result in a 'learning loop' so that the

results are fed back into the policy making process (Lagendijk and Charles, 1999). This is particularly important in a policy environment where, as Nauwelaers (2001) points out, policy makers are the part of the system they are trying to influence.

3.6 What's New?

From these discussions around the rationales for cluster policy, the focus and aims of cluster policy and the cluster policy process it can be seen that there are many facets to a cluster approach, but what is new? What differentiates a cluster approach? Again there is no consensus.

Some academics see the starting point of a cluster approach as its distinguishing feature. Policy makers look to build on available resources and the current environment in which firms and organisations operate. Therefore, for Enright (1996), it is the indigenous nature of the material policy makers are working with, with an emphasis on developing the skills, capabilities and industrial base found in regions. For Boekholt and Thuriaux (2000), cluster policy all stems from a view that 'improving competitiveness or increasing innovation is an interactive process between firms and their environment' (ibid. p. 5). Therefore cluster policy is about stimulating the links to that environment. This once again highlights the significance of understanding and analysing the base from which policies can be developed.

For others, it is the type of policies that are put into place that distinguish a cluster approach as they are both broad and wide ranging, and tend to focus on linkages between actors. For Raines (2002) cluster approaches have common themes in the role of cooperative behaviour and a multi-faceted approach to policy support. Nauwelaers (2001) points to the focus on developing linkages and synergies and Feser (1998) notes that one hallmark of a cluster specific approach is that it is holistic in nature.

However, looking at the outcomes of the cluster policy process reveals another aspect – the formation of 'club goods'. Benneworth et al. (2003) see such assets as defining cluster policy, arguing that '[a] cluster policy can be regarded as any policy which seeks to encourage transient relationships to solidify into more tangible and sustainable cluster assets' (ibid. p. 518). Lagendijk (2000) defines club goods as

'assets that are accessible and beneficial to specific groups of businesses and organizations in a locality' (2000, p.174). He goes on to outline particular characteristics of 'club goods', pointing out that they can be conventional in nature, such as a specialised labour market and dedicated infrastructure, but that the key club goods are associational in nature and represent relational assets that can 'underpin the institutional capacity for reflexive and strategic action' (2000, p.174). These are akin to the conventions that Storper (2002) maintains permit coordination amongst economic actors (cf. section 3.5.5). Therefore the cluster approach aims for the production of cluster specific assets in the form of 'club goods', both tangible and intangible, outside of individual firms but available to be exploited by actors within the cluster, depending on their individual motivations, strategies and capabilities.

For some it is the policy making *process* that is distinctive, particularly its participatory nature. For Benneworth et al (2003) the difference is the way policy has been produced from a two-way dialogue between academic and policy spheres. Nauwelaers (2001) notes that cluster policy involves a more interactive way of implementing policy and Feser and Luger (2003) also see cluster policy as differentiated by a participatory rather than top down policy making process. Nauwelaers (2001) also points out that a cluster approach is more than a strategic and interactive way of developing policy, it also involves a focus on 'orgware', rather than hardware and software.

Therefore it can be argued that, although taking a cluster approach can, and should, result in differentiated policies (depending on the context in which the policy is designed, the aims and focus of the policy maker and the specific requirements of the cluster), the cluster approach is distinctive. A cluster approach is differentiated by its starting point which is very much the existing resource base of a territory; by its approach which is holistic, inclusive and focused on synergies, and by the intended outputs which are cluster specific assets, 'club goods', available for exploitation by actors within the cluster.

I would argue that the cluster policy-making process set out above provides a framework to draw together all these threads. The decision to take a cluster approach reflects the policy-making context and the rationale and goals for intervention. The

identification, selection and analysis phase clarifies an understanding of a territory's economic structure and starts to bring on board actors from within that structure, but from outside normal policy making circles. This participatory aspect is continued through the participant mobilisation stage, during which a vision for the cluster should be agreed. The policy instruments employed are varied and depend on the analysis of the needs of the cluster and its developmental stage. Evaluation is of the cluster development process, as well as the outcomes, and can be participatory, should be ongoing and provides an opportunity for learning in policy circles.

3.7 A Cluster Approach: Myths and Misunderstandings: Caveats and Conclusions

Therefore I would argue that there is a distinctive cluster approach to policy. However, this approach to policy is frequently misunderstood and meets with far from universal approval. Having highlighted a number of myths and misunderstandings around clusters, we can consider first, the criticisms of those who, while supporting the use of the cluster approach in policy, highlight caveats to pursuing such an approach, and second, the criticisms of those who challenge the use of clusters in policy.

Drawing on the work of Centre for Urban and Regional Development Studies (2003) and Peneder (1999) it is possible to debunk some myths and misunderstandings about cluster policies, as follows:

A cluster approach is not a specific policy instrument. A range of policy instruments, including technology transfer and networking initiatives, can be used to develop firms within specific clusters. Most clusters are also affected by other public policies. For example, aerospace and marine engineering clusters will be affected by defence procurement policies; biotechnology and pharmaceutical clusters will be affected by health policies and drug regulation. Therefore the cluster approach is not a specific policy instrument; rather a cluster specific approach moderates existing policies affecting particular clusters and designs specific initiatives to develop them.

A cluster policy is not a strategy for 'picking winners'. Cluster analysis should involve a much better understanding of the linkages and synergies between different industries and parts of industries. This should enable policy makers to establish priorities, to schedule initiatives and in certain cases take action to improve the regional economic structure (Lagendijk and Charles, 1999), but should not equate to a naïve attempt to 'pick winners'.

A cluster policy does not necessarily involve large-scale government schemes. On occasions new policy initiatives will not be required at all because cluster policy is often about tailoring existing programmes to meet specific cluster needs and removing barriers to growth.

Collaboration is not sufficient to build clusters. In successful clusters, even where there is a degree of collaboration, it is not necessarily formal, intentional cooperation. Cluster policies often focus on developing cooperative relationships between firms, but successful clusters cannot be accounted for on the basis of cooperation alone and the development of cooperative relationships, while potentially beneficial, is not sufficient for cluster development.

Cluster policies do not have to be private sector led. Indeed some of the most successful clusters have grown out of substantial public investment and procurement policies (for example, aerospace clusters). Public sector involvement will vary from situations where well-established private sector groupings approach the public sector for assistance, to situations where the public sector can identify an emerging cluster, but that cluster has little or no identity and the public sector needs to develop appropriate policies to achieve a vision for the cluster.

Not all regions can have multiple clusters although many may have multiple cluster development policies. In England, at least eight of the nine Regional Development Agencies have at some point identified a business and financial services cluster within their region. Given that a cluster should be overly represented in its region and significant at least nationally, if not internationally, it is extremely unlikely that so many business and financial services clusters exist. However, a policy to promote

clustering within business and financial services in each of these regions might prove an effective way to provide business support.

Cluster policies are not just for firms in so-called high technology industries. Many policy makers have chosen to focus on new industries based on new technologies but many clusters are based around more traditional industries and policy makers should consider all clusters, not just those around biotechnology and information and communication technologies.

Held (1996) classifies various potential pitfalls including: 'prescribe but don't identify', where cluster type remedies are initiated without cluster analysis: 'identify but don't prescribe' where purely quantitative analysis gives little guidance for policy: 'say cluster but think industry' which involves reverting to more traditional narrow sector policies and 'only the "classic" cluster will do', where policy makers are only interested in clusters dominated by vertical supply chain linkages. Roelandt et al. (1999) also highlight that policy makers should not try to create clusters from 'scratch'; should not try to take a direct lead in cluster initiatives, acting instead as a catalyst and broker; should not focus on analysis alone; should not stifle competition and should not ignore small and emerging clusters.

However, the most cautionary note of those opting the 'proceed with caution' approach regards the way in which clusters have been selected for support. A cluster approach should focus on the endogenous potential within a territory and should be an individual tailored approach - why then are such similar clusters identified in so many locations? Enright (2000) points out that '[i]t would be particularly ironic if a process predicated on the embeddedness of economic activity into local society results in the same set of disembodied policies regardless of the local context' (ibid. p. 327).

There are particular problems for non-core regions in developing cluster strategies. Where there are few obvious endogenous strengths it is tempting to aim for clusters that are at best a product of wishful thinking. The recommendation is therefore not to go for high-tech (in the traditional sense of the word) clusters, for example, biotechnology, but rather to look to exploit local university strengths and attract compatible R&D inward investment (European Commission, 1999b). Feser (1998)

points out the paradox that the traditional goals of regional policy are to reduce economic disparities between regions. However, industry clusters are likely to be stronger in economically strong regions. If policies encourage the promotion of clusters throughout a nation the disparities between regions may therefore increase causing further problems for non-core regions.

Not only should the clusters selected typify the unique strengths of the region but policies should consider the dimensions of the cluster and the stage of the cluster and look to improve the relevant dimensions considering, not only the areas requiring improvement, but also the areas in which policy actions will make a difference. Particular attention is required to ensure that clusters are adaptable in the face of external changes. Clusters are a product of specific historic development trajectories and are path dependent. They therefore may face risks of functional, cognitive and political lock-in and decline (Grabher, 1993a). Enright (1996) identifies five failure mechanisms from the literature; falling demand for the cluster's products, organisational obsolescence, competition, loss of ability to coordinate activities and ossification. There is therefore a role for policy in helping clusters to adapt and change in the face of external pressures, particularly as too much support for existing trade and products can delay a required radical reorientation of a cluster (Boekholt and Thuriaux, 1999). The type of innovation encouraged by the learning-by-interacting approach fostered in regional clusters is likely to be of an incremental type and therefore not only must policy makers ensure that clusters deal with the risks of lock-in, they should also encourage them to be open to the sources of radical innovation, which are often to be found in universities and research institutes (Asheim and Cooke, 1999).

Other critics are more trenchant in their opposition to a cluster approach. Lovering (1999), in criticising the new regionalism, of which cluster policy could be said to be a part, argues that such policies are merely tinkering and too insignificant to solve the true problems of regions such as Wales. He argues that the whole agenda is being driven by policy makers, who are ignoring welfare and macro issues, and is being bolstered by the rise of a regional service class and academics chasing research contracts. Hudson (1999) also points out the limits to a policy based around

'learning'. However, Morgan (1997b) defends the approach as sound in theory and worthwhile in practice, if not sufficient.

Enright (2000), writing about the case of Venezuela, highlights a more serious allegation. Particularly with the spread of cluster type approaches to such developing countries, there is the possibility that cluster policies will be used, and absorb considerable resources, when they are inappropriate because certain skills and basic infrastructure are missing.

Martin and Sunley (2003) see the popularity of clusters in policy terms as a passing fashion successfully branded by Porter, '[a]t its best the current policy preoccupation with cluster strategies looks like a fad for a fairly imprecise and flexible label for differing combinations of measures' (ibid. p. 28). However, they appear to accept many of the ideas behind a cluster approach provided they are not harnessed to the cluster 'brand'. They outline four main varieties of public goods that cluster policy seeks to provide; cooperative networks and the facilitation of dialogue between firms and other agencies; the collective marketing of an industrial specialism; the provision of local services targeted on industry specialisms; the filling of gaps and the strengthening of linkages in cluster value chains. They then state:

> It is by no means our intention to argue that all of these measures are, in themselves, misguided and of no benefit to local and regional economies. However, what is dubious is whether setting and attempting to implement such policies within a cluster framework actually improves their effectiveness and outcomes. In many cases it appears that the cluster framework is either unnecessary or even constraining (2003, p. 24)

While I would agree that Porter's specific cluster framework may be unnecessary or constraining, I would argue that a cluster approach can be beneficial in delivering tailored policies through a participatory process predicated on a detailed understanding of the local economic (and cultural, social and political) environment. Where a cluster – a pronounced and recognisable critical mass of firms and associated support organisations and research and education establishments exists, that cluster

can provide an appropriate scale at which policy makers can intervene to generate 'talk', which can lead to a tailored programme of policy actions.

In this chapter, I have outlined the theoretical justifications for taking a cluster approach to policy and the pragmatic reasons why the cluster approach has appealed to policy makers. I have outlined a cluster policy process involving the decision to take a cluster approach; cluster identification, selection and analysis; participant mobilisation, cluster animation and relation building; selection and implementation of policy instruments; and evaluation and policy learning and illustrated this with examples of how cluster policy has been put into practice in different countries. I conclude that, while not a policy panacea, a cluster approach to policy can be beneficial if properly applied. My empirical work goes on to focus on the cluster policy-making process and examines the way in which cluster policies have been developed and implemented in the North East of England. I particularly consider the impact of the policies on firms and supporting organisations within the marine and offshore engineering cluster. This work illustrates the need for cluster policies to be context dependent and sensitive to the requirements of individual clusters; highlights the role of individual actors and organisations and also demonstrates that issues of scale, not only in terms of policy, but also in terms of the cluster itself, are important.

4 Research Questions and Methodology

In the first section of this chapter I want to explain how the findings from the literature that I have reviewed in the previous two chapters gives rise to my detailed research questions. In the second section, I then want to outline the context in which the research came about and in the third section, I want to discuss the methodological approach and research design before looking, in the fourth section, at the methods I have utilised to answer the research questions. I conclude the chapter by outlining the limits of the study and the nature of the results that are set out in the following four chapters.

4.1 Reaching the Research Questions

In Chapter 2, I concluded that clusters comprise a pronounced and recognisable critical mass of firms and any associated support organisations and research and education establishments who, by their interactions, create cluster-specific assets. These cluster-specific assets are available for exploitation by actors within the cluster, depending on the actors' capabilities and strategies. I highlighted that clusters are often associated with particular places, but they are not geographically concentrated over predetermined scales. The scales at which clusters are concentrated will vary, because it is the scale of the interactions within the cluster that determine the geographical area of the cluster, rather than any pre-defined geographical limits.

I have argued that there is no universal model that can account for the origin, sustainability, and, in some cases, decline of clusters, but the diverse explanations that can be found are all inherently concerned with interactions between actors and the cluster specific assets that arise as a result of those interactions. Cluster specific assets are of many kinds and range from, at the softer end of the scale, trustful relations, untraded interdependencies and collective learning, through intangible assets such as the labour market, to more formal assets including specialised training providers, research institutes and business support organisations. It should not be taken for granted that the cluster specific assets are beneficial. In certain cases the interactions within clusters have led to an introverted mindset and the cluster has become characterised by a situation of lock-in (Grabher, 1993b).

In Chapter 3, I demonstrated that there has been a burgeoning interest in cluster concepts in policy circles since the 1990s. The application of cluster concepts has ranged from simple renaming of existing policies at one end of the spectrum, to a more academically informed approach to policy-making at the other end of the spectrum. Again there is no universal model of cluster policy and I have preferred to consider a cluster approach as a process including overlapping and continuous stages: firstly deciding to take a cluster approach; secondly identification, selection and analysis; thirdly the mobilisation of participants, cluster animation and relationship building; fourthly design and implementation of policy interventions; and finally evaluation and policy learning, with the overall aim of the process being to stimulate and facilitate the kinds of processes believed to be occurring within successful clusters, in order that cluster specific assets can be generated for the benefit of the cluster. Clusters are not necessarily geographically concentrated at a scale that mirrors administrative and policy boundaries, but policy tends to apply within those boundaries and the assumption tends to be that the wider territory in which the cluster is situated will benefit from the cluster's development.

A key question is therefore whether, and in what way, policy can stimulate and facilitate the processes that characterise successful clusters, particularly given that most successful clusters have not been subject to cluster development policy, even though they may have benefited from government policy in other ways (for example, Silicon Valley and defence spending). Because many successful clusters have flourished, not due to any form of cluster development policy, but as an unintentional side effect of other government policy and expenditure programmes, often implemented at a national scale, it is important to consider the impact of other aspects of government policy because this can often have a far greater impact on clusters than specific cluster development policies.

Research into cluster policy is particularly appropriate at this time because there is a suspicion that cluster policies are not delivering all that they were expected to. I say suspicion because, given that cluster policy operates over the long term, the policies have often not been in place for sufficiently long to be adequately evaluated. Therefore I want to examine empirically the way in which two cluster policies were developed and implemented to consider how particular understandings. or indeed a

lack of understanding, of the processes occurring within clusters impact upon the outcomes of cluster policy. I want to consider the cluster policy process, including the context in which the policies were designed, and also to examine the way in which the implementation of the policy has impacted upon individual clusters. In doing so I want to achieve a deep understanding of the policies and to consider how the impact of the cluster policy is not only affected by the context in which it is designed and the process by which it is designed, but also to examine how the impact of policy is partially determined by particularities within the cluster. While there has been research into individual cluster policy initiatives (Altenburg and Meyer-Stamer, 1999. Gilsing, 2001, Lundequist and Power, 2002) and comparative studies of cluster policy initiatives across different countries (Raines, 2002), little research has been conducted into the coordination of different scales of cluster policies (Brown, 2000b) and there are many unanswered questions in this respect. Therefore rather than singling out an individual policy, I wanted to look at two policy initiatives, designed at different levels of government, that have had an impact in the North East of England. I have therefore looked at the development of regional cluster policy (Chapter 5) and the development of a local authority cluster initiative (Chapter 7). To consider the outcomes of policy I have examined the impact of policies on the marine and offshore engineering cluster.

As discussed above, to understand the impact of the policy it is necessary to understand the cluster that the policy is intended to develop. In seeking to gain an understanding of how firms and organisations, in particular those within the marine and offshore engineering cluster, have been affected by the two cluster policy initiatives in the North East of England, I have attempted to identify the nature of interactions within that cluster and the scale at which they occur and to examine the role of institutions, particularly in the form of formal organisations.

By examining the design and implementation of two cluster policies from initiation through to the impact on the firms and organisations, this work should advance our understanding of the cluster policy-making process and enable policy-making lessons to be drawn.

The specific research questions I have sought to address are:

How has the cluster policy that impacts upon the North East of England been developed? What are the antecedents of the current policies and what is the policy-making background? What is the cultural, social and economic context in which the policies were designed? What are the rationales for adopting a cluster approach? What are the aims of the individual cluster policy approaches? At what scales is cluster policy developed? How are different policies coordinated? Using the model of the cluster policy process outlined in section 3.5 – What analysis was undertaken? What clusters were identified? How were clusters for support selected? How was consensus built and participants mobilised? Was a more participatory method of policy-making encouraged? What policy measures were introduced? What was the focus of the policy measures? How were policies tailored to individual clusters? What is the role of the public sector and of the private sector? How is the policy evaluated?

How has cluster policy impacted on the marine and offshore engineering cluster in the North East of England? What is the composition of the cluster, if indeed it can be classed as a cluster at all? What are the interactions between actors? What clustering activities and organisations have arisen either as a result of policy initiatives or in the absence of policy initiatives? What obstacles have been encountered in developing cluster policies for these clusters? How do the actors within the cluster perceive the cluster policy approach? To what extent have cluster policies facilitated and stimulated the processes taken to characterise successful clusters, such as trustful relationships? What cluster assets that have arisen and how are they valued by the firms involved? What other policies have impacted upon the clusters?

What lessons can be learned? What can be learnt from studying the impact of different cluster policies on two clusters in the North East of England? What does this study tell us about the usefulness and 'fit' of different concepts employed to explain clusters and cluster policy? What does this tell us about the scale at which clusters and clustering operate and what does it tell us about the coordination between different scales of cluster policy-making? To what extent has a cluster approach

contributed to business and regional development? To what extent can difficulties in implementing cluster policies be accounted for by the circumstances of individual clusters and to what extent can difficulties in implementing cluster policies be accounted for by a lack of understanding of the processes occurring within clusters? Can the processes of the type occurring within successful clusters be stimulated by policy-makers or do policy-makers need to adapt to a different kind of policy approach?

4.2 The Background to the Research Project

This research project was developed by the Centre for Urban and Regional Development Studies (CURDS) at the University of Newcastle upon Tyne and the Regional Service for Clustering, as an Economic and Social Research Council CASE collaborative studentship. The staff of the Regional Service for Clustering, a small project promoting clustering, whose development will be outlined in Chapter 7, had an ongoing dialogue with CURDS and were keen to part-fund a PhD studentship in order to provide them with a reflective view on their activities. Previous academic research in which they had participated had provided an independent and rigorous input to their thinking and they valued academic research as a way of linking them into debates about alternative approaches to economic development.

The Economic and Social Research Council funds collaborative studentships as one way of promoting and supporting successful social science research collaboration between industry and academia. The ESRC recognises that such collaboration brings its own particular issues, particular for PhD research, and has published advice in this respect (Bell and Read, 1998). Some of these issues relate to negotiations regarding the establishment of the studentship (for example, identifying a research need in the non-academic organisation that can provide a three year PhD project), but I want to concentrate on issues that can arise once the project is up and running.

Some of the particular issues that arise with CASE studentships are, firstly, that there are requirements for the student to establish a sound working relationship with the non-academic partner, as well as their academic supervisor. Secondly, there can be conflicts between the expectations of a PhD project and the expectations of the non-academic partner, who is contributing financially, both to the student and the

university. These conflicts can be resolved by strictly defining the research project before recruiting the student, but this in turn can appear constraining for the student. Thirdly, issues can arise if there are changes of policy and personnel at the partner organisation.

In terms of establishing a relationship with the non-academic partner I was fortunate to be made very welcome by the RSC. Some of the staff, including my non-academic supervisor, had, as mentioned above, already been involved in research projects conducted with my department and there was a positive attitude towards collaborative research. There were only five staff at the RSC when my studentship was arranged, although two new members of staff started as my studentship commenced. This meant that all the staff were immediately aware of my research. I was given my own desk and complete access to any files, computer or paper, which I required. From an early stage I was included in social events and generally encouraged to feel part of the team. This inclusion was to bring its own issues, which I will explore later, but provided a pleasant initial backdrop to conducting the research.

The starting point for the research was constrained by the collaborative nature of the research. It had already been decided that the research would start with a case study of the organisation itself. The initial expectation was that comparative case studies of similar organisations worldwide would then be undertaken. However, a series of events and developments led to the research design being revised and consequently the research questions detailed in section 4.1 were arrived at. This was because, as I reviewed the literature on clusters, it became apparent that there were interesting questions around the geographical scale at which clusters and cluster policies operate. This is not to say that I fell into the trap, highlighted by the ESRC guidelines (Bell and Read, 1998), of being side tracked into changing the scope of the project on purely academic grounds. Cluster policy was being developed by the Regional Development Agency at the time my studentship commenced and the RSC, which had begun as a stand-alone policy experiment, was seeking to find a place as cluster policy moved into the mainstream. Therefore research that would contribute to an understanding of cluster policy at different scales was apposite to the organisation.

There were subsequently several changes of leadership at the RSC. These were difficult times for the RSC, and for a short period of time the situation was so unsettled that, although the issues arising were entirely unrelated to my research. I lessened my involvement with the organisation. Once matters had been resolved, and I had returned from a year's maternity leave, the priorities and personnel at the organisation had changed and, although I was still given all the access that I required and always made welcome by all the staff, the original project, to compare the RSC with similar organisations worldwide, had lost priority and a different research design. outlined below, was developed.

4.3 The Research Design

Hoggart et al. (2002) suggest that we ask three questions of the research design – is it '*credible* (capable of providing convincing conclusions), *directed* (targeted at the question in hand) and *feasible* (given cost and time constraints)' (ibid. p.50, italics in the original). My specific research design has evolved and was initially directed by the RSC, but it was always going to take the form of a multiple case study approach. A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context (Yin, 1993). A case study design is appropriate for answering 'how' and 'why' type questions, rather than a survey type approach which looks for answers to the puzzles 'who', 'what', 'where', 'how many' and 'how much' (Yin, 1994).

The selection of cases was initially influenced by the pre-selection of the RSC as a case study of a local level cluster policy initiative (case study 1b). In order to compare the RSC approach, operating at a local scale, with an alternative approach conducted at a regional scale, the local Regional Development Agency, One NorthEast was selected as a case of cluster policy-making at a regional level (case study 1a). The national level was also examined but, for reasons that will be outlined in section 5.1.2. a full case study at a national level was not appropriate.

In developing the proposal for the CASE studentship it had always been the intention to study the micro clusters facilitated by the RSC and, given my second research question regarding the impact of cluster policy on the firms and organisations within clusters, it appeared appropriate to identify a micro cluster within an area of economic

activity where a larger regional cluster could be identified. This would permit me to examine whether, and how, interactions within the cluster varied depending on geographical scale and to consider the role of policy enacted at varying scales.

Peck (2003) suggests that cases be selected for their explanatory power. The selection of marine and offshore engineering as the regional cluster (case study 2a) to study was, to an extent, pragmatic. Argonautics (case study 2b), a marine technology cluster, was one of the earliest examples of a micro cluster facilitated by the RSC. My literature review had highlighted the time taken for relational assets to develop, and the length of time for which Argonautics had existed enabled me to analyse the development of relationships over time. Also, as I conducted the interviews with the firms within Argonautics, it became apparent that there was a wealth of material. The marine and offshore industries, in which Argonautics was involved, had traditionally been associated with the North East of England and, although these industries were not consistently named as a cluster to be supported within the cluster development programme of the regional development agency, they were affected by regional policy and embodied a complex institutional framework, again providing a rich depth of material.

Rodríguez-Pose (2001) calls for an expansion in the number of cases and for those cases to be conducted in a more systematic way. Similarly Markusen (2003) favours large comparative research projects, but such projects are not practical for PhD research. The research detailed in this thesis could be expanded to cover other clusters in the North East of England or it could compare the experience of regions elsewhere in the United Kingdom, or internationally, with the experience of the North East, but, for the purpose of this thesis, the research is limited to considering in depth the development of two cluster policy initiatives within one region and the impact of those initiatives within one cluster in that region.

Although a case study approach was obligatory, it was also appropriate. Case study research is a form of intensive research. Extensive research is capable of revealing patterns whereas intensive research is more likely to unearth causal processes (Crang, 2002). As Lagendijk (2003) suggests, 'actual research on regional development requires insights into how, in particular places, a multitude of forces, factors and

actors produce specific outcomes, that are beyond the reach of model-based approaches' (ibid. p.725). My framework for understanding clusters has highlighted the importance of such forces, factors and actors in the forms of untraded interdependencies, relational assets, collective learning and social capital, and the economic, cultural and social context in which these factors are played out. These factors and their context, I would argue, can only be accessed through intensive, qualitative methods.

Malmberg and Maskell (2002) point to the difficulty of empirically validating these intangible factors and acknowledge that, although much effort has gone into researching clusters in the past decade, the causes and effects of spatial clustering remain 'elusive'. They highlight major shortcomings in existing research on spatial clustering, particularly a lack of systematic attempts to assess empirically the precise mechanisms behind and the magnitude of localisation economies. They attribute this in part to clusters being a relatively new, or newly rediscovered line of research and partly to the fact that empirical testing requires a level of simplification that would be unacceptable to those seeking a deep understanding of the operation of clusters. They also criticise the case study approach in so far as it has a bias to success stories; a tendency to static research design and an inability to support the main theoretical argument, that localisation economies exist – in most research they remain 'elusive'. While, as detailed above, my research necessarily took a case study approach, I have attempted to avoid the pitfalls outlined by Malmberg and Maskell (2002) by concentrating on industries that would not fall into the normal definition of 'high-tech', in a region that would not be categorised as successful. I have attempted a more dynamic research design, avoiding a very narrow snapshot approach, by trying to obtain a historical perspective and by conducting interviews over a three and a half year period. I have also tried to obtain an understanding of those horizontal relations, which are not necessarily of a collaborative nature and are not easily observable, as well as the vertical relations and collaborative horizontal relationships, which are more visible. The research design, summarised in Table 4-1 and Table 4-2 was developed in order to identify key actors, organisations, and locations and meeting places and I have tried to trace the relationships between them in order to understand the heterogeneous networks from which clusters are comprised (cf. Yeung, 2003.

pp.449-450) and which policy should influence. This thesis might therefore be seen as a part of an increasing trend to relational economic geography.

4.4 Methodological Debate in Economic Geography: The Need for a Relational Turn?

A relational 'turn' or approach to economic geography (Bathelt and Glückler, 2003, Boggs and Rantisi, 2003) has developed from an ongoing debate over how to understand economic activity and how to account for the social context in which economic activity takes place.

Some are concerned that while the 'cultural turn', which is seen to have arisen as a reaction to dissatisfaction with the formal mathematical modelling that dominated the discipline of geography for a time, represents the important recognition of cultural, social and institutional processes in economic life, it actually represents too great a move to social and cultural explanation, at the expense of the economic and that this carries 'the danger of reducing economic geography to superficial "storytelling" reliant on a trendy and fast-moving jargon that constantly evades any rigorous evaluation' (Martin and Sunley 2001a, p.149). There are related debates around the issue of the policy relevance, or otherwise, of the work of economic geographers (Martin, 1999b; Peck, 1999, Pollard et al., 2000, Henry et al., 2001, Yeung, 2001, Martin, 2001) and standards of research (Markusen, 1999; Martin and Sunley, 2001a, Grabher and Hassink, 2003). Martin and Sunley (2001a) welcome 'a multiperspectival economic geography that gives due weight to the socio-institutional-cultural context and dimensions of economic life' (2001, p. 152), but accuse 'new' (cultural) economic geographers of having vague theory and thin empirics. They call for 'detailed, carefully formulated, and empirically testable theoretical frameworks in which structural causes are assigned a key explanatory role' and suggest that, in the place of such detailed frameworks, theory is based on ill-defined concepts and fuzzy metaphors or highly jargonised 'discourses' from cultural or social theory, which, as Lagendijk (2003) also suggests, ignore criticisms and

Question	Case Study	Methods	Sources	Analysis/Use	Findings
How has the cluster policy that impacts upon the North East of England been developed?	The Cluster Development Programme of the RDA, One NorthEast (Case study 1a)	Semi structured interviews	ONE Officials University & trade union representatives Local economic development consultants Representatives from Centres of Excellence Local authority staff	Identification of themes. Identification of contributions to themes	Chapter 5
		Documentary evidence	Predominantly publicly available documents obtained from the agency or its website	Background info. Consideration of presentation/evaluation of policies	
	The Regional Service for Clustering (Case study 1b)	Semi structured interviews	RSC staff, RSC clients (present and former) Representatives of funding bodies	As above	Chapter 7
		Documentary evidence	Wide range of publicly available and internal documentation incl. reports to external funders and computer based records	As above	
		Participant Observation	A day a week for 18 months at the RSC's offices Participation in 'away day' events Attendance at Steering Group Meetings Occasional observation of RSC/Client meetings	Identification of themes and contribution to those themes. Examples of benefits of clusters in practice	
		Review by respondents	Draft chapter reviewed by former member of RSC staff	Member-checking. Revisions made as a result of review	

Table 4-1: Research Design

Question	Case Study	Methods	Sources	Analysis/use	Findings
How has cluster policy impacted upon the marine and offshore industries in the North East of England	One NorthEast's Cluster Development programme for the marine and offshore industries (Case study 2a)	Semi structured interviews	ONE officials/ Cluster organisation representatives Industry and Union representatives University representatives	Identification of themes/contributions to themes	Chapter 6
		Documentary evidence	Publicly available material from cluster organisations Publicly available/some internal material from One NorthEast Press cuttings	Identify interviewees, background info., updates	
		Focus group	Subsea focus group meetings	Observation of networks and contributions to themes	
		Review by respondents	Draft chapter reviewed by university representative	As above	
	Argonautics, a microcluster facilitated by the Regional Service for Clustering (Case study 2b)	Semi structured interviews	Argonautics members/former members RSC staff/former RSC staff	As above	Chapter 8
		Documentary evidence	Publicly available publicity material Material from RSC records	As above	
		Observation	Observation of informal and formal meetings of Argonautics	E.g.s of benefits of clusters in practice	
		Review by respondents	Draft chapter reviewed by Argonautics member	As above	

Table 4-2: Research Design cont.d

debates in the home field. However, as Yeung (2003) concludes, 'the context of economic action becomes a critical component in any economic-geographical explanation. As the discursive plurality of social actors increasingly shapes this context, it is highly difficult to determine the exact causality of economic action' (ibid. p. 445).

For Yeung, the methodological issues and 'practicalities of what it means to 'do' new economic geographies are still unclear and remain underdeveloped' (2003, p.442). For Yeung the key features of new economic geographies are an understanding of the social embeddedness of economic action, mapping shifting identities of economic actors, and exploring the role of context in explaining economic behaviour. This stress on context and multiple identities avoids the determinism associated with both positivism and Marxism, but complicates the methodological challenge of 'doing' new economic geographies.

For Boggs and Rantisi (2003) and Bathelt and Glückler (2003) what is required is a relational approach to economic geography. Ettlinger (2001), in arguing, from a post feminist perspective, for a research agenda that includes 'people', concludes that 'a relational perspective suggests connecting culturally and economically focused research' (ibid. p. 217). What is important is that a relational approach allows that 'actors, their inter-relations and consequent practices themselves carry explanatory weight' (Boggs and Rantisi, 2003, p. 111). This is not to discard structural approaches entirely, in favour of agency; actors are 'still viewed as operating within a context of institutions, norms and rules which condition their choices and relations' (ibid. p.111). In studying clusters and cluster policy, the actors include the firms, individuals within the firms, policy-makers, cluster organisations and individuals within cluster organisations and more importantly the relations and interactions between them, as Boggs and Rantisi explain '[r]elational geographers do not resort to methodological individualism by viewing actors as atomistic units. Rather, they view actors as interdependent subjects whose identities and resource capabilities i.e. the very assets that enable them to act – are co-constituted by their relations with other actors' (2003, p.112). Studying relations and 'relational proximity' also avoids elevating the role of geographical scale to prime importance by considering 'relational proximity' to be equally as important as geographical proximity'.

A relational approach is not new, both Ettlinger (2001) and Yeung (2005) point out its antecedents, and Yeung (2005) calls for further theorisation as to the causal nature of relationality and power relations and concludes that much recent work of a relational nature is relational in a thematic sense only. However, a relational approach appears to offer a 'mid range' theoretical theme (Yeung, 2005, p.39), avoiding the extremes of both structural determinism and anti-essentialism.

I now want to turn to the methods I employed to study the relations within clusters, the impact of policy and the cluster specific assets that arose from those relations and from policy interventions.

4.5 Methods

'Data are not "out there" waiting collection, like so many rubbish bags on the pavement' (Dey 1993, p.15, quoted in Hoggart et al. 2002). My three main methods for collecting data were: interviews to trace and understand the actor networks[8] through which clusters operate; participant observation; and analysis of documentation. In section 4.4 I mentioned the debate about standards of research in new economic geography. Markusen (1999) criticises 'fuzzy concepts and scanty evidence' and ties these into the debate about policy distance. Markusen's article was the subject of a debate on the SECONS (Socio-economics of Space) Discussion Forum (www.guib.uni-bonn.de/grabher/) and the articles from the forum, along with a rejoinder from Markusen, were then featured in an edition of *Regional Studies* (Grabher and Hassink, 2003, Hudson, 2003, Lagendijk, 2003, Peck, 2003, Markusen, 2003). I have attempted to detail my conceptualisation of clusters in Chapter 2 in a way that views clusters as a framework against which different explanations and theories can be considered and applied. My research intends to be policy relevant by the very nature of its subject matter, not that policy relevance should be the yardstick for judging the merit of economic geography research, but now I want to look at the nature of evidence in my research, in part drawing on the Markusen debate.

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[8] Yeung distinguishes between the methodological implications of researching actor networks from the epistemological claims of actor network theory. Here I am referring to the methodological practice of tracing actor networks as a way of understanding how they influence the operation of clusters.

Yeung (2003) considers a range of research practices and assesses them against the criteria of validity, reliability, and reflexivity both within neoclassical economic geography and new economic geographies and tabulates the results (see Table 4-3 below). The validity, reliability and reflexivity of research methods depend on both the research objectives, and epistemological and ontological opinions. Yeung outlines that neoclassical economic geography has as its goal the explanation of spatial patterns and processes of economic activities. It adopted a quantitative methodology, testing hypotheses and models against survey data and government data sets with a key presumption that 'the causality of empirically observable outcomes can be identified and measured, and no external influence on this causality can be found' (Yeung, 2003, p. 447). Such a methodology meets scientific standards of objectivity, reliability and validity. However, if we do not accept the premise that economic processes are empirically observable, it is not a suitable methodology and it does not provide a method of studying the actions of individual actors within their particular setting. Because I accept the highly complex nature of economic life and the role of multiple actors and their interactions in constructing clusters, my research practices are related to the last three of Yeung's categories (tracing actor networks, in situ research, abstraction and deconstruction).

Table 4-3 The Validity, Reliability and Reflexivity of Research Practices in Economic Geography

	Validity in Explanation		Reliability of data		Reflexivity of Approach	
Research Practices	Neoclassical Economic Geography	New Economic Geographies	Neoclassical Economic Geography	New Economic Geographies	Neoclassical Economic Geography	New Economic Geographies
Using quantitative and secondary data	Strong	Weak	Strong	Ambiguous	Irrelevant	Weak
Tracing actor networks	Weak	Strong	Weak	Ambiguous	Irrelevant	Strong
In situ research	Ambiguous	Strong	Ambiguous	Strong	Irrelevant	Strong
Abstraction and deconstruction	Irrelevant	Strong	Irrelevant	Good	Irrelevant	Strong

Source: Yeung (2003)

I will return later to the specific strategies I employed to demonstrate validity, reliability and reflexivity but in the meantime the use of each of my three methods raises substantive issues.

4.5.1 Interviews

In-depth interviews, or as Clark (1998) terms them, 'close dialogues', are time-consuming and labour-intensive but enable the exploration of issues of complexity in a depth that could not be achieved with a survey. Neither postal surveys nor even the personal administration of a standard questionnaire allow elaboration of answers. There is of course no guarantee of who answers a postal questionnaire (Healey and Rawlinson, 1993). Poor response rates can also be a feature (Curran and Blackburn, 1994). Even a standardized interview does not guarantee consistency because the meaning of language will differ amongst respondents (Healey and Rawlinson, 1993).

Much of my data collection was therefore by way of semi-structured interviews. This method is not without critics and Cochrane (1998) questions whether it is really 'enough simply to buy a tape recorder, invest in a suit and tie or a smart dress, write some letters, prepare a semi-structured questionnaire and seek out some research subjects' (ibid. p.2123). However, I maintain that an understanding of the relationships and interactions occurring within clusters, the developing of policy, and the interface between policy and clusters can best be obtained by talking to those involved in those relationships, interactions and development. Ethnography would be an alternate approach, and elements of my research at the RSC were, to an extent, ethnographic and based on participant observation. However, it would have been impractical to try to gain the level of access to the clusters, or other cluster organisations and policy-makers, required for ethnographic approaches given the timescale of the project and the range of relationships I was attempting to explore.

Selection of interview respondents

Markusen (1994) calculates that a two-hour interview involves an additional ten hours work in initiation, preparation, transcription, analysis and write up. I was seeking to interview, not only the owners/managers of firms, but also policy-makers at different geographic scales; university officials involved in clusters and cluster policy;

representatives of cluster organisations; staff of business support organisations and trade union officials. Time considerations meant careful selection of potential interviewees.

Patton (1990) distinguishes between random sampling, which seeks to achieve statistical representativeness, and purposeful sampling, which seeks out information rich cases. My choice was purposeful sampling. Markusen (1994) accepts that purposeful selection of interviewees is acceptable, providing the process is acknowledged and explained. I used various methods to identify the kinds of respondents identified in Table 4-1 and Table 4-2.

For case study 1a, looking at the development of cluster policy in One NorthEast, I sought to identify individuals at the agency who were involved, or had been involved in the development of cluster policy. Given my understanding that the development of cluster policy is highly context dependent I also interviewed individuals from the agency who had worked on the policies that had preceded cluster policy. I also interviewed individuals in the region who were considered to be knowledgeable with regard to regional development policy. These individuals were initially identified with the assistance of my supervisor.

For case study 1b, the development of the Regional Service for Clustering, I interviewed current and former members of staff. I also interviewed 28 of their clients in order to understand the way the service had developed and to ascertain the impact of the service provided to them. I also interviewed representatives from organisations that provided funding to the Regional Service for Clustering, again to understand the context in which the initiative had developed.

When it came to identifying actors in the wider regional cluster for case study 2a, the impact of cluster policy on the marine and offshore industries in the North East of England, the interview respondents were not so obvious. I was trying to trace the networks and linkages that exist within those industries and one tactic was to use a snowball approach. I would try to identify an initial key actor from the background information I had. When meeting them I would try and identify the networks in which they operated and the circles in which they moved and then I would try and

meet the actors (other firms and organisations) they mentioned as significant. When selecting particular informants within firms the researcher is faced with difficulties if the firm is large. Most of the firms I interviewed were relatively small (less than ten employees) and the target to interview was straightforward. In other cases I interviewed at managing director level because I was looking at the overall impact of the cluster and cluster policy, rather than having a focus on any one aspect such as skills and training, for example. For case study 2b, Argonautics it was a straightforward process to identify the firms as the micro clusters facilitated by the RSC have a formal membership and I interviewed representatives of member firms as well as representatives of firms that had left the microcluster. I also was able to speak to members of RSC staff about their involvement with Argonautics.

The size of sample required is not easy to ascertain. My plan was to involve as many people as possible until I reached 'saturation' and no new themes emerged, or given the time limits present for most research, I ran out of time. Snowball sampling can lead to biases, which must be recognised, and in order to alleviate this I did try and obtain a wide range of points of view, by speaking to former members of micro-clusters and retired heads of cluster organisations as well as current members. I also sought a historical context by talking to people who had been involved early on in the development of policy and initiatives. In addition to relying on recommendations from other interviewees in the 'snowball' approach mentioned above, I also identified 'target' firms from the membership lists of various cluster organisations and where possible identified firms with multiple memberships, feeling that this would enable them to comment on a range of initiatives. This sampling inevitably leads to a bias towards those firms who have been involved in cluster policy initiatives and excludes those firms who have not engaged in policy initiatives but, given the focus on the interaction between cluster policy and clusters, I maintain that this bias is justifiable, but it must be recalled in reading the research.

Arranging interviews

I therefore had very specific 'targets' to interview and would need to arrange specific meetings with them. As Mullings (1999) points out, you are unlikely to come across these people accidentally and whether you achieve access to them is highly dependent on how you approach them. She also questions whether, and how, the strategies used

to encourage respondents to participate in research impacts on the information revealed.

In most cases I did write a letter, very briefly explaining my research, and then followed that up with a telephone call. I always used headed note paper from my university department, which is well known in the locality, and usually mentioned my Economic and Social Research Council Funding in an attempt to provide credibility for my research. I used various strategies in the letters to obtain interviews. While I accept that it may have given a particular impression of how my research was developing, I did on occasion mention the names of other people I had seen. The wording of my letters also changed depending on the recipient. 'Clusters' is not a universally popular word in the business community and on occasion I consciously avoided using the term. Most people I approached were willing to be interviewed. On occasion the response was surprisingly quick. The owner of a local shipyard telephoned me personally on receipt of the letter to arrange a meeting the following day. Other meetings required much more perseverance – a letter written in September 2004 resulted in a meeting in March 2005. Another strategy I employed was to try to meet potential respondents at other events and functions and obtain their agreement to a meeting in due course. All of this came fairly naturally to me having previously worked in business development for a bank.

I should distinguish here between those interviews that were with 'clients' of the RSC and those that were not. Macmillan and Scott (2003) highlight a particular question that arises when contacting potential research subjects during collaborative research. Do we stress our identity as being associated with our university or with the collaborating organisation? This was an issue in both my research into the Regional Service for Clustering and Argonautics (case studies 2a and 2b). I never used RSC headed paper and, although I did mention that the RSC were part funding my research when I was approaching their clients, I stressed my independence and willingness to keep their views confidential. On occasions I would ask the RSC to telephone a client to mention that I would be contacting them. However, I found a useful alternative was to approach people at functions arranged by the RSC so that I could introduce myself, rather than relying on the RSC to do so.

Ward and Jones (1999) remind us of the need to consider the time specific nature of the interview process, particularly in terms of influencing access to organisations. One manifestation of this is that access, particularly to politically sensitive institutions, may be restricted at times of political sensitivity. We should also consider that 'the personnel that make-up a locality's elite are likely to be open to regular change'(Ward and Jones, 1999, p.308). There was certainly a great deal of change in personnel in the policy-making community during the course of my research and this complicated matters, particularly with regard to my case study of One NorthEast (case study 1a), because each incoming individual impacted on the policy of the organisations.

Once interviews were scheduled they usually took place as planned and where they were rearranged it was usually by policy-makers not by firm owners.

Recording the data

On most occasions I asked to tape the meeting. On occasions this was impractical (see below), on a very few occasions it was refused and on two occasions I did not even ask – once because I was under the, mistaken, impression that the meeting was only to provide me with the names of other people to speak to and once because a colleague had recently been refused permission by the same individual and it would have seemed ill-informed to ask again. When I was taping interviews I still took notes for back up purpose and when I knew the meeting was not being recorded I took more detailed notes, although I could never attempt to write down verbatim what was said.

The interview journey

Sabot (1999) uses Kvale's (1996) metaphors of the interviewer as a miner or traveller. For Kvale (1996), the miner 'digs nuggets of data or meanings out of a subject's pure experiences, unpolluted by any leading questions' whereas the traveller 'wanders along with local inhabitants, asks questions that lead the subjects to tell their own stories of their lived world. and converses with them' (Kvale 1996, p.3, quoted in Sabot 1999. p.329). Like Sabot, I chose the traveller approach, attempting to construct understanding from conversations. I used a checklist (appendix A) to guide

these conversations, although as I 'journeyed' and my understanding grew, this checklist changed from being a detailed list of questions and themes, to a list of key words. The initial questions were always very general to ensure that the interview did not progress down a predetermined path. A general, non- exacting start also puts the interviewee at ease and encourages trustful dialogue. The initial topic guide was developed with feedback from staff members at the RSC and other researchers. I tried to avoid framing my questions in such a way that would prejudge and lead responses to support a particular theoretical line and I also included a very general question at the end of the interview so that any issues that I missed, but which may have been significant for respondents, could be raised. I tried to avoid using language that, while widely used in the academic community, is alien in the business community.

I let conversations develop in an open-ended way, not shutting off respondents' detours. That said the interview is often a 'one-off', and time limited, chance to elicit information and too much deviation from the planned topics could leave particular issues uncovered. Often my interviews took much longer than I had expected (up to 2½ hours) but where they were strictly time constrained (fortunately rarely) I did, on occasion, feel I had left paths unexplored. Schoenberger (1991) discusses the issue of control, suggesting that in corporate interviews the respondent is often used to exerting control but suggesting that it would be a mistake for the researcher to try to impose 'military discipline' and suggests in place of either extreme, 'a collaborative dialogue' (ibid., p.182).

This approach would be anathema to those of a positivist persuasion as it implies a lack of consistency and neutrality, but I maintain that interviewing is a dynamic social process and that my research project had more to gain from the insights achieved by attempting to build up rapport with interviewees than is lost due to any perceived lack of neutrality and consistency (cf. Hoggart et al. 2002, p227).

In an article on researching embeddedness, Oinäs (1999) raises three important issues that are relevant to conducting interviews and to my research on clusters. Firstly there is a need to create an atmosphere in which trustful dialogue can take place. Secondly

there is a need to engage the respondent and thirdly there is a need to consider silence as well as voice. Each of these is examined below.

Getting Started: creating the atmosphere. The interviewer has to create an atmosphere in which a trustful dialogue can take place. Some of this work has been done, as mentioned above, by establishing some credentials prior to the meeting (the status of my department, the nature of the funding, other people who have devoted time to the project) and also by opening the dialogue with very general questions. Oinäs also mentions the need for appropriate appearance and behaviour. Undoubtedly there is more to interviewing than the smart suit, but appearance, in the form of attire and body language, is part of the context in which the interview takes place, and my background experience of interviewing company owners and managers, gained during previous employment, gave me some confidence in this respect. In introducing myself and in conducting the conversation, I took a 'modest' approach to my level of knowledge. Being female may have actually helped; the, predominantly male, respondents did not necessarily expect me to know a great deal about marine engineering or offshore technologies. I believe that showing a willingness to learn from the specific experiences of those I interviewed encouraged them to be more forthcoming. However, in an attempt to establish myself as a 'temporary insider' (Mullings, 1999), and win respect from respondents, I did attempt to show a reasonable level of background information on the industry.

Engaging the Interviewee. Having established an appropriate atmosphere for dialogue we come to a second and more important point raised by Oinäs– an academic researcher trying to gain insight into concepts such as embeddedness or, in my case, concepts including social capital, untraded interdependencies, relational assets and collective learning, has to engage the interviewee and 'translate academic terminology into questions that interest managers from the perspective of their life and work' (Oinäs, 1999, p.356). As Malmberg and Maskell (2002) highlight, these intangible concepts can be 'elusive'. I talked with interviewees about their day-to-day activities, relationships with other firms and organisations, the ways in which the relationships that arose through the cluster impacted upon them and their engagement with cluster policy. I also explored how their activities with firms within the cluster differed from activities with firms outside the cluster. Therefore, rather than asking

directly about academic concepts which would not have engaged them, I sought to hear how they benefited from the cluster in practice.

The problem of silence and multivoicedness. Oinäs mentions a third issue – the problem of silence and multivoicedness. What is not uttered can be as significant as what is uttered. She identifies different forms of silence from both researcher and respondent. As researchers we may choose to remain silent about particular views we have or about particular aspects of our identity (Mullings 1999). We may remain silent because we are unable to articulate in appropriate language the concepts we seek to uncover. Respondents may remain silent because they are being asked to speak about issues outside the range of matters they usually confront or they may chose to remain silent because they are unwilling to comment. I found that an awareness of issues where respondents might be unwilling to comment was useful and careful analysis of transcripts after the event can be helpful in identifying silences, although, as Oinäs points out, by that time it is often too late to uncover what was hidden in that silence. I may just have to accept that material may be intentionally withheld and I will never know what kinds of information I am missing (Schoenberger, 1992).

Respondents also speak with multiple voices, reflecting their multiple roles and the complicated context in which their opinions are formed. In my research I needed to be aware of whether respondents were speaking as members of a 'micro-cluster', or were seeking to represent the views of the wider regional cluster, or were defending a particular cluster organisation, or were solely representing the views of their firm. With policy-makers again it was significant to distinguish whether individuals were expressing the 'the party line' of their organisation or a more personal view. People did voice strong opinions, only very rarely requesting that those were not recorded.

Power relations

Power relations are rightly considered to be an issue in interviewing. As mentioned above, power is often held to lie with the interviewer, but in interviewing business owners this is not clear-cut. I was very aware of differing agendas. Business owners and policy-makers may have their own agendas and a vested interest in presenting their organisation in a favourable light. The RSC is a grant giving body, so I tried to

avoid interviewing firms during the period of time that their grant applications were under consideration (Schoenberger, 1991). In other cases I tried to remain very aware of interviewees' potential agendas and tried to corroborate their opinions against those expressed by others.

The issue of multivoicedness and silence, and power relations are related to the need to question the reliability of informants (Cochrane 1998). Reliability may be an issue of conscious and subconscious decisions about what to reveal. I did conduct as many interviews as possible to corroborate what different individuals said or to identify conflicts and silences. During my interviews there was no evidence of unreliable 'factual' information. Different respondents, particularly within the micro clusters, expressed different views as to the effectiveness, purpose and equity of the clusters. This does not mean their evidence was unreliable, but rather reflects the way in which they perceived the situation. I have tried to encompass these different perspectives in the narrative of the chapters detailing my empirical work.

Neutrality

Sabot (1999) discusses the dilemma highlighted by Moyser and Wagstaff (1987) when dealing with 'threatened elites'. If the interviewer appears neutral in the academic sense of the word, this 'inhibits and may even prevent the conduct of the research' (1987, p.190), but not achieving such neutrality could call into question the objectivity of the research. This was certainly a dilemma I faced. Mullings (1999) discusses this issue in terms of her research into the data input industry in Jamaica, where she interviewed managers and workers, and she accepts that at some time you are destined to end up in the camp of one or the other group. Given a level of dissatisfaction from the business community towards One NorthEast's cluster policy, I was faced with a similar dilemma, although it did not have the impact on obtaining access that Mullings found. I accept that I probably portrayed myself as in the camp of the business community in order to gain trust and openness from respondents in the business community. In the same way when I encountered any dissatisfaction with the RSC I felt it was necessary to be empathetic in order to elicit the most understanding from the dialogue. Again I feel the position I took was justified but I recalled it in analysing the data and it should be recalled when reading the results.

Location, location, location

For Elwood and Martin (2000) where interviews take place is a key issue. They call for an analysis of interview sites in order to assist in interpreting and understanding interview material. We should consider the effect of the interview location on the researcher, but also on the interview participant. I usually visited respondents at their business premises. McDowell (1998) questions whether this inhibits people's responses to questions on non-work issues, but in my case the respondents were in powerful positions within the organisation, usually had their own private offices and, in any case, my questioning mainly related to matters related to their work. Additional information can be gleaned from visiting interview participants in a location in which they usually operate, rather than in a neutral location or on the researcher's university premises. Elwood and Martin (2000) point out that this can be from observation of artefacts or observation of interactions between participants and their colleagues.

I found it especially useful when I was offered a tour of the premises. Not only does a tour provide useful background material for understanding a business, it also triggers additional thoughts from the interview participant – it is just much harder to 'record' these aspects of the interview and such tours have on occasion resulted in a mad dash to the car and a rather breathless recounting of all I could recall into a tape recorder.

Other locations cause practical problems. I conducted one interview in a light and airy restaurant just before Christmas. I did take notes, as I always do for back up purposes, which was fortunate as when I came to transcribe the tape it consisted mainly of 'canned' Christmas music. The next time I conducted an interview in a café I chose not to tape the interview at all, but took very detailed notes instead.

By the end of my research I had interviewed around 70 people and further details are included in appendix B, including which respondents were used to inform which case studies.

4.5.2 Documentary Evidence

Particularly in respect of the RSC (case study 1b) and Argonautics (case study 2b) I obtained staggering levels of documentation. I had free access to all the files of the RSC, including computer files. This raised ethical issues as I had access both to information that had been given to the RSC in confidence and to internally recorded opinions about individuals and relationships within clusters that could have been controversial if aired. Although this information was useful to me, I was careful not to reveal sensitive information to interviewees. Although some of the documentary evidence from the RSC gave me insights into opinions about individuals and relationships, on the whole it is difficult to gain insights into intangible factors such as untraded interdependencies from documentary evidence. However, access to monitoring reports and returns that had to be submitted to funding organisations gave me access to quantitative data on the impact of the policy.

From other policy bodies, cluster organisations and firms, I had access to publicly available information, for example, published documents and websites, but other than that I was restricted to documents that I was offered, or I requested, during interview. One employee of the One NorthEast had collated a pack of information ahead of our meeting, but this was unusual. However, I was able to use the documentary evidence obtained in certain ways for all of the cases. It provided me with background information ahead of interviews thereby giving me more confidence and credibility in interviews. Historical documents allowed me to obtain a wider time perspective, particularly on cluster policies and cluster initiatives. Particularly with regard to the case study of One NorthEast (1a), documentary evidence in the form of the organisation's regional economic strategies was important in tracking the way in which the approach to cluster policy changed over time. The use of documentary evidence permitted me to either confirm, or triangulate, information obtained from other methods or to highlight differences worthy of further investigation. In general the documentary evidence was used to support the interview process and to provide additional information in developing the narrative of events.

4.5.3 Participant Observation

Whereas documentary evidence and interviews were used in all four case studies, participant observation was only used for the case studies of the Regional Service for Clustering (2a) and Argonautics (2b). Hoggart et al. (2002) drawing on the work of Junker (1960) distinguish between different combinations of 'participant' and 'observer'; the complete participant often associated with covert research; the complete observer where social interaction is avoided; the participant as observer where participation takes priority over observation and the observer as participant which is really observation with some participation. My main site for observations was the office of the RSC where I spent at least one day a week for 18 months and my observations at the RSC fall into the last category.. I was able, and indeed was asked, to join in with formal and informal meetings within the RSC. I was also party to, and could observe, conversations and interactions as they occurred. I observed the RSC bi-monthly steering group meetings and 'away day' meetings where future strategies were discussed.

There was a possibility of joining meetings, led by the cluster project officers from the RSC, with micro clusters, but this never materialised and I sensed some unwillingness in this respect from RSC staff. I also preferred to stay more removed from the RSC, in the eyes of the members of the micro clusters, in order to maintain a sense of independence.

Observing enables the researcher to look at events in their natural settings, as they occur, whereas interviews are always based on recollection. I accept various caveats in terms of observation. I did consider my impact on the observed events and I did not assume that my observations matched what every one else is observing (Mason, 1996). I recorded observations by taking field notes that were written up under descriptive and reflexive headings.

Other observations, outside the RSC, included joining an informal meeting of one of the micro clusters at a local pub, observing a meeting of members of one of the cluster organisations, observing a networking meeting of members of one of the micro clusters, and attending a networking event for RSC micro clusters.

4.5.4 The Focus Group

Research can be about taking opportunities as they arise and towards the end of my project a new project looking at the subsea element of marine and offshore engineering was commencing at Durham Business School as part of the EU funded NEKS (Networks, Knowledge Sharing and Cluster Development) project, which aims to develop clusters of knowledge-based companies through hands-on research, collaboration and a series of supporting actions. As a result I was invited to participate in a focus group which provided useful material for case study 2a, the marine and offshore cluster. Hoggart et al. (2002) distinguish between focus groups rooted in a psychotherapy context and those rooted in a market research context. The former requires in-depth, repeat interactions whereas the latter has a reduced level of intensity, depth and interaction over time. The focus group I participated in was of the latter type. The group of ten industry/policy representatives included three individuals that I had interviewed and three of the other participants were from organisations where I had interviewed other individuals. In the one-to-one interviews I could only hear what the individuals said and respond to it myself, but in the focus group situation I could see how other participants reacted to, and even challenged, what was said. This does not strictly permit triangulation of what was said in interviews, as people do behave and react differently in group situations, but it did provide further insight into their opinions. There is little literature on the use of focus groups in academic settings (Hoggart et al., 2002), and there are issues with this method. Particularly in this situation, I was not responsible for selecting the questions for discussion or for moderating and facilitating the discussion; I did not decide that the discussion be recorded and, perhaps most importantly, I was not involved in selecting the participants. This latter point is particularly significant as the discussion was designed to lead to policy recommendations and I am aware that a representative of one of the firms was particularly significant in eliciting the attendance of other firms at the focus group. However, this material did provide me with more context. specifically for analysing the interviews I had conducted with three of the focus group participants, and also provided me with more background understanding of the offshore industry and relationships therein.

4.6 Extracting the Data

Interview data

The data I had collected was mainly in the form of the narratives from the seventy interviews I had conducted. I now had to extract the data from these records. I have retained the original recordings and transcribed or taken detailed notes from the tapes. I never attempted precise transcription techniques, where every pause and intonation is recorded, but in the early stages of my research I transcribed word for word. At times, due to time pressures and recognition that I was going to want to listen to the tapes again and again to analyse them, I reverted to the less time consuming practice of taking detailed notes from the tapes. I chose not to use any of the variety of qualitative analysis packages available, partly because I had chosen not to transcribe all my interview tapes, but also because they are not widely used in qualitative economic geography and I was not convinced that their use would add to my analysis. My chosen alternative was to first listen to transcripts that I recalled as being 'rich' and to extract themes from them. I would then listen to other transcripts and look for their contribution to those themes. The identification of themes was guided not only by the rich transcripts but also by the literature. If new themes emerged from later transcripts I would go back to the transcripts I had already studied and look for their contribution to the new theme.

McDowell (1998) describes her use of the Listeners' Guide, developed by feminist psychologists Brown and Gilligan (1992), whereby the researcher reads through transcripts or listens to tapes several times, each time 'listening' for different voices. McDowell notes that this is a particular feminist method designed to ensure the female voices are heard. Due to the nature of the research I was conducting, the interviews were almost entirely undertaken with males and the females I did interview were not in an inferior position or less powerful. However, repeated listening to tapes and reading of transcripts has proved enlightening and McDowell reminds us to constantly question who we were speaking to and the context in which their answers were given.

Schoenberger (1991) also draws attention to the issue of interpretation and language - there are no objective facts - I interpret what is said to me and respondents interpret

what I say to them. The interviewee responds to my questions, the response prompts further questions or comments and the whole process of the interview is intertwined - the particular themes and words I choose may influence the responses I obtain.

There are different attitudes as to whether interviewing can be used for formal hypothesis testing. Markusen (1994) argues it can, whereas Schoenberger (1991) argues that it does not lend itself in this way. I used interview material, not for formal hypothesis testing, but to build up a picture of how the particular clusters functioned, how relationships were built up within the cluster and how the cluster was affected by policy, in order that that picture could be viewed against the framework developed for understanding clusters and cluster policy.

Participant observation and the focus group

My field notes from participant observation and my notes from the focus group were analysed in a similar way to my interview transcripts. As mentioned above, case study 1b of the Regional Service for Clustering was the case study most informed by participant observation. I was able to go back through the notes that I had made and use my recall of events again to build up a picture of how the service had developed. Observing policy develop in front of you also gives a particularly good sense of the tensions that existed within the organisation.

From my other observations of meetings of micro clusters and cluster organisations, and from my participation in the focus group, I was able to extract examples of the benefits of clusters in practice that I could use in writing up my research (cf. p.266) and also I could use the insights that I gained from observing how individuals networked with each other to gain a better understanding of the interactions (and the value of the interactions) that took place within clusters at different scales.

Documentary evidence

As mentioned above, the documentary material was used in all four case studies as background information to assist in the interviewing process. In the case studies of One NorthEast's cluster policy making process (1a) and the development of the

Regional Service for Clustering (1b) analysis of documentary evidence was used to establish the way in which policy had been presented by the two organisations. Documentary evidence of evaluations was also available for both policy making organisations and was used to gain a picture of the success of both policies.

For the case study on the marine and offshore industries (2a) documentary evidence was used, as mentioned above, to assist in identifying potential interview respondents but the evidence was also analysed to identify policies and initiatives that had impacted upon the cluster. Press cuttings were used in an attempt to keep up with some of the events in what is an unstable industry in the North East.

For the case study on Argonautics (2b) the documentary evidence was used to provide background information on the firms who were members of the cluster. Additionally the internal records of the RSC provided details of key events in the microcluster's history and these were used to develop a picture of the evolution of the cluster and to inform the interview process.

4.6.1 Writing the Research

Hughes (1999) reminds us that the knowledges revealed by interviews are '*subjective, partial* and *positioned*' (ibid. p.365, italics in the original). We, as researchers, interpret our respondents' interpretations of events and relationships. Hughes recommends taking a polyphonic textual strategy to representing the voices of the narratives obtained by corporate interview. For Hughes, such a strategy 'allows the social and cultural complexity [...] to be articulated in the texts, rather than the interviewees' descriptions being subsumed under generalisations' (1999, p.372). I have therefore used verbatim quotations from the transcripts I obtained and picked out examples from observations. While seeking to keep quotations anonymous, I have identified them in such a way that it is possible to trace the voices of particular individuals throughout the narrative. As well as allowing the narratives to 'speak for themselves', Hughes recommends triangulating the narratives from interviews with other data and reflecting it in the light of theoretical perspectives on the issue. I have used evidence from observation and documentary evidence along side evidence from interview transcripts to do that. Even with such triangulation we must acknowledge

that the account we are giving remains partial and developed from situated knowledge.

4.6.2 Judging Qualitative Data

There are various criteria against which research can be evaluated. The most often quoted criteria are those of validity, reliability and objectivity and these criteria have been 'lifted' from traditional scientific research. An attempt to evaluate qualitative research according to scientific criteria can be problematic given that, as outlined in table 4.1 above, the research objectives, epistemological and ontological basis of much qualitative research, including that practised within new economic geography, differ from both traditional scientific research and geographical research of a more positivist nature.

Yeung (2003) concludes that a methodological framework must be legitimised by a 'tripartite litmus test' of validity, reliability, and reflexivity (ibid. p.443). Within traditional scientific research, reliability is the likelihood that repetition of the research process would achieve the same results. Validity is the extent to which the results are accurate and conform to 'true' reality. In the absence of an acceptance of a single reality, Yeung argues that the deep insights from direct engagement with respondents during 'in situ' research increases the validity of explanations of actors' actions and concludes that tracing actor networks is a valid approach, if we understand the economy to be composed of these heterogeneous networks. However, reliability, in terms of producing replicable results, is not achievable using these methods. Reconstructing the questions I asked would not elicit the same responses, even if it was me who asked them again, as each dialogue is contingent and time and context dependent. Schoeneberger (1991) also questions whether notions of reliability and validity are compatible. Traditional scientific standards call for objectivity, but Yeung replaces this with a call for reflexivity. True objectivity is again not observable with the kinds of methods I employed. There is no 'neutral' observer standing outside, and having no impact upon, a site of observation. In place of objectivity we need to be reflexive and open about our role as researchers.

Lincoln and Guba (1985) call for research to be judged against the criteria of credibility, transferability, dependability and confirmability. Their notion of

credibility is akin to that of validity and demands that we give an authentic representation of experience, accepting that there is no single reality but multiple constructed realities. Their concept for transferability relates to the criteria of generalisability. Qualitative research is often criticised for providing findings that are not representative and are not transferable to contexts outside the study (Markusen, 1999). However, Hudson (2003) responds by arguing that, while qualitative accounts may not be representative in a statistical sense they may 'be representative of key causal processes and mechanisms' (ibid. p.744) and therefore, again returning to table 4.1, different theories have different epistemological assumptions and different quality criteria to be met. Lincoln and Guba's notion of dependability is linked to that of reliability, which, as mentioned above, is problematic due to the temporally specific nature of this kind of research. Finally their notion of confirmability is linked to notions of objectivity. Again, as mentioned above, objectivity, in a traditional scientific sense, is not achievable in qualitative research and reflexivity is the required standard.

4.6.3 Strategies for Demonstrating Rigour

Taking into account these issues regarding the appropriate standards required within qualitative research and concurring with Peck (2003) that 'the search for reliability need not (and should not) lead us to reach for the props of traditional theory, positivist proofs, and statistical verification' (ibid. p.730), we can draw on the work of Baxter and Eyles (1997), Lincoln and Guba (1985) and Yeung (2003) to employ a range of strategies that are, in Peck's terms, 'epistemologically coherent' (ibid., p.737) in order to establish the rigour or quality of qualitative research in terms of validity/ credibility, reliability/dependability, confirmability/objectivity and transferability/ generalisability. These are tabulated below in Table 4-4 and the strategies I used are subsequently discussed.

Table 4-4 Evaluating Qualitative Research

Criteria	Requirements	Assumptions	Strategies	
Validity/ Credibility	Authentic representation of experience	Multiple realities Socially constructed nature of knowledge Researcher as instrument	Providing rationale for methodology Multiple methods Information on informant selection Peer debriefing Rationale for linking evidence to theoretical constructs	Verification by respondents Triangulation Verbatim quotations Details of interview practices *In situ*, lengthy research
Reliability/ Dependability	Minimisation of idiosyncrasies in interpretation. Ability to track variability to identifiable sources	Temporally specific research Changing nature of reality Multiple realities Researcher as instrument	Mechanically recorded data Account of research process Use of descriptive field notes	Triangulation Peer debriefing Member checking
Confirmability/ Objectivity	Extent to which the biases, motivations, interest, or perspectives of the researcher influence her/his interpretations	No neutral researcher Presence of researcher impacts on what is researched Need for reflexivity	Consideration of the researcher as active instrument Peer review of the research process	Account of the research process including strategies to demonstrate validity, and reliability
Transferability/ Generalisability	Fit with contexts outside the study situation	Time and context bound experiences	Thick description of results Details of methodological strategy	Details of interpretative strategy and approach to analysis

Source: Baxter and Eyles (1997), Yeung (2003) Lincoln and Guba (1985)

Validity/Credibility

Taking the four categories outlined in Table 4-4 I would argue that I have established *validity/credibility* with a range of strategies including providing the rationale for my methodology (cf. section 4.3), by using multiple methods as outlined in section 4.5, by providing information on informant selection and interview practices in section 4.5.1, and by using verbatim quotations widely in the next four chapters. I also sought verification by respondents. Revisits to respondents and member checking involves ensuring opinions are accurately expressed. Baxter and Eyles hold that this is an ethical imperative, but there are both practical issues in terms of firstly, arranging for the research to be reviewed by individuals who have already dedicated time to the project and may not be willing or able to devote further effort and secondly, dealing with disagreements over interpretation. Also, theoretically, we acknowledge that respondents do not have privileged access to one 'truth' and their responses are constructs in themselves from which we construct our understanding. However, each of the empirical chapters was provided in draft form to at least one respondent to enable them to provide feedback and I received feedback from three respondents.

I received no feedback from One NorthEast. The feedback in the case of the RSC case study (case study 1b, written up as chapter 7) was by e-mail from a former member of North Tyneside Economic Development Unit staff. I used the feedback to correct some misapprehensions that I had gained, although at times his interpretation of events differed from my own and I chose to retain my own interpretation of events. The feedback in the case of the marine and offshore cluster (case study 2a) was from a colleague at Durham University and might be considered more accurately as peer review. It was once again by e-mail. He, in addition to kindly pointing out some typographical errors and providing some reassurance as to the content and argument of the chapter, also provided some interview evidence from his interviews and findings from his research that supplemented my arguments and some additional literature and documentary material that I was able to use for that chapter. The feedback in the case of Argonautics (case study 2b) was partly from the same former member of North Tyneside Economic Development Unit staff and partly from the managing director of one of the firms within Argonautics, to whom I spoke by

telephone. It was reassuring to hear that the Argonautics member had been entertained by the case study, but also thought it was an accurate and interesting account. He had found the chapter thought provoking and planned to use some of the points raised in a review of the future of Argonautics. His comments were particularly useful because while I had highlighted certain characteristics of the microcluster that he had not necessarily thought of, he was able to draw out implications of those characteristics that I had not necessarily identified (cf. sections 8.1.2. and 8.1.3).

Reliability/Dependability

I have sought to demonstrate *reliability/dependability* with strategies including mechanically recording interviews and taking detailed field notes. As detailed above I also sought review by interview respondents as a form of member checking. Peer review and peer debriefing are an integral part of the graduate supervision process and according to Baxter and Eyles (1997) involve 'exposing data and interpretations to a respected colleague in order to point up possible sources of misinterpretation and the 'suppression' of themes voices that do not 'fit' the 'storyline''(ibid., p.514). In addition to review and debriefing by my supervisor throughout the research process, sections of my thesis were reviewed by colleagues both prior to submission of my thesis and prior to my viva.

Triangulation is a much-used term but requires clarification. Drawing on the work of Burgess (1984), Hoggart et al. (2002) specify five different types of triangulation – data, investigator, theory, method and academic discipline. The most common, and feasible for a PhD research project, are the use of different data sources and data collection methods. Crang (2002) points out concern that triangulation of different methods, survey and interview, may not be satisfactory because the data arising from the different methods answers fundamentally different questions (Winchester, 1999). I did not attempt to combine survey methods with the more detailed interviews, believing that that information that could be elicited from a questionnaire would not uncover the processes underlying clustering. I also felt the use of questionnaires ahead of interviews could influence the scope of subsequent interviews. Participant observation was used alongside interviews for aspects of the research and an element

of documentation was available to enhance most of the interviews. Rather than using systematic triangulation of method I therefore concentrated on seeking out as many possible sources of data from which to construct my account and analysis.

Confirmability/Objectivity

The need for confirmability/objectivity highlights the need for reflexivity and a key theme running through the evaluation of qualitative research is the need to reflect on our role as researchers. As Crang (2002) puts it 'no one will brag about being unreflexive' (ibid. p.651), but he goes on to point out that reflexivity has in turn been critiqued for implying that we can eventually fully know a social situation. Even if I try to be reflexive about my identity as a researcher, I have to accept that conducting the research has changed my identity. When I listen back to transcripts of early interviews I am aware how much my understanding of the cluster policy environment and the particular clusters I have researched has, inevitably, and fortunately, increased during the research process, but I am also aware that, because of the interactive nature of the interview, this means the knowledge I obtained from later interviews is of a different nature to that obtained early on.

It is all very well to reflect on my perception of me, but how was I perceived? Some characteristics are visible – I am fairly obviously white, female and in my mid-thirties. Other characteristics are audible – I had already lived in the North East of England for ten years when I commenced my research, but I do not have a local accent. I had worked for a bank for eight years prior to commencing my research and as an industrial surveyor prior to that. Most of my banking work had involved corporate customers and I was accustomed to visiting them at their premises. As an industrial surveyor I was also used to visiting industrial premises and I was therefore comfortable interviewing at industrial locations. I was always very open about my affiliation to the University of Newcastle upon Tyne, although sometimes less so about my connections to the RSC. The respondents tended to be male, usually older than me, and mainly, particularly in the case of respondents from industry, with a long career in their industry. Baxter and Eyles (1997) call for the implications of the characteristics of interviewer and respondent to be stated, but I am unsure that I can know what the implications were, and so in this chapter I have preferred to be open about my tactics for conducting the interviews, and in analysing the interview

transcripts I have endeavoured to be aware of how the context in terms of timing, setting and my presence have impacted upon what was revealed.

Transferability/Generalisability

Results from studies such as mine are clearly not typical or representative of all situations where clusters may appear to exist and where cluster policy is employed, but this does not render them less valid. However, there should be a connection between data and theory, and the findings should be valid for those researched (Baxter and Eyles, 1997, p.511). Strategies for checking validity with those researched have been discussed above, but Yeung (2003) maintains 'whatever one's epistemological orientations, he/she should still be concerned with theory development' (ibid. p. 452). The multi layered explanations that I have taken to account for clusters cannot 'be taken off the shelf and 'tested'' (Peck, 2003, p.732), but they are still useful and, as Benneworth and Henry (2004) argue, '[f]rom a position of hermeneutic theorising, 'clusters' have the potential to add value by allowing theoretical debate across a wide range of (overlapping and competing) perspectives whose partiality and situatedness are made explicit' (ibid. p.1011).

Yeung appears to hold a similar position to Barnes (2001) and Benneworth and Henry (2004) when he argues that 'epistemological theorizing', where theories are 'deducted a priori and tested statistically by empirical data' (Yeung, 2003, p.452) is not appropriate within new economic geographies. Just as the quality of qualitative research should not be judged using scientific standards, theorising should have epistemological coherence (Peck 2003). Yeung identifies two alternatives to 'epistemological theorising', first, abstraction and second, deconstruction of grand theories. Yeung (2003) concludes there is 'an urgent need for theory *reconstruction* through different *rounds* of abstractions *and* deconstructions' (ibid. 2003, p.453 italics in the original) and Peck (2003) argues that 'in theoretically informed intensive research, conceptualisation occurs through abstraction and through continuous dialogue with concrete cases, selected on the basis of their potential elucidation of the relationships in question' (2003, p.732). My research attempts to contribute to the 'process of critical scrutiny [that] will take place in order to establish the 'usefulness'

of a theory' (Benneworth and Henry, 2004, p.1013). Clusters are so context dependent that there can never be one theory of their development, but, through investigating individual clusters and the application of cluster policy, the usefulness and 'fit' of different concepts employed to explain clusters can be examined.

4.7 Limits of the Study

The choice of interviewing ensures a time-consuming research process and one that produces data that is temporally bounded (Markusen, 1994). I did try to re-interview certain key informants and due to personal circumstances the interviewing did extend from 2001 to 2005. The spread of time brought its own problems in equating information from four years ago with current data, but it did allow for an, albeit limited, element of historical perspective. I also sought out views of what had happened in the past and attempted to reconstruct policy approaches form documentation.

The research also covers a very limited geographical area and focuses on only one cluster within that area. This can be justified as it was the only way of obtaining detailed insights into the processes at work within the timescale of a PhD project but, as explained in section 4.3, the research detailed in this thesis could be expanded to cover other clusters in the North East of England or it could compare the experience of regions elsewhere in the United Kingdom, or internationally, with the experience of the North East.

4.8 Conclusion

What follows is the result of a long journey through interviews, documents and participant observation, via my analysis. It is my constructed version of how cluster policy has been developed in the region and how that has policy has impacted upon a given cluster, given the particular relationships and context of that cluster. As Hoggart et al.(2002) explain 'there is no 'telling it like it is'; only interpretation, selection and an attempted directing of the reader' (ibid. p.238). I do not believe that there is some truth out there waiting to be recorded, but in this chapter I have tried to be open about how I collected my data and began analysis of it. The next four chapters of this thesis contains my interpretation and selection of material, but, again

to quote from Hoggart et al. (2002), 'insight from another keyhole might produce a different emphasis and understanding' (ibid. p.300).

5 The Cluster Policy Approach in Practice: The Case of the Regional Development Agency for North East England, One NorthEast

In Chapter 3, I argued that a cluster policy approach to policy-making does exist and, while not a policy panacea (Martin and Sunley, 2003), it can be applied in a beneficial manner. I identified rationales and aims in respect of such policies but concluded that, given the different contexts and backgrounds in which cluster policy is designed and the consequently different policy outcomes, it is the cluster policy-making *process* that can best be used as a framework for analysing a cluster policy approach. I therefore proposed a five-part model for analysing the cluster policy process comprising the decision to take a cluster approach; identification, selection and analysis of clusters; participant mobilisation, cluster animation and relation building; selection and implementation of policy instruments: and evaluation and policy learning. Through this analysis it is possible not only to draw lessons for cluster policy-making, but also to consider whether policy-makers have taken into account the concepts identified as underlying clusters in Chapter 2.

Various cluster policy initiatives have impacted upon North East England and in this chapter and Chapter 7, I want to look at case studies of two particular cluster policy initiatives in order to answer my first research question – how have cluster policies that impact upon the North East of England developed? The first case study, addressed in this chapter, is of the Regional Development Agency, One NorthEast, which has sought to introduce policies for the development of regional clusters. The second case study, developed in Chapter 7, is of the Regional Service for Clustering, which has sought to develop clusters at a very local scale.

To answer the question of how these two cluster policies have developed I outline, in the first section of each chapter, the cultural, social and economic context and policy background against which the policies were designed, considering the antecedents of the current policies in order to identify how previous policies have impacted upon the development of cluster policy. In the second section of each chapter, I apply the model of the cluster making process in order to analyse the way in which the cluster

policies developed. The final section of each chapter will draw out generic lessons from each case study.

In Chapters 6 and 8 I seek to answer my second main research question – how has cluster policy impacted on the marine and offshore engineering cluster in North East England? Focusing on the outcomes of cluster policies within a particular area of economic activity allows us to draw on theories around clusters, as outlined in Chapter 2, to analyse the dynamics of the cluster and then to integrate that with our understanding of cluster policy, as outlined in Chapter 3, in order to account for the outcomes of the cluster policy process. Such an approach also enables us to examine scale issues both in respect of a cluster and the cluster policies impacting upon it. This emphasises the particular issues faced in developing a cluster policy for the marine and offshore industries in North East England, but also allows general lessons to be drawn about the problems and challenges of adopting a cluster approach to economic development. The results highlight the importance of viewing cluster policy as a process, the significance of the scale at which cluster policy is implemented and the role of cluster organisations and animators in the cluster policy process.

5.1 The Background to One NorthEast's Cluster Policy Development

5.1.1 The Cultural, Social and Economic Context

One NorthEast is the Regional Development Agency with responsibility for the North East of England, which is a diverse region, covering Northumberland, Tyne and Wear, County Durham and Tees Valley. With a population of 2.5 million it is the smallest English region in population terms (Office of National Statistics, 2004a). Historically its economy has been dominated by heavy industry – coal mining, steel, shipbuilding and heavy engineering – and manufacturing still accounts for 24% of gross value added (GVA), compared with 19% for the United Kingdom (Office of National Statistics, 2004a). There are also large rural areas, particularly in County Durham and Northumberland, and these were deeply affected by the Foot and Mouth Disease Crisis in 2001.

The well-known decline in heavy industry has left the region in a disadvantaged position. Regional gross value added for 2003 is the lowest per head in the United Kingdom, with the exception of Wales. GVA did grow by 5.5% in 2002, a figure above the national average, but the region provides the lowest share of UK GVA of all the English regions (Office of National Statistics, 2004b) and the performance relative to the UK national average has worsened from a level of 84.5% of the national average in 1991 to 79.7% in 2003. The region had the lowest employment rate (for people of working age) in the UK, at 68.2 per cent in spring 2003, and there is above average employment in public administration, defence, education and social services (Office of National Statistics, 2004a). The highest proportion of people living in low-income households was to be found in the North East region in 2000/01 (Office of National Statistics, 2003). Research and Development expenditure is also poor, with businesses expending only 0.4% of total regional GVA on research and development, compared with an average for the United Kingdom of 1.4% and government only expending £4 million in the region out of a total budget exceeding £1.8 billion. Rates of entrepreneurship are also low with business registrations standing at only 43.8 per 10,000 of resident adult population, a figure considerably below that for other regions (Office of National Statistics, 2004a) and there is a perception that a history of large scale employers and branch plants has led to an 'employee' culture.

There have been successes – there are research strengths in the region's five universities, which are seen by One NorthEast as an integral part of their economic strategy, and the region received worldwide press coverage when the first licence for the cloning of human embryos for therapeutic stem cell research was granted to researchers at the University of Newcastle upon Tyne in 2004. Culture has also played a large part in regenerating the physical fabric and image of the region, with particular successes being the BALTIC Centre for Contemporary Arts and the Sage Music Centre on the Gateshead quayside. A history of high quality manufacturing and heavy engineering expertise has provided the region with a reputation for high quality engineering and manufacturing, and a legacy of a highly skilled, albeit ageing, engineering workforce.

However, it can be concluded that the North East is a geographically peripheral region within the United Kingdom, a position exacerbated by relatively poor road links. The region exhibits a weak economic performance, with substantial structural weaknesses in the economy and associated issues of social deprivation, and therefore presents policy-makers with a significant challenge.

5.1.2 The Policy-Making Background

The establishment of Regional Development Agencies

One NorthEast is one of nine English Regional Development Agencies sponsored by the Department of Trade and Industry, and its remit, in common with the other RDAs, is to use all the resources at its disposal, in both rural and urban communities throughout the region, to further the economic development and the regeneration of the region; to promote business efficiency, investment and competitiveness in the region; to generate employment; and to encourage and enhance the relevant work skills of the people living in the region.

Regional Development Agencies (RDAs) were established in eight English regions on 1 April 1999, with the ninth development agency for London being launched on 3 July 2000 and their geographical coverage is depicted in Figure 5-1 below. In certain cases this necessitated the formation of new organisations, but in the North East an existing organisation, the Northern Development Company, evolved into the new regional development agency, One NorthEast. The Northern Development Company (NDC) was formed in 1986 and it, in turn, took over from the North East of England Development Council (NEDC). The role of both organisations had been focused on inward investment attraction, although NDC had also sought to develop the supply chains supporting inward investments, and had included a research function. The Regional Development Agency is a much larger organisation in terms of people, budgets and sphere of influence, but the legacy of its predecessor organisations has influenced its development. Many staff moved from one organisation to the other and the previous policy work on inward investment and supply chains was to influence both the choice of policies and the *modus operandi* of the new organisation.

REGIONAL DEVELOPMENT AGENCIES: ENGLAND

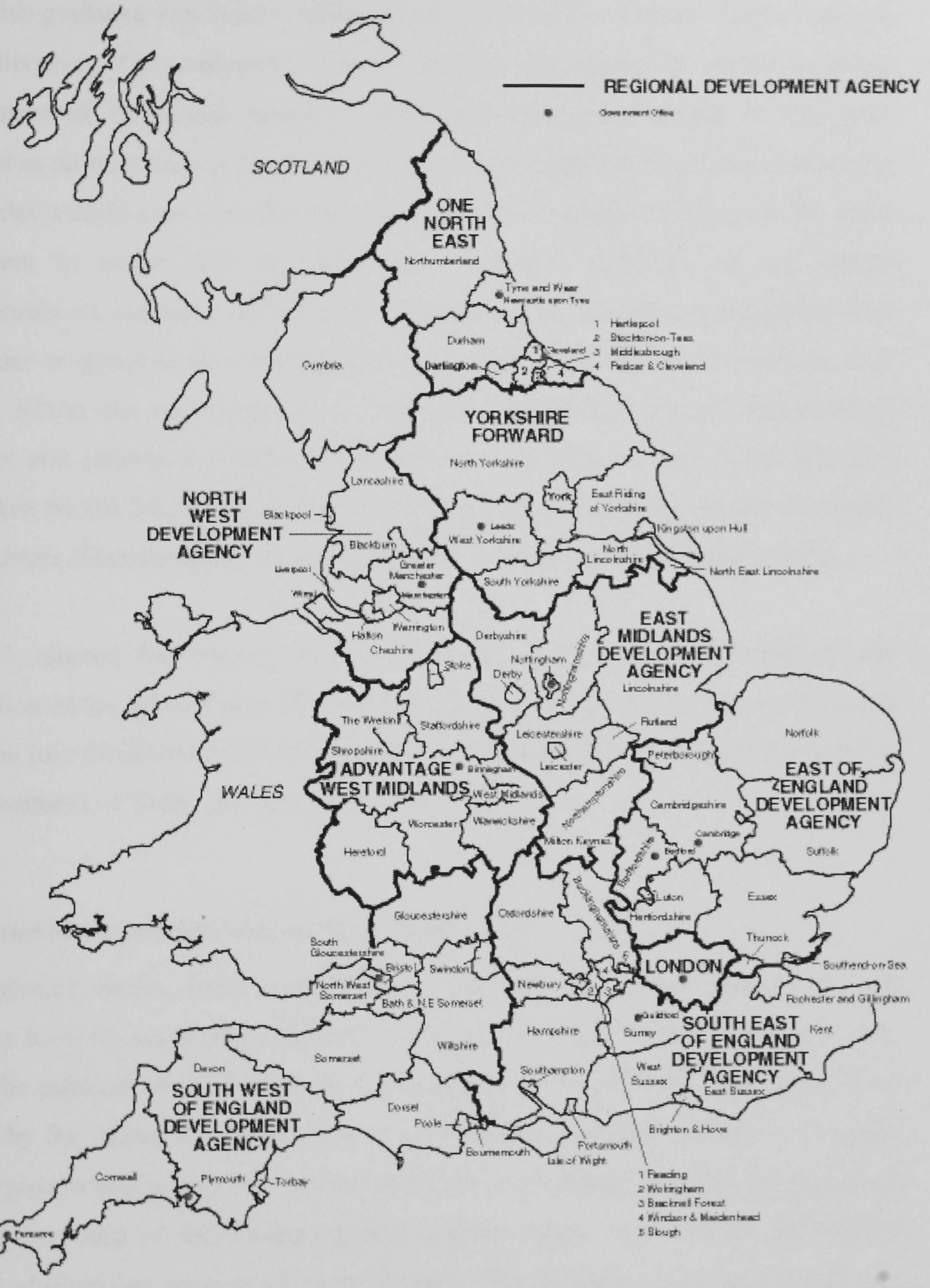


Figure 5-1 Map of English Regions

Source: www.dti.gov.uk

One of the first priorities for the RDAs was to generate regional economic strategies and the then sponsoring department, the Department for Transport, Environment and the Regions (DETR), published supplemental guidance in this respect on 14 April 1999. This guidance was heavily influenced by the 1998 Government White Paper on Competitiveness, *Our competitive future: building the knowledge driven economy* (Department of Trade and Industry, 1998), and highlighted cluster and business networks as an important policy initiative. The early approach to clusters was in line with Porter's early views on the role of government towards clusters, and the main focus was to ensure that regulation and legislative measures do not impact unfavourably on clusters – s.2.4.57 of the supplemental guidance recommends that, '[i]n order to promote the development of clusters and business networks in their regions, RDAs are encouraged to identify and support key clusters and business networks and address any barriers facing them'. In addition, one of the activities undertaken by the DETR was a review of the planning system to consider its impact upon clusters (Department of the Environment, Transport and the Regions, 2000).

By 2001, clusters had become further embedded in government thinking and the publication of the White Paper, *Opportunity for all in a world of change* continued to stress the role for RDAs in developing clusters. Sponsorship of RDAs transferred to the Department of Trade and Industry in June 2001.

The National Government approach to cluster policy

As mentioned above, while cluster-based approaches had been employed at local authority level for some time and Scottish Enterprise was piloting a cluster approach, it was the publication in 1998 of the Competitiveness White Paper that signalled an interest by the United Kingdom national government in a cluster approach to policy. Central government policy for England has been to encourage Regional Development Agencies to focus on facilitating regional clusters, while cluster policy focusing on national clusters has been much more limited. The national government's role was initially seen as being concentrated on framework conditions 'to encourage the formation and growth of clusters' (Department of the Environment Transport and the Regions, 2000) and in so far as any explicit national cluster policy directed towards a national cluster can be identified, it is probably the work that was done on the

Biotechnology Cluster (Department of Trade and Industry, 1999) by Lord Sainsbury's team. However, it could be argued that the Foresight Panels, particularly the first round, contained elements of national cluster policy. Actors were brought together in certain industries to identify structural weaknesses and create new development strategies (Lagendijk and Charles, 1999). The sector panels in the Technology Foresight Programme 1995 were agriculture, natural resources and environment; chemicals; communications; construction; defence and aerospace; energy; financial services; food and drink; health and life sciences; information technology and electronics; leisure and learning; manufacturing, production and business processes; materials; retail and distribution and transport. Marine was subsequently added to the list.

Benneworth and Charles (2001) point out that the national government in the United Kingdom were latecomers to the cluster approach and One NorthEast officials shared this perception. In interviews with officials from One NorthEast it was also clear that there was confusion around the concept of clusters:

> As a concept it was really quite chaotic in terms of how people understood it or didn't understand it, and it was very difficult, I think, to really see it as [...] anything other than another way of describing sectoral policy (ONE representative 1)

The RDAs provided the DTI with a regional delivery mechanism for the first time. However, the DTI's previous lack of a territorial framework and a history of dealing with individual companies was identified as a problem by a university representative:

> They do not really understand place and space within it. They do not understand the whole importance of things like infrastructure; they don't really get their heads around the whole idea of social, soft tissue. The basic cluster model is still quite problematic (university representative 1)

There was also an ongoing tension between regional policy and the national interest. The focus in the North East is on trying to reduce the economic performance gap between the region and the rest of the country, whereas the national focus is on

improving the performance of the United Kingdom as a whole and the DTI did not explicitly identify the cluster approach as a mechanism to address regional economic imbalances.

The national government did commission the research project to map clusters (Department of Trade and Industry, 2001), but unlike in the Netherlands where national clusters were mapped (Roelandt et al., 1999), the exercise was to identify clusters existing at a regional level in an attempt to assist RDAs in formulating cluster strategies. The methodology employed was to identify 'regional highs', defined as 5-digit Standard Industrial Classification (SIC) codes with a location quotient of over 1.25 and employing over 0.2% of the regional workforce and then, using a more subjective approach, to group these into regional clusters. A second element of the process was to consider allocating other 5-digit SIC codes to regional clusters where there was either a location quotient over 1.25 or significant employment, not serving solely local demand. There was also an attempt to use local knowledge to identify clusters not revealed by SIC code analysis, either due to their embryonic nature or due to inadequacies in SIC code data (Department of Trade and Industry, 2001c). This top down, broad brush, predominantly statistical analysis inevitably has weaknesses, not least its inability to gain a deep understanding of the nature of linkages in the clusters identified. This is acknowledged, not least in the title of the document, *Business Clusters in the UK – A First Assessment* but the exercise was seen as supporting the RDAs in their cluster development efforts.

A Ministerial-led Clusters Policy Steering Group headed by Lord Sainsbury and an Official Level Working Group were set up in 2000 to undertake a review of cluster policy, to identify barriers to the growth and development of clusters, and to recommend new policy initiatives on cluster and network activities. The Cluster Policy Steering Group included cross-ministerial delegates and representation from trade unions and academia, and oversaw the above mapping exercise, but the RDAs were seen as the key delivery mechanisms. Both the Clusters Policy Steering Group and Official Level Working Group were dissolved in January 2003, by which time it was felt that cluster strategies were sufficiently embedded in the RDAs' strategies. The Business Relations Unit at the DTI continues to liaise with RDAs in respect of cluster policies and advice to Regional Development Agencies was formalised in *The*

Practical Guide to Cluster Development, a report to the DTI and the English RDAs by Ecotec Research & Consulting, although this was not published until April 2004.

The influence of the DTI on the development of cluster policy within One NorthEast will be discussed further, but the UK national government did not take an overtly cluster approach to policy-making in general and did not foresee a role for the national government in fostering clusters at a national level, preferring to devolve responsibilities for clusters to the RDAs.

The regional policy-making context

The policy background is further complicated by the existence of other policy-making and delivery organisations in the regions.

In a referendum in November 2004, the North East rejected the possibility of having an elected Regional Assembly, but an unelected Regional Assembly remains in place. The North East Assembly was established in 1999 by the Government as part of its commitment to strengthening policy in the English regions. It came into operation in April 1999, at the same time as the regional development agency, One NorthEast, and has over 70 members drawn from local authorities, private business, trade unions, culture, media and sport organisations, further and higher education, skills and training providers, MPs and MEPs, health providers, rural organisations, the environment and voluntary sectors. As well as providing scrutiny of the operations of One NorthEast, the North East Assembly has been the regional planning body since April 2002 and is responsible for producing the Regional Spatial strategy. The Assembly has a wider role for ensuring that broader regional interests are properly represented and voiced in relation to One NorthEast's regional economic strategy and on issues, such as transport, land use planning and improving quality of life.

The Government Office for the North East represents the interests of ten central government departments and is 'charged with working with regional partners and local people to help deliver the Government's central aims in the region' (Government Office North East, 2003). It is also responsible for managing the Objective 2 and 3 programmes of European Structural Funding in the region.

Local authorities retain some economic development functions and an interest in cluster development. For example, Newcastle City Council intends to support eight clusters.[9] Four sub-regional partnerships, which include local authorities, business leaders and other stakeholders, covering County Durham, Northumberland, Tees Valley and Tyne and Wear, also have their own economic development strategies and programmes financed by funds delegated to them by One NorthEast and other European and national funds. Some of these development strategies include their own cluster strategies.[10]

At a more aggregated level the *Northern Way* is a strategy launched in September 2004 to address the productivity gap between the north and south of England. It was initiated by the Deputy Prime Minister, John Prescott, and is led by a coalition of the three Northern RDAs – the North West Development Agency, Yorkshire Forward and One NorthEast. The Northern Way has its own economic strategy with a £100 million Northern Way Growth Fund. The strategy includes a cluster development programme, receiving £6 million of growth fund money and covering three clusters in its first phase (Chemicals, Food and Drink and Advanced Engineering) and a further three in its second phase (Energy and Environmental Technologies, Financial and Professional Services and Logistics).

In the skills area the Learning and Skills Council (LSC) has a responsibility for planning and funding the provision of almost all government funded post-16 education and training, including work based training, other than higher education. It became fully operational in April 2001, replacing the Further Education Funding Council and the 72 Training and Enterprise Councils. The Learning and Skills

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[9] Digital Technology and Creative Industries, Financial/Professional Services, Engineering (Marine/Added Value/Renewables), Retail, Construction, Tourism/Hospitality and Culture, Life Sciences, Airport and Avionics

[10] The TyneWear Economic strategy, Leading the Way, lists 11 sectors/clusters – power, environmental industries, chemicals, engineering, automotive, offshore/marine, construction, food and drink, digital and telecommunications, creative industries, tourism. Tees Valley Vision Strategic Framework lists 7 priority sectors/clusters – chemicals/process industries, renewable energy and environmental technologies, higher value business and financial services, civil and mechanical engineering, health and social care, digital media technologies, tourism

Council has a national office in Coventry and 47 local offices, including local learning and skills councils for Tyne and Wear, Northumberland, County Durham and Tees Valley. Given that the local LSCs have responsibility for working with local business to forecast and prepare to meet local skills needs from local learning provision the local LSCs are potentially significant in cluster policy-making. More recently, and as a result of central government's National Skills Strategy, *21st Century Skills*, a Regional Skills Partnership, Skills North East was established in June 2004 to provide a more strategic approach to skills.

In the business support arena a review of business support services in the North East was commenced in March 2000[11] and as a result a new Business Support Network was established in June 2003 to deliver business support in accordance with a brokerage model whereby Business Link advisers signpost businesses to appropriate specialist support organisations.[12]. While the status and identity of the specialist support organisations was uncertain at the time of writing, the approach is both generic, in that there is no apparent alignment with the cluster/sector team within One NorthEast, and responsive, in that businesses are required to make contact with Business Link advisers once an issue is perceived. The model also tends to providing support to individual businesses and is far removed from a cluster policy approach.

Overall many regional delivery bodies and policy-making organisations are involved either directly in cluster policy-making or indirectly because they are developing policies that impact upon clusters. Many of these organisations are recently established, or substantially changed in function, and this complicated policy environment has impacted upon the cluster policy-making process and its subsequent delivery.

5.1.3 The Antecedents of the Current Policies

There is a long history of regional development policy in the North East which is well documented elsewhere (Hassink, 1992, Lagendijk, 1999). Regional policy measures

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[11] One NorthEast Review of Business Development Infrastructure

[12] One NorthEast The New Business Support Network for the North East

date back to at least 1934 and the establishment of the Team Valley Trading Estate, and have included a particular focus on inward investment attraction. However, cluster type policies preceded the establishment of Regional Development Agencies. As discussed in section 5.1.2, in the North East, One NorthEast took over responsibility from an existing body, the Northern Development Company (NDC), which had received central government support for its inward investment role. Inward investment marketing had taken place around sectors and had particularly emphasised the availability of labour. Prior to the establishment of the RDAs, NDC was already looking to develop a regional sector strategy and in *Cooperating to Compete* (Northern Development Company, 1998), a strategy on sector development was established. One of the reasons for developing this strategy was in order to access additional European structural fund monies for SME development. The Single Programming Document, which directs the expenditure of Structural Funds for a region, had been renewed in 1997, and 32m ECU was available to develop endogenous strategic sectors (Charles and Benneworth, 1999). The requirements for the structural funds dictated both a tight definition of the sectors that would get support and demanded a concentration on job creation. This report in itself drew on the experience of previous sector working groups that had been established in the region.

Sector working groups had been developed, as part of a Department of Trade and Industry pilot initiative, by the DTI regional office for the North East in the early 1980s. They had included industrialists and academics, but one of the main lessons taken from this exercise was the need for an institutional framework to drive forward the ideas generated. Subsequently there was a focus by the NDC on developing sector associations. This was partly as a result of the establishment, and success, of the Northern Offshore Federation, which had been established in 1988 and will be discussed further in Chapter 6. Progress was made with defence industries, food and drink and chemicals but little progress was made in electronics/IT or plastics and materials manufacturers. The rationale for adopting the sector working group approach was due to perceived benefits from interaction between firms. The benefits were seen to be of two main types – firstly, peer group support and secondly, collective action to identify constraints and opportunities within 'clusters of common interest'. Four critical success factors had been identified: – the need for a critical

mass and inclusive nature to constitute a 'viable community of interest'; the ability to identify and prioritise issues that were of relevance to a significant part of that community; the existence of a neutral and knowledgeable facilitator and finally motivation within the business support and academic arenas to provide tailored support to meet demand. Four main types of modes of production were identified as a background against which to develop clusters – high volume clusters, low volume clusters, process clusters and service clusters. Meetings were held with groups of companies in the Electronics, Call Centres, Food and Drink, Defence and Aerospace, Life Sciences and Low Volume Engineering industries to verify the analysis undertaken for the report. Although little attention appeared to be paid to the critical success factors identified through this exercise, this work went on to shape the conception and selection of clusters in the first regional economic strategy and the legacy of an institutional framework of sector associations would influence the operation of One NorthEast's cluster development programme.

A Regional Foresight Programme had also been established, which is now run by the Regional Technology Centre. At the time of its inception, and during the operation of the sector working groups, there was no recognition for third strand activity within the Research Assessment Exercise and the Foresight coordinators were reliant on the voluntary commitment of those in industry, DTI or academia.

Other attempts had been made within the region's five universities to stimulate academic-industry links, a common feature of cluster policies and, while all universities in the region are undertaking these types of activities, examples from the University of Newcastle are used here to illustrate the types of links formed. The idea of establishing a Centre for Marine Technology research had been proposed in the late 1980s by the Marine Technology Directorate of the DTI. This became encompassed in a DTI proposal to establish engineering design centres across the country. In the Engineering Design Centre (EDC), based at the University of Newcastle, 12 to 14 large companies were brought together and matched research council funding of £1.3M over three years to fund innovative research. At the outset there was a generic core and four sub groups –subsea; naval architecture and shipbuilding; aerospace and petrochemicals, nuclear and chemicals. The initiative brought together Newcastle, Northumbria, Sunderland and Teesside Universities and the EDC also ran the

Regional Foresight Initiative. The centre contributed to collective learning by providing a forum within which even commercially sensitive information came to be shared.

Given the success of the Engineering Design Centre, the Regional Centre for Innovation in Engineering Design (RCID) was set up in 1995. The RCID, now known as the Resource Centre for Industrial Design, was aimed at smaller companies but again a group of companies, some with a marine focus, but all with a manufacturing focus, came together to undertake design work. The RCID acted as a collective asset by giving access to expensive equipment to small companies in areas like rapid prototyping and advanced CAD systems. A visiting professor scheme assisted in enrolling the support of small companies and additionally trustful. beneficial relations were built to such an extent that several respondents referred to RCID as a 'club'. Specific problems were addressed for SMEs so they could see real immediate returns on their involvement, but a proportion of the funding was used to address fundamental, long-term issues.

In a further initiative to establish industry-academia links, Newcastle University had established a team of Business Development Mangers with an award from the Higher Education Funding Council for England's Higher Education Reach-out to Business and the Community (HEROBC) fund. Similarly, the other universities in the region were establishing links with industry and EPICC, the European Process Industry Competitiveness Centre, was established in 1995 by the University of Teesside. The Regional Centre for Electronics Technologies (ReCET) was established by the University of Durham, and in 1993 the University of Sunderland set up the Centre for Achievement in Manufacturing and Management (CAMM) which later evolved into the Institute of Automotive and Manufacturing Advanced Practice (AMAP).

5.2 One NorthEast's Cluster Policy-making Process

It is clear that the development of One NorthEast's cluster policy takes place against a complex, and at times contested, policy background and there are antecedents within the region that have gone on to influence the subsequent development of cluster policy. I now want to analyse the development of that cluster policy using the model

of the cluster making process developed in Chapter 3 to consider the decision to take a cluster approach; the selection and analysis of clusters; participant mobilisation, cluster animation and relation building; selection and implementation of policy instruments; and evaluation and policy learning. In section 5.1.2, I mentioned that the RDAs were charged with developing regional economic strategies. To the date of this research three regional economic strategies had been published and the approach to cluster policy changed over time. These strategies are identified as RES 1, RES 2 and RES 3 throughout the chapter.

5.2.1 The Decision to Take a Cluster Approach

As outlined in Chapter 3 the first stage in a stylised cluster policy process model is the initial decision to take a cluster approach and the associated rationales. The need to adopt cluster development strategies was imposed on One NorthEast and the other RDAs by the requirements of Central Government, although there were elements of previous practice in the region that fitted well with a cluster approach. Links between academia and industry were being developed, supply chain initiatives were well established in the region, industry fora were being established to identify the requirements of particular groups of industries and an institutional framework of sector/industry associations was being put in place.

In addition, given that the region has been eligible for Objective 2 European Structural Funds, One NorthEast has been influenced by the priorities of Single Programming Documents, which determine the allocation of funds and have offered funding for clusters. The cluster approach favoured by the European Union tended towards support for SMEs via a networking approach and through improved delivery of business support assistance. One NorthEast was to an extent constrained by these requirements, which were very sectoral and focused on a target of jobs created.

The first Regional Economic Strategy of One NorthEast (RES1), *Unlocking Our Potential,* published in 1999, was therefore written against, and influenced by. this background. Clusters were defined in a loose manner as 'a group of industries. organisations and businesses whose interrelationships enhance the competitive advantage of individual and groups of companies' (One NorthEast. 1999, p.33).

RES1 had six main strands [13] and the aim of cluster development was to contribute to the first priority – 'creating wealth by building a diversified, knowledge driven economy'. Identifying new markets was to be a particular focus with the overriding aims being an increase in GDP and job creation. The approach was very inclusive '[c]lusters will be developed in the North East so that all the Region's companies have a part to play' (One NorthEast, 1999, p. 33). The language was very much around the 'knowledge economy' and 'competitiveness' in line with the government's competitiveness white paper (Department of Trade and Industry, 1998). In section 3.5.3, seven possible rationales for cluster policy were identified: government regulation may impact disproportionately on certain clusters; SMEs do not take opportunity to collaborate with other firms; firms do not have access to information and knowledge when they operate in isolation; firms do not access knowledge from public providers; clusters may lack self awareness; clusters may lack certain components and there my be a lack of demanding customers. The rationale for intervening was not made explicit in RES1, but the implicit rationale was to bring together firms who would not usually take the opportunity to collaborate, in order to develop new products and access new markets. This focus on collaboration alone has already been highlighted as a tendency amongst policy-makers.

An evaluation of RES1 commissioned by One NorthEast had indicated that '[t]o date, there is little or no statistical evidence that the economic step change in the North East, upon which the strategy is posited, is being achieved' (SQW Limited, 2002, p.ii). A feature of One NorthEast's approach was a desire to achieve an impact quickly and it could be argued that, given that RES1 had been in place for less than three years, an expectation of a step change was unrealistic. However, there were specific criticisms of the cluster development programme, not least that it had been poorly communicated. A topic paper (One NorthEast, 2002b), produced as part of the review of RES1, indicates that modes of production, which had previously been used to identify clusters, was to be replaced by a method of identifying clusters by linked

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[13] The six strands were – creating wealth by building a diversified, knowledge driven economy; establishing a new entrepreneurial culture; building an adaptable and highly skilled workforce; placing universities and colleges at the heart of the region's economy; meeting 21st century transport, communication and property needs and accelerating the renaissance of the North East

industries or common markets. This appeared to be a conscious move away from the solely inward investment and supply chain work of the agency's predecessor, NDC.

In the second Regional Economic Strategy (RES2), *Realising Our Potential*, the six priority strands were similar to the previous strategy, although by 2002 national priorities had changed with an ever-increasing focus on productivity (HM Treasury and DTI, 2001) and therefore the priority related to wealth creation changed to 'creating wealth by raising the productivity of all businesses'.

In RES2, the definition of clusters had been clarified to '[c]lusters are concentrations of competing, collaborating or interdependent companies and institutions connected to one another through market and non-market links. Clusters organise to achieve shared aims. They are business led and backed by a responsive public sector'. Three different approaches to cluster development were now outlined –the enhancement of globally competitive clusters; the establishment of new globally competitive clusters and collaboration to improve competitiveness amongst smaller groups of companies.

The overarching aim of the cluster development programme was the 'increased prosperity of the Region', which was to be achieved by increased productivity, commercialisation of R&D and increased competitiveness with consequent benefits in terms of increased learning and employment opportunities.

The rationales for intervention varied according to the different strands of cluster development. It was recognised that the region had only a small number of the first strand of clusters, 'truly globally competitive industries', and the rationale for intervention was to remove barriers to growth and to provide an environment conducive to growth. The wish to establish the second strand of clusters, 'new globally competitive clusters', grew in part from a desire to exploit the research strengths of the region's universities and the rationale for intervention was to mitigate the risks of investment which would otherwise lead to an under investment in new areas (Roelandt and den Hertog, 1999). The third strand of cluster development, and one that was largely overlooked, was 'clustering for competitive advantage' where it was perceived that companies outside the clusters identified for further development could enhance their competitiveness through collaboration around supply chains,

markets or other forms of network. This accords with the five-part typology discussed in section 3.3 where clustering, defined as cooperative interaction to gain advantage, which may or may not take place within a cluster, is seen as theoretically distinct from the cluster. The implicit rationale for intervention in this case was that SMEs might not take the opportunity to collaborate in this way without some, limited, public sector intervention.

This breakdown of the definition of clusters into three elements indicated a better understanding of the cluster concept and the need for differentiated policies, but there were still to be great difficulties in putting the policy into practice.

It should be noted that a significant part of what might be considered One NorthEast's cluster policy is not termed cluster policy by the agency. A *Strategy for Success* was submitted to the DTI in November 2001 – this was influenced by the innovation agenda of national government and reflected research into the region's research base. Following the decision not to site the new Synchrotron at the Darsbury Laboratories in Cheshire, Stephen Byers, the then Secretary of State for Trade and Industry, had arranged a review of the science base in the North West. Byers subsequently recommended the same review for the North East. The review was to consider the research base in North East England in relation to the current and future needs of key industry clusters. Notwithstanding some misgivings in the research community about the review process, the resulting report, *Realising the Potential of the North East's Research Base,* along with the desire to see universities at 'the heart of the regional economy' and disappointment with the cluster analysis, led to the Strategy for Success. The intention was to develop more effective linkages between industry and academia through the mechanisms of new institutions, known as Centres of Excellence. Five Centres of Excellence for the commercialisation of research were established, each with an industry led board, in the areas of Life Sciences, Process Industries, Nanotechnology, Digital Technology and Multimedia and New and Renewable Energies. Using Boekholt and Thuriaux's (1999)and (2000) conception of 'cluster policy models' it can be said that the *Strategy for Success* and Centres of Excellence represented an Industry-Research Link Model.

The consultation process for the third Regional Economic Strategy (RES3), provisionally entitled *Leading the Way*, began in 2005. Again the overall language and tone are influenced by national agendas with an emphasis being placed on sustainability and the overall goal being 'to deliver greater and sustainable prosperity to all of the people of the North East over the period to 2016' (One NorthEast, 2005a). In place of the previous six strands, RES3 centres on eight key drivers[14] emerging from SHINE, which was a scenario-planning project initiated and funded by One NorthEast and managed by The Henley Centre, a strategic marketing consultancy.

In place of cluster development, RES3 proposed a strategy of 'enhancing established significant sectors and helping to create 'new market' globally competitive sectors' within a framework of three strategic pillars (cf. section 5.2.2). The dropping of the term clusters was seen from within One NorthEast as a subtle change, reflecting the difficulty the agency had had in communicating its clusters policy. In a review of RES2 (Frontline Consultants, 2005), the cluster approach was seen as an example of 'fashion-chasing'. There appears to be little appreciation that a sector policy could be very distinct from a cluster policy, however, it is noticeable that the sectors are narrower than the previous clusters. The rationale for adopting the sector approach was to provide specialist support to improve the performance of firms in a limited number of sectors and also to identify gaps in supply chains, to embed inward investment operations and to address structural weaknesses in the economy. These rationales were very similar to the work that had been done in the days of the Northern Development Company. However, it could be argued that a cluster approach continues to exist within the agency as the three 'pillars' could be seen to equate to clusters.

The decision to adopt a cluster approach has been, to a certain extent, imposed on One NorthEast by central government and influenced by the European Union Structural Funds programme. Although the approach taken has been heavily influenced by previous policy traditions in the region, the influence of central government priorities

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[14] Leadership; Enterprise and Business Support; Sectoral and Global Networks; Innovation and Creativity; Skills; Economic Inclusion; Infrastructure and Built Environment; Image and Cultural Assets

also pervades the changing aims and rationales of One NorthEast's cluster approach. The background of poor economic performance has led One NorthEast to look to achieve radical and swift structural changes through its economic strategy. Given the need to base cluster policies on existing strengths, the acknowledged reservations as to whether clusters can ever be built from scratch and the long time frame required to achieve results from a cluster approach, a cluster approach to policy-making in the region was always going to challenging. Some respondents also expressed the opinion that One NorthEast never fully embraced the cluster concept:

> I am not sure that One NorthEast has really bought into the concept of clusters as a way of tackling economic regeneration (university representative 2).

> Certainly up here it is difficult to see the avowed cluster philosophy being pulled through so that it becomes the warp thread of policy. It is almost as if it is in a separate box (university representative 2).

One of the issues highlighted in chapter 3 is that there is there is no specific cluster policy instrument, but rather a range of potential policy interventions that need to be tailored to the requirements of individual clusters. The utilisation of differing policy instruments depends on the rationales for government intervention, policy-makers' understanding of clusters and the specific policy-making environment in which policy is being designed. This left One NorthEast, and other RDAs, with the problem of how to put a cluster approach into practice. A One NorthEast representative talking of the cluster development strategy said:

> I think there was a strategy of sorts. It struck me that One NorthEast knew of it – in terms of cluster development and the fact that there was a management guru who was peddling it and everyone else had bought into it and therefore the DTI thought it was a good idea – therefore we have to follow that methodology – what it didn't tell me or what it didn't seem to be telling us is how you actually go about it (ONE representative 3).

And another commented:

> I think for us, certainly for me, the cluster concept is a good way of understanding a set of relationships and a set of organisations, institutions and so it is more an analytical tool, an understanding and conceptual tool than it is in itself a policy tool (ONE representative 1).

5.2.2 Identification, Selection and Analysis of Clusters

How cluster analysis is undertaken, and the results from that analysis, cannot be separated from the policy concerns and policy background that led to the cluster analysis being undertaken (Feser and Luger, 2003).

There have been numerous attempts to identify and understand clusters in the North East. The DTI commissioned report, *Business Clusters in the UK – A First Assessment* identified nine clusters for the North East and these are tabulated below in Table 5-1, with an estimation of the number of employees in each cluster.

Table 5-1 Regional Clusters and Employment in the North East of England

Regional Clusters	Employment (1999)
Agriculture/food	31,000
Automotive (assembly)	13,000
Chemicals (organic)	20,000
Clothing	11,000
Electrical industrial equipment	14,000
Electronics	11,000
Furniture manufacture	9,000
Metal processing, ship repair and industrial equipment	42,000
Plastics (primary, industrial products)	9,000
Total Employment	952,000

Source: Department of Trade and Industry (2001b)

The conclusions from this national study were not encouraging:

> The clusters are small with relatively few industries and few supporting and related industries [...] it is difficult to escape the conclusion that, with the exception of chemicals, the region has no distinctive cluster strengths with a dominant role within UK economy (Department of Trade and Industry, 2001b, p.39).

The problems of using SIC code data to identify clusters are well known and were rehearsed in section 3.5.4, but the lack of cluster strengths identified from SIC code analysis left One NorthEast with an immediate problem of needing to implement a cluster policy without any strong clusters having been identified. The inability to identify and understand the region's clusters has been a recurrent and considerable problem for One NorthEast's attempts at cluster development.

The publication of RES1, predated the DTI national assessment of clusters. The clusters selected for particular development were to be those where there was 'a strong science and technology base, an entrepreneurial culture, a growing company base, a skilled workforce and ability to attract key staff, suitable premises and infrastructure, the availability of finance, effective networks, close collaboration between academic institutions and industry, and a supportive public policy environment' (One NorthEast, 1999, p.34). However, RES1 is fundamentally contradictory in proposing that there should be an initial cluster assessment, but then prejudging the clusters. Five clusters were identified using the modes of production approach seen in the NDC report, *Collaborating to Compete,* in high volume manufacturing (inward investment in the 1960s and 1970s had seen a growth in high volume manufacturing), low volume manufacturing (where the region's traditional strengths lay), process industries, transactional services and bespoke services with a further four clusters of importance being tourism; heritage, leisure, culture and sport; logistics; public authorities and the voluntary sector. According to a One NorthEast official, the mode of production approach arose from dissatisfaction with SIC code data and it instead took a supply chain approach to understanding why businesses might want to work together. Eleven cluster development groups were proposed for the nine clusters due to the subdivision of the process industries into chemicals, food

and drink and agriculture and life sciences. A key requirement had been inclusivity and RES1 was described as 'making sure everyone was inside the tent not outside' by ONE representative 4, and it appears that the list of clusters had mainly been drawn up by a process of negotiation with local stakeholders, particularly businesses.

By the time of the review of RES1 in early 2002, the use of means of production, heavily associated with the team who had produced *Collaborating to Compete*, had been dropped. There had, according to a One NorthEast official, been a question as to how the programme would be operationalised because money was to be allocated to sector federations, but neither a low volume, nor a high volume, association was ever established.[15] It was decided instead to identify clusters where there were linked industries or common markets. In the topic paper produced as part of the review of RES1 (One NorthEast, 2002b), thirteen clusters were identified and, as with RES1, there was an emphasis on being inclusive to ensure that cluster development initiatives covered a substantial proportion of the Region's industry. Once again there was no explicit methodology for identifying clusters to support and on the whole the process appears to have been to commission research on pre-selected clusters, rather than to overview the region as a whole.

RES2 was published with the addition of Creative Industries as a further cluster and minor amendments to the list in the topic paper. However, the policy implementation framework for RES2 included sixteen clusters, with the addition of Construction and Rural clusters and, as will be discussed further in Chapter 6, a significant change in the designation of one cluster, from Offshore to Energy. Other lists appeared in subsequent One NorthEast presentations and there was never a clear methodology for selecting clusters for support. According to ONE representative 5, 'there was a thought process of well, if it isn't Centres of Excellence and it doesn't fit anywhere else in the agency, it must be clusters'.

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[15] There had been proposals to use research centres at local universities, EPICC at Teesside, CAMM at Sunderland and EDC/RCID at Newcastle as the foundations of the process industry/ high volume/low volume approach, but this was not taken forward.

By 2003 there was perceived to be a need to rationalise the list of clusters so that the clusters team would be doing more than generic business support and the number of strategic clusters was reduced back down to eight in 2003. These were apparently selected on the basis of employment, GDP, opportunity, technology and development although no analysis or methodology was made available by One NorthEast. The main criterion, according to ONE representative 5, was the potential for One NorthEast, working with organisations and businesses to 'make a difference'.

In 2004 an Industrial Landscapes study was commissioned because One NorthEast required further research on the significant industries in the region and the way in which benefits from those industries could be exploited for the benefit of the region.

By 2005, following a major restructure within One NorthEast, the term 'clusters' was no longer being overtly employed and, in the consultation process for RES3, nine sectors were designated for support. These sectors were related to an understanding that the region's economy was supported by three main economic pillars – energy and environment, processing industries and healthcare and health sciences and this model of the economy is depicted in Figure 5-2 below. Interestingly the website of the Strategy for Success team describes these pillars as clusters.[16]

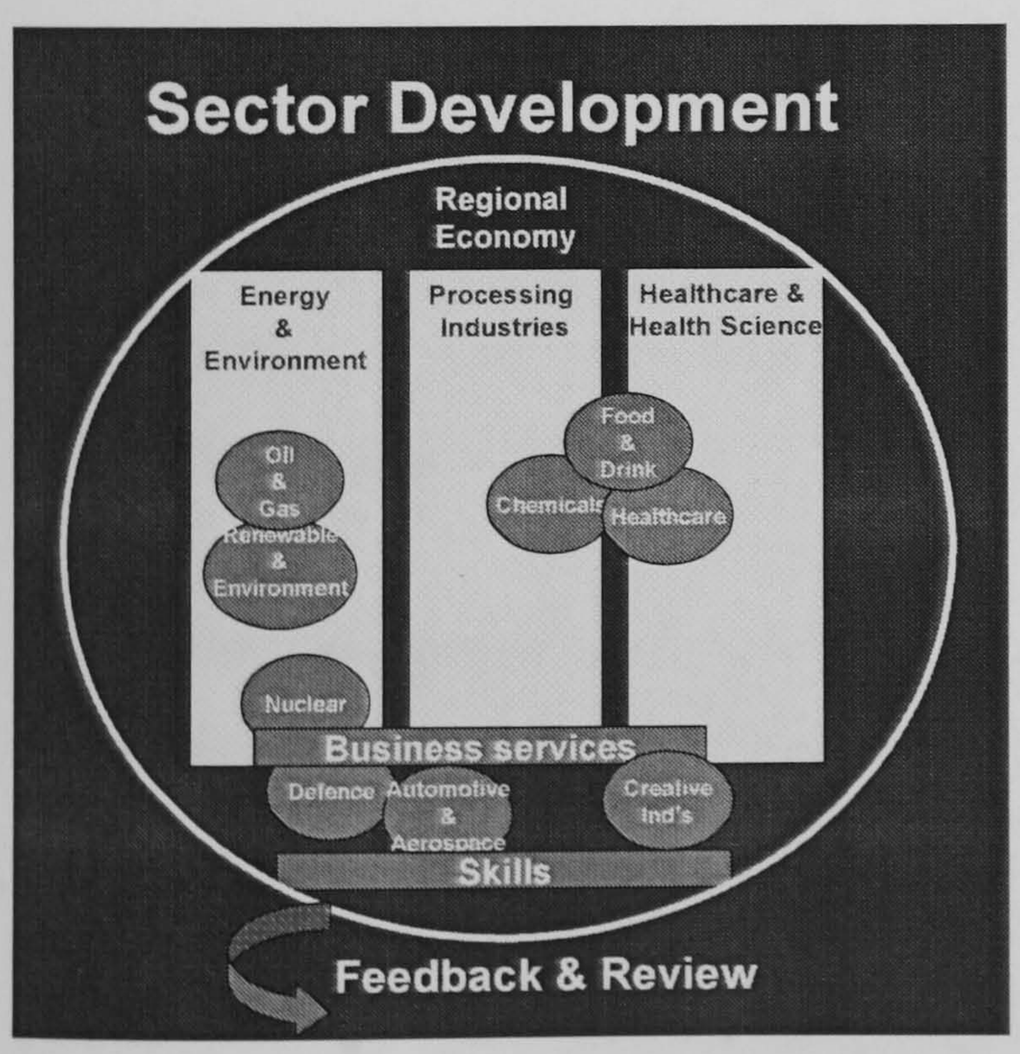


Figure 5-2 One NorthEast's Three Pillars of the Economy

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[16] <http://www.strategyforsuccess.info/page/about.cfm> accessed 26.10.05

Although broad goals in terms of 'building a diversified, knowledge driven economy' and 'raising the productivity of all businesses' were expressed, and the underlying aim of all three regional economic strategies was to reduce the performance gap between the North East and the remaining English regions, One NorthEast has never been explicit about the rationale for choosing particular clusters for support. I was told:

> The [clusters] that we believe are key in terms of underpinning wealth generation in the region are the ones that we have identified and I would argue that certain other ones - we need to give them support, create an environment for them, but the level of intervention is less than for those ones that we believe are absolutely critical (ONE representative 1)

However, it was never made clear which were the 'absolutely critical' clusters and throughout the agency, and the region, there was confusion about which clusters should be supported, and, indeed, what the cluster concept was:

> Well the honest answer to that is that it was handed to me (ONE representative 6, when asked how the then current list of clusters/sectors had been compiled)

> And there were two questions [about the cluster policy] – which sectors do you want to support and secondly – why? Because nobody knew. […] There was lots of rhetoric. There was no rationale, there was no appreciation of the reality, it was very diluted, it was extremely broad in coverage (ONE representative 3).

In a further demonstration of the difficulties of balancing the political approach and the evidence based approach to selecting clusters/sectors for support, the above sectors were announced, both on One NorthEast's website and in presentations, at the same time as further research was commissioned to obtain, according to the tender specification, an 'assessment of current and potential industry sector strengths within

the region' to allow 'the inclusion of a clear articulation of sectoral strengths within the revised RES [3]'.[17]

Therefore, six years after the establishment of the RDAs, there was still not an understanding of the regional economy and the areas where One NorthEast could add value by being involved in a strategic manner, and there was yet another list of sectors for support to add to previous lists of clusters. These lists are tabulated in Table 5-2 below.

[17] ONE Tender Specification CT05/06-02-05. Identifying and assessing sectoral strengths in the North East

Table 5-2 Clusters and Sectors Identified for Support by One NorthEast

RES 1	Review of RES1 2002	RES 2	RES 2 Policy Implementation framework 2002	RES3 Consultation
High volume manufacturing	Automotive	Automotive	Automotive	Automotive and aerospace
Low volume manufacturing	Offshore and high-value added engineering	Offshore	Energy (including offshore, marine and defence)	Oil and Gas
	Environmental Industries	Environmental industries	Environment	New and renewable energy and environmental technologies
	Defence, aerospace and component manufacturing	Defence and precision engineering		Defence (including naval marine)
Chemicals (a sub cluster of process industries)	Bulk/base chemicals	Base chemicals	Base chemicals	Nuclear Chemicals
	Pharmaceutical and speciality chemicals	Pharmaceutical and speciality chemicals	Pharmaceutical and speciality chemicals	
Food and Drink (a sub cluster of process industries)	Food and Drink	Food and Drink	Food and Drink	Food and Drink
Agriculture and Life Sciences (a sub cluster of process industries)	Biosciences	Bioscience	Life Sciences	Health
Tourism, heritage, leisure, culture and sport	Tourism and cultural industries	Tourism	Tourism	
		Creative industries	Creative industries	Creative Industries (not dealt with by the sector team)
	Nanotechnology	Nanotechnology	Nanotechnology	
	Digital	Digital	Digital	
	Electronics	Electronics	Electronics	
Transactional services		Service industries*	Service Industries	Business Services (including retail)
Bespoke services	Clothing and Textiles	Clothing and Textiles	Clothing and Textiles	
		Construction*	Construction	
Logistics				
Public Authorities				
Voluntary Sector				
		Natural resources based clusters e.g. forestry*	Rural	

** indicates that clusters were described as 'to follow'*

Source: author's own representation

A cluster approach should permit a more detailed understanding of an economy. however, mapping exercises were not undertaken until 2002 when, according to ONE representative 1, 'we then clearly recognised that we had quite a serious lack of detailed understanding of some of the clusters and how they operated in the region'. Contracts for the various mapping exercises were all let at the same time. The initial idea was to have a consistent methodology across the clusters, but that intention was never followed through. It could be argued that a consistent methodology would have, in any case, been inappropriate and the mapping exercise for the creative industries cluster, for example, took a very innovative approach (Benneworth, 2002). In line with a tendency to want quick results, the mapping exercises were conducted over a very short time scale, with the process intended to be complete within twelve weeks. Although the exercises did usually seek input from local 'experts', there was no real attempt to win support for the cluster approach through the mapping exercises and the exercises produced mixed results. According to university representative 2:

> The cluster mapping exercise, so called, was supposed to be the springboard for taking actions. I think that stage has been very, very patchy.

The exercise was also not ongoing. Some of the results were made available on One NorthEast's website and then removed; some were never published. By 2005, only the Food and Drink mapping exercise was accessible via the website. However, the process raised people's expectations and ONE representative 5 complained:

> Everyone who assumed they had a group of businesses working together or had had a mapping exercise done felt they were a regionally significant cluster.

The selection of clusters for support has always appeared problematic for One NorthEast. Despite acknowledging in RES2 that the region has few globally competitive clusters, One NorthEast has attempted to have a cluster policy covering many economic specialisations. It is only in the Centres of Excellence programme that a more selective approach has been taken. This in itself is a high-risk strategy and a One NorthEast official accepted there was an element of picking winners, but

argued that was justified because it was not possible to be equally interventionist across the board:

> It is not all eggs in one basket, but there are quite a few of those eggs in one basket (ONE representative 1).

The establishment of the Centres of Excellence also highlighted the difficulty of combining an industry-research model with a more general model of regional development as will be seen as the operationalisation of policies is considered.

5.2.3 Participant Mobilisation, Cluster Animation and Relation Building

A key element of a cluster approach is the involvement of all parties to the cluster in developing the policy, with facilitation provided where necessary by public authorities. In this way, a cluster approach should not only ensure that policy is demand led, but it should also be cost effective as it should leverage in private resources. An additional element of the cluster approach is the need to have key actors, not necessarily within the public sector, who can animate and drive forward the cluster. Eklund et al. (2002) include the presence of cluster animators as a necessary condition for successful cluster development and, as discussed in section 2.6.7, Camagni suggests a role for a local 'collective agent' (1991, p. 133) in enhancing the milieu.

In section 3.5.5. I discussed the role of cluster organisations, or as they are termed by Porter and Emmons (2003) 'Institutions for Collaboration' (IFCs) and concluded that they can have an important role in the design and delivery of cluster policy. I also highlighted that policy-makers can have a positive or negative impact on the ability of cluster organisations to perform that role.

In RES1, One NorthEast identified that for each cluster there was a need for a set of formal institutional mechanisms, in the form of a representative organisation. In certain cases those organisations existed, but in other areas funding was to be given to establish organisations. The role of these organisations was partly to identify policy needs and identify instruments to meet those needs, but the initial idea, according to

ONE representative 4, had been to develop forums that would achieve group competence and exchange knowledge thus gaining competitive advantage. There was also an intention, stated in RES1, to establish Cluster Development Teams, comprising key private companies, individuals with expertise from outside the region and relevant university and college based staff to prepare Cluster Development Programmes. Local authority staff, business support advisors and other public authority and voluntary sector organisations were to be involved as appropriate. ONE representative1 commented that, at the outset:

> They really didn't know how to implement a policy, that's probably not true, but they were defining the means of how they would take that forward.

Eklund et al. (2002) identified a division of labour in cluster development as a necessary condition for success, but in the case of One NorthEast's policy there was no clear division of labour and it was not clear who was responsible for different aspects of the process.

By early 2002, as detailed above, the clusters selected for support had changed but it was reported that '[r]egional cluster development initiatives are now well underway in many industries with the establishment of business-led cluster teams' (One NorthEast, 2002, p.4).

However, the relations between the cluster organisations or to use Porter's terminology, IFCs, and One NorthEast were problematic. In some cases new bodies were established, including an organisation known as the P&S Cluster, representing the pharmaceutical and speciality chemicals industries within the chemicals cluster. Some of the organisations that One NorthEast intended to use to deliver cluster activity were existing trade associations and the perception within One NorthEast was that the cluster development programme had encouraged those trade associations to seek public funds. According to ONE representative 5:

> In reality what happened was the organisations took the money and ran and delivered their core activity.

This may have been influenced by a history of public sector support for cluster organisations in the region, particularly through European Structural Fund programmes, which meant that members of organisations were not necessarily used to paying for the benefits, and the organisations expected funding to deliver their activities.

The model that was frequently held up as best practice was an existing organisation, Northern Defence Industries (NDI). Not only did NDI have a particularly charismatic leader, it also worked in a very particular, focused way, to bring together small groups of, not necessarily regional, companies, to work on contracts. However, it would be unlikely to deliver a wider range of what would be termed cluster activity and did not directly undertake work on competitiveness or training as it focused on meeting the procurement requirements of major defence contractors.

There were some issues with the cluster organisations. It was difficult to sustain private sector involvement because a lot of public sector bodies 'sat round the table, talking about public sector outputs and how to fund their activity' (ONE representative 5). Others voiced the concern that the creation of host bodies is problematic, particularly when they are membership-driven, because the 'clubs' created tend to want to keep non-members out. There was also a concern about the ability and skills within the cluster organisations and whether they were suited to delivering cluster activities. For example, a strategic vision for each cluster is required, but it is uncertain how this can be developed.

The status of the Centres of Excellence was also problematic, partly because their remit in relation to the clusters was not clear. Only Codeworks, the digital media Centre of Excellence, performed the role of a typical cluster organisation. However, in healthcare, when One NorthEast realised that there was not a representative body, the Centre for Excellence in Life Sciences (CELS) were asked to develop a cluster strategy – although previously they had specifically seen their role as excluding that aspect. This was seen as an evolution in that CELS would still have its incubation and early stage commercialisation role, but would move forward to trying to get groups of healthcare companies together to identify strategic projects.

One NorthEast were in a powerful position in relation to these organisations as in many cases they provided substantial proportions of their funding. Over time One NorthEast reviewed the cluster organisations and for example, the P&S Cluster and TCI were seen as duplicating effort and the two organisations were brought together as NEPIC, the North East Process Industries Council, to focus on skills issues, export issues and order issues. One NorthEast tended to view some of the trade associations as offering only representation and lobbying for their members. One NorthEast's aim was to create organisations to create orders, increase revenue and decrease costs, however, this may ignore the more intangible benefits obtained from the existing functions of the organisations.

To refer back to the five-part typology of (Benneworth et al., 2003) there were often existing 'cluster organisations' delivering 'cluster activity'. These organisations varied in effectiveness and often overlapped, reflecting the complicated nature of the regional economy.

A second group of actors often involved in the development of cluster policy is universities. Universities were seen as being 'at the heart of' One NorthEast's regional economic strategies and initially Newcastle University, for example, conceived that it could have a strong role in the clusters policy of One NorthEast. A Business Development Team had been established with HEROBC funding and academics were working already working with clusters, for example the food and drink cluster. However, one university representative expressed the opinion that with the strong science push approach of the Strategy for Success model, the universities got separated from the elements of the cluster development programme that were not related to the Strategy for Success and therefore:

> The people who were cluster managers [at ONE] were not at all plugged into the knowledge base of the university and [the university's] business development managers, who were around, in a way got marginalised from discussion (university representative1).

The focus on the science push model also meant universities were predominantly valued for their technical knowledge, but not for their social, cultural, political

knowledge, which could have been particularly useful in terms of international marketing.

Some academics felt they were kept at arm's length because of pressure from the DTI to have industry-led clusters. University representative 3 commented that if One NorthEast had identified the right academics in the region who knew how to 'make it tick' with industry, had the energy to drive the process and the knowledge of funding regimes, the cluster policy process would have been more productive, but that approach was rejected because of a drive by DTI to be industry-led. This is not to say that One NorthEast did not seek to engage with the universities in the region, or to say that individual academics were not involved within clusters, but universities appeared to be sidelined from One NorthEast's cluster development programme.

The role of businesses in the cluster policy process was also problematic. A cluster approach should encourage a more participatory method of policy-making and, as mentioned above, there was a desire for clusters to be 'industry-led', but there were issues of time:

> They haven't really got time to say right let's sit down with a clean piece of paper, what's our strategy, how are we going to move forward [...] because they are too busy fire fighting, too busy trying to win orders (university representative 5)

Businesses could also not necessarily see where they fitted into the cluster approach:

> The problem we've got in the region now, because they decided we'd have these 14 regional clusters – if people don't see themselves fitting neatly in to one of the boxes, they don't see themselves as being involved in cluster activity (ONE representative 5).

The focus of One North East had become clusters as an outcome, rather than the use of theories that underlie clusters as a method to improve business performance. As a result, there was little evidence of initiatives to build relationships and, although RES2 had talked about 'clustering', the cluster development policy, which had at the

outset been intended to be inclusive, had become exclusive, because firms felt excluded from the programme.

The constant change in the clusters selected for support caused widespread confusion and disillusionment, and the lack of progress caused businesses to drift away from the process. University representative 2 commented that 'businesses remain unconvinced that this is something they can respond to, that they can identify with' and ONE representative 1 admitted that, 'if you mentioned cluster programmes, people groaned, because there was such confusion about it'. Industry representative 1 commented of One NorthEast:

> I think they could have a role - it appears to be that they are struggling to find a role. They seem to be continually 'is it clusters? Is it this? Is it that?' And while they continue to pay a load of people to analyse that, they are not actually helping anyone.

Certain key individuals and organisations did participate in One NorthEast's cluster development policy, but overall the opportunity to encourage participation was missed. Even in 2005, the action plans for the sectors were being drawn up by individual sector specialists within the agency and the industry involvement was, according to ONE representative 6, only to 'sanity check all of those plans'. Although there was recognition that there was not enough external involvement, there was a continued tendency to draw up strategy within the agency, rather than seeking to mobilise industry leaders and cluster organisations, in order to build a consensus about what needed to be done within clusters.

The role of policy-makers in cluster policy is different from former roles. The role is much more one of intermediary and facilitator or animateur (Morgan, 1997b), with the cluster actually being driven from within. There was a concern that those within the agency did not have a sufficient understanding of cluster concepts or the necessary skills to implement a cluster development policy. Many were drawn from an existing policy environment, but it was suggested that you require:

> a cadre of people, professional intermediaries in the RDAs to tackle this really subtle question that for clusters to work you need a combination of soft tissue. hard infrastructure, industrial policies, working with national policies, working with the University (university representative 1)

Even from within the agency there was a recognition that:

> If you have spent 30 years managing someone else's schemes of a fairly traditional nature and then you suddenly start coming across people that are sort of talking about developing significant institutions in the area of nanotechnology, then you might find it difficult to understand and the things that have really dogged us have not been in the area of overall policy – they have been much more at the nitty, gritty detailed level and that's been a hard learning curve for us (ONE representative 1).

5.2.4 Selection and Implementation of Policy Instruments

A cluster approach requires a new style of policy delivery with policy-makers acting as catalysts, to encourage the private sector to participate in policy development, and then as facilitators and brokers, to oversee the design and delivery of necessary policy actions. As can be seen the encouragement of private sector involvement proved difficult and a facilitator/broker role to policy delivery was very different from the role of the predecessor organisation to One NorthEast. 'Part of the problem is that RDAs, rather than accepting a role as catalysts and brokers, are still tempted, as in the case of foreign investment acquisitions, to acquire full ownership and credit for the projects they are involved in' (Lagendijk and Charles, 1999, p. 139).

One NorthEast can be seen as operating two of Boekholt and Thuriaux's (1999) and (2000) four broad 'cluster policy models' – the industry-research link model and a more traditional regional development model and the policy instruments developed within each model were distinct.

The Industry-Research Link Model: the Centres of Excellence. A substantial amount of funding was earmarked for the Strategy for Success programme, approximately

£200 million over 5 years. The idea was to establish five centres to exploit world-class research in the Region's universities. The Centres covered life sciences, process industries, new and renewable energy, nanotechnology and digital media. Although the underlying idea was that each Centre of Excellence might lead to the creation of an aspirational cluster, at the outset the Centres of Excellence did not have a remit to grow the cluster or even to develop links with the cluster. Instead they were seen as being a resource for the cluster. Only the Centre of Excellence for Digital Media, Codeworks, undertook cluster development work and brought companies together, and its status was subsequently changed so that it was no longer seen as a Centre of Excellence. While the Centres are fundamentally different from each other, the kind of activities they undertake can be seen from a brief review of two of the Centres.

The Centre for Excellence in New and Renewable Energy, NAREC, has a focus on the provision of testing facilities for new forms of energy production, including wave and tidal tanks, an electrical lab to simulate connection to the national grid and a wind turbine blade test facility. However, it also provides incubation facilities and investment in technology businesses to fund development of product ideas. It is also seen as having a role in branding the North East as a hub for wind and wave renewable energy with the aim, partially, of attracting inward investment. The overall idea is to provide the infrastructure to enable the region to build on the skills of universities and the SMEs that support the supply chain.

Recognising the region's universities' research strengths in oncology, ageing and health, genetics and stem cell research, and plant biotechnology, the Centre for Excellence in Life Sciences, CELS, was tasked with identifying areas of scientific excellence in the region that could be developed commercially. They also sought to promote the region's biotechnology capability worldwide and to attract talented individuals into the region. Like NAREC, CELS also sought to provide incubation facilities and investment particularly in start up companies.

According to a One NorthEast briefing note:

> The Strategy for Success, with partners in business and the universities, is establishing the basis for a more successful and prosperous economy, whereby

> businesses would engage in higher value adding activities, competing through innovation, design and functionality, by applying scientific and technological research outcomes (One NorthEast, 2005b),

However, the history of the Centres of Excellence programme is relatively turbulent. Three of the centres have changed chief executive in their relatively short lives. The links between the Centres of Excellence and the clusters was initially unclear, although on the whole the Centres of Excellence were seen as providing a resource for a wider industry cluster. ONE representative 7 described the initially strong links between the two programmes as having become 'muddled and lost'.

The Regional Development Model: The Cluster Development Programme. Having invested so heavily in the industry-research model of cluster development, the status of the residual cluster development programme was unclear. The Strategy for Success team, overseeing the Centres of Excellence, worked very independently for the first eighteen months of its existence, even being based in a different location from the cluster development team.

Given the investment in the Strategy for Success programme, the direct budgets for the other parts of cluster development were not large either as a proportion of One NorthEast's budget or in comparison with the cluster development budget of other RDAs. While one of the benefits of a cluster development programme is its low cost and ability to leverage in private sector resources, the small budget available meant that the cluster development team needed to influence other public sector activity and to encourage the private sector to invest. However, given the troubled status of cluster development this was difficult to achieve.

The difficulty in teasing out a coherent series of activities is also compounded by the existence of sub-regional partnerships to whom One NorthEast devolved a large proportion of its funding. As discussed in section 5.1.2, there are four sub-regional partnerships within the region and some of those had their own cluster development programmes, which, while overlapping, did not appear to be coordinated with One NorthEast's cluster development programme. Even within One NorthEast there appeared to be a differentiation between those clusters that were eligible for funding

under the Objective 2 Structural Funds programme and those that were not, and also the culture and tourism clusters came to be the responsibility of the Tourism and Regeneration Directorate, rather than the cluster development team.

As discussed in Chapter 3, Raines (2002) groups policy measures under three headings – those intended to increase interaction amongst cluster actors, those intended to develop common resources to improve the competitiveness of the cluster and those intended to build and project an identity of the cluster. The Centres of Excellence programme was narrowly focused on the development of a particular resource – research expertise within the universities and also to an extent on image building. Due to the difficulties that had been encountered in analysing the economy of the region, the constant change in clusters selected for support and the general confusion surrounding the cluster development programme it is difficult to identify coherent action plans for the clusters selected for support. It was therefore difficult to demonstrate progress and the small steps required to build momentum and trust (Altenburg and Meyer-Stamer, 1999, Ceglie et al., 1999) were in many cases not achieved, partially because of difficulties earlier in the process whereby clusters were not properly identified and did not become animated. Gilsing (2001) identifies the need for a learning policy-maker who can switch from analysis to action, but ONE representative 6 expressed the opinion that:

> the agency is skewed so much towards planning and policy, it makes it very difficult for business led initiatives to actually get through the system.

A key aspect of cluster policy is that the policy instruments selected should be specific to the cluster in question. However, partially as a result of the difficulties detailed above, there was a tendency to look for generic measures that could be applied to all clusters. University official 2, talking about the need for tailored solutions, commented:

> I think that all gets put in the too difficult box. It is much cheaper to mount big generic [programmes].

It is inevitable that the policy aims for clusters will reflect the overall aims of the RDA and, following the publication of RES2, the focus for all the clusters was to be productivity enhancement, innovation, and gap identification and response. Again echoing previous policies, other officials mentioned the need to encourage inward investment. One NorthEast representatives talked about 'gap identification and response', which built on previous work around supply chains. Productivity enhancement was based around the work of NEPA, the North East Productivity Alliance. NEPA had been set up to work on the automotive supply chain on projects such as the Digital Factory, which looked at the digitisation of the manufacturing process, but its relevance to other clusters was not clear. By 2005 the 'offering to business' of the cluster/sector development team was to increase revenue, decrease costs, identify new market opportunities and develop networks, in order to obtain jobs, orders and new businesses, but again the intended 'toolkit' was very generic. The stress on productivity by 2005, and the possible perception that all innovation related to the Centres of Excellence, reduced the emphasis on innovation within the sector team and there was an ongoing emphasis on supply chain work, which had been the specialism of One NorthEast's forerunner, NDC. In addition, the focus tended to be on providing business support to individual businesses rather than in encouraging the interaction between businesses that would lead to increased trust, untraded interdependencies and other relational assets.

Again returning to Benneworth et al.'s (2003) five-part typology, it should be noted that cluster activity is distinct from cluster policy. Despite the lack of signs of progress being initiated under the One NorthEast's cluster development programme, there was cluster activity going on in the region. There was funding for small collaborative projects – RCID received funds to purchase hardware and software to use with their client base of 300 companies. Within the renewable energy field, clustering activity was being undertaken by differing cluster organisations including NE BioDiesel, Biomass Initiative, Photovoltaics North East (PVNE) and NOF Renewables. Although these projects were partly funded by One NorthEast and involved more interaction between firms, what was less visible was the strategic role from One NorthEast in cluster development.

Where the analysis of the cluster was strong and the cluster was consistently identified as being appropriate for support, progress can be more easily identified. The Food and Drink Cluster has been recognised as a regionally significant cluster since the first Regional Economic Strategy in 1999 and there had been a sector-working group in the late 1980s, which had led to the NE Food and Drink Federation, although by 2002 this was in abeyance. A detailed mapping exercise was undertaken in 2002 and a strategy was devised with the involvement of industrialists and support agencies in the region. [18]

Similarly the Creative Industries cluster, although not recognised as a cluster until 2002, used the mapping exercise conducted by CURDS as a springboard to further development. Although consultations were held, the mapping exercise was seen as having little direct input from businesses so a series of 'co-creative' dinners were held to bring together businesses and partner organisations. From these emerged eight broad project proposals for each of which it was intended to produce a detailed delivery plan. One of the participants told me that a lot of people had been involved up to this stage, but operationalisation proved difficult and some of those who had been involved became disillusioned at both the time taken to achieve results and the time they were having to devote to the endeavours. By 2005 the creative industries were no longer detailed amongst the list of strategic sectors, and policies relating to them were generated by the Tourism and Regeneration Directorate of One NorthEast. Again successful initiatives, such as the Cultural Skills Development Initiative, were funded by One NorthEast and a participant in the work of the Creative Industries Cluster maintained that there were able and competent staff within One NorthEast with responsibility for the creative and cultural industries, but a coherent cluster approach was not clearly identifiable.

Another key role One NorthEast has sought to undertake has been the identification of market opportunities to foster the restructuring of the economy, but it is debatable how well resourced they are to fulfil this task. Opportunities were identified in nuclear decommissioning and wind energy, and substantial efforts were put into

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[18] Great North East Food and Drink: Food and Drink Sectoral Support Strategy and Food and Drink Cluster Mapping (2002) for One NorthEast.

developing awareness in the SME community of these markets. One NorthEast commissioned research into the supply chain for wind energy. Pursuing such opportunities is highly resource intensive and entails a type of Foresight role in identifying early market and technology trends, bringing them to the attention of firms, encouraging investment into the region and developing links with outside areas showing positive trends. The precise role for a Regional Development Agency in this respect is unclear. NAREC are involved in the wind energy supply chain initiatives and RCID have been working with One NorthEast on nuclear decommissioning.

Therefore while there is evidence of clustering activity within the region, there is an acceptance within One NorthEast that the cluster development programme has 'never gone the way it's supposed to have gone' (ONE representative 6). The difficulty in developing policy instruments tailored to the individual clusters is largely related to the difficulties in earlier stages of the cluster policy-making process. Without a clear understanding of clusters and without the participation of key actors from those clusters in the design of policy, it is impossible to design tailored policies for clusters. Without a detailed idea the division of labour and the allocation of responsibilities, operationalising policies is also difficult. What also seems to have been lacking, despite the intentions in RES2, is any policy to encourage clustering, not necessarily within designated clusters, which may have been more beneficial given the structure of the economy. The Regional Service for Clustering, the subject of the chapter 7, did seek to encourage such clustering.

5.2.5 Evaluation and Policy Learning

Within One NorthEast there is an acknowledgement that the cluster policy has not gone well, it has been difficult to put into practice and a lot of time was spent in talking about what were clusters and what were not. Lessons have been learnt and during interviews there was acknowledgement that maintaining the Centres of Excellence so separately from the cluster development programme was problematic and also that with certain designated clusters, for example, textiles, so little progress was being made that no further policy would be developed. There have been substantial changes to the cluster development programme and therefore there must have been an internal review, and there are references within external documents to

'reviewing regional commitments including strategy for success and clusters', [19] but this has not been clearly communicated outside the agency.

In section 3.5.7, I highlighted that evaluation can be of an 'accounting' kind, whereby progress is assessed against numeric targets, and the performance of the Agency is measured quarterly by the DTI against such targets. Similarly, individual projects funded by One NorthEast or with European Structural Funds have been subject to evaluation. The cluster strategy as a whole was evaluated as part of the evaluation of RES1 undertaken in 2002 (SQW Limited, 2002) and RES2 undertaken during 2005 (Frontline Consultants, 2005).

The evaluation by Frontline Consultants makes the point that RES2 does not identify specific measurable indicators to assess progress under each theme. Consequently Frontline Consultants used the Tier 2 and 3 indicators required by the DTI and used Gross Value Added per capita and labour productivity as measures for the success of the 'Creating wealth by raising the productivity of all businesses' theme, within which the cluster development programme fell. Frontline Consultants also noted the lack of 'bottom up' assessments of activities and projects, which would have added to the statistical analysis. There does not appear to have been any attempt to produce evaluations of the progress of individual clusters. In addition the evaluation of the cluster policy *process* has not been an integral part of the cluster policy-making process and had this been done there might have been more of a recognition of the need to move from strategy to implementation.

Although, as has been noted in section 3.5.7, there have been moves in Scotland, and more recently in Wales, to design and implement cluster evaluation frameworks, this lack of clear evaluation frameworks is not unusual, and throughout the RDAs there have been issues in respect of how to evaluate cluster development programmes, with some agencies attempting top down broad, thematic evaluations and other agencies, including Yorkshire Forward, proposing a bottom up approach building on the

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[19] Discussion paper for SPMG meeting 8.9.04 accessed on 18 November 2005 at <http://www.europeanfundingne.co.uk/downloads/meetings/20041109111001.doc>

evaluation of individual projects.[20] However, the constant change in policy approach within One NorthEast appears to have hampered the development of an evaluation framework.

5.3 Conclusion

The decision to take a cluster approach was to an extent imposed on One NorthEast by central government and influenced by European Structural Fund requirements. The aims of cluster policy, and economic development policy in general, did change over the first five years of One NorthEast's existence, but there was an underlying desire to effect a quick change to the structure of the region's economy, and the cluster development programme and Strategy for Success were seen as key tools for achieving such a change. However, the move to cross-departmental working that a cluster policy requires was difficult to achieve within the Regional Development Agency and ONE representative 6 reported:

> A lot of people see clusters as being a totally separate entity to everything else that goes on. We have inward investment, we have business support, we have Regional Selective Assistance, and then in its own box they see clusters.

An apparent difficulty in understanding cluster concepts appeared to lead to an inability to stabilise a cluster development policy and a related inability to demonstrate progress in cluster development. These factors contributed to the decision by One NorthEast to move away from the explicit use of the term 'cluster'. However, I would argue that the three pillars approach, more recently adopted, still represents a cluster approach and that policies to support the energy and environment, processing industries and healthcare and health sciences 'pillars' and their component 'sectors' should be informed by an understanding of clusters and the policy processes required to support them. There have been continual difficulties in the cluster policy-making process within One NorthEast, particularly due to problems in identifying, selecting and analysing clusters within the region. To illustrate the effect of these

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[20] Information obtained from telephone conversation with Bea Jefferson, Head of Evaluation, Yorkshire Forward, the Regional Development Agency for Yorkshire and Humberside.

difficulties on the outcomes of the cluster development programme I want to look at the impact of One NorthEast's cluster development policy on the marine and offshore industries in the region in the next chapter, before looking at an alternative case of a cluster policy initiative in chapter 7.

6 The Impact of Cluster Policy on the Marine and Offshore Engineering Cluster in North East England: One NorthEast's Cluster Development Programme

The previous chapter used a cluster policy process model to examine the way in which One NorthEast's cluster policy developed. By examining the policy *process* I have demonstrated that the goals of, and background to, the policy-making process impact upon the development of cluster policy. I now want to look at One NorthEast's development of policy for a specific cluster, to demonstrate that existing relationships and activities within a cluster affect, and are affected by, particular interpretations of the concept of clusters and cluster policy, and that those interpretations influence the outcomes of cluster policy. Chapter 7 then examines the development of an alternative policy approach and Chapter 8 considers the outcomes of that approach. In both cases the need for policy to consider the role of trust and untraded interdependencies in developing the perceived advantages of clusters is highlighted, as is the length of time required to develop these assets. In the case of regional cluster policy the role of existing cluster organisations or, as Porter terms them, 'institutions for collaboration' (Porter and Emmons, 2003) is seen as particularly significant, because it can be through these organisations that networks form and activities conducive to the development of untraded interdependencies occur.

The cluster I have used to examine the outcomes of both policy approaches is the marine and offshore engineering cluster. Many studies of clusters and cluster policy focus on 'new' industries, but for several reasons this more traditional cluster is a useful case study through which to examine the questions raised in the previous chapter. Firstly, although the industries within the cluster are well established in the region, they have undergone significant change and face considerable challenges and therefore this case study can provide lessons for developing cluster policy for more mature industries. Secondly, a complicated institutional framework has grown up within the cluster and therefore the role of a variety of cluster organisations can be identified. Thirdly, policy from all governmental scales has impacted upon the cluster

and therefore the interdependency of regional cluster policy with other scales of policy can be examined.

In section 6.1, I provide a background to the marine and offshore industries in the North East and highlight some of the relationships that exist between actors. In section 6.2, I outline the institutional framework and range of cluster organisations that have arisen, in order to highlight both the complexity of that framework and the benefits that arise from those organisations. In section 6.3, I analyse One NorthEast's policy approach to the cluster, again using the cluster policy process model outlined in Chapter 3. In Section 6.4, I conclude that, while One NorthEast's cluster policy towards the marine and offshore engineering cluster has been flawed, there were particular issues and difficulties in designing policy for this cluster.

6.1 Background

The marine sector, as a whole, throughout the United Kingdom, is characterised by diversity and complexity and is very difficult to identify from SIC code data. Scottish Enterprise found marine related companies across 99 separate four-digit SIC codes.[21] The Marine Foresight Panel defined marine related activities as 'those activities which involve working on or in the sea, together with those activities that are involved in the production of goods or the provision of services that will themselves directly contribute to activities on or in the sea'.[22] UK Trade and Investment operate a much narrower definition of the marine sector, 'Boat building; cruise ships; EEZ (Exclusive Economic Zones) related equipment and services (marine only); Inland waterway craft; Leisure boats; Marine equipment and associated services: Powerboats; Sail craft; Ship repair and conversion; Shipbuilding and associated services; Ships; Superyacht building, repair and conversion and equipment; Workboats; Yachts'.[23]

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[21] Marine Engineering, Technologies and Services Cluster Analysis. A report for Scottish Enterprise by Frontline Management Consultants and Ron Botham Associates (June 2000)

[22] Fore*sight* Progress Through Partnership 16: Marine, Office of Science and Technology (1997)

[23] <www.uktradeinvest.gov.uk>

There is no statistical analysis of the significance of these industries in the region, but a desk based analysis of the North East membership of various industries bodies[24] identifies a minimum of 180 companies operating in the marine, offshore and subsea sectors. This figure is adjusted to exclude organisations such as solicitors, banks and colleges who may be members of marine and offshore organisations, and will be an underestimate as many smaller SMEs may be excluded. These industries have also represented a sizeable, if difficult to quantify, workforce in the region, estimated at between 25,000 to 38,000 in 400 firms in 2000 (Department of the Environment Transport and the Regions, 2000). The cluster in the North East of England is depicted schematically in Figure 6-2 below, in which three overlapping areas are identified - ship building, construction for the offshore oil and gas industry and construction of renewable offshore energy equipment. The size and scope and evolution of these different aspects of the cluster are considered below.

6.1.1 Shipbuilding: 'They build ships here to perfection'[25]

There is a long history of marine industries in North East England, with one of the earliest examples being shipbuilding, driven by a need to transport coal and other cargoes from the region. Indeed shipbuilding pre dated the industrial era, with a galley for the king's fleet being built in Newcastle in 1294 and shipbuilding recorded in Sunderland from 1346, and at Stockton from 1470. By the early seventeenth century shipbuilding was well established on the Tyne as demonstrated by the foundation of a shipwright's guild in Newcastle. The skills of the shipwrights, in repairing ships at sea, were easily transferred to wooden ship construction.

Shipbuilders in the North East of England pioneered the production of iron vessels and the use of steam power, and the Tyne was to become one of the world's centres for metal shipbuilding. Skills developed in boiler making were easily transferred to

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[24] Author's own 2005 analysis of regional membership of NDI Marine, NOF, NEKS project at Durham University Business School, NEMOC, Shipbuilders and Ship Repairers Association (SSA), Tyne First

[25] Said to have been written by Daniel Defoe of Newcastle at the beginning of the eighteenth century and quoted in *Lost Shipyards of the Tyne* (French & Smith, 2004), which has been used extensively for this section.

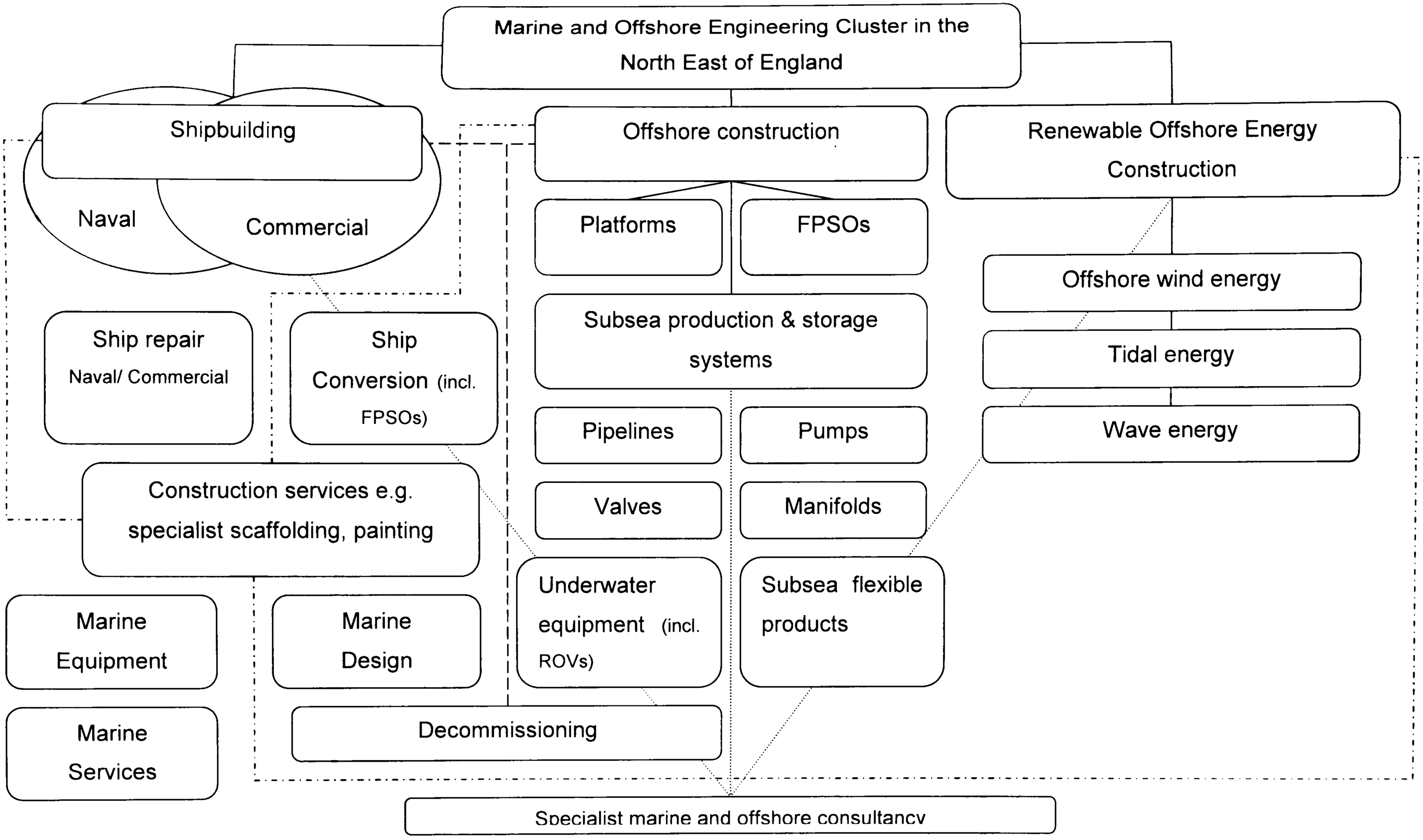


Figure 6-2 Marine and Offshore Engineering Cluster in North East England

shipbuilding in iron, but it was soon steel that was the preferred metal for ship construction. The world's first steam turbine-driven warship was built at Hawthorn Leslie's Hebburn yard, drawing on the local engine making skills of Sir Charles Parsons. Other innovations involved the use of welding to replace riveting. However. by the First World War, shipbuilding in the North East, which had been a world leader in technological developments, was already starting to lose its edge (Tomaney et al., 1999).

The industry was always cyclical. Hawthorn Leslie's Hebburn workforce was reduced to only 600 in the early 1930s, rising again to 6,000 during the Second World War. Between 1928 and 1930 the Redheads yard launched 13 cargo vessels, but only one new ship was completed between 1930 and 1937, with the yard surviving on ship repair work. There was a further peak during the Second World War when 35 ships were constructed at the yard. The region continued to produce a substantial proportion of UK output, but the UK market share of world output fell from 24% in 1946 to 7% in 1960 (Tomaney et al., 1999). Tomaney et al. point out that in a growing market, absolute levels of output were maintained for a time, but shipbuilding was moving towards large scale, capital-intensive production that did not accord with the facilities at the UK yards. Lord Geddes' report of 1966 (Geddes, 1966) recommended amalgamation of yards into regional consortia and the industry was subsequently nationalised in 1977.

At the end of 1918,there were 20 shipyards on the Tyne alone, however global trends in shipbuilding have seen production move to areas such as China, Korea and Japan, with European shipbuilding moving into more specialist areas (cf. Eich-Born and Hassink, 2005). The leisure boat industry, which has been a source of growth in the South of England, does not exist in the North East. Most of the yards have now disappeared under business developments, with the most striking example being Sunderland, where there were 65 shipyards in 1840 making it the largest shipbuilding town in the world, but no shipbuilding industry at all by the late 1980s.

Although the A&P Group still has a presence on the Tyne and the Tees, the only true ship builder on the Tyne is now Swan Hunter (Tyneside) Limited, bought out of receivership in 1995 by Jaap Kroese. During its history, Swan Hunter had built over

1,600 ships at its Wallsend and Neptune yards (Rae and Smith, 2001). It had been privatised in 1986 and during the 1980s there was an increasing reliance on warship orders, including HMS *Ark Royal* and HMS *Illustrious,* because the yard had been designated as a warship builder and was therefore ineligible for European Commission subsidies for merchant shipbuilding. It had gone into receivership on May 13, 1993 having failed to secure the order for the helicopter carrier, HMS *Ocean.* Jaap Kroese also bought the Port Clarence Yard on the Tees, although this was mothballed in 2005[26].

Early contracts were for ship conversions and Swan Hunter (Tyneside) Limited converted the merchant ship *Solitaire* into the world's largest pipeline laying vessel, securing 3,000 jobs for 20 months, followed by the conversion of *Global Producer* into an FPSO (floating production, storage and offloading) vessel. However, the yard also secured orders to build two 16,000 tonne amphibious landing vessels for the Ministry of Defence.

Naval shipbuilding in the United Kingdom is witnessing a resurgence with the United Kingdom navy due to embark on a substantial replacement of its fleet, with up to six new ship programmes over the next 15 years – the Type 45 destroyer, the *Astute*-class attack submarine, the Joint Casualty Treatment Ship (JCTS), the Miltary Afloat Reach and Sustainability programme (MARS), the Future Surface Combatant (FSC) and most significantly the Future Aircraft Carrier (CVF).

The CVF project was initiated in 1998 and relates to the construction of two aircraft carriers, costing in the region of £3bn, which could be the largest warships ever constructed in the United Kingdom, displacing 65,000 tonnes and being 280 metres long. The proposal was to construct the ships in super blocks and transport the blocks to one shipyard for final assembly. It is anticipated that non-shipbuilder suppliers will provide in excess of 50% of the value of each vessel,[27] offering substantial opportunities in the supply chain. The process was highly protracted, [28] but a physical

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[26] *Yard work ends,* report in the *Evening Chronicle* May 20 2005

[27] Can the United Kingdom Rebuild Its Naval Fleet? Rand Europe Research Brief www.rand.org

[28] Still ongoing in 2006

integrator, KBR Ltd, was appointed in 2005. It was originally envisaged that Swan Hunter would be one of only four UK shipyards competing for work on the main structure of the CVF project, however, in December 2005, it was announced that none of the super blocks would be awarded to Swan Hunter, but would instead go to BAE Systems in Govan and Barrow, VT Group in Portsmouth and Babcock in Rosyth. It became apparent that smaller yards, including A&P Tyne, could, however, bid for sub-packages of work, with the super superstructure above the hangar deck being constructed in over twenty upper blocks.[29]

Given the fragility of the offshore fabrication and shipbuilding industries there was always a need to identify alternative sources of work pending the possible naval contracts. This need was heightened by the decision by the Ministry of Defence to not award the construction of CVF super blocks to Swan Hunter and to remove the last ship under construction on the Tyne, the Royal Fleet Auxiliary Larg's Bay, from Swan Hunter to be completed on the Clyde due to an escalation of costs and dissatisfaction with performance. A working group was established to explore opprotunities for job creation on the Swan Hunter site.[30]

Swan Hunter had already been investigating the possibility of establishing a ship recycling facility, potentially using the dry dock on the North side of the Tyne, vacated by A&P's consolidation at their Hebburn Yard. Ship scrapping is predominantly undertaken at present in India, Pakistan, Bangladesh and China and there are concerns about the health and safety implications of procedures in these countries. There is a growing interest in recycling ships and it is likely that the north east's industrial strengths give it potential in this area. The Maritime and Coastguard Agency have estimated that approximately 750 ships of a weight greater than 500 tonnes are decommissioned worldwide each year, with a further 2,000 single hulled vessels requiring decommissioning over the next 5 to 10 years. In July 2005, the Marine Environment Protection Committee agreed that the International Maritime Organisation should develop, as a high priority, a new instrument on recycling of

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[29] <http://www.mod.uk/DefenceInternet/FactSheets/ProjectFcatsheets/WhatNext.htm>

[30] <http://www.newcastle.gov.uk/press.nsf/latestbyid/D879150B552564838025 71E200369583?opendocument>

ships with a view to providing legally binding and globally applicable ship recycling regulations for international shipping and for recycling facilities by 2008. In 2005, British Maritime Technology assessed the United Kingdom's ship recycling capability on behalf of The Department of Environment, Food and Rural affairs.

Ship repair ranges from routine maintenance and repair, done almost 'en route', to major refits where projects are more internationally mobile. From 2000 to 2003, United Kingdom turnover in ship repair and conversion increased by 25% to Euro 420 million.[31] A&P Tyne, the main ship repairer on the Tyne had turnover of £31m in the first half of 2004, compared with £36m in the whole of 2003, but the industry is cyclical and by November 2004 they had mothballed one of their two Tyneside yards and announced 48 redundancies from their workforce of 283.

In addition to ship building, ship repair and the potential for ship recycling, there are other related industries in the North East. It is estimated that over 50% of ship construction involves subcontracted work (RAND Europe, 2005) and there remains a significant supply chain in the region in this respect. Within the shipbuilding supply chain, and as will be seen below, in the offshore fabrication supply chain, there are many firms that offer general engineering and services to a large range of sectors, albeit some companies focus on the marine market. There are specialist suppliers providing marine equipment e.g. coatings/paints and specialist blinds to both local fabricators and worldwide markets. Although UK shipbuilding is in decline, world shipbuilding is forecast to continue to grow. Figures are not available for the region, but the UK marine equipment industry has an annual turnover of around £1.7 billion, of which 62% is exported[32]. Within the region there are also a range of naval architects; draughting companies, marine engineers and consultants, and specialists in shipyard and port design. There are also a number of marine and offshore recruitment and labour supply services.

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[31] Marine Sector Technology Plan, DTI 2005

[32] Competitive Analysis of the UK Marine Equipment Sector, DTI 2001

6.1.2 Offshore Construction

In other regions significant investment has been made to retain shipbuilding capacity (Hassink, 2005), but in the North East of England, as shipbuilding declined through the 1970s, an offshore fabrication industry grew up, constructing major platforms for oil production within the United Kingdom Continental Shelf (UKCS). To an extent new industries grew from the ashes of the old and the yards survived by *not* building ships. The physical infrastructure of the shipyards transferred easily into this new market and the skills that had been developed for shipbuilding also transferred to offshore construction.

The North East became an acknowledged world leader in offshore platform construction and it has been estimated that as many as 80% of the platforms in the UKCS involved North East companies as prime contractors or suppliers.[33] In particular the use of FPSO (Floating Production Storage and Offloading) technology for oil extraction was a boon to the region, because it involved converting vessels to take topside oil production facilities on deck. In 2002, the Amec yard undertook a £300 million contract to refit the 300,000 tonne Bonga for oil production in Nigeria.

Offshore fabrication is a cyclical industry and by 2004 the position had become extremely fragile, especially on the Tyne. In 2002 the industry in the Northeast had been relatively buoyant with the AMEC yard undertaking the above work on the Bonga. Subsequently the AMEC yard was mothballed and faces an extremely uncertain future and McNulty Offshore had a period in administration. However Heerema on Teesside won a substantial part of the construction of the Buzzard contract for the oil company, EnCana. The oil and gas industry still intends to invest over £18bn in the UK Continental Shelf during 2003 to 2010[34], albeit an increasing proportion of development is subsea and further substantial large-scale platform fabrication is unlikely. There are however possibilities in offshore decommissioning with costs of decommissioning projected to be £9.1 billion (2003 money) to 2030[35]

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[33] Alan Campbell MP in parliamentary debate 4 April 2000. Recorded in Hansard Official Reports of Parliamentary Debates, The Stationery Office, London

[34] *Maximising Britain's Oil and Gas Resources* UKOOA Economic Report 2004

[35] *Maximising Britain's Oil and Gas Resources* UKOOA Economic Report 2004

and the North East having the necessary skills and facilities to handle decommissioning projects. The market is emerging and remains dependent on the oil and gas operators' plans for the North Sea infrastructure.

Even within the offshore market the range of products provided is wide, extending from the manufacture of specialist valves to the provision of survival equipment for helicopter passengers en route to offshore installations. Additionally the technology used in oil and gas extraction is changing and moving away from large platform construction. According to a manufacturer in the industry, 'high tech subsea trees, manifolds, flowlines and control systems are replacing the B.M.T.s (Big Metal Things)'.[36] Firms within the North East have a growing interest in such subsea technology and there is evidence of an emerging subsea technologies cluster arising from the region's long history of pipeline expertise, the presence of two world-leading firms in the production of subsea flexible products, DUCO[37] and Wellstream[38] and a number of highly innovative SMEs (Siedlok and Andriani, forthcoming). The manufacture and installation of subsea equipment serves many markets – including oil and gas, renewable energy instalations, defence, nuclear and telecommunications. However, the main market relates to the manufacture and installation of subsea equipment for subsea oil and gas exploration and production (including the manufacture of pipes that go down from FPSOs to the seabed) and it is a growing industry, not only in the UKCS but also worldwide, as subsea production grows at the expense of new platforms, and oil and gas production moves towards deeper waters and smaller fields, requiring different technologies. Subsea production now takes place in depths beyond 2,300 metres and demand is strong in Brazil, West Africa and the Gulf of Mexico. In the North Sea, subsea technology is being used to increase the field life of existing assets. 2,349 subsea wells are forecast to be installed in the period 2006/10. This represents an 89% growth from the period 1999/03, where 1,242 wells

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[36] Allen Southern writing in the NOF directory 2004 –2005

[37] Duco is a manufacturer of control umbilicals for subsea production systems. It has been based in Walker, Newcastle since 1990 and has approximately 350 employees and revenue for the Newcastle plant in excess of £100 million.

[38] Wellstream is a manufacturer of unbonded flexible flowlines and risers established in 1989. Headquartered in the north east since 1996, it has 430 employees locally and spends over £30 million in the region per annum. 90% of its output is exported.

were installed.[39] Durham University Business School have identified over 100 companies in the region involved in the subsea industry many of them being world leaders in their respective fields.

6.1.3 Offshore Renewable Energy Construction

Developments in energy markets and increasing concerns with regard to climate change are leading to a growing interest in wet renewables (offshore wind, and wave and tidal energy sources). Smith Reay (2002) noted the potential to exploit this emerging market, given the presence of the United Kingdom's first offshore wind farm at Blyth, specialist consultancy capability and existing manufacturing expertise. However, this remains only an emerging market.

6.1.4 The Cluster: Firm Relationships and Rivalries

In terms of relationships amongst the fabrication yards, bilateral agreements in terms of labour have long existed between the yards on each river, so that one yard would move workers to another yard, but retain them on their own books. In boom times work would be moved between the yards and there was movement of staff and management too. Wider groupings of firms have also come together and in the 1970s there was an umbrella group of six ship repair yards called Tyne Ship Repair Group. Despite a perception of union militancy, sources from both the yards and the unions reported a long history of partnership between the unions and the yards and trade unions were involved in marketing missions overseas. Despite these arrangements between the yards, other sources highlighted a lack of trust and 'huge cleavages between the employers based upon personal animosity' and highlighted the fragility of the relationships in that 'the relationships are as cyclical as the work – when things are going well people get on better' (trade union official 1). The yards were often competing for the same work, but would collaborate when work was plentiful.

The supply chain for the fabrication yards is diverse and, as mentioned above, is not exclusively serving the shipbuilding and offshore industries. When the offshore industry began its rise to prominence in the North East, this supply chain was ill

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[39] <http://www.infield.com/subsea_production_market_reports.htm>

defined and relatively anonymous but it has subsequently been developed. Within the SME community in the cluster there is a certain level of personal knowledge of other actors. People have often worked together in the past and know, or at least know of, each other. In certain cases there were close working relationships in the supply chain, with joint development of products and technologies occurring. That said, on occasion, people highlighted that, although they knew of people, it took an organised meeting to bring them together as they would not have met through normal business engagements. Networking and informal learning exchanges did not necessarily occur exclusively within the region and the managing director of one valve company reported networking nationally with contacts made through national trade associations and mutual suppliers.

Therefore there were relationships, within and outside the region, beneficial to businesses throughout the industries comprising the marine and offshore engineering cluster. Some were long standing, close working relationships, whereas others were more pragmatic, functional and dependent on specific business opportunities. What was particularly interesting was that the names of certain key individuals were often mentioned during interviews as being significant or as having brought together a number of firms.

6.2 The Institutional Framework of the Cluster

A complicated institutional framework has developed from these relationships and a series of organisations have been formed, sometimes with support from policy-makers, but usually instigated from within the industries. To use the terminology of Benneworth et al. (2003) these could be termed 'cluster organisations' or in Porter's terminology, 'institutions for collaboration'. I would argue that these organisations themselves form a kind of 'collective asset' or 'club good' available for firms within the cluster to draw upon, and that these cluster organisations are able to produce other cluster assets of the kind that cluster policy-makers would seek to deliver.

Because, as was mentioned in the introduction to this chapter, these organisations affect, and are affected by, the policy-making process, I want to look at a range of these cluster organisations in order to consider their origin, the activities they organise and the way in which they have contributed to the production of cluster assets and

other forms of untraded interdependencies. I will then go on to emphasise the significance of the organisations in terms of cluster policy development.

6.2.1 Northern Offshore Federation

The Northern Offshore Federation was formed in 1988. Significant actors within the offshore industry in the region thought there could be a role for a representative organisation in the region, and a member of staff from the AMEC offshore yard was seconded to approach companies in the offshore industry to see if they were interested in such an organisation.

The offshore construction industry has a clear pyramid structure with, at the top, the oil companies, as clients, followed by the prime contractors, many of whom were based in the North East, beneath which were several layers of smaller suppliers. At the outset Northern Offshore Federation was very tightly restricted to the offshore industry and did not include shipbuilding. Its role was to strengthen and develop the supply chain by raising awareness of, and within, that supply chain. It soon grew to 300 members of two different types – those supplying oil companies direct and those supplying main fabricators. Unique factors led to its success – a brand new, emerging, local market; prime contractors in the locality; the need for a new supply chain and SMEs who could form that supply chain due to the strong engineering base in the region.

Northern Offshore Federation initially offered information dissemination and market information. Its activities included meetings with project managers from the major oil companies who would visit and explain their procurement policy. The Federation also provided information on the stringent requirements of the industry (for example in health and safety). It was particularly aimed at the smaller players who would have otherwise been unable to access such information.

This role changed, partly as the result of the availability of European Structural Funds, and the Federation began to offer more active support including training and business development services, especially in relation to exporting. According to their literature, their services involve market intelligence and information provision,

networking and mentoring, training and export support, and include bi-monthly technology meetings to present and discuss emerging technologies, Inward and Overseas Trade Missions, inclusion in directories and a web portal, export training and project management courses, and representation at offshore exhibitions. All services are considered to be industry driven, with representatives from industry leading steering groups for the different aspects of NOF's activities.

In 2002 the Federation conducted a Foresight exercise in conjunction with 20 companies, Newcastle University and the Offshore Suppliers Office in Aberdeen. This was considered a fruitful exercise as the key actors in the firms were brought together and indeed two companies produced a subsea manifold together as a result of the process. A further series of foresight workshops commenced in the summer of 2005. Northern Offshore Federation also commissioned a study on unused reserves in the North Sea to provide information to members and to support its activities in lobbying the government to promote further development in the North Sea oil fields.

The organisation was renamed NOF in 2001 and its scope widened to provide business support to the marine, offshore and renewable energy sectors. In recognition of the decline in work in the North Sea region, it provides support and encouragement to firms to export and, in line with the strategy of One NorthEast, it is also looking to encourage firms to diversify into the renewable energy and nuclear decommissioning markets. Traditionally a lot of NOF's work was around supply chains for the offshore industry and their Renewables Club now tries to replicate this for the offshore renewables market, where they work with One NorthEast and have hosted events to promote opportunities in the renewables sector.

The organisation faces great challenges at present. The construction of topside oil platforms involved a very clear pyramid of suppliers and NOF was very influential when it was involved with the main fabricators. As this element of the industry has declined the role and focus of the organisation has been less clear and it has tried to diversify into other areas such as marine, nuclear decommissioning and wet renewables. The challenges of a decline in its main industry focus are compounded by a transformation of the organisation's funding structure to a dependency on

membership fees with the ending of substantial structural fund contracts in April 2005.

There are also very different views about the efficacy of the organisation and the cluster assets or collective goods it provides:

> What have they ever done? (Industry representative 1)
>
> It's been going a long time, it's not terribly effective, but it's there (university representative 3)

However, the cluster assets provided by NOF are not always quantifiable. For a time regular networking lunches were not held, but NOF came to realise that members valued the social aspects of these lunches and that they offered meeting places for industry players to meet and exchange information.

One member highlighted the role of the federation in providing access to significant players in the industry and government. Through his membership of NOF he had come to act as manufacturing representative on the Industry Leadership Team (ILT), a top level team from the oil industry who were working with PILOT, a group comprising ILT, DTI and HM Treasury, to create a vision and strategy for the future of the North Sea. Because of this role he reported:

> Once every two months you are on a table with 20 other people who are chief execs of BP, Shell – there's no way I could get to that forum as a managing director of a valve company' (industry representative 1)

Having members in positions of national significance, not only on ILT but also on the International Oil and Gas Advisory Board, not only provides benefits to those members, but it also enables those members to provide feedback to other members. This is one way in which NOF collects and disseminates information but it has also conducted foresight exercises and provided other industry relevant and specialist information to its members.

A representative body also enables the needs and requirements of its members to be fed into policies at a regional level and NOF has been linked to the Learning and Skills Council and involved in skills strategies for the ' Energy Cluster' in the region. Crucially, as an industry body, NOF has a level of specialist knowledge, not available to policy-makers, which enables it to identify market failures relating to the future development of the UK Continental Shelf, and to lobby national government in this respect.

Therefore the initiative came from industry and was built on the requirements of the participants. It provided collective or 'cluster' assets for its members particularly in terms of firstly, provision of information which might have otherwise been inaccessible or too costly to obtain; secondly, by providing tailored business services in terms of training and export support; thirdly, by providing status and voice at a regional and national level and fourthly, by providing a meeting place for networking to take place. Its capacity to generate these assets depended on its level of specialist knowledge, its ability to bring together a critical mass of local players in the region and the availability of funding to finance its activities. However, the precipitous decline in offshore fabrication has resulted in the need for a revised focus for the organisation and this has coincided with a substantial drop in the availability of European Structural Funds to finance some of its activities. It is yet to be seen whether the management of the organisation have the necessary skills to achieve a revised strategy, particularly given the drop in availability of public funding.

6.2.2 North East Maritime Group

A second organisation that arose from industry was the Tyne Maritime Group, later to be known as North East Maritime Group. This group started in around 1999, originally as Tyne Maritime Group, as a result of an idea from the then Regional Secretary of the GMB Union. After 18 months it became the North East Maritime Group (NEMG). It was never formalised into a legal entity and took the form of a forum meeting every 6-8 weeks to identify issues in the industry and propose solutions. The main sector businesses on the river (the offshore yards, shipyards and one of their main suppliers), unions, local Members of Parliament and organisations such as Northern Offshore Federation were part of it, although NEMG tended to

represent major employers whereas Northern Offshore Federation was more focused on the supply chain.

In the marine industry, particularly in the main sector businesses, there was nature of employment was highly cyclical. People were continually in and out of contract with consequent detrimental impacts both on their livelihoods and in terms of training and pensions. This was having a long term, damaging impact on the sector. The original overarching idea of NEMG was to have one holding company employing all the labour in order to provide continuity of employment, to facilitate pension provision and to permit up-skilling of the workforce, particularly during cyclical downturns. The idea was also to produce a coherent industrial voice with the involvement of politicians. The radical idea failed – it would have competed with the business of one of the yards, which operated a labour supply organisation, and generally there was a lack of trust. The group was more successful in terms of harmonising health and safety and pay and conditions, for a time, and in organising collective lobbying activity. The group also worked with the Sector Skills Council, SEMTA (the Science, Engineering, Manufacturing Technologies Alliance) and the Learning and Skills Council on remodelling adult apprenticeships and a skills passport to assist labour mobility between the yards.

The group contributed to the development of conversations that did lead to more trustful relationships. One trade union official demonstrated the step-by-step nature of these conversations. NEMG was:

> [T]rying to get the employers to talk on a regional basis, initially on a sub regional basis, but then on a regional basis (trade union official 1).

In the end the radical idea did fail as the result of a lack of trust. but relationships were improved in an industry where:

> They haven`t trusted each other for forty years (cluster organisation official 1)

And where, while there were hosts of good bilateral agreements

> The relationships are as cyclical as the work' (trade union official 1).

The creation of a 'voice' for the industry, the Common Labour Agreement and the health and safety passport could all be seen as 'cluster assets' available for exploitation by the individual companies and the industry as a whole. NEMG also provided links into national government and the group met with the then Energy Minister, Brian Wilson MP. However, by 2005 NEMG was considered to have 'mothballed' itself and there was a feeling of frustration at the lack of progress. Lobbying was still done by MPs and key actors from the main sector businesses and the Skills Passport still being worked on by SEMTA but:

> The big draw back is that we haven't realised our ambition in terms of having commonality on all counts because of the lack of work – it's the lack of work, it's the lack of work' (trade union official 2).

In interviews it was emphasised to me that the group had undoubtedly benefited from charismatic and focused leadership at the outset, highlighting Eklund's emphasis on the need for cluster animators and Camagni's suggestion of the need for a 'collective agent', as discussed in section 5.2.3. However, interest waned and one local authority official described the group as having fallen apart. As one trade union official explained:

> Getting round the table to talk about the demise of the sector isn't how anyone wants to spend their time' (trade union official 1)

Notwithstanding the mothballing of NEMG and the extreme downturn in the yards. key individuals involved in the industry continue to have a role in identifying market opportunities, such as naval decommissioning, and this has involved much lobbying, often done by the unions and those key individuals. The GMB union worked with Greenpeace to lobby the national government to agree to decommission Royal Navy vessels in United Kingdom yards. There has still been a concern that on occasion invitations have gone out to tender for such contracts and not reached Tyneside and this highlights the importance of the links key individuals within industry have to. for example, the Ministry of Defence. which enable local players to link into the national

scale. Collaboration between the yards in respect of decommissioning has been a possibility, although there remains suspicion and the local evening newspaper headline, 'Fury as yard's cranes removed'[40], draws attention to continuing tensions between the yards. These tensions could be eased by the presence of a facilitator charged with moderating relations and building trust.

6.2.3 Jobs on the Riverside

Jobs on the Riverside was an initiative that resulted from the work of NEMG, which initially funded the post of Tyne Strategy Manager to analyse the skills and workforce on the Tyne and to conduct a skills gap analysis, given concerns over an ageing workforce and lack of training during downturns in work. Although this was not a policy led initiative, once the local authorities were alerted to the need for strategies to overcome potential skills shortages, Jobs on the Riverside was funded in a unique arrangement between Newcastle City Council, North Tyneside Council and South Tyneside Metropolitan Borough Council using money from their Single Regeneration Budget (SRB6). The initiative went on to develop three main schemes - an adult apprenticeship piloted and developed in conjunction with Swan Hunter; funding for existing workforce training in an attempt to restore training as an integral part of businesses and a sector development programme operating at entry level into the industry. Swan Hunter viewed the adult apprenticeship scheme as successful, but it never moved beyond being a pilot scheme and concern was expressed amongst those involved that the tailored, small scale approach that it entailed did not fit with a regional model for skills which dealt with much larger programmes. Other problems associated with the provision of training included the lack of work and the lack of investment in facilities at further education colleges.

Alongside these training initiatives there was an attempt to develop a brand, 'Tyne First', to raise the profile and improve the image of the river. The brand building was aimed at encouraging recruitment into the industry and at bringing together companies to work together. The instruments included a website with around 20 companies and exhibiting at trade exhibitions. The aim was to build on improved

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[40] Newcastle Evening Chronicle, 15 July 2005

relations that were perceived to be emerging from the work of NEMG, but crucially these depend on there being a surfeit of work. Certain local authority interviewees were concerned that Tyne First represented the imposition of a brand with little behind it and saw the website as a duplication of other local authority initiatives. There was also a concern in other parts of the region that the focus was entirely on Tyneside.

The issues around this industry initiated, local authority initiative were never resolved and in 2004 the local authorities withdrew funding and the project closed. The difficulty of operating within a regime of short term funding is also highlighted by the experiences of the Regional Service for Clustering (cf. Chapter 7).

6.2.4 NEMOC

A further industry driven cluster organisation is NEMOC, the North East Marine and Offshore Cluster. Partially funded by European Structural Funding, originated by Swan Hunter and representing their first tier suppliers, NEMOC is a group of fifteen companies. Views vary widely on the purpose and benefits of NEMOC. According to one member NEMOC is motivational and assists in the functioning of the supply chain:

> I like to work with the same people, because if you keep the same people sometimes you have a job that doesn't go all that well and they will help you out - if it's a one off they can say 'well we're not going to get the next job' (industry representative 2).

Another member, while seeing little direct benefit from membership, did acknowledge:

> indirectly it probably has benefits in that [our] name is mentioned in the same breath as some of the other players in NEMOC (industry representative 3).

Another member noted that to an extent the organisation is political in that it demonstrates, to the Ministry of Defence amongst others, a UK supply chain for the

Dutch-owned Swan Hunter shipyard. However, that member also pointed out that NEMOC has been motivational and has provided NEMOC members with access to government ministers, which they would not otherwise have obtained. NEMOC has certainly provided a focus for lobbying the government with regard to the naval shipbuilding programme. This lobbying has been done in conjunction with the GMB Union and with the support of the local press, as One NorthEast are perceived to have been less prevalent in the campaign than their Regional Development Agency counterparts in the South West or North West of England. Cluster organisation representative 2 voiced the opinion that, three years into its existence, One NorthEast was only just giving the naval shipbuilding programme sufficient senior attention.

NEMOC has also been used by Swan Hunter as a vehicle through which to pursue diversification opportunities for itself and its supply chain. For example, the proposal to develop a ship recycling facility for naval decommissioning on the Tyne has been pursued by Swan Hunter under the banner of NEMOC with the assistance of One NorthEast and Newcastle City Council.

Local authority official 1 saw NEMOC as the key to securing a future for the shipbuilding industry in the North East, but others were much more cynical viewing NEMOC as a way for Swan Hunter to extract funding from it supply chain. ONE representative 8 also made the point that the owner of the Swan Hunter shipyard, a key player in the offshore and marine engineering cluster, was unwilling to participate in the energy cluster, partly because, in their view, they were well served by NEMOC.

On balance NEMOC predominantly appears to have functioned as a lobbying vehicle working in the interests of Swan Hunter and its supply chain. In a similar way to the way in which certain NOF members saw that organisation as providing access to players that they would not otherwise have been able to access, NEMOC has given its members access, particularly to government circles, that they would not otherwise have reached. However, and again drawing attention to the key role of individuals in clusters, it is the Managing Director of Swan Hunter. Jaap Kroese who has been the key driver in this process. Successful individuals often have forceful and dynamic personalities and some resent this forcefulness. During interviews some people expressed concern about Jaap Kroese, whereas others expressed admiration.

6.2.5 NDI

NDI, with the initials originally standing for Northern Defence Initiative, was formed in 1996, as the result of a public sector initiative. There was concern that the collapse of the Soviet Union and the anticipated 'peace dividend' was going to have an adverse effect on the defence sector, particularly the marine sector. Although the initiative was started by the public sector, the idea was to get players together in the industry to generate ideas of what could be done to 'turn swords into ploughshares'. It became clear that there was an ongoing market for defence related products and by April 2001 NDI, now standing for Northern Defence Industries, was formed as a company limited by guarantee.

NDI's growth since then has been remarkable. NDI's business model involves firstly, promoting opportunities in the defence supply chain to firms in the North of England; secondly, finding and bringing together suppliers, preferably from the North of England, but in practice from all over the United Kingdom, capable of meeting the procurement requirements of global defence players and thirdly, helping global defence players promote their bids to the Ministry of Defence.

NDI provides meeting places for its members to network and it brings together small groups of firms to work together on larger defence contracts. It too has a role in promoting the region as a location for naval construction and in 2004 hosted a conference entitled Shipbuilding for the 21st Century, which brought the major players in the warship programme onto Tyneside. NDI also enables smaller firms to participate in large exhibitions by taking stands at major defence exhibitions and again this enables firms to have access and status that they would not necessarily achieve alone. It arranged for both BAE Systems and Thales to present to the region and through newspaper campaigning stimulated some 200 small companies in the North of England to register as potential suppliers.

Both NOF and NDI are fee paying membership organisations and there is an overlap of membership, although NDI's membership is growing and NOF's is declining. The overlap arises because of the interest from both organisations in the potential warship contracts and as a result of the previously mentioned tendency for the firms in both the offshore and defence supplies chains to supply into diverse markets. Both One

NorthEast officials and members of these organisations pointed out the danger that such member organisations become mere talking shops and highlighted the need for both the management and the members of these organisations to ensure that they fulfil a purpose for their members. NDI have remained strictly and intentionally focused on supply chain management, whereas NOF diversified into export support and training. NDI have been very astute as an organisation in regularly marketing figures for the additional business won by firms in the defence industry. NOF profess not to measure the value of contracts obtained as a result of their endeavours:

> We don't measure it, but it has to be the case because it's gone on so long and there is still a clamour for it' (Cluster organisation representative 3).

6.2.6 Cluster Organisations: Conclusions

The cluster organisations discussed above are not the only organisations representing elements of the marine and offshore industries in the region, although they are the most significant ones. The organisations have predominantly arisen from industry, although in many cases they have subsequently attracted public funding. The activities they organise are diverse but the benefits or 'cluster assets' that have arisen and are then available for cluster members to exploit (depending on their own competencies and strategies) include specialised and tailored training; representation and voice; information provision; access to individuals, organisations and contracts that would not otherwise have been obtained and meeting places for networking and information exchange. Many of these activities are those highlighted in Chapter 3 as potential activities to be promoted as part of a cluster development policy.

Several sources pointed out the pressures of time when it came to drawing on the potential benefits of cluster organisations

> I have limited my involvement to the associations I can commit time to – otherwise if you don't put the time in, you don't get the return (Industry representative 1)

> There are only so many [organisations] that you can concentrate on (industry representative 4)

There are only so many organisations that an individual can focus upon and the benefits offered by cluster organisations are only realised if the individuals within firms are able to focus on that organisation. This in turn highlights a potential difficulty in that a complex institutional framework has grown up around the marine and offshore engineering cluster as it has developed and diversified, and there is therefore a wide range of cluster organisations all representing overlapping, but different, aspects of the cluster. If, as I have argued, cluster policy is distinguished by the participation of key cluster actors in the design and delivery of highly tailored policy instruments aimed at impacting upon all aspects of the cluster including the softer relationships therein, then policy-makers need to engage with these cluster organisations to both design and deliver policy. Grabher (1993b) concludes that an institutional infrastructure that incorporates overlap and redundancy can be beneficial in avoiding the lock-in that can characterise older industrial regions. However, the organisations need to be linked together. This was not achieved partly because there was disquiet at One NorthEast about the ability of some of these organisations

> We have many organisations who have evolved into trade associations and they probably still think they are the catalyst for the sector but they are probably just representing the sector (ONE official 6)

This difficulty was one of many that One NorthEast would face in developing cluster policy for the marine and offshore engineering cluster.

6.3 Regional Cluster Policy for the Marine and Offshore Engineering Cluster

There has been a long, contested and well-documented history of national policy and political involvement in the shipbuilding industry (Tomaney et al., 1999). Within the region, prior to the establishment of the regional development agency, there had been local authority initiatives for the offshore industry. Newcastle City Council in particular had been active in providing infrastructure support. However, in the remainder of this chapter I want to look specifically at the approach of One NorthEast towards this cluster. As in the previous chapter, I propose to use the cluster policy

model as a framework to analyse the process of developing a cluster policy, in this case for the marine and offshore engineering cluster in the region. In Chapter 6. I mentioned that the first stage of the model is the decision to take a cluster approach to policy. As One NorthEast had decided to adopt a cluster development approach across a range of clusters, of which offshore came to be one, I will start at the second stage of the model – the selection and analysis of the cluster.

6.3.1 Identification, Selection and Analysis

The selection of marine and offshore industries as a regional cluster for support, or as an element of a wider regional cluster for support, was predictable because those industries given the sizeable, if difficult to quantify, workforce in the region. It must also be noted that there is also a historic and political attachment to the offshore and marine sectors, which would have made their exclusion from a clusters policy difficult. Therefore the inclusion of the marine and offshore industries within a clusters development programme in the North East is unsurprising. What has proved to be more changeable and unstable is the way in which One NorthEast conceptualises the cluster of which the offshore and wider marine industries are a part.

As discussed in section 5.2.2, the clusters identified for support by One NorthEast in the initial Regional Economic Strategy, *Unlocking Our Potential*, were based on the modes of production approach that had pervaded the sector strategy of their predecessor body, Northern Development Company. Offshore engineering was not specifically identified as a cluster, but was encompassed under the Low Volume Manufacturing cluster. The difficulties of operationalising the cluster strategy outlined in *Unlocking Our Potential* have been highlighted, and by the time *Unlocking our Potential* was reviewed, the way of defining clusters had moved away from modes of production and clusters were defined by industry or market. As part of the review process, topic papers covering each of the main themes of *Unlocking our Potential* were prepared. The topic paper covering cluster policy classified the cluster containing the offshore industries as 'offshore and high-value added engineering' (One NorthEast, 2002) although the second Regional Economic Strategy, *Realising Our Potential*, published in October 2002, simply lists 'offshore' as one of 14 clusters and it claims that '[a] business plan for the **offshore** cluster, embracing the offshore,

marine and energy industries in the Region, is well in hand' (One NorthEast, 2002. p. 21 emphasis in the original).

As highlighted in section 6.1, the offshore and marine industries are difficult to define and the difficulties that lay ahead in defining a regional cluster to incorporate the offshore and marine industries had been presaged in the DTI mapping exercise (Department of Trade and Industry, 2001b) where ship repair and large scale metal fabrication, including the construction of oil rigs, were included in a diverse 'metal processing, ship building and industrial equipment cluster', which was, according to that exercise, the largest of the North East's clusters.

At the outset of One NorthEast's cluster development policy the focus was very much on the offshore industries and marine engineering. Existing players in the region including Northern Offshore Federation and North East Maritime Group were heavily involved in consultations with regard to the cluster. One of the series of mapping studies commissioned by One NorthEast (see Section 5.2.2) was for the offshore cluster. The mapping exercise was conducted by the consultancy Smith Rea Energy Limited and they conceptualised the offshore cluster as comprising three sectors – offshore engineering, marine renewables and shipbuilding and repair. Key industry players attended meetings where they were advised that an offshore/marine cluster would 'commence' in September 2001. Initially a large steering group was established. This body, initially called the Regional Offshore Cluster, was chaired by former minister Stephen Byers, who was quoted on Newcastle City Council's website [41] as saying;

> The newly formed Offshore Cluster incorporates all significant regional players in both the public and private sector. The cluster, combining offshore with marine and engineering, is looking at significant growth in these industries. If we get this right, we have the opportunity to become a critical player in the global market place bringing with it a considerable number of contracts and jobs to the North East.

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[41] <http://www.newcastle.gov.uk/compnewc.nsf/1pt/bcap_engineering> accessed 22.04.04

The language around the cluster 'commencing', being 'newly formed' and being seen as a body shows confusion about the cluster concept, as clearly the cluster both pre-dated One NorthEast's policy towards it and also existed independently of the steering group. However, there was more fundamental confusion about the conceptualisation of the cluster.

By the time of the publication of *Realising our Potential* (RES2) in 2002, the offshore and marine industries were already firmly bracketed with the energy industry as a result of possible diversification opportunities into wave, tidal and offshore wind equipment construction and installation, although the list of clusters the Corporate Plan 2003-2006 (One NorthEast, 2003a) includes offshore as a separate entity and does not include energy. However, by the time of the production of the policy implementation framework for *Realising our Potential* (RES2)[42], offshore and marine industries were actually subsumed into an expanded 'Regional Energy Cluster', which also included the defence industries. The link between the defence industry and the offshore and marine industries arose because of the planned programme of new vessels for the Royal Navy. However, as will be seen below, the energy cluster was subsequently to be conceptualised as incorporating the oil and gas sector, renewable energy and environmental industries and the nuclear sector, hence losing the link to shipbuilding and repair all together.

As mentioned in section 5.2.2, One NorthEast have not been explicit about how individual clusters came to be selected for support and the mapping exercises were rarely published. In the case of the offshore mapping exercise there were cluster organisations specifically involved in that industry who were unaware of the mapping exercise (interview with Cluster organisation representative 4). However, it must be remembered that, as Feser and Luger (2003) point out, the methodology for identifying clusters is influenced by the aims of cluster policy, which are in turn related to overall policy priorities and there appear to have been particular issues around defining and conceptualising this cluster.

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[42] Downloaded from onenortheast.co.uk on 15.10.03

Firstly, there were issues around the scale and significance of the industries involved. Boekholt and Thuriaux (2000) note that a cluster should have 'a certain critical mass in terms of size and 'actor mix'. Subsequent to the Smith Reay mapping exercise, which had identified an offshore cluster comprising offshore engineering, marine renewables and shipbuilding and repair, there had been a severe downturn in work for the main fabricators for the offshore oil and gas industry and continuing delays in the planned warship programme. Some voiced the opinion that the offshore and marine industries had never been a suitable focus for the cluster:

> I think it has always been a mistake to think of what is the residue of an international industry, fragmented through major international forces as some kind of voluntary, dynamic, organic kind of cluster (university representative 4)

Others pointed to the issue of scale particularly in terms of the marine industry where one expert pointed out that 'the region doesn't really map onto the industry' (university representative 3). This again illustrates the problem, discussed in section 2.2.2, of identifying clusters within predetermined geographic areas, rather than tracing the linkages. Another respondent pointed out:

> This is where the public sector goes wrong. It thinks clusters are bounded by [public sector] territorial boundaries, but of course they are global. If you have to go looking for capability elsewhere, which makes a bunch of companies here successful you have to do that (cluster organisation representative 2).

However, the delivery mechanisms for cluster policy within the United Kingdom have largely been the Regional Development Agencies and this has tended to lead to a widening of the industrial boundaries of the cluster for policy purposes rather than to a widening of the geographical boundaries and this has led to consequent problems as the structure has appeared incoherent:

> [One NorthEast] see offshore and energy as the cluster and it is not, they don't see marine as a separate sector (university representative 3)

Secondly, as a strategic body for a poor performing region, One NorthEast was trying to find areas of growth and, given the decline in offshore fabrication, there was a perceived need to identify strategic opportunities for diversification. Again it is unclear how particular opportunities were assessed, but there was a particular emphasis on the possibility of diversification into nuclear decommissioning, in light of the anticipated spend by the newly formed Nuclear Decommissioning Authority, and opportunities were envisaged in offshore wind energy, given that the Government's Renewables Obligation requires licensed electricity suppliers to source specified percentages of the electricity they supply from renewable sources. The percentage target is set to increase each year from its current level of 4.9 per cent in 2004/05 to reach 10.4 per cent by 2010/11. Therefore nuclear and renewable energy were conceptualised as being part of the same wider energy cluster because the lower tier of suppliers could potentially feed into any of these areas. However, the resulting cluster was not necessarily coherent. It is also unclear why these two diversification opportunities were privileged above other opportunities including those in ship recycling. Platform decommissioning and particularly those in subsea technology.

Thirdly, the choice of energy as a cluster may have been influenced by other events at a national and regional level. At a national level there had been an increased focus on energy with the publishing of the Government's 2003 Energy White Paper, *Our Energy future – creating a low carbon economy* and, for example, the DTI Oil and Gas Industry Development Directorate became the Energy Industry Development Team, responsible for providing support to energy sectors including – oil and gas, renewables and civil nuclear decommissioning.

Within the region there was a growing number of initiatives in respect of both the demand for energy (encouraging the uptake of low carbon technologies and energy efficiency measures) and the supply of energy (seeking alternative sources of energy from new and renewable sources) and a North East Energy Policy Group was formed in October 2003 by the Government Office for the North East, One NorthEast and the Regional Assembly to take overall responsibility for the coordination of energy related activity in the region.

As noted in section 5.2.4, renewable energy had been identified as an opportunity within the region by the Arthur D Little research and the New and Renewable Energy Centre (NaREC) had been established in Blyth as one of the five Centre of Excellence under the Strategy for Success. The focus initially had been very much on offshore sources of renewable energy (offshore wind, wave and tidal) but there was a perception that there were firms in the region that had expertise in power generation that was not covered by a marine/offshore cluster. There was also a perception that there was expertise and activity around other new energy sources such as biomass and fuel cells that were unrelated to a marine/offshore cluster. Indeed, in addition to the plethora of cluster organisations in the marine and offshore industries, there were a multitude of cluster organisations and activities in energy related areas including Renew Tees Valley, a company limited by guarantee and supported by both One NorthEast and the sub regional partnership for Tees Valley, to promote economic opportunities from renewable energy and recycling; the Environmental Industries Federation, a trade association representing businesses in the environmental sector and again receiving funding from One NorthEast; the North East Biodiesel Partnership, seeking to establish a biodiesel supply chain in the North East; the Biomass Implementation Group, coordinated by the Environmental Industries Federation to promote biomass as a form of renewable energy and North East Biofuels, a group of private and public organisations aiming to establish renewable transport fuels (Government Office for the North East, 2004).

Therefore there were a variety of reasons why energy was designated as a cluster for support, but by the time of the restructuring at One NorthEast in 2004 and the move to a three-pillar approach to driving the economy forward, supported by a sectoral support policy, energy remained as a strategic pillar but the component sectors had been disaggregated, and oil and gas, nuclear, and renewable energy and environmental industries were viewed as separate sectors. It had proved impossible to develop a policy for an energy cluster:

> Energy has evolved into its component parts for very good reasons, because it was a complete basket case (One NorthEast Official 6)

This provides support for Martin and Sunley's (2003) argument that it is difficult to draw industrial boundaries around clusters. The mapping exercise could have been more open and participatory, and this could have led to a more accurate understanding of the linkages between sub-clusters within the energy cluster. There were certainly many views expressed about how the cluster could have been framed:

> I think marine is a more sensible focus in terms of the skills – commercial marine, offshore and naval marine skills are very much the same, whereas the skills needed in other defence are very different. The scale is the problem. (university representative 3)

> The thing that would give you critical mass would be engineering (trade union official 2).

This concurs with comments made in the DTI mapping of clusters in the North East, which pointed out that the economy did not have strong clusters:

> It is difficult to escape the conclusion that, with the exception of chemicals, the region has no distinctive cluster strengths with a dominant role within UK economy (Department of Trade and Industry, 2001)

There may have been apparently insufficient critical mass to have an offshore or marine cluster, but to encompass all the industries into an energy cluster did not work. A different focus might have arisen had the mapping been more inclusive and had the links between firms and sets of skills been more fully explored. The mapping might then have resulted in an advanced engineering cluster which could have incorporated offshore fabrication, ship building, ship repair, subsea technologies and fabrication for marine renewables, along with other areas of expertise in the region related to defence and aerospace industries. The chemicals cluster in the region could then have incorporated biomass and biodiesel, which had been included as part of the energy cluster. Interestingly, although no mapping exercises have been published, advanced engineering has been identified in the Northern Way cluster programme (see section 5.1.2).

Therefore both an increased focus on energy at a national and regional policy level and the level of activity in renewable energy, which was seen as a form of growth. may have influenced the move within the region to designate the cluster as an 'energy' cluster. Whatever the reasons for the continual change in designation, the constant modifications have led to much confusion amongst key players in the offshore and marine industries, and have also impacted upon the ability of One NorthEast to mobilise participants in the cluster and to select and implement suitable policy instruments.

6.3.2 Participant Mobilisation, Cluster Animation and Relation Building

One of the reasons for taking a policy process approach to analysing cluster policy is to highlight the impact of decisions and activities throughout the policy-making process and to demonstrate that different aspects of developing the policy are intertwined. This section will show that the difficulties in analysing and understanding the cluster of which the offshore and marine industries formed a part impacted upon the ability of One NorthEast to build consensus around the cluster and to achieve sufficient participation from the key actors to drive the cluster forward. The process by which an energy cluster was identified by One NorthEast has been described, but it was apparent that this cluster was so diverse that key players in the marine and offshore industries became disengaged and even officials at One NorthEast were unclear about its origin:

> There is an attempt by One NorthEast to come up with a group, a big energy cluster. It's taken some time to get off the ground to be perfectly honest and I'm not convinced it's the answer [...] I'm not sure what its purpose is and whether or not it's got what it takes to pull the employers together (trade union official 2)

> We're engineers and we came up with an alternative and we had support for an alternative, quite frankly I think it didn't go down well with One NorthEast and some of the people who were engaged with that because they are looking at something different (trade union official 2).

There was the thing that Stephen Byers was chairing [...] and that seems to have quietly disappeared and this new strategy, I believe, is coming in to replace it and I think there are 3 pillars in it and the other day I did go on to the One NorthEast website to try and find out more about it, but failed (industry representative 3)

I honestly don't know the background. When I arrived there was an energy cluster [...] – it wasn't energy related a lot of it. (ONE representative 3)

There had been an intention from One NorthEast that the process of understanding the cluster and developing cluster policy would be inclusive:

> That definition of what the cluster looks like, how one puts together that cluster, is now something they are all engaged in, all the Centres [of Excellence] and supporting bodies are engaged in (ONE representative 1)

However, this was not borne out by the experiences of smaller cluster initiatives or industry players

> [One NorthEast] are looking at the grand plan, so it doesn't sometimes filter down to organisations like ourselves, which is a pity because we think we've got a lot to contribute (cluster organisation representative 5)

> What [One NorthEast] forget is you need practical experience and smaller organisations to make it happen –well they definitely exclude smaller groups (cluster organisation representative 5)

> There's not been an open process; there's not been a visible process in any sense of taking cognisance of regional industry (industry representative 3)

Partly the inability to involve all representative bodies in the policy-making process can be attributed to the complicated institutional framework that had grown up around the constituent industries within the energy cluster

> There are so many interest groups – we're not working as a team in my view in the region. We're not working as a team; we're not joined up (trade union official 2).

One of the main ways in which to drive the cluster would have been to use the cluster organisations and that had been the idea at the outset. However, there were concerns at One NorthEast about the efficacy of some of these organisations, including those involved in the offshore and marine industries, and the decision was made that in some cases the agency would work directly with firms rather than through intermediary organisations. This was problematic as the agency was not resourced to work in depth with a large number of firms, and smaller firms in particular did not have the time or the voice to become involved in One NorthEast's policy-making.

There were other problems more specific to the offshore and marine industries. Within the region, personalities made it difficult for certain groupings of firms to be brought together and there was a perceived lack of willingness from the private sector to see the issues facing the public sector. At times the main sector businesses and the public sector were brought directly together but 'our mistake was bringing them together in one room' (trade union official 1). These difficulties made it even more relevant to have a facilitator who could draw the participants together and build consensus, but circumstances played a part. Kevin Curran, instigator of the Tyne Maritime Group and cited by many in the industry as a key player able to bring together divergent interests and individuals, had moved to London as General secretary of the GMB Union. Therefore not only were many potential participants disengaged at an early stage of the cluster policy-making process, but also the cluster was deprived of an individual with potential to animate the cluster.

6.3.3 Selection and Implementation of Policy Instruments

One of the key aspects of a cluster policy is the need to tailor policy instruments to the requirements of the cluster, with those requirements being identified with the involvement of players within the cluster. There were already issues in this process because, as has been seen above, many players in the offshore and marine industries felt excluded for the policy-making process. Another issue arose because of an

apparent preference on behalf of One NorthEast for standard policy measures to be applied across clusters. For example, the North East Productivity Alliance (cf. s.5.2.4) was seen as a useful tool across all clusters. Undoubtedly this was useful and NOF reported benefits to their members, but it was not a specific tool for the cluster. There was also a preference to fund larger projects available across the region. This partially arose from a perception in the agency that there were too many initiatives having too little impact, but it caused problems within the cluster

> One North East have said they don't want lots and lots of small projects going on – they want it to be more regional and big – we know from practical experience that does not work (cluster organisation representative 4)

> It is too big to think up a whole idea in one go, you've got to do it in smaller stages and get people, who are in whatever area they are in, get their practical solutions to the problems (cluster organisation representative 5).

As discussed in section 3.5.6, Raines (2002) highlights three broad objectives of cluster policy, which he relates to three aspects of a cluster and then identifies possible policy measures. In their 2002 mapping exercise, Smith Reay Energy Limited had proposed a series of short term and medium term measures specifically for, what was still designated then as, the offshore cluster and these are tabulated below in Table 6-1.

Table 6-1 Policy Recommendations for the Offshore Cluster

Objective of policy	Policy Measures	Smith Reay recommendations
Increase interaction by creating conditions for cooperation and increasing or highlighting incentives for cooperation	Incentives for joint R&D Provision of business premises to encourage interaction Network brokering	Developing a strategy for the 'Rivers' including evaluating the infrastructure requirements for future activities.
Development of common resources to improve competitiveness of the cluster	Provision of information Technological and business infrastructure Technology transfer Tailored skills training Venture capital provision	Work in close cooperation with NaREC on technology transfer. Improve cluster competitiveness through e-business techniques. Specific skills/training initiatives.
Building internal awareness of the cluster (identity building) and projecting the identity of the cluster (identity projecting)	Cluster mapping Marketing and brand building Foresight and benchmarking exercises Setting up cluster representative organisations	Provide a cluster coordinating body. Supply chain management and benchmarking initiatives. Foresight exercises to identify regional sub clusters with potential for development and export Focus on export opportunities through existing trade association mechanisms Use offshore wind power expertise to attract inward investment. Develop a regional cross-cluster strategy, particularly with energy related clusters. Develop a diversification strategy, both geographical and sectoral.

Source: Raines (2002a) and Smith Reay Limited Offshore Mapping for One NorthEast

Elements of the strategy proposed by Smith Reay can be identified. For example, Northern Offshore Federation obtained funding for a cluster portal to encourage e-procurement and also received funding for international marketing. One NorthEast, with NaREC, made attempts to secure inward investment in the wind energy field. Separately the GMB Union, working with Greenpeace launched a report entitled 'Offshore Wind; Onshore Jobs'. Newcastle City Council continued to have a land and buildings interest in the cluster and they participated in other initiatives for the

cluster, for example, in conjunction with one NorthEast, the council worked with Swan Hunter on a proposal to encourage an inward investment project in ship recycling. One Northeast also encouraged diversification into nuclear decommissioning and offshore wind energy. An Energy Cluster Skills Action Plan was published with the Learning and Skills Council, and Jobs for the Riverside. until its closure, worked on the adult apprenticeship scheme for the yards. Lobbying was undertaken in support of part of the naval shipbuilding work coming to the North East, although there was a perception that the firms, unions and MPs largely undertook this, as opposed to the regional development agency. In 2005 NOF also worked with the Regional Technology Centre (RTC) to launch a series of Foresight workshops for the oil and gas industry. However, there was little co-ordination of effort and, at times, initiatives appeared very disjointed. For example, One NorthEast were unaware of the GMB Union initiative with Greenpeace until the report was launched and NOF were unaware of the ship recycling plans.

Other elements of cluster development mentioned by Raines (2002), but not specifically recommended by Smith Reay, can also be discerned. Northern Offshore Federation continued to provide a forum for networking. Newcastle University has a large School of Marine Science and Technology and, although many industrial links were at a national and international level, there were links between the university and individual firms, and a masters course in pipeline engineering was offered with much of the teaching provided from within the industry.

However, as with One NorthEast's cluster policy as a whole, there never appeared to be an overall strategy or a coordinated selection of policy instruments and a One NorthEast Official admitted that he could 'never bottom out any *modus operandi*' for the energy cluster. Local authority representative 1 argued that there was no policy for marine and offshore regionally and commented that while the public sector traditionally was seen as spending money and not delivering 'this is beyond a joke'.

At the outset organisations were encouraged to bid for funds available for cluster development and these were assessed and funded on an *ad hoc* basis through both European Structural Fund programmes and single pot finance from One NorthEast. If we consider Raines' (2002) policy objectives. it appears that while there were

attempts to develop common resources to improve the competitiveness of the cluster and to project the identity of the cluster, there were fewer efforts to increase interaction amongst the players in the cluster, and attempts to build the internal awareness of the cluster were probably damaged by the change in designation of the cluster from an offshore cluster to an energy cluster. If we return to section 3.5.6 and Eklund et al.'s (2002) seven general requirements for successful cluster development – the presence of cluster animators, support for competence and skills development, the availability of meeting places, division of labour in cluster development, brand building and a vision for the cluster – flaws can be identified throughout the policy. Although there were key individuals who could animate certain parts of the energy cluster, the concept was too diverse to enable one individual to drive forward the cluster. There was support for competence development and skills development in the marine and offshore industry but, without the contracts and work, training schemes could not operate. Although the cluster organisations such as NOF and NDI provided opportunities for networking, the meeting places available were fragmented and there was never one body that could cover all the interests within the enlarged energy cluster. Crucially there was no division of labour in the energy cluster and the feedback was that there was no sense of who was responsible for what aspects of policy:

> We had lots of initiatives, we had lots of groups laying claim to skills etc. but nobody taking ownership [...] because it was too broad (ONE representative 6)

The brand building was also problematic as many overlapping brands were being promoted. Finally, the vision for the cluster was unclear because there seemed to be a lack of understanding within the Regional Development Agency about the components, and prospects, particularly for the oil and gas element, of the energy cluster.

6.3.4 Evaluation and Policy Learning

As discussed in section 3.5.7, evaluation and policy learning should be an integral part of a cluster policy-making process. Within One NorthEast, as outlined in section

5.2.5, there was an evaluation process for the Regional Economic Strategies as a whole and the evaluation of *Unlocking Our Potential* (RES1) and draft evaluation of *Realising Our Potential* (RES2) were available on One NorthEast's website. Individual projects funded by European Structural Funds and Single Pot finance were subject to standard monitoring requirements. However, although there was a general sense that the cluster policy, and the policy for the energy cluster in particular, had not gone well there was no published evaluation of the cluster policy as a whole or of the impact on individual clusters.

As discussed in section 5.2.5 there certainly was an internal review of the cluster strategy as part of the restructuring of One NorthEast and the energy cluster appears to have been a particular focus of review. However, large number of actors in the marine and offshore industries felt excluded from the whole process and there was no participatory evaluation as recommended by Diez (2001).

However, by 2005 there were signs of change and a move to more positive relations with cluster organisations

> One of the issues is – do the trade associations have the right people, they're almost providing a secretariat, very nice, very woolly you can put on events and workshops and take your members up to the international markets, great, but the actual strategic vision which I would have thought One NorthEast should have been working on with an organisation like NOF is looking at these options and saying – actually there's potentially an opportunity in sequestration, there's an opportunity for heavy fabrication for offshore wind, and there's an opportunity for decommissioning in the fields (ONE representative 3).

However, the issue of understanding the links between firms and drawing them into a cohesive framework, be that called a cluster or otherwise, remained unresolved following One NorthEast's restructure. Oil and gas, defence, nuclear and renewable energy were seen as four separate sectors, with marine industries being split between oil and gas, and defence, but there appeared to have been little reference to players

within those industries. Crucially the post of sector specialist for oil and gas at One NorthEast remained unfilled.

6.4 Conclusions

I conclude that the process of developing a cluster policy for a cluster incorporating the marine and offshore industries was highly flawed. Even early on in the process, while the focus was still on the offshore cluster, Smith Reay, in their Offshore Cluster: Summary of Mapping and Strategy, highlighted as a key weakness:

> [c]urrent confusion and frustration regarding cluster strategy and perceived lack of regional leadership to drive individual cluster programmes forward.

Some of the issues that arose were generic and applied across the cluster development programme as highlighted in chapter 5. However, there was a particular lack of understanding of the marine and offshore industries and the composition of any cluster of which they could be considered a part. This partly resulted from a failure to use the initial mapping exercise as starting point for understanding and developing the cluster, but also arose because of One NorthEast's attempt to use cluster policy to quickly address the structural weaknesses in the region's economy and to close the performance gap between the North East and the average of the other English regions. This led to an aspirational feel to the energy cluster with a focus on renewable energy and nuclear decommissioning, rather than engineering and fabrication for the more traditional offshore oil and gas and marine markets.

Some of the issues originated from within the marine and offshore engineering cluster. Undoubtedly the cyclical nature of the major industries, offshore fabrication and shipbuilding, and the coincidence of the development of the cluster policy with an acute downturn in work made it difficult for some of the major players to participate in policy development, as they were struggling for survival, and to a certain extent it was accepted that regional policy-makers could not overcome that decline:

> I think if there were an easy solution someone would have found it by now (trade union official 1)

> There's not much they can do (industry representative 2, talking of One NorthEast)

Respondents often considered the national scale to be the scale at which policy was significant. Offshore construction is linked to rates of exploration in the North Sea, which were seen as being dependent not only on the oil price and the whims of multinational oil companies, but also on both taxation rules from the Treasury and licences from the Department of Trade and Industry. Naval procurement was seen as dependent on the Ministry of Defence, with close control from the Treasury, and renewable energy was seen as a highly political market dependent on decisions at a national and international level.

That said, and again returning to the lack of understanding of the cluster and the difficulty of observing the cluster from SIC code data, other sub-clusters, such as the firms involved in subsea technology, were seeing an upturn in work driven by a high oil price and changes in oil and gas extraction technology. However, that sub-cluster was not recognised by One NorthEast despite having featured in the initial mapping exercise. This may have related to a lack of resource within One NorthEast because, although oil and gas continued to be a recognised sector within One NorthEast's sector development programme, the post of sector specialist, as mentioned above, was unfilled.

Another particular difficulty for the marine and offshore engineering cluster is its fragmented nature, both in terms of industries and geography. Tyne Maritime Group was widened to encompass the Tees, but on the whole there were few links between firms on the Tyne and the Tees and little movement of labour between the Tyne and Tees. The fragmented nature of the industries also led to a multitude of overlapping cluster organisations representing different elements of the cluster. Although understandable given the wide scope of the cluster this may have weakened the impact of the organisations and made it more difficult for One NorthEast to engage. Industry representative 5 talked of there being small echoes at present, rather than a strong voice and it was also argued that

> What we've got is a number of clusters at present time and in my view we should have one cluster [...] we should have one cluster. There are lots of little clusters and in my view we should have a combined operation in terms of speaking on behalf of the engineering industry (trade union official 2).

Therefore prior to the establishment of the cluster development programme by One NorthEast there were, within the marine and offshore engineering cluster, cluster organisations, cluster activities and clustering, with the latter being described by (Benneworth et al., 2003) as cooperative interaction to gain advantage. However, One NorthEast's regional cluster policy towards the marine and offshore industries has not been successful and it remains to be seen how the cluster organisations, activities and clustering will evolve.

7 The Cluster Policy Approach in Practice: The Case of the Regional Service for Clustering

In Chapter 5, I outlined the approach to cluster policy-making taken by the Regional Development Agency, One NorthEast, and, in Chapter 6, I considered the outcomes of that cluster policy-making process in respect of the marine and offshore engineering cluster and concluded that difficulties throughout the cluster policy-making process, as well as issues within the cluster, impacted on the policy outcomes. In this chapter, I want to tell the story of the Regional Service for Clustering, known at its inception as the Real Service Centre, a cluster based policy initiative operating at the local level, and I want to consider how a different understanding of clusters impacted on the development of that cluster development initiative. In the next chapter I will consider the outcomes of the initiative by considering its impact on a small group of firms, again within the marine and offshore cluster.

Following a similar structure to Chapter 5, in the first section of this chapter, I outline the cultural, social and economic context and policy background against which the policy was designed. In the second section I apply the model of the cluster making process in order to analyse the way in which the cluster policies developed. In the final section I draw out generic lessons from the policy initiative.

7.1 The Background to The Regional Service for Clustering

7.1.1 The Cultural, Social and Economic Context

The Real Service Centre, later to be known as The Regional Service for Clustering, was an initiative of North Tyneside Council, one of the five boroughs within Tyne and Wear. According to 2001 census data, the borough has a population of approximately 192,000 and it is situated on the North Sea coast, along the northern banks of the river Tyne. Historically the area's economy was dominated by shipbuilding, fishing and coalmining, but the last mine in North Tyneside, the Eccles Pit, was closed in 1980 and, as discussed in Chapter 6, there has been a severe decline in shipbuilding.

While inward investment has been successfully attracted into the area. most notably, and temporarily, in the form of Siemens' wafer fabrication plant[43], employment growth has largely been in part time and temporary work, with many new jobs created in the emerging 'call centre' industry. While overall North Tyneside is the least deprived of the five Tyne and Wear boroughs, it still ranks as the 69th (out of the 354) most deprived borough in England according to the Index of Multiple Deprivation 2000.

7.1.2 The Policy-making Background

The local authority

Staff from the Economic Development Unit of North Tyneside Council instigated the RSC initiative. An interest in clustering to support SMEs had existed within North Tyneside Council since 1993, when their economic development section became interested in the work of the Centre for Urban and Regional Development Studies (CURDS) at the University of Newcastle upon Tyne. CURDS had published the *North East of England Economic Assessment* and had identified four potential clusters within the North East region, in the areas of marine engineering, energy industries, pharmaceutical and healthcare activities and environmental groups and technology. In order to develop these nascent clusters, CURDS recommended a move away from generic forms of business support to the provision of new and innovative policies, especially those focused on the promotion of inter-firm networking (Tomaney and Bradley, 1993). The council sought to explore the possibility of developing such innovative policies to support clusters in these industries at a local level (Tyneside Real Service Centre, 1996).

This interest in clusters coincided with large job losses at two major employers in the area. Swan Hunter, the last remaining ship builder on the Tyne, went into

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[43] Siemens announced their intention to invest £1.1bn in a wafer fabrication facility on North Tyneside on 4 August 1995 (Charles & Benneworth, 1999. The plant was officially opened by the Queen in May 1997 but its closure was announced, less than three years after the original announcement, on 31 July 1998.

receivership on May 13 1993 and, although work on *HMS Richmond* was subsequently completed, almost all of the 2,400 workers employed at the time of the receivership lost their jobs. Then, in October 1995, the Engineering Research Station, one of five British Gas research centres, was closed, with the operations being relocated to Loughborough. It had employed between 450/500 people within the North Tyneside Borough and was at the forefront of pipeline technology. As a result the locality was faced not only with the loss of two substantial employers, but also with the potential loss of world-class skill bases in shipbuilding and pipeline technology.

The capacity to develop innovative policies at a local authority level was partly a result of the relative autonomous standing of local authorities at that time and partly as a result of the capabilities and drive of staff at the Economic Development Unit at North Tyneside Council. However, both the need to fit into a larger regional policy framework and a high turnover of staff were to impact on the development of the initiative.

In January 1996, following two years of development activity within the council, the Real Service Centre, as it was then termed, was established to provide a focused research and support service and to offer advice and guidance in the process of developing strategic clusters of competitive advantage. The definition of clusters was a very narrow one, 'groups of similar companies develop[ing] cooperative groupings able to access larger contracts' (North Tyneside Real Service Centre, 1996).

From the outset the RSC had difficulties in finding a place within the complex business support network in the North East. During the first six months of the RSC's existence a great deal of time was dedicated to resolving such issues with Government Office. The temporary nature of the project, and its very nature as a pilot project, led to insecurity amongst staff and necessitated the dedication of a substantial amount of resource to securing a future for the project.

The RSC has had various iterations – phase one (from inception to 1998) where it was very much a pilot project covering North Tyneside: phase two (1998 to 2002) where

the geographical coverage was extended to Tyne and Wear and phase three (2002 to date) during which the ongoing existence of the project has been called into question. However, throughout these iterations the organisation has continued to carry out the primary function of facilitating groups of SMEs, termed micro clusters, to work together for mutual benefit, although the mutual benefit has been derived from different sources including the achievement of a collective identity; developing innovative products; being able to access larger contracts; economies of scale in areas such as marketing, developing tangible group assets, and more intangible benefits in terms of providing a self help, hand holding and confidence boosting group for the SMEs involved.

The outcomes of the service were monitored by those providing funding and are tabulated in Table 7-1 below showing the quantitative impact of the project. However, the story of the development of the service gives a much richer understanding of how the project worked in practice and also reveals that firms received benefits which cannot be captured by quantitative data alone. It is to that story that I will now turn.

Table 7-1: Quantitative outputs of the RSC project

Outputs	Phase 1 (Jan 1996 – Dec 1998)	Phase 2 (Jan 1999 – Dec 2001)	Phase 3 (Jan 2002 – April 2004)
Micro clusters developed	7	54	82*
Number of firms in new micro clusters	102	578	775
Jobs created	208	109	77
Total increase in turnover	Figures not available	£3.1M	Figures not available

** figure relates to period January 2002 to March 2006*

Source: RSC internal reports

The wider local authority context

The background to the initiative is complicated by the existence of other policy-making and delivery organisations. At the outset the RSC was very much a North Tyneside initiative, run by North Tyneside Council and funded through European Structural Funds. However, once the policy was extended to cover the whole of Tyneside, there was an involvement from South Tyneside and Gateshead Metropolitan Borough Councils, and Newcastle City Council. The level of involvement varied from council to council, as did the motivation for being involved. A member of the RSC team advised that

> You necessarily bring new people on board and it takes time for these people to get a handle on what it is [...] and it also depends on their motivation to get involved. It might not be to understand clustering and to try to develop it fully in their area: it might be because funds are available; therefore it is a mechanism for reaching their own individual patch objectives and doing their economic development plans (RSC representative 1).

Sunderland City Council also became part of the initiative, but this was against a background of concern over the way in which the activities of the RSC had impacted upon a firm that had located away from Sunderland.

A Steering Group was formed to oversee the activities of the RSC. At the outset the steering group had consisted of two representatives from Tyneside TEC Ltd and one representative from North Tyneside Council. The Steering Group had initially involved discussions about the shape and form of the project and subsequently came to be tasked with supporting the RSC in achieving the aims and objectives of the 1997-1998 business plan, monitoring achievement of the project outputs and, importantly, to share information with partner organisations (The Real Service Centre, 1997).

Following the expansion in the geographical coverage of the RSC, the steering group was reconstituted in 1998/9 to include representatives from each of the partner organisations (North Tyneside Council, North Tyneside Challenge, Newcastle City

Council, Gateshead Council, South Tyneside Council, Tyneside TEC and subsequently Sunderland City Council). It continued to meet monthly, with day-to-day management of the project continuing to be carried out by the Economic Development Unit at North Tyneside Council. In an endeavour to link with the Regional Development Agency, One NorthEast was invited to be part of the RSC steering group in September 1999.[44]

In 2000, the steering group were consulted on their views as to the role of the RSC. It is interesting to note that, while there was a recognition that the RSC offered an innovative approach and that there was a role for modernising small companies, the RSC was seen by most parties as part of their portfolio of business support services. The RSC was therefore seen as providing business support, rather than being part of a wider cluster strategy. There was also evidence of the parochialism that dogged the RSC with some local authorities feeling that the effort was entirely focused on North Tyneside (The Regional Service for Clustering, 2000b).

Although the steering group performed a monitoring role for the RSC and provided feedback on its services, it did not assist the RSC to achieve a regional profile and the RSC has historically been seen as very much focused on North Tyneside. This has been somewhat inevitable given that the project remained in North Shields and overall management responsibility for the service rested with North Tyneside Council. Even when the service was expanded to cover the whole of Tyneside, the first 18 months were treated as a pilot exercise and the RSC concentrated support on projects bringing benefits to North Tyneside.[45] Other aspects of the association with North Tyneside Council could have been avoided, for example, most e-mails originated by the RSC unnecessarily had a North Tyneside Council e-mail address. The overwhelming association with North Tyneside Council led to problems in terms of 'selling' the service to other local authorities within Tyne and Wear. The RSC sought to develop

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[44] Letter dated 29 September 1999 to Jeff Ball, Head of Business Development, One NorthEast from Angus Garrett, RSC Manager

[45] Internal correspondence between Gillian Miller and Mike Halsey, North Tyneside Council, 1998

its own identity, but its attempts to operate on a regional basis have always been hampered by its close association with North Tyneside Council.

During the early years of the RSC, North Tyneside Council was undoubtedly a lead authority on clustering activity and, in 1997, the RSC was recognised as an innovative approach to business development and a model of good practice by the European Parliament Committee on Regional Policy. The RSC sought to be active in research undertaken in the clustering field in the North East of England. This included participation in the Regional Cluster Research project, commissioned by One NorthEast and conducted by the Foundation for SME Development at the University of Durham. As other cluster initiatives emerged across Tyneside, including a cluster initiative originated by the then TEC and the emergent cluster strategy from One NorthEast, the RSC sought to coordinate clustering activity and sought to be formally recognised as the lead cluster authority on Tyneside, in the North East and in the United Kingdom as a whole (Ratnatunga, 1998b). This was an unrealistic goal given the size of the organisation, but members of the RSC team did carry out a role as secretariat for the Tyne and Wear Cluster Development Group, a role that kept the RSC in close contact with a wider network of economic development players in the area, and also worked with CURDS and the Tyne and Wear Research and Intelligence Unit to develop a Cluster Development Framework for the Tyne and Wear Sub-Regional Partnership (Regional Service for Clustering et al., 2001). This framework positioned the RSC as a form of bottom-up operational support for cluster development in contrast to a form of top-down strategic support, which might be provided by a regional agency. However, despite initial championing of the framework by the Tyne and Wear Partnership, the impact of both the framework and the RSC on cluster policy in the region was limited. The role as secretariat for the Tyne and Wear Cluster Development Group ended and, in a further retrograde step, the Steering Group for the RSC, which had been made up of officials from the other local authorities in Tyne and Wear and the Regional Development Agency, was disbanded.

Therefore it can be seen that the project operated against a complicated and, at times, troubled, background and one significant task for the RSC was to build a place for

itself amongst a myriad of other policy initiatives at a time when there were substantial changes in both business support and clusters policy in the region.

The regional context

The RSC was, as mentioned above, considered to be a business support agency and at times there were tensions between it and other business support organisations. Some of the strains arose due to an element of competition and overlap between business support organisations and their projects. Particularly as clustering type initiatives became more prevalent in the North-East as a means of assisting small firms, the RSC continually sought to stress that their service was a unique one within the region (Tyneside Real Service Centre, 2000).

Throughout 2002 and 2003, there were protracted negotiations about who should 'sponsor' the RSC organisation. Strong links were made with the regional Small Business Service, a DTI agency charged with supporting business start-ups and subsequent growth in small businesses. However, changes in personnel, and subsequently the withdrawal of the Small Business Service from a regional delivery role, left the RSC isolated.

The RSC was also influenced by a review of business support in the North East of England (One NorthEast, 2003b). The North East Business Support Network, managed by One NorthEast, came into effect in April 2004 and implemented changes to the way businesses access publicly-funded business support in the region. The new model was a demand led brokerage model, whereby it was intended that businesses would seek advice from Business Link representatives who would in turn broker advice from a network of business support providers as required. This model represented a fundamental change in delivery and funding of business support, with funding residing with the recipients of business support in an attempt to deliver a more demand led approach. As will be seen, the role of the RSC within that model was never clear.

The relationships between One NorthEast and the Regional Service for Clustering were also complicated. In the early days of One NorthEast, they held the RSC in high regard. The RSC Corporate Brochure produced in 2000 includes a foreword by the Head of Cluster Development at One NorthEast describing a meaningful partnership with the RSC. One NorthEast's first Regional Economic Strategy, *Unlocking Our Potential* cited the RSC as 'an excellent example of the systematic development of small business 'micro' clusters' (One NorthEast, 1999, p.33). However, in interview, ONE representative 1 pointed out that, while the Northern Development Company, the precursor of One NorthEast, had been interested in the work of the RSC, that work had proved too incompatible with the cluster 'model' envisaged by the Department of Trade and Industry.

When the RSC sought funding for Phase 3 of the project it was advised that it was ineligible for funding under the cluster policy measures and instead the project obtained funding under measures for 'access to finance' and 'advice to SMEs less than and greater than 36 months'. In March 2004 I was advised by ONE representative 5 that the RSC did not fit into the agency's cluster model because they were not working on regionally significant clusters, but even as late as December 2003, the same individual from One NorthEast had given the impression to the RSC that their services were seen as valuable to One NorthEast's cluster development programme and One NorthEast's 2003-2006 Corporate Plan (One NorthEast, 2003a) includes 'Developing Sub-Regional micro clusters' as a key sub regional programme.

One of the problems facing the RSC has always been that it has taken the form of a project with a limited lifespan. Not only has the time-limited nature of the project been an ongoing problem for staff retention – during January and February of 1999 three of the original five RSC team obtained new positions outside the RSC – but it has also necessitated huge dedication of resource to securing short-term funding. This has hampered the embedding of the project within the business support network and hampered relationships with the Regional Development Agency, both because of lack of time and resource on behalf of the RSC, due to the time dedicated to securing the funding, and because the uncertainty over the future of the project has not been conducive to establishing long term relationships.

The difficulty in obtaining funding and other income may partly relate to the difficulty the RSC has in explaining its activities and services to clients and the wider business support network. This has not been helped by a tendency for individual clusters to be managed by individual officers, all of whom have very different ideas about the services that should be offered. Not only does this lead to a varying approach to cluster facilitation and development, it also gives rise to concern over the potential loss of tacit knowledge of the clusters if an officer leaves.

The particular uncertainty that was to surround phase three of the project was exacerbated by the delay in producing strategies and action plans for business development at a regional level, which impacted on most business support organisations in the region.

Therefore the policy background resulted in a continual need for the RSC to attempt to position itself within a much wider framework of policy. The short term funding of the project also made planning ahead difficult and caused issues with staff retention. As will be seen these aspects of the development of the organisation impacted on the development of the RSC's policy. However, while organisational issues did influence the project, a particular understanding of clusters also influenced their policy development and it is to this aspect that I know want to turn.

7.2 The RSC's Cluster Policy-making Process

In the previous two chapters I have used the model of the cluster making process developed in section 3.5 to analyse a policy process for developing specific clusters. I suggested in section 2.2.6 that such clusters comprise a pronounced and recognisable critical mass of firms and associated support organisations and research and education establishments, who by their interactions create cluster specific assets available for exploitation by actors within the cluster, depending on the actors' capabilities and strategies. The approach of the RSC was distinct and started from the premise that 'clustering', defined by Benneworth et al (2003) as 'cooperative interaction to gain advantage, which may or may not take place within a cluster', was a beneficial and achievable goal for policy. Therefore the RSC sought to develop 'clustering' amongst

SMEs rather than to develop a predetermined cluster, but the model described in Section 3.5 can still be used to analyse the RSC's cluster policy-making process.

7.2.1 The Decision to Take a Cluster Approach

The Real Service Centre can be seen as a locally driven pilot exercise arising as a response to large-scale plant closures in the area. The decision to take a cluster approach arose from a desire to retain the skills base that those major employers had encompassed and the recognition that existing business support policy would not be adequate for that task, but the decision was greatly influenced by the availability of European Structural funding for the development of clusters of competitive advantage. As mentioned above, the closures coincided with work done by the Centre for Urban and Regional Development Studies (CURDS) at the University of Newcastle upon Tyne on clusters, and staff at the Economic Development Unit became interested in applying this work on clusters to policy. During a time in which the Economic Development Unit worked with two specific groups of firms following the closures, the idea of applying a cluster approach more widely began to germinate.

In September 1994 North Tyneside Council (NTC) began to work with a group of marine engineering design companies who were based at Davy Bank in Wallsend. Following the receivership at Swan Hunter, North Tyneside Council were keen to retain the world-class skills base in marine engineering that the area was perceived to have. Through discussions with the companies, the companies' needs were explored and it emerged that the companies' limited resources, an inability to market on an international stage and an inability to tender for larger contracts were the barriers to their growth. The Economic Development Team encouraged them to consider working collaboratively in order to increase their competitiveness and therefore facilitate their growth. By early 1995 discussions were centring on property issues, formalising the group, accessing risk and venture capital, and developing research and development projects. An initial £30,000 was made available by Tyne and Wear Development Corporation to develop the group. which came to be known as Argonautics.

Also at the end of 1994 talks began with a firm called MicroAlloying International Ltd to explore how pipeline expertise could be retained in the North East given the announcement of the closure of British Gas's Engineering Research Station in Killingworth. Again surveys of need for all potential members of a pipeline technology cluster were undertaken. This group came to be known as Pegasus and, in providing guidance on structuring and managing the cluster, North Tyneside Council sought to use the lessons it had learnt from the Argonautics project. The development of Argonautics will be discussed further in Chapter 8, but this chapter will focus on the development of the project that arose out of these experiences and came to be known initially as The Real Service Centre, and subsequently as The Regional Service for Clustering.

In the second half of 1995 a group of design and marketing companies approached North Tyneside Council having heard of the work under way with Argonautics. A group with the name of Affinitas was subsequently formed to offer a customised package of marketing services to large companies both within and outside the region. The RSC also surveyed locally based software companies. A range of common key issues was identified and the RSC subsequently brought together a group of software companies interested in forming a micro cluster. A micro cluster named Polaris (subsequently renamed Sarius) was formed and a European Regional Development Fund application was a submitted in April 1996.

Following the initial interest in the work of the Centre for Urban and Regional Development Studies at the University of Newcastle upon Tyne and based on the experiences of working with these four groups, individuals within North Tyneside Council wanted to establish an organisation to provide a focused research and support service and to offer advice and guidance in the process of developing what were termed as 'strategic clusters of competitive advantage'. The definition of clusters was a very narrow one – groups of similar companies develop[ing] cooperative groupings able to access larger contracts (North Tyneside Real Service Centre, 1996).

At the outset the mission statement was:

> To maximise the potential of local SMEs by seizing the opportunities of the emerging global economy. To develop effective public and private interaction by facilitating private sector interests to generate wealth for the benefit of the local economy (The Real Service Centre, 1998b)

Using Boekholt and Thuriaux's (1999) and (2000) conception of 'cluster policy models', it can be said that the RSC's approach was an inter-firm networking model. The rationale for intervening was that firms within these groups, which came to be termed 'micro clusters', were expected to be more competitive due to an ability to realise economies of scale by joint initiatives in accessing contracts, marketing, research and development, and finance. However, it was unlikely that the firms would come together without outside support due to a lack of trust, the cost of building relationships and a lack of awareness of the opportunity to work together. In order to maximise the potential of such firms, the RSC's intention was to give them access to new technologies, current research and innovation and market intelligence which they could not have gained access to individually. It was felt that cooperation amongst the firms would lead to better access to finance, larger contracts and sharing of overhead costs. The expectation was that this would generate wealth, as jobs would be created due to growth of the companies supported by the RSC, and the local economy would also benefit because there would be a base of technical expertise from which to develop further innovation and entrepreneurial activity. An underlying theme was that it would also be necessary to improve relationships between firms and business support providers, in order to assist local SMEs to be more successful, by making business support more business led. At the outset the expectation was that the RSC would identify groups of firms and then provide a tailored research and information service. What was not recognised at the outset was just how much work would go into formulating the relationships within the groups.

During this initial phase, phase one, there was a staff of three Economic Research and Development Strategists, a Research Assistant and a Cluster Development Officer. The project was financed by European Regional Development Fund Objective 2

Structural Funds as a pilot project for one year. The pilot period was the extended for a further two years to the end of 1998, the argument being that the developing clusters were at too early a stage to be evaluated and that the RSC was a crucial support service for their ongoing development (Tyneside Real Service Centre, 2000).

It had always been the intention of the North Tyneside pilot to expand and become Tyneside wide if it was successful. By 1998 it was felt that there was evidence that clustering, as supported by the RSC, had encouraged small firms to undertake research and development activity, build upon their skill base and the skills of their sector, broaden their client base and take on larger contracts all leading to an increased competitiveness for small firms in North Tyneside. The proposal for phase two was to expand the geographical coverage of the RSC pilot project from North Tyneside to the whole of Tyneside. The key aim was now stated as being:

> To maximise the potential of new and established Tyneside firms by developing clusters of competitive advantage in order to maximise new market opportunities (Tyneside Real Service Centre, 1998)

The RSC had come to realise that, in addition to accessing larger contracts, there could be other benefits from clustering and by March 2000 the Mission Statement was less specific and involved:

> Promoting economic prosperity through the creation and development of business clusters

The role envisaged for the RSC was always divided into three elements: the provision of a research and information service of benefit to both the private and public sector; improving the synergy between the public and private sector, and the development of clusters which were, as defined above, 'groups of similar companies develop[ing] cooperative groupings able to access larger contracts'.

The RSC has continued to provide a research and information service and attempted to improve the synergy and responsiveness of the business support they provide.

However, the role I want to examine most closely in this chapter is the way in which the RSC used a process to develop small groups of firms into micro clusters and how the evaluation of that process was used for policy learning.

Although at the outset the RSC was intending to focus on certain sectors (cf. section 7.2.2), it is important to reiterate that in taking the decision to adopt a cluster approach the RSC, from a very early stage in its development, was not seeking to develop existing, recognisable, regional clusters. It was seeking to develop policy to promote clustering, defined, as above, as 'cooperative interaction to gain advantage, which may or may not take place within a cluster' (Benneworth et al., 2003). The method it used to promote clustering was the formation of small, tightly knit, interacting groups. The RSC worked from a premise that linkages amongst businesses and other organisations are likely to prove beneficial to those businesses and organisations and *may* result in the emergence of new clusters, even though those clusters are not necessarily 'visible' at the outset of the policy. Therefore a policy to promote clustering can be open to all firms within a geographical territory. However, the SME population is a natural target as traditionally the take up of business support services by SMEs has been low (Curran, 2000) and SMEs face particular problems in terms of accessing information, collaborating and overcoming barriers to isolation (Curran et al., 2000).

However, it should be stressed that policies to promote clustering can operate within existing clusters (either as part of a specific policy for that cluster or in addition to a specific cluster policy) or they can operate within the general business environment. This dual role for the public sector in promoting clustering activities is highly pertinent to the RSC. Also if, as a result of clustering activity, a critical mass arises or becomes evident, a specific cluster policy for that critical mass may be appropriate.

From an early stage the RSC were aware that taking a cluster approach, which involved the formation of small groups of collaborating SMEs, would necessitate following a process with those groups. The model they used is not dissimilar from the model I have used to analyse the cluster policy-making process and the two models are compared in Table 7-2 below. Therefore, just as I have argued that the cluster

policy should be analysed as a policy-making *process,* the staff at the RSC recognised at an early stage that there was a *process* to developing the groups, which they came to term micro clusters.

Table 7-2 Models of a Cluster Development Process

RSC Model	Cluster Policy Process Model
	The decision to take a cluster approach
Cluster identification	Identification, selection and analysis of clusters
Cluster Initiation/Creation	Participant mobilisation, cluster animation and relation building
Cluster Development and Facilitation	Selection and implementation of policy instruments
Cluster Continuation	
Assessment/evaluation with a feedback loop to cluster identification	Evaluation and policy learning

Source: Author's representation

While the services provided to the micro clusters were always intended to be tailor made, attempts were made from the outset to codify the process of supporting micro clusters, utilising the experience of working with the first four groups. Stages for the development of 'clusters of competitive advantage' were identified – cluster identification, cluster creation, cluster development, cluster facilitation, cluster continuation or self sustainability (exit strategy), assessment/evaluation with a feedback loop to cluster identification – and within each stage the interventions and support services to be offered by the RSC were detailed. It was intended that this clustering model would be available for dissemination and discussion in the UK and in Europe (Tyneside Real Service Centre, 1996).

Attempts to codify this process came to dominate the RSC's activities during Phase 2 and, at its most formulated, the process was presented as a Cluster Development Programme (CDP) depicted in Figure 7-1 below, which was envisaged as a structured development programme to help groups work together. Within the Cluster Development Programme four stages were identified: Initiation (formation of the group), Planning (group business plan developed), Implementation (plan and funding

in place) and Review/Workshop (assessment of progress) (The Regional Service for Clustering, 2000a). Alongside the different stages the role played by, and services offered by, the RSC were outlined.

Therefore the decision of the RSC to take a cluster approach arose against a background of large-scale losses of highly skilled jobs in the locality. The decision to react to those losses by utilising a clustering approach was taken by a young, innovative and enthusiastic team at North Tyneside Council, inspired by academic work carried out locally and by evidence from Emilia Romagna. That team came to realise that their cluster approach would involve following a particular process with groups of firms. The decision to expand the project to cover the SME population of North Tyneside was driven by that team of individuals at North Tyneside Council, based on the initial progress of working with the groupings that arose from the closures.

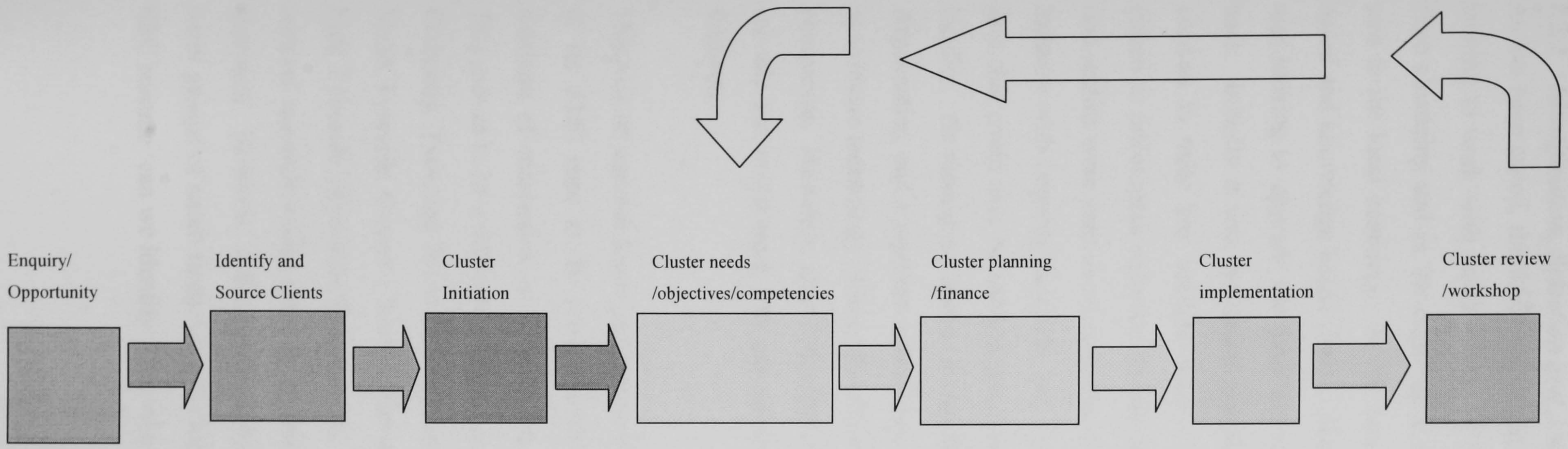


Figure 7-1 The RSC Cluster Development Programme

Source: RSC

7.2.2 Identification, Selection and Analysis of Clusters

As has been stated, the RSC was not attempting to develop regional clusters. It was looking to work with small groups of firms in order that those firms might benefit from clustering and in the expectation that those benefits would prove beneficial in turn to the local economy. At the outset the RSC sought to work with technology based and knowledge based firms. The RSC started with a strategic orientation and was looking to upgrade the local economy by building on the area's historic skills base. Initially it was envisaged that the RSC would predominantly develop micro clusters in three key sectors: marine design, pipeline technology and electronics (taken to encompass software development and internet related activity). The first two sectors were seen as contributing to the offshore engineering sector, a traditional industry with ongoing potential, and electronics was seen as a potential new growth area that could also be used to provide professional services to other sectors in the locality. As mentioned above, initial discussions were with a marine design cluster, Argonautics, and a pipeline technology cluster, Pegasus. A cluster of firms involved in software technology cluster also came together as the result of a survey of software companies. However, apart from this initial focus, the RSC tended to be non-sector specific and would work with any group of SMEs where a beneficial outturn could be foreseen.

This lack of sectoral focus partly arose because of a lack of information on the nature of the SME base in the area. Attempts were made to establish a comprehensive database of companies on Tyneside in the marine/pipeline and electronics sectors. This proved to be a difficult exercise despite consultation with Northern Development Company, Tyne and Wear Research and Intelligence Unit, Newcastle City Council, South Tyneside Council, North Tyneside Council, the Yellow Pages and Business Link Tyneside (Tyneside Real Service Centre, 1996). It was anticipated that such sectoral research would identify further potential cluster companies for the RSC to approach. However, it became apparent that most of the RSC clusters were arising when groups of small firms came forward for assistance and the key question for the RSC became 'can we identify firms who want to work together?'

One method of identifying firms with the potential to work together was largely reactive and involved raising awareness of the service offered by the RSC. The awareness raising was amongst other business support agencies and directly with the SME community. One major tool for raising awareness was a regular newsletter, circulated to SMEs and business support agencies, highlighting the work of the RSC and providing case studies of existing clients,[46]. Additionally articles highlighting the service were published in the local daily newspaper, the Journal, and also in the local Chamber of Commerce Business Contact magazine. An initial A 5 brochure was designed and printed to outline clustering and the services provided by the RSC, and a new brochure superseded this in late 2000. An RSC web site was launched in 1999 (http://www.clustering.org.uk) and a corporate video was also launched to supplement the other marketing material.

As well as activities aimed at raising awareness in the SME community, workshops were held for business support organisations including Tyneside TEC, ENTRUST, Sunderland Business Link and South Tyneside Economic Partnership. In September 2000 a Tyne and Wear Cluster Workshop, mainly attended by public sector representatives, was held to explore perspectives on clustering and the RSC played a pivotal role in this workshop. The RSC also sought to expand awareness of cluster facilitation within other business support agencies by a series of secondments, although these were not always successful. Other endeavours to increase the profile of the RSC included contacting business clubs with a view to presenting the RSC service to their members and offering the service to recipients of other forms of business support. Links were made with Trade UK and Business Link Northumberland, especially in the tourism area.

In addition to attempts to increase awareness of the RSC's service in the region, staff from the project attended international conferences to promote awareness of their services and to learn from other practitioners. Business support agencies from outside the area contacted the RSC to learn more about their approach to cluster

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[46] The circulation list for Issue 22 (Winter 2001) numbered 1685 clients. Of these, 1249 were private sector companies and 436 were public sector contacts

developments and staff from Nottinghamshire Small Business Services visited the project in 2001.

The links with other business support and economic development organisations within the region were not always strong, and the inability to market the RSC during the uncertainty over funding undoubtedly impacted on the RSC's 'presence' both in the SME community and the business support network. As RSC representative 2 reported 'we haven't been out there [...] it was a case of when we come back on 1st April [2004] are we coming into work or not?'

The alternative approach to raising awareness and attracting 'ready made' groups was to try to build a micro cluster from scratch, i.e. to bring together a group of SMEs. who did not know each other, to form a group to work for a mutual benefit. To develop a micro cluster from scratch the RSC identified three stages of preparatory activity –identification of opportunities or generation of ideas from within the RSC (sector selection); groundwork preparation (marketing the concept of clustering to the target market) and canvassing for participants. In these cases the RSC was selecting the initial companies who would participate in, what were in effect, closed groups, where new members could only join with the approval of existing members. Given that these clusters were, on occasion, obtaining substantial funding, this was a sensitive role to undertake and the RSC's need to be objective was paramount.

It was always difficult to identify new groups. Work was done with a group of micro breweries and staff on occasion sent speculative letters to local firms working in a particular field, for example, internet services. The most extreme example of the RSC 'recruiting' firms for a micro cluster was undertaken in 2003 at a time of great uncertainty for the RSC and when they were under great pressure to meet targets for the numbers of SMEs assisted by the project. Initial personal experiences within the RSC raised the possibility of improving the marketing of wedding services in the North East of England. It was anticipated that improved marketing would aid the sustainability and professional standards of businesses offering wedding services and also retain wedding business in the North East that might otherwise go overseas or elsewhere in the UK. Therefore the RSC set out proactively to canvas support for clustering amongst wedding businesses. The result was the launch in October 2003 of

a new organisation, Bit of a Do, with a permanent manager employed. 86 businesses were enlisted in 16 separate sub clusters (for example, photography, cakes, cars). All members paid a joining fee, standing at £400 in 2004, and a 10% commission on business arising from Bit of A Do. £50,000 of public funding was made available amounting to approximately £580 per SME. This was a far departure from the initial RSC concept of providing research services for groups of knowledge intensive. high technology businesses, but it was driven by the need to satisfy targets.

The predominantly reactive approach to identifying groups of SMEs to work with meant that any sector focus amongst the micro clusters supported by the RSC was predominantly driven unintentionally by private sector demand for the services of the RSC, although it may also have reflected the particular relevance of the kind of collaboration promoted by the RSC in certain areas, for example, tourism and business services. The nature of the benefits of clustering meant that the RSC's model was particularly appropriate in certain sectors where benefits arose from joint marketing of very small SMEs. Much work was undertaken in the tourism sector, where clusters were formed around group breaks in conjunction with the Tourism Information Centres, hotels, clubs, pubs, outdoor and leisure activities and the police. The idea was to work together to attract business to North Tyneside that might otherwise, with the advent of cheap flights, go overseas, and also to increase the average spend of groups visiting the area. Other clusters were formed in the vicinity of Hadrian's Wall, again with a view to networking the businesses in order that they could market themselves jointly and look to increase leisure spending in the area. The work with smaller groups along the Wall complemented work done by a larger Hadrians Wall Tourist Partnership, because individual groups obtained financial assistance to develop websites that fed into the Hadrians Wall Tourist Partnership web site.

Therefore the RSC was always attempting to identify groups of SMEs that they could work with to promote the benefits of clustering and this was done either by reacting to groups of companies that came to the RSC or by proactively identifying possible combinations of SMEs. Initially it was envisaged that between seven to ten firms would be a suitable group. although there was a tendency during Phase 2 to drift to

smaller groupings, even though it was recognised that the smaller groups would not necessarily generate as many benefits to those involved.

In one case an initial grouping of four environmental businesses led to the creation of The Environmental Industries Federation, a trade association for the environmental industries in the North East, and a subsequent mapping exercise led to recognition by One NorthEast that the environmental industries were a significant cluster in the region, employing up to 17,800[47]. However, while it was anticipated that the bottom up approach used by the RSC would on occasion reveal such embryonic clusters and Roelandt et al. (1999, p.335) identify starting from the micro level as a third approach to identifying clusters, the RSC's primary objective was not to identify and develop regionally significant clusters, but was simply to identify and work with groups of SMEs who could benefit from clustering.

7.2.3 Participant Mobilisation, Cluster Animation and Relation Building

Cluster identification was akin to the 'selection and analysis' stage of my stylised cluster development model and, having identified groups of SMEs who wanted to work together, the RSC came to realise that there was a difficult process of building relationships between the parties. They realised that building consensus and developing relationships between the parties was a lengthy and time consuming process and that different personalities could be hard to mould together. The RSC called this stage 'cluster creation' and it is equivalent to my 'participant mobilisation, cluster animation and relation building' stage.

Initially the role for the RSC had been envisaged as one of providing information and research services to groups of SMEs within given sectors. These would take the form of 'real services' akin to those provided by ERVET in Emilia Romagna and hence the project was initially entitled the Real Service Centre. It was envisaged that the groups would work together collectively and would benefit from a central source of research and information provided by the RSC.

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[47] EIF environmental industries survey, 2000 and 2001.

However, the RSC came to recognise that the provision of research and information would not be sufficient, because getting the firms 'to cluster' to achieve mutual aims. once they had come together as a group, required intervention. The RSC had learnt that to make the groupings work openness, trust, understanding, common goals and respect for others' opinions were required (The Real Service Centre, 1999), but it could be difficult to get group members to talk to each other, it was difficult to encourage the 'what can it do for me' person to work collectively, there could be poor inter-company relationships due to a lack of trust and poor information flows between companies. The groups often did not work towards their stated aims and it was difficult to keep the group mindful of its direction. The RSC felt there was a difficulty in getting group members together for frequent meetings and it was acknowledged that clustering can be costly in terms of the investment of time required and that this might prove too much for small companies in the absence of any immediate return. In interviews the need to devote substantial time to the activities of the cluster was often raised:

> I changed jobs in the meantime and my job became incredibly time consuming and I was working 7 days a week doing that, so I just couldn't fit in any extra time to spend with [the cluster] (micro cluster member 1)

> I was spending a hell of a lot of time with it – very little reward really (micro cluster member 2)

> We were also spending too much time on [the cluster] and not enough on our own companies (micro cluster member 3).

One way in which the RSC sought to build relationships within the group was to create a structure to underpin the working of the group and common documentation for the formation of clusters was made available. In the early days of the project a very formal structure for the clusters was proposed and part of the learning process within the RSC has been the evolution of different types of structure for micro clusters. The initial preference for a limited company status for the groups was partly because the groups were receiving substantial tranches of European Structural Fund

monies and it was felt the formation of a limited company would provide more accountability. Other groups found the limited company structure beneficial:

> We needed to have a company structure for us to feel safe (micro cluster member 4)

> I think if we'd just joined together as a cluster and said we're all part of the same group and this is our name that would have been OK but I think going for the limited status and going for VAT registration gives us something, or at least gives me a feeling that there is a company there (micro cluster member 5)

> We felt that the limited company would be necessary because we were dealing with public funds, which had to be accounted for (micro cluster member 3).

Other groups did not find the limited company status satisfactory describing it as 'a huge administrative burden' (micro cluster member 6) and other saw it as unnecessary

> It depends who you are, if you've worked with people for 20 odd years you don't need the formal structure quite so much (micro cluster member 7).

While the formal limited company model is still suggested as one alternative, there are also examples including a subscription model (for example, the wedding services cluster, Bit of a Do) and also the idea of core members with a wider group of associates around that core. The production of standard documentation was partly born from a desire to codify the process of working with micro clusters. There was also an aspiration to create an RSC franchise with a toolkit of procedures and documentation to offer to the public sector business support system in England and Wales on a commercial basis.

It should be noted that the micro clusters are essentially closed groupings with new members only included with the agreement of existing members. This has not been seen as beneficial by all of those involved:

Really I think informal cluster groups are probably more effective, but they are not seen to be effective (micro cluster member 7)

I think if you leave a cluster you are no longer a member of the cluster and therefore you are no longer of a group to be talked to, or spoken to, or worked with, whereas if we'd never been in the cluster we would have been ex ERS and I think that did happen. (ex micro cluster member 1).

There have been varying attitudes to the inclusion of new members:

> I think it will change in as much as there will come the time when we won't be able to do something and we'll have met someone probably in the pub who we've thought – hey come in (micro cluster member 8).

On occasion there were unsuccessful attempts to bring in new members:

> That was the worst part of the entire thing to do with the cluster and it was a personality clash rather than anything else. He wanted to own everybody basically and I didn't like it, I didn't get on with him at all (micro cluster member 9).

On the whole there was a presumption that only non-competing firms could work in such small groups

> That's why we don't really compete and why we can work together because we are each doing our own thing (micro cluster member 10)

> One of the strengths that we thought we had was that the companies did different things [...] and that was one of the things that we thought would allow the cluster to function because we weren't directly competing with each other (micro cluster member 3).

and there have been examples of tensions where competition issues have arisen

> [The cluster] needed to be collaborative and they were competitive (micro cluster member 3).

As mentioned above, groups of companies who might work together were identified by a variety of means. Once participants had been identified it was necessary, not only to decide on a suitable structure for the group, but also to generate consensus and build relationships, usually around a commercial opportunity, with the RSC acting as a facilitator. The idea was to establish aims for the cluster and to build a relationship both between the companies within the cluster and between those companies and the RSC. The building of a relationship that would lead to collaboration required trust to be built between the companies. The magnitude of this task depended on both the level of prior knowledge between the parties involved and the extent to which they had previously considered collaborating. It was a much harder task when the RSC had brought the individuals together, because in those cases the companies needed to be convinced that collaborating would be a good idea. It was an easier task where individuals had already worked together previously:

> There was an element of trust, all that kind of stuff, even though we'd not worked together we kind of got on well, so we knew each others' background (micro cluster member 11).

> The fact that we all get on and like and trust each other had a lot to do with it (micro cluster member 9).

> I suppose that is one thing I have developed with [X] and [Y] and [Z] – there is a lot of trust there – you can say things knowing that they are not going to be taken further. (micro cluster member 10).

In other cases the lack of prior knowledge was seen as a problem:

> You know we really got this whole thing wrong, because like five or six years ago when we started this concept, this cluster or what have you, I think we should have all put our cards on the table, our CVs, and said 'this is who we

are and this is what we can do, our strengths and weaknesses and what have you' (micro cluster member 12).

The role of the RSC at this 'cluster creation' stage therefore depended on the source of the micro cluster. The micro clusters were on occasions 'artificially' developed by the RSC following a marketing exercise within a particular industry, or there may have been one individual within the private sector willing to put the group together following a marketing approach from the RSC or a pre-existing group of companies came forward for assistance. On the whole the RSC's role has been one of facilitating the development of the loose grouping into a more structured group able to achieve tangible results from collective working

> Their main role has been as the catalyst that brought us together basically, this wouldn't have happened if they hadn't contacted me. We would have still been struggling along as individual businesses (Micro cluster member 5).

Although the source of the micro clusters is only loosely tracked, in most cases it appeared that there was already a loose grouping of SMEs introduced to the RSC by another business support organisation/enterprise agency or the grouping came directly to the RSC as a result of RSC marketing, word of mouth or personal recommendation. Only the Bit of a Do series of micro clusters, and to a lesser extent a cluster of hospitality businesses known as the 'Group Break' micro clusters, were composed of SMEs predominantly identified by the RSC.

The RSC's ability to perform the function of bringing the group together depended on the staff within the organisation being able to adopt a role as a facilitator within the micro cluster groups. The initial staff developed a particular way of intervening in the groups that was non –threatening, because they were young and enthusiastic, and they were able to persuade people by the force of their argument in such a way that members of the groups did not feel pushed into particular courses of action. This accords with the findings of Huggins (2000) who found that the energy, enthusiasm and experience of those promoting networks were vital particularly at an early stage. That said when the RSC staff were called upon to act as a negotiator/peacemaker it was a harder task. In most cases where significant disagreements between members of

the group arose, one of the aggrieved parties left the cluster. According to a former member of one of the clusters:

> You can't do this without having a strong view, and if you bring together people with strong views it either does gel or it doesn't gel (ex micro cluster member 1).

By their very nature people running their own businesses are likely to be determined and have fairly strong personalities and the ability of a third party, the RSC, to resolve fundamental disagreements remains in doubt. The role as counsellor and provider of reassurance was more achievable, if time consuming.

The ability of the firms to build the trustful relationships that would facilitate the clustering process also depended on the way they functioned as a group. The initial plan for the RSC had been to take over a new building, subsequently known as The Centre for Advanced Industry, for which the Economic Development Staff at North Tyneside Council had obtained funding, as a centre for clustering for firms in marine design and pipeline engineering (cf. section 8.1.1). Although one of the clusters came to be partially based in that building, the main plan did not come to fruition. However, other of the micro clusters co-located elsewhere and reported positive benefits from that proximity:

> Every day, we talk, we have coffees together, we chat, pass the time of day (micro cluster member 13)

> Being in the same building helps us a lot (micro cluster member 3).

The ability of the micro clusters to achieve benefits from clustering also depended on the personalities, not just of the RSC staff, but also of those within the group. Although the RSC could perform the role of facilitator. it was necessary to have an individual or individuals within the groups, particularly the larger groups, who could drive the micro cluster and sustain the relationships within it. In certain cases, where the cluster overlapped with the majority of work of one or all of the businesses this

was not a problem and there was, on occasion, a natural leader with others filling more subsidiary roles:

> He's the lynch pin. We've got fingers in other pots (micro cluster member 9).

On other occasions there appeared to be a natural division of labour. However, in certain cases it was felt this leadership was not there:

> It's very difficult when people are put together and there is no one, dominant person who says yes we will do that. I think that is the fundamental flaw of a large cluster group (micro cluster member 3)
>
> You need leadership and you need to make decisions and it doesn't lend itself, a cluster group doesn't lend itself to decision-making (micro cluster member 13).

Sometimes, where there was not an animator and motivator for the micro cluster, that role fell back on to staff within the RSC. Lagendijk (1998), when studying The Real Service Centre, raised a concern in this respect and advised that '[w]hat should be prevented, however, is that clustering support turns into a style of nurturing' babies' (ibid. p.203). RSC staff were at times too involved in the operation of the micro cluster and this was acknowledged by members of the micro clusters:

> [The member of RSC staff] did a bit of everything really, I mean yes, he did help us resolve problems, he was also a team leader as well, and he shouldn't have [been]. I think he does a fantastic job, but he should have thrown us in at the deep end more – that's probably best, whereas he really gave us a bit of a comfort factor and he probably gave us too much of a comfort factor (micro cluster member 1)

Although on occasion a member of staff from the RSC could have acted as leader for a short time, it was necessary to hand that role on to the micro cluster.

Funding was also recognised as a method of attracting firms to work together. While the RSC had been very successful in accessing European Structural Funds for the development of clusters, with over £1 million having been secured by March 1997 (Ratnatunga, 1997), one of the acknowledged problems had been the time lag between applying and accessing funding via this route. Therefore, while the RSC did continue to encourage and assist their clients to seek additional/alternative funding where appropriate, including from the Innovation Action Fund and Arts Council, the idea of a fund held by the RSC and available to businesses wishing to develop clusters was proposed. The existence of a Cluster Facilitation Fund that could be directly granted by the RSC simplified the process of administering grant funding to clusters. This funding could be used to 'kick start' the micro clusters and offset the costs incurred in building trust between SMEs sceptical of the benefits of working together. It was envisaged that this would enable economies of scale in delivering clustering services to be achieved because at the time the support was very labour-intensive with the RSC only working with eight clusters[48] at the end of its first phase. The labour intensive nature of the service had arisen both as a result of managing the structural fund applications and subsequent projects on behalf of the micro clusters, which would be reduced by having a simpler form of funding, but also as a result of offering such hands on support without which the micro clusters might not develop successfully.

The ability to offer funding to groups of SMEs prepared to form micro clusters undoubtedly attracted firms to the RSC. There was a risk that the availability of funding would attract applicants who were only interested in the funds and had no intention of continuing to cluster for mutual benefit in the medium to long term and, while RSC staff considered themselves alert to this risk, in certain cases it was apparent that the motivation to cluster was solely driven by the availability of funds

> We combine together to get a grant, which is basically what [the micro cluster] is there for, as far as we are concerned it's not really a strength (micro cluster member 7)

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[1] Argonautics, Pegasus, S. & S group, The Environment Cluster, Sarius, Affinitas, Holistic Health, Eurocrafts

Notwithstanding the codification of the process, described in section 7.2.1, each member of RSC staff had to choose their own way of facilitating each cluster. During the first two phases of the RSC, each cluster, however it had arisen, had a relationship with one member of RSC staff. There was concern that this reduced objectivity in dealing with micro clusters because personal attachment to the grouping could lead to a notion of ownership and on occasions, as mentioned above, members of staff from the RSC appeared to adopt a leadership role within the micro clusters. This was extremely time consuming for the RSC staff and impacted on the ability of the micro cluster to be self-sustaining. The RSC tended to find developing an exit strategy from providing intensive support to the micro clusters difficult and, although the RSC identified a self sustainability phase for the micro cluster, the actions undertaken by the RSC during that phase were similar to those in the cluster facilitation phase. One dichotomy has been that the RSC wanted to build permanent working relationships with the cluster companies, while acknowledging that clusters must be able to continue without public sector funding.

Subsequently it was decided that at least two members of staff would be involved with each cluster, and early stage and developing clusters were monitored within team meetings and with the RSC manager. This was designed to ensure that objectivity was retained and effort was not absorbed with clients unlikely to progress. However, the success and benefits that some of the clusters reported often came from the very close relationship they had had with a particular member of staff:

> I think from my point of view he was probably the most significant part of it rather than anything else (micro cluster member 10)

The role that the RSC needed to perform was continually under review and various attempts were made to reduce the level of support required by the SMEs not only once the micro clusters were 'up and running', but also in the earlier stages of development. This was largely because of the need for the RSC to meet the targets associated with their funding. Both the targets and funding had increased as a result of the availability of the Cluster Facilitation Fund. It was noticeable that, in general, there was a move away from the extremely resource intensive support that characterised the early micro clusters, to support that was very much more private

sector led and where ownership of cluster development was held by the collaborating SMEs and not with the RSC. It was reasonable to expect more cluster animation from within the cluster because, on occasion, the aims and objectives of groups had been driven either by the RSC with little ownership from the cluster or had been driven by funding considerations. The latter problem may have been compounded because there was little vetting of the firms wishing to be part of the clusters.

The need to reduce the amount of time spent by RSC staff with each micro cluster was largely driven by the need to achieve the targets for the project. Micro clusters were categorised as early stage (initiation), developing, active or dormant. In 2004 a time limit of nine months for progression from initiation to active status was introduced to ensure that the necessary targets were achieved. This caused concern within the RSC staff that opportunities would fall by the wayside because, as with all aspects of the cluster approach, micro clusters do take time to develop and a balance was required between achieving short term results for the RSC and allowing micro clusters to develop at their own pace and take the required time to build trust and collaborative relationships. Attempts to short cut the process could be detrimental because, as Huggins (2000), drawing on the work of Storper (1993, 1995), suggests, 'the evolutionary pathway of the relationships that generates untraded interdependencies forms a valid and valued collective asset' (Huggins, 2000, p.131).

The RSC recognised that the building up of relationships within the groups, the participant mobilisation and cluster animation as I have termed it, was a critical stage in developing micro clusters. They acknowledged that the process took time and required leadership from within the group and, in many cases, required substantial facilitation from RSC staff. Funding was seen as a method of speeding up the process, but funding alone was insufficient to build relationships and the RSC's role as a facilitator of relationships was key. Experience showed that time, and often a very long time, was required to build the trustful relationships that would permit untraded interdependencies to operate within the micro clusters. However, the short term funding regime under which the RSC, like most business support organisations, operated militated against taking time to develop relationships, and the target driven regime was not compatible with a process that took time.

7.2.4 Selection and Implementation of Policy Instruments

The selection of cluster activities and policy initiatives is related to the goals and background of policy-makers and their understanding of clusters. Because of their interest in the work of Real Service Centres in Emilia Romagna, the RSC had a particular interest in the provision of research and information. Because of a particular interest in developing small businesses and a perception of problems with existing business support the RSC wanted to improve the synergy between the public and private sector. Because the RSC perceived that groups of SMEs could undertake joint activities beneficial to their performance they wanted to encourage groups of SMEs to form and undertake such joint activities. I now want to look at those three areas – the undertaking of joint activities by micro clusters, the provision of research and information services and the improvement of the synergy between the private sector and publicly funded business support.

Development of micro clusters

The RSC intended that groups of SMEs would obtain benefits from clustering and envisaged that a range of activities could be undertaken to achieve these benefits. These potential activities included – research and development, development of joint products and services, joint marketing activity, work to improve skills and expertise, provision of shared resources, joint projects and contracts, mentoring and learning networks and capacity building (Tyneside Real Service Centre, 1998).

As discussed the RSC came to realise that a large part of their role was to build relationships within the micro clusters, in order that the members of the micro clusters could undertake joint activities, and therefore a substantial amount of time was spent on the previous two stages of the cluster policy process model - identifying groups of SMEs who could work together and building relationships between the parties so that there was consensus as to a vision for the micro cluster and sufficient involvement from the participants to achieve that vision.

Once the micro clusters had formed the RSC did not dictate which activities should be undertaken, but a plan for cluster activities was drawn up with the micro cluster members. This was considered by the RSC to be the cluster development stage.

Cluster Development involved conducting a survey of need, identifying market opportunities, developing an action plan, establishing a framework to carry out the action plan, developing projects to meet the identified needs of the cluster, and gaining assistance in obtaining public funds. The development was supplemented by the provision of information services and networking. Notwithstanding the level of involvement of the RSC at the outset, it was acknowledged that this input should, and could, be reduced once the cluster was operating in its own right.

As with most processes the stages are not entirely distinct and, just as the way in which the group came together impacted upon the amount of work required to build trust, so the cluster activities themselves could be used as part of the consensus building stage because low risk activities, which achieved a quick win for the businesses involved, were one method of building trust between the parties (Altenburg and Meyer-Stamer, 1999, Ceglie et al., 1999).

The kinds of clustering activities that were expected to bring benefit to the firms, the micro cluster and the wider territory can be divided into three main types. The first was the provision of collective or 'club' goods, which might be considered as cluster assets. The second was the generation of relational assets. The third was related to a notion that the micro clusters would give the SMEs 'borrowed size' and I want to look at each of these aspects. However, I firstly want to discuss the way in which these activities were funded.

By 1998 the RSC had identified that clusters might require financial assistance in the initial and developmental stages of development in order to achieve their long-term aims. At an early stage it was recognised that the funding of individual cluster initiatives by separate public finance applications was inefficient due to the time scales imposed, the restrictions applied and the bureaucracy involved. Experience with at least two of the clusters had demonstrated that the funding, which had been predominantly from European Regional Development Funds (ERDF), was restrictive and the administrative burden on the RSC of acting as project manager for the ERDF projects had been problematic. It was proposed that the RSC be funded so as to be able to give grants of up to £10,000 to clusters to enable them to cooperate on a focused activity, thus aiding the development of the cluster. Examples of projects

likely to be funded included marketing brochures, joint purchase of a useful resource, financial consultancy or marketing advice, product development/service development, joint project work.

During phase two of the project the process of applying for this funding appeared to subsume other elements of the process. This was partially because one of the major targets was to achieve full utilisation of the ERDF funded Cluster Facilitation Fund. The main priority therefore appeared to be to get the clusters to write a business plan that could form the basis of an application for funding. On occasions it appeared that the plans were written by RSC staff with little input from the firms within the cluster and an emphasis on building relationships within the micro cluster was, to an extent, lost. However, as mentioned above the three benefits the RSC believed clustering would bring were club goods, relational assets and borrowed size and I will look at these in turn.

Club Goods. Industrial District literature has theorised that the dynamism of the districts is a result of a mixture of cooperation and competition and that the cooperation takes two forms – adherence to norms and provision of club goods (Lawson and Lorenz, 1999). The clusters working with the RSC also attempted to create collective or club goods in many areas including training. A distinction should be made between the provision of a club asset available exclusively to members of the micro cluster and the provision of a club asset available to a wider community.

In certain cases the groups came together specifically to provide a collective good. One cluster was specifically formed to provide a small batch CMT (cut, make and trim) facility for the cluster members and other fashion designers. There was undoubtedly a demand for the service and premises were found and fitted out, but there were problems with this project that illuminate issues in respect of providing collective goods. The time taken to provide the collective good can be detrimental to the existing businesses:

> I think this is the problem – instead of focussing on our own businesses and how we were going to use the facility, we ended up running the facility itself (micro cluster member 4).

When the groups attempting to provide the cluster asset are small they also do not necessarily have the skills to provide the collective good:

> There was nobody there that had the right knowledge really to deal with that manufacturing and you wouldn't just need one person, you would probably need maybe at least two, but ideally three or four to share the responsibility of getting it off the ground (micro cluster member 1).

It was subsequently acknowledged that links should have been made with the colleges offering fashion design courses, larger textile manufacturers in the region and other cluster initiatives being developed at a regional scale, because the micro cluster existed at too small a scale to offer the service that should have formed a club asset.

Although there was an unsuccessful attempt by the Argonautics cluster to provide a training facility for the local marine industry, which will be discussed further in Chapter 8, the Pegasus Pipeline Cluster were founder members of a very successful MSc. Course in Pipeline Engineering at the University of Newcastle. This initiative was differentiated from the CMT facility and Argonautics examples because firms outside the micro cluster, including larger firms, were involved in a wider grouping known as North East Pipeline Group, which had emerged from Pegasus. North East Pipeline Group had an independent chairman and obtained funding for various initiatives, including the initiative that identified a need for and established the MSc course. While members of the Pegasus cluster were heavily involved in the provision of the course and continue to teach on the course, the existence of a wider regional grouping enabled more resource, both time and human, to be dedicated to the project. This reinforces the argument that micro clusters may exist at too small a scale to provide collective goods for a wider community than the micro cluster itself.

The carrying out of the activities even solely for the benefit of the micro cluster could be problematic because, as is well recognised, SME owners do not have surplus time, yet some of the activities required substantial time commitments. A paid employee sometimes provided the human resource required to market the micro clusters. Argonautics employed a Business Development Manager. Bit of a Do employed a

manager and a marketing manager operated a large craft network supported by the RSC. However, where this position required external funding, it was always insecure. One question was whether the activity of the cluster was core to the members' business interests and how much they valued the collective service provided by a shared employee.

However, micro clusters did successfully provide other club assets at the scale of the micro cluster. Cluster members cited examples of shared machinery and joint employment of 'virtual' administrative staff (a service whereby one individual operates a remote telephone handling service on behalf of many clients). During interviews with cluster members there was reference to access to each other's facilities. One cluster member mentioned that he could use the manufacturing facilities of another member and another cluster member detailed the kinds of equipment to which his firm gained access:

> They do have facilities down there which we haven't got, like they have a laboratory which has equipment, microscopes and that sort of thing, which we don't have, and they have a digital camera for example. So if we want to take pictures of things it's a lot easier to go down there and take pictures down there (micro cluster member 7).

Therefore, while the scale and resources of the micro clusters meant that the provision of collective goods for a wider community of firms than the micro cluster itself was problematic, the micro clusters did provide club goods for members including on occasion a dedicated member of staff.

Relational Assets. I have argued in Chapter 2 that untraded interdependencies, described by Storper (1997, p.5) as taking 'the form of conventions, informal rules, and habits that coordinate economic actors under conditions of uncertainty', and social capital, described by Cooke (2000b, p.2) as 'an attribute of societies from which individuals or collectivities may benefit, derived from community-like relationships of reciprocity, favor-exchange, trust, dependability, and open communication', are both forms of relational assets. While Storper maintains that the region is the locus of untraded interdependencies, it appears that activities within

micro clusters facilitated the development of relational assets at a very micro level. Through cooperation between the parties in the groups untraded interdependencies emerged, including open and honest communication, which in turn facilitated trading relations within the cluster, facilitated the transfer of knowledge leading to innovation and led to a mentoring network.

Relational assets are, by their very nature, intangible and cannot be quantified. However, many firms involved in micro clusters reported benefits from the relations that existed. Many of the benefits were related to overcoming perceptions of isolation that can detrimentally affect SMEs (Curran et al., 2000, Morgan, 1996) and clustering also encouraged the formation of peer group/self help groupings which should over time lessen the reliance on publicly funded business support (Business Link. Tyne and Wear 2003):

> It's a very lonely existence when you're on your own (micro cluster member 4).

> The main function has been as a comfort blanket for us all (micro cluster member 13).

> It's a very friendly open system you know, we help each other out as best we can, which makes the world go round, so it's quite good in that sense (micro cluster member 7).

> You have got two other people who are motivated to get something done and it encourages you to get something done (micro cluster member 10).

The cluster also enabled individuals to take a low risk step into entrepreneurship:

> From my point of view it was the sort of creative outlet. it was the opportunity to try out ideas, off my own bat rather than what you have to do for work. I think that was my main motivation (micro cluster member 10).

The micro clusters, where strong relational assets were developed, provided meeting places for firms to come together and exchange information, raise opportunities and ask questions in a non-threatening, non-competitive environment. On occasions this was achieved through co-location:

> I haven't had to go anywhere and I was able to talk informally about it (micro cluster member 3)

However, on other occasions there was evidence that the micro clusters arranged informal meetings. One cluster member talked of meeting in a local North Shields pub:

> Our boardroom, if you like, was the big table in the Maggy Bank (micro cluster member 5).

I sat in on another meeting in a pub where busy individuals had got together in a relaxed atmosphere and I was struck by the way information was gleaned. 'Has anyone done business in Chile?' asked one cluster member; 'yes, I have a contact there – I'll call you in the morning' came the reply. This way of obtaining business information was valued by the businesses. Having small closed networks may not have been the best way of generating such flows of knowledge, but it was one outcome of clustering that the firms valued.

As discussed in Chapter 2, innovation is often the result of multidisciplinary knowledge and is therefore facilitated by the cooperation of individuals with overlapping tacit knowledges (Lawson and Lorenz 1999). The RSC envisaged that micro clusters would be a fertile ground for innovation not only because of the overlapping knowledges, but also because conducting research within the cluster would alleviate some of the financial and time constraints faced by SMES when it came to undertaking research and development. It was anticipated that economies of scale would be achieved by conducting research within the cluster and that joint research and development projects would reduce the risk to individual SMEs by spreading risk across the cluster.

One micro cluster created a safety enclosure to go in a saloon cab. Although they had already come together loosely as a group before the RSC's involvement, they maintained that RSC involvement brought coherence and ideas to the group. Other micro clusters talked of generating ideas through the cluster and the relations within the cluster were seen to be beneficial to innovation:

> We get together, have a meeting and we tend to find – like a brain storming session – other ideas or avenues of exploration will come out or it (micro cluster member 11)

> I can sort of share ideas, it's good for me, I get feedback (micro cluster member 10).

> The cluster group was actually one way of keeping our friends together and a source of support if you like, to go and bounce an idea off somebody else (micro cluster member 7).

The relational assets generated within the micro clusters are difficult to identify, let alone quantify, but I was often made aware just how much cluster members found it beneficial to have a self help peer group to turn to and learn from. The benefits from the relational assets were greatest where the relations between the firms were strongest and characterised by trust and good channels of communication.

Borrowed Size. The initial RSC definition of clusters, 'groups of similar companies develop[ing] cooperative groupings able to access larger contracts', indicates that the RSC's intention at an early stage was that contracts would be won by the cluster groupings. It was also anticipated that collaboration would lead to economies of scope for the cluster, because a wider range of products and services could be offered, thereby widening the client base. It was further anticipated that work would be passed between cluster companies and that additionally economies of scale could be achieved with overheads for marketing initiatives being shared.

However, in the case of the first two cluster groupings, the nature of the contracts and liability issues meant that this was not straightforward:

> The problem with Pegasus was that it was a shell; it clearly was a shell and probably would not be acceptable as a structure [...] to larger companies. (micro cluster member 3)

Members of the Pegasus cluster did find ways around this issue but came to realise that the actual formal structure of the cluster was not necessary for these working relations to occur, what was necessary was the relational assets discussed above:

> [A] and [B], who you've spoken to, often work through [X firm] and that's no problem and they effectively hide the identity of their company and they work through [X firm]. No problem at all. At other times they'll work with [Y Firm]. [Z firm] people work with us and they'll work with [Y firm] so there is a tacit recognition there that you have to work with the bigger organisations but Pegasus itself I think, as I say, will fade away to be honest (micro cluster member 3).

The inability to use the micro cluster identity in certain cases may have been related to the nature of the pipeline and marine design industries. Other micro clusters had no problems with using the micro cluster identity with clients and used that larger identity to their benefit:

> You say well we've got 6 people working for us – it gives a feeling of strength and it helps (micro cluster member 8).
>
> .

What was also significant for undertaking joint work was the fit between the activities undertaken within the cluster. In certain cases the firms had overlapping and complementary products and services but on other occasions the firms competencies were too divergent for work to be undertaken jointly:

> So really it didn't work because we were too different I think (micro cluster member 13).

> I expected from [the cluster] to be able to develop my client base primarily. but it really didn't come to fruition. It was more a consultancy type base

> cluster [...] I mean I'm not a consultant; I'm a hands-on practical type of guy (micro cluster member 2).

The RSC had anticipated that the borrowed size element of micro cluster development would prove the most useful to firms within the clusters. It became evident that this aspect was much more problematic than had been envisaged. Not only did the firms need to have developed relational assets to facilitate the operation of joint contracts, but also the compatibility and fit between the businesses had to be strong and the contracting arrangements had to be acceptable in the market in which the firms operated.

Improving relations between publicly provided business support and the private sector

As stated in their mission statement, the second activity envisaged for the RSC had been the improvement of the relationship between the private sector and business support functions in the public sector, particularly as many SMEs were sceptical about the worth of advice from the public sector and the take up of business support was low (Curran, 2000).

Initially the RSC looked to perform the role of a one-stop shop for business support, providing a clearer route through the proliferation of support agencies. The RSC were active in signposting both Pegasus and Argonautics to other sources of business support including, in the case of Argonautics, the DTI and, in the case of Pegasus, the Northern Enterprise Fund. However, during phase two of the RSC, possibly because the staff at the RSC became more focused on meeting the targets that arose due to their funding structure and possibly because the RSC had its own grant funding available, there appeared to be fewer linkages made between the micro clusters and other business support services. During phase 3 of the project, when the RSC had to operate for a time without being able to offer grant funding, micro clusters were again directed to other forms of business support. This model of a broker directing businesses to specialist types of support forms the basis of the Area Brokerage Model proposed for the business support network in the North East. However, the RSC were never able to establish their claim to be considered as a broker within that model.

The RSC also sought to be perceived in a different light from most business support organisations by maintaining a longer lasting relationship with the cluster members. In this respect there was always the dichotomy, mentioned above, of the RSC wanting to maintain a relationship with the cluster, but needing to be able to apply resources to developing new clusters. The perception of the quality of the relationship and the role of the RSC did, in any case, vary from cluster to cluster. Micro cluster member 4 described the benefits of the RSC's role:

> Having a mentor for the business and all the different companies concerned and having an impartial agency there to assist

A member of one of the later micro clusters commented:

> Their main role has been as the catalyst that brought us together (micro cluster member 5)

This may reflect a change in the role performed by the RSC as the support offered became less intensive. As the support became less intensive there was a greater need for the cluster members to have the drive and leadership to drive the cluster forward.

Much of the work that the RSC was undertaking was to do with building relationships, which are dependent on individual personalities, and it is not surprising that opinions differed. Some cluster members spoke highly of the RSC staff and others did not:

> An absolutely wonderful guy, really, really, really helpful. And he hasn't told me to say that! (micro cluster member 9)

> He was a right pain; he was terrible (micro cluster member 7).

Some cluster members found the operating procedures of the RSC problematic. Micro cluster member 6 saw the RSC as very prescriptive and contrasted them unfavourably with the Regional Development Agency, One NorthEast whom they saw as more prepared to support 'businesses at the sharp end'. There were also

particular problems when the RSC was facing uncertainty as an organisation. That uncertainty caused problems for the relationships between the RSC and its clients:

> While they messed around, kept changing the rules, changing conditions, we had to keep the submitting [the business plan], it was a real nightmare, I mean I don't know what was going on, but it was a complete pain. (micro cluster member 13)

The strength of relationships between the micro cluster members and RSC staff did depend on individual personalities, and the RSC's role changed as the organisation tried to expand and offer its services to more SMEs. The resource intensive support offered at the outset was not sustainable as short-term targets had to be met by the organisation. RSC staff had to become more distant form the cluster and the lower intensity of the relationship changed the role of the RSC. That changed role placed more emphasis on the firms within the micro cluster driving the process but, given that the initial rationale for the RSC's involvement was that firms would not come together without outside support due to a lack of trust, the cost of building relationships and a lack of awareness of the opportunity to work together, it may have also reduced the effectiveness of the service provided.

Research and information provision

The third element of the service provided by the RSC was the provision of research and information. During 1994 and 1995 the majority of research undertaken and information provided was for the benefit of the Economic Development section and other business support agencies. From early 1996 it was decided that the focus should be on providing economic and market intelligence primarily of use to local companies, especially the companies within the embryonic clusters. Initiatives were undertaken to provide an internet accessible database containing details of 400 firms in Tyne and Wear in the marine, pipeline and electronics sectors; a newsletter promoting clustering and related activity; an opportunity database holding details of business support availability in the area; a summary of information of interest to cluster companies gleaned from Internet databases, newspapers and specialist publications, and distributed by e-mail: the provision of tender information and sector

specific research, including the production of a report into the state of the shipbuilding and ship repair sectors.

At the outset the RSC was able to monitor developments in marine, electronics and pipeline sectors, but without that sectoral targeting it is much harder to provide in-depth information to a wide range of clusters in a cost-effective way. When asked, many cluster members agreed that the general information provided to them by the RSC was useful, but felt that any specialist requirements for information that they had would be too specific for the RSC to provide.

7.2.5 Evaluation and Policy Learning

In Chapter 3 I suggested that there were three elements to evaluating economic development policy – evaluating the efficiency of policy, evaluating the effectiveness of policy and achieving policy learning that feeds back into the policy-making process. I also highlighted that, in addition to the usual issues of additionality, displacement and substitution and multiplier effects, particular issues arise when evaluating the effectiveness of cluster policy including the difficulty in measuring the intangible and softer impacts of cluster policy and the difficulty in establishing a suitable level for evaluation given that the cluster approach has a triple focus – the development of the individual businesses, the development of the cluster, and the consequent development of the wider territory.

Evaluation and policy learning were, from the outset, important to the RSC. In this section I want to look at two aspects of evaluation that relate to the RSC initiative. I want to look at the way the RSC evaluated its service and learnt from its experiences as an organisation, but firstly, I want to show that the RSC recognised that evaluation and learning should be an important part of the process of developing each micro cluster.

Evaluation and learning for micro clusters

Assessment and evaluation were identified as a necessary part of the development of each micro cluster. It was planned that for each cluster there would a review meeting

held between RSC staff and micro cluster members. Argonautics undertook a strategy review in summer 1998 and this led to more action being taken to develop the cluster than previously (The Real Service Centre, 1998a).

Micro clusters were also encouraged to learn from each other's experiences. Events have been held to bring together various micro clusters either as a group or meetings between two micro clusters. These have proved to be valuable networking events and individual clusters have drawn on the experience of other micro clusters to develop their own grouping.

Evaluation and policy learning for the RSC as an organisation

Policy Efficiency. By 1998 the RSC was working with eight clusters. Many projects had been undertaken to support the clusters in the areas of research and development, networking, marketing, training and resource sharing. The value for' local' money of the RSC was also highlighted. During the period October 1996 to September 1997 it had cost the local partners £133,452 to run the project, but £1.06 million of European funds had been obtained (Ratnatunga, 1998a). Outside recognition for the project was obtained with the RSC being highly commended in the 1998 National Local Government's Chronicle awards for Business Partnership of the year. However, overall it was felt that 'current cluster support is insufficient and inefficient'.[49] The support was also very labour-intensive with the RSC only working with eight clusters[50] at the time.

It was envisaged that the wider geographical remit of Phase 2 of the project would enable economies of scale to be achieved in delivering clustering services and the cluster facilitation fund would be available in order to address the time lag between applying and accessing funding for small firms identified above.

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[49] Notes from an RSC team meeting, 1998.

[50] Argonautics, Pegasus, S. and S group, The Environment Cluster, Sarius, Affinitas, Holistic Health, Eurocrafts

At an early stage of the organisation the staff appeared to have a clear idea of the rationale for their interventions and a strong understanding of their role and this was passed on to new members of the team in such a way that it could be argued that there was a 'community of practice' (cf. Lesser et al., 2000) within the organisation. Internally regular team meetings were held and certain longer brainstorming sessions tackled issues such as identifying the different elements making up facilitation. The precise nature of the service being offered was always a key issue and from April 1998 onwards there were attempts to analyse and standardise methods of facilitation. There was an attempt made to develop a series of 'knowledge books on clustering' and, although these never came to fruition, the desire to codify the process represented a key issue for the RSC in that much of their role depended on tacit knowledge of how to facilitate the process of developing relationships within groups. The process was codified into the Cluster Development Programme (see fig. 7.1 above) and this represented an attempt to transform the knowledge about facilitating micro clusters that was embodied in individuals into a physical form, in an attempt to stabilise the knowledge base and to provide a vehicle through which to transmit this knowledge outside the organisation (Lesser et al., 2000).

Through dramatic changes of staff, despite the attempts to codify the process, substantial amounts of this tacit knowledge was lost and, although the RSC had rightly sought to be a learning organisation (Morgan, 1996), it was hindered by the loss of elements of knowledge embodied in individuals who left the organisation. Problems with staff retention were inherently linked to issues of short-term funding and a lack of job security but the rapid turnover of staff impacted on individual relationships with micro clusters and led to a loss of understanding about the nature and evolution of the organisation and the service it attempted to provide.

The desire to codify the process of developing clusters came from a recognition that the process was based on tacit knowledge embodied in members of staff. However, the Cluster Development Process came to be seen as a way to speed up the process in order to achieve short-term targets. It appeared, and was recognised by the RSC, that they could become too immersed in the 'procedures' for clustering. In attempting to achieve targets in the short term, there was a risk that the longer-term gains that could

come from the micro clusters would be lost. While this was recognised by the RSC, it was not resolved.

Policy Effectiveness. The RSC has always been keen to provide evidence of the effectiveness of its approach and indeed has been required to do so by its funders. Numerical data as to contract and employment figures was obtained from firms on a regular basis and recorded in a sophisticated database and RSC staff recorded the amount of time they spent with firms. Regular reports were submitted to the Government Office for the North East and, as the funding structure of the RSC got ever more complex, reports were submitted to the additional funders too. However, the collection of numerical data was time-consuming both for the RSC and the firms involved, and the validity, veracity and value of the figures obtained was questionable, not least because of the difficulty in ascertaining the level of additionality achieved. This was particularly true where firms had started at the same time as the micro cluster.

One commonly adopted evaluative measure for economic development initiatives is the 'cost per job created'. However, this is not only difficult to measure, it is also not necessarily appropriate for the RSC because it was anticipated that club goods in excess of the benefits to individual SMEs within the micro cluster should arise through the clustering process. The RSC was also intended to act as a demonstration project, illustrating the benefits of collaborative and self-help behaviour. In a region where historically rates of entrepreneurship and business survival have been low this aspect should have been valuable, but it is difficult to quantify as any change would occur over a very long time period and be difficult to isolate from external factors. Rosenfeld (1996b), writing about a similar project in the United States, concludes:

> Incentives are intended not to subsidize collaboration but to demonstrate its value so that other firms and services will adopt and internalize the principals of collective services and cooperative ventures (ibid. p.249).

Job creation was always a goal for the RSC and many firms within clusters have increased their head count. The clusters have also proved to be successful incubators of new companies providing peer group learning. confidence, mutual support and

ready-made networks. One unexpected benefit of the evolving clusters was their incubation effect in encouraging new business start-ups. This was ascribed to the benefits of peer group learning, greater confidence and ready-made networks.

By the end of 2000 it was evident that restricting the success criteria of a cluster purely to job creation was too narrow and there was a wish to explore 'softer indicators'. A more qualitative approach was adopted for the RSC steering group and an activity report was produced on a quarterly basis tracking the progress of clusters through the micro cluster development process. However, there was an ongoing desire to establish a systematic method of measuring the softer impacts of the project, particularly as problems with benchmarking the performance of clusters led some, internally and externally, to doubt the value of the service provided by the RSC. Despite a keen interest from individual staff, the RSC never did develop standardised, soft indicators to measure the outcomes of clustering and I would argue that due to the highly contextual nature of each micro cluster this may have been an unobtainable goal.

The businesses involved in the clusters did benefit, but business support should not just meet business wants but should rather look to move business on to a higher plane of performance (Lagendijk, 1998). The RSC were aware of this role but their ability to improve the competitiveness of the businesses, or to evaluate their contribution to such an improvement, was to be an ongoing question.

Policy Learning. While the RSC found it difficult to quantify the outcomes of the project its approach to evaluation was participatory. The RSC also sought participatory evaluation of its service from both its funders and its clients and sought to learn from this feedback. In 2000 a research survey was undertaken to seek client opinion on the Business News Update service, which was subsequently relaunched (Wilkinson, 2000). Company monitoring surveys were undertaken on a quarterly basis in order to obtain numerical data from firms and in 2000 the RSC decided that each cluster would be interviewed in turn to assess the advantages and problem areas that have arisen for the companies as a result of clustering in order to obtain a more qualitative picture.

In addition to the public sector steering group, which monitored the performance of the RSC, a Private Sector Group was also established during Phase 2 of the project to provide feedback from SMEs involved in micro clusters into the strategy of the RSC. The first meeting was held in December 2000 and the private sector group recommended that all of the clusters should meet regularly to network and discuss relevant issues. This resulted in a networking event in September 2001.

The RSC also sought to learn from outside organisations and numerous contacts have been made across Europe and in the USA through attendance at conferences. The organisation also participated in research projects including the ADAPT programme at the University of Newcastle (Lagendijk, 1999) and the University of Durham FoSMED research (Foundation for SME Development, 2001) and indeed, as discussed in Chapter 5, the RSC was the 'industry' partner in my ESRC Collaborative Studentship.

While the RSC did learn from its experiences its impact on policy within the region was very limited. The 1999 to 2000 Business Plan stressed the need for a coordinating role for Micro clustering strategy. The RSC wanted to share their learning process with other local authorities, and the Regional Development Agency. but this was not ever successfully achieved. It was not easily possible to share the tacit knowledge that had been gained. It might be concluded that the RSC was a learning organisation, but other policy-makers did not learn from it.

7.3 Conclusions

The Regional Service for Clustering was an unusual and ambitious project. Its service was predicated not on developing particular *clusters*, but on the understanding that groups of firms could come together to achieve mutual benefits by *clustering*. It soon became apparent that the relationships required to achieve such benefits took time to develop and that there was a particular role to be performed by an outside agency – that of facilitating the process of developing what came to be termed micro clusters.

The ability to develop micro clusters depended on using particular skills to develop relationships between firms, to work with the firms so that the firms could undertake

suitable clustering activities and to evolve the group into a self-sustaining entity. This was a difficult, time-consuming process and, while there were attempts to codify the process, the skills were based on the tacit knowledge of those who worked within the RSC. The effectiveness of the service was difficult to demonstrate quantitatively and the benefits produced were not necessarily those targeted by the funders of the project causing difficulties for the RSC in meeting targets. Therefore the service it provided came to be altered to meet the targets it was required to meet as a condition of its funding.

Not only was the service offered by the RSC difficult to align with the targets it was set, but it also had difficulties as an organisation. From the outset the RSC sought to develop its own identity, but its attempts to operate on a regional basis have always been hampered by its close association with North Tyneside Council. The organisation was not seen as part of the cluster strategy of the Regional Development Agency and did not have an obvious position in the Business Support Network of the region. By 2005 the organisation was reduced to two members of staff operating under the auspices of another enterprise agency in order to complete an outstanding ERDF contract. The ambitions of the organisation had not been fulfilled partially due to the nature of funding for business support organisations and the inability to find a place within the larger regional picture. However, while the organisation has not necessarily had a long term impact on policy, the legacy of the organisation remains in the micro clusters it developed, and I now want to turn to my final case study, that of the marine design cluster, Argonautics, to consider one outcome of the RSC's cluster policy initiative.

8 The Impact of Cluster Policy on the Marine and Offshore Engineering Cluster in North East England: The Regional Service for Clustering and Argonautics

The previous chapter used a cluster policy process model to examine the way in which the Regional Service for Clustering project sought to develop micro clusters – small groups of SMEs working together for mutual benefit. I have shown that a particular understanding of the benefits of *clustering* influenced the development of the project and I have demonstrated that the context in which the project operated impacted upon the methods the organisation used to develop micro clusters. I now want to look at a particular micro cluster that the RSC worked with, to demonstrate, as in the case of the larger marine and offshore cluster that was the subject of Chapter 7, that existing relationships and activities within a cluster affect, and are affected by, particular interpretations of the concept of clusters and cluster policy, and that those interpretations lead to different outcomes from cluster policy. Once again the need for policy to consider the role of trust and untraded interdependencies in developing the perceived advantages of clusters is highlighted, as is the length of time required to develop these assets.

Argonautics, the micro cluster I have used as a case study, encompasses a group of predominantly marine design firms that form part of the region's marine and offshore cluster. The choice of this case study came about because of my research into the development of the RSC. Argonautics was the first micro cluster that the RSC worked with and the relationship had continued over a period of ten years. The length of time over which the micro cluster has evolved permits a detailed analysis of the development of the cluster over time, and its role as part of a wider regional cluster permitted an exploration of some of the issues of scale raised in section 2.2.1.

This chapter uses the cluster policy process model to examine the impact of the RSC initiative on the firms. In the first section I provide some background to the RSC's involvement with the micro cluster and, using the cluster policy process model once more, I outline how the micro cluster developed. The second section concludes the

chapter by outlining some of the limitations of a clustering approach to policy-making revealed by this case study.

8.1 The Regional Service for Clustering's Approach to Argonautics

8.1.1 The Decision to Take a Cluster Approach

As discussed in Chapter 7, staff at the Economic Development Unit had become interested both in the work on clusters undertaken by the Centre for Urban and Regional Development Studies at the University of Newcastle and in work that was being undertaken in Emilia Romagna to support firms by offering real services. Brusco (1990) highlights the difficulty of defining such real services:

> I have tried on many occasions to explain the ideal of real services - the ideal of real versus financial, of offering the firm what they need in kind, instead of offering them money to buy what they need (ibid. p.17).

European Structural Funds were available to support the development of clusters of competitive advantage and the Economic Development Unit decided to use a particular cluster approach, partially based around the provision of real services, with a small group of marine design companies to try and preserve the skills base in marine design, which was seen as threatened by the potential closure of the Swan Hunter ship yard. It is important to note that the decision to work with this group of companies pre-dated the establishment of the Real Service Centre, later to be known as The Regional Service for Clustering, and indeed it was partly as a result of the Economic Development Unit's experiences with this group of marine design companies that the Real Service Centre came into being.

Although Swan Hunter did not close until 1995, a member of Argonautics described how initial moves began much earlier:

> This was 1992, 1993, early 1992, at some point, the then MD of Conmarque, [...] had some contact with North Tyneside Council and met a few people. This is all just before Swan Hunter went toes up and so I believe the wheels started turning slowly even then (Argonautics member 1).

The initial mission statement for Argonautics stated that it would be:

> A vehicle to encourage the development of the marine industry in the North East, and specifically to work towards growth for the cluster as a whole and the constituent individual companies (The Real Service Centre, 1998a).

The goal of the Economic Development Unit was to retain employment and, more specifically, to retain the skills embodied in that employment, but the goals of the individual firms were more diverse:

> That was one of our objectives, to get close to businesses who knew what they were doing. Other companies within the cluster initially could see a pot of gold that they might be able to dip into, that was an incentive and a goal for them. And indeed when the pot of gold diminished some of the companies fell by the wayside (Argonautics member 2).

As mentioned above, one of the initial motivations for taking a novel, cluster approach was the availability of European Structural Funds. One of the priorities of the 1994-1996 Single Programming Document for Objective 2 funding was allocated to the development of clusters of competitive advantage and subsequently Regional Challenge funding was made available for larger projects. North Tyneside Economic Development Unit made a multi million pound bid for funding to construct a building in which marine and pipeline businesses could be 'clustered'. The bid was successful but, following the successful attraction of the Siemens' wafer manufacturing facility, the building became known as the Centre for Advanced Industry and the home of the North East Microelectronics Institute. The pipeline businesses did not locate there because the facilities were too expensive and did not incorporate the workshops that had initially been proposed, although a number of the Argonautics companies did eventually come to be based there.

Therefore the decision to take a cluster approach in this case was motivated by a desire to retain skills in the locality, inspired by knowledge of academic research and experiences in Northern Italy and spurred on by the availability of government funding.

8.1.2 Identification, Selection and Analysis

The selection and analysis of the firms took place at a micro level and involved identifying a group of firms who might work together. This method of selection relates to the RSC's definition of clusters as 'groups of similar companies develop[ing] cooperative groupings able to access larger contracts' (North Tyneside Real Service Centre, 1996). The initial selection of participants for the group involved the identification of a number of existing marine design companies based in one location, Davy Bank, in Wallsend. Two of the firms, Ken Chapman Associates and Conmarque Engineering Limited were, coincidentally, aware of the work on clusters being undertaken at CURDS and had already approached the Economic Development Unit at North Tyneside. That unit had a particular interest in maintaining the skills of the Swan Hunter design team who had been made redundant following the receivership at the yard. Ken Chapman had been Group Marketing Director at Swan Hunter and formed Ken Chapman Associates. David Hewitt had been Head of Design at Swan Hunter and had gone on to form Armstrong Technology Associates, which had located on Davy Bank. Indeed the cluster was initially known as the Davy Bank Cluster.

The RSC's role at this time was to bring these firms together, identify the issues that they faced and to 'sell' the benefits of working collaboratively. Nathan Pellow from the Economic Development Unit was seen as pivotal in bringing the firms together:

> It was Nathan's foresight that foresaw that clustering would be a useful tool, especially in the climate of shipyard closure, a nexus for change, so we got together with Nathan and discussed it and during that period Nathan was instrumental in setting up the Service Centre (Argonautics member 3).

Other members came on board once Argonautics was formed. According to a representative from one organisation:

> We didn't get considered for Argonautics when it was first formed because it was regarded as a North Tyneside activity and we made moves to join as soon as we knew it had been formed (Argonautics member 4).

Although it was not the intention of the RSC, it should be noted that Argonautics was a 'closed' network in that the existing members closely controlled the selection of firms for membership. Membership was by invitation, and only with the approval of existing members:

> We were invited to join initially by [X], well they first mentioned the cluster to us and it was really as a result of the resignation of [Y] who are a competitor of ours, and do pretty much the same as we do, and they left the cluster and we were invited to fill the vacancy (Argonautics member 5).

On occasions firms approached Argonautics with a view to joining, but more commonly existing members of Argonautics proposed contacts of theirs as potential members. I sat in on a meeting where a potential member made a presentation to the Argonautics' members and discussions were then held in the absence of the applicant to decide if they would be permitted to join.

In addition to the group being 'closed' in this way, the notion also arose that Argonautics should be a group of complementary, rather than competing, firms. Indeed the name Argonautics was taken from the Greek legend of Jason and the Argonauts, because the crew of the Golden Fleece were each the best individual in *their own discipline*. In the same way the cluster was described in its marketing literature as being 'made up from a group of different companies each excelling *in its own field* of maritime technology providing a spectrum of sophisticated, knowledge based skills'. There was an element of overlap in competencies but firms were on the whole selected to be complementary. When asked what the nature of competition was between firms in the cluster, one member responded:

> Complementary, but there is some. At the beginning there was a company which was direct competition for us, but we suffered that. But they left once they got their research and development money (Argonautics member 3).

Another member commented:

> There's no way that it would work with competitors in there (Argonautics member 5).

Therefore the members were selected at a very micro level, initially by the firms who had first approached North Tyneside Council and subsequently by invitation and sanction from existing members of the cluster. This had not necessarily been the expectation and RSC representative 1 advised me that it had been intended that the group should grow to encompass all the marine firms in the region. I will return to this aspect, but I now want to concentrate on the initial group of firms that were to form the Argonautics micro cluster.

8.1.3 Participant Mobilisation, Cluster Animation and Relation Building

Having identified a group of complementary organisations, the Economic Development Unit wanted to bring them together to work more actively as a group. The firms on Davy Bank had already to an extent been working together because it had seemed the natural thing to do as they were located so close to each other. As one firm advised:

> One didn't need to be a marketing genius to say 'well here we are, we are a little group of marine companies'– never thought of the word cluster – 'a little group of marine companies and why not, when we are out on the road, help each other if we see opportunities' – very informal (Argonautics member 1).

However, from the outset the involvement of the local authority brought an element of formality to the grouping. The same member advised:

> From then on it ran into a different mode which was more formalised – meetings, applications for funding, justification.

Prior knowledge and trust building

As mentioned in Chapter 7, the magnitude of the task of building consensus between parties depends partially on the level of prior knowledge between those parties. On the whole there seemed to be ample evidence that the members knew each other:

Basically I knew them all, I knew Isherwood's very well and North Rivers Marine – I knew their first MD very well. So yes, we were all reasonably well acquainted (Argonautics member 1)

In our industry you tend to know pretty well everyone, especially in the local area, you know pretty well everyone. You don't necessarily like them, but you know them, maybe they don't like you either but that's by the by (Argonautics member 3)

We had been dealing with various member companies over a number of years in particular [X] and [Z]

and

Yes we knew the names, I didn't know them all particularly well, we hadn't done any work with them, but we did know the other organisations there (Argonautics member 5)

I think there's probably a network of people who had all heard of each other, even if they hadn't worked with each other (Argonautics member 6)

Yes well all of us pretty much knew Peter Rossiter anyway. Some of us knew people like David Hewitt and some of his team (Argonautics member 4)

So I think one of the things about the marine industry was that people knew generally who was around and working in the marine industry in the area, so there was knowledge of the other individuals and organisations – perhaps not a great understanding of what they did, but roughly a knowledge of the areas they were active in. (Argonautics member 2)

From a point of view of why we joined Argonautics – we've done some work with [Z] (Argonautics member 7).

However, a second reading of the excerpts from the interviews shows that the level of knowledge was fairly superficial. Although there were examples of good two-way relationships within the group where firms had worked together, overall it appears that it was more a case of 'knowing of' rather than 'knowing' and the level of trust was low at the outset. Trust is considered to be necessary to foster the development of untraded interdependencies, from which firms can benefit, and it is noticeable how long it took to build up trust, one of the key relational assets, between these firms:

> Companies that had been in existence for even 10, 15 years had an established way of working, so they were a little bit suspicious of what's this cluster going to mean to them, how was it going to effect their existing business [...] so it was trying to squeeze these organisations together into a cluster and the build up of trust between the member companies certainly took some time and some fairly heated debate at times about 'why should we explain what we do to you because you might steal our ideas' (Argonautics member 2)

> I think that as far as the frustrations go, I think we've got to keep at it, but people, when they get to a cluster, look at the others with suspicion (Argonautics member 3).

Even seven years into the cluster, a cluster member told me that he considered one of the other members to be secretive and that information had to be 'hauled out' of them and another, comparing the cooperative mentality within Argonautics with another organisation, concluded that it was better, but revealed a suspicion of other members:

> I think it is [better] in that more information is shared, how much is held back I don't know (Argonautics member 5).

The Real Service Centre emerged as an organisation at the same time as Argonautics were forming and they performed a role in terms of organising meetings and operating as a secretariat for Argonautics. The RSC were a catalyst in the process of forming relationships but, while the RSC could provide opportunities for the firms to come together and suggest clustering activities, the building of trust and the strong relationships necessary in such a small, closed environment depended largely on the

firms and personalities within them. One firm left the micro cluster following a conflict so acrimonious that it led to legal proceedings, and another left following a disagreement with a fellow member. A further member found itself compelled to leave because there was a conflict of interest between its parent company and one of the Argonautics member companies. As one member commented:

> They were in a state of constant change over that period [...] in that various people were finding they'd got incompatibilities (Argonautics member 4).

Because of the small closed network *modus operandi* of Argonautics it was difficult to resolve these issues, which might have been accommodated in a larger grouping. Although the closed nature of the group and the non-competitive positions of the members enabled the building of trustful relations and ensured a generally amicable atmosphere, it also excluded radical ideas because those holding them tended to either be pushed out of the network or would comply with the consensus of opinion to maintain unity.

Limited company status

As mentioned in Chapter 7, one method the RSC used to build the cluster was the formation of a limited company. Therefore this loose group of marine design engineering companies was constituted as a private limited company in 1995. The members of the cluster chose to have the original constitution drawn up by a large firm of local solicitors and it was executed so as to cover all eventualities. The board of Argonautics incorporates the position of a paid chairman and was initially chaired by Marshall Meek. He was chosen due to his pre-eminent status in the marine industry as past president of the Royal Institution of Naval Architects and of the North East Coast Institution of Engineers and Shipbuilders:

> I think there was general consensus that we wanted somebody who had some stature in the industry and that would enable doors to be opened to us and give the cluster some standing within the marine community (Argonautics member 2).

The members of Argonautics made the choice of the large firm of solicitors. It resulted in a very expensive legal exercise and a constitution that is considered to be overly complex and lacking in flexibility. Much time at the early meetings was spent in discussing the constitution:

> It was mainly endless discussions about Type A shares, Type B shares, who would do this, what would happen if Fred got shot and all that sort of stuff (Argonautics member 1).

The members learnt from the experience:

> One of the mistakes we made was going to a large legal company, who shall remain nameless, who set up Argonautics as if it was a multinational. It`s just horrendous, I really mean that, horrendous, the whole constitution, the whole set up is fraught with, it could have been done on a single piece of paper, it should have been done on a single piece of paper. (Argonautics member 3)

> We're beginning to see that it wasn't necessarily a good idea to form a company (Argonautics member 3).

Relationships within the cluster

However, it appears that the formality of the relationship came not only from the legal constitution, but also because of the backgrounds and business culture of those involved. Members of the RSC team commented on the lack of intimacy within Argonautics, comparing it with the Pegasus cluster where the members had worked closely for many years prior to forming the cluster, and mentioned that former members of Argonautics had found its organisation too 'cliquey' and 'old school tie'. As I talked to the members of the cluster and observed meetings the formal nature of the operations of Argonautics came through. There were quarterly board meetings and monthly networking meetings, all with agendas, formally chaired and held around the board table of the one of the member firms. This was in stark contrast to other clusters where, as mentioned in section 7.2.4, the board table might be a large table in a local pub. Therefore it was not just the existence of the very formal constitution that

shaped the relationships, it was the very character of some of the firms that made up the cluster that led to this air of formality.

Meetings did take place and relationships did exist between members of the micro cluster outside the formal boundaries of Argonautics operations. When the firms were based on Davy Bank one firm told me there were 'over the garden wall sort of meetings all the time' (Argonautics member 1). However, these meetings appeared to depend on proximity and he commented on the change once the firms were no longer co-located:

> As usual with the distance, although not large, there was a falling off of day-to-day contact and the contact then tended to come down to the monthly management meetings.

Other members highlighted the benefits where firms continued to be co-located:

> I think the fact that we're in the same building – I can nip up there and talk to them and Allan drops down and talks to me about projects. It's very noticeable that with [firm W], who are based in Sunderland there's not that opportunity to drop by and I think that particular relationship suffers as a result of that (Argonautics member 2).

These relationships and meetings were not all about proximity though. The likelihood of talking to people also depended on both the overlap of business interests and the culture within the different firms. One cluster member said the co-located cluster members met:

> Only if we've got something to discuss with them. I don't see [firm V] at all

and

> [Firm X] we can walk in and see hello there, but you tend not to do that with [Firm Z] because they're a different sort of company, they are bigger and they've got all the security things (Argonautics member 7).

The relationships seemed to flourish more where there was geographical proximity and therefore it was difficult to disentangle the impact of the cluster from the impact of co-location. It was also difficult to disentangle the impact of the cluster from relationships that would have existed anyway. Relationships certainly appeared to be easier within the cluster for the firms that were co-located and those that were not co-located talked of efforts they made to remain involved despite the distance:

> Apart from seeing the person I want to, I usually meet one or two other people in whatever organisation I visit and it never does any harm to keep in touch (Argonautics member 4)

> For going to meetings and for talking to people it is much easier if you're in the same building, it can take me an hour when the roads get busy to get from here to North Shields (Argonautics member 5).

Participant mobilisation and the role of animator

Involvement with the cluster was about much more than geographical proximity. Cooperating with other firms, let alone with a group of other firms, is a time consuming business and it requires certain roles to be performed.

The paid chairman, Marshall Meek, acted as a figurehead for the micro cluster and performed the required duties of that role in terms of chairing meetings. He also linked Argonautics into a wider environment by using his industry contacts. David Bowles, director of Northern Defence Industries, took over following Marshall Meek's retirement. His appointment as chairman was seen as giving Argonautics a strong link into Northern Defence Industries and his background of working within regional development organisations was seen as useful. The downsides to the appointment were a further emphasis on defence related industries, which were not of interest to all Argonautics members, and the other commitments of the new chairman:

> David is an extremely busy person doing a lot for not only NDI, but a lot of other organisations and at times it has been difficult to attract his attention, but

that is outweighed by benefits of having David with all his links (Argonautics member 2).

Outside the formal role of chairman, which appeared to be unique to Argonautics amongst the micro clusters in that form, there was a role to be played in terms of administering the cluster and facilitating the relationships between the firms. At the outset much of the administrative and facilitating work was undertaken by the RSC, which was still operating very much as a pilot scheme and dealing with very few micro clusters. Part of the original funding secured for Argonautics had been used to fund a post at the RSC, specifically to administer Argonautics. As the RSC's role changed more resource was required from within Argonautics. This was initially provided by the wife of the managing director of one of the firms who provided substantial input into the cluster. Her role was described as 'a PA role in effect to Marshall and [she] did a lot of work in that respect' (Argonautics member 4).

However, the administrative cost of providing this kind of support to the micro cluster was huge and it was realised that too great a sum was being spent on administrative costs alone. This could not be borne by a group of small companies and it was realised that the cost structure would have to be changed. This, and the need to drive the cluster forward, led to the need for more input from the member firms and as I interviewed firms, divisions came to the surface:

Whether people actually put the time in is another question altogether. There are certain member companies who will probably not be contributing very much now to the organisation compared to others, so it has started to become unfair in that way, in that the burden is being taken by fewer people who seem to be keen, still keen, on the organisation and others who have lost interest to a certain extent. (Argonautics member 5)

A lot of the directors absorb work you know on behalf of the cluster, [...] attending the meetings, preparing business proposals, the proposals to get Steven Knaggs, the business plan that David Hewitt did, the enquiries to the solicitors, it's all time input. (Argonautics member 6)

But I've noticed that companies like [firm U] have tended, not to drift away, but they've not been as present as they might have been in some of the Argonautics' meetings (Argonautics member 2)

The bigger companies really I despair sometimes. You would think [...] if someone can't come to a meeting they would send someone else. (Argonautics member 3)

> He doesn't have any time for it and has largely lost interest in the organisation (Argonautics member 5).

Certain members were largely credited with animating and driving the cluster and, without their involvement and dedication, it is unlikely that the cluster would have survived. However, there was an issue around the leadership of the cluster. The paid chairman performed a figurehead role and both individuals who performed that role were seeing as having merits and bringing good ideas into the fold. However, Argonautics member 2 raised the issue of needing a leadership role of a Chief Executive type, as well as a Chairman. In section 7.2.3 I raised the possibility that leadership could be provided from within the RSC, and Argonautics member 2 agreed that Nathan Pellow from the RSC had provided the initial leadership for Argonautics but concluded that the leadership position would have required election and also would have raised the issue of compensation for performing the role.

The role of certain firms in driving the cluster was made difficult not only because of the lack of formal leadership, but also because the level of significance of Argonautics to the member firms varied and this related both to the purpose that Argonautics served for those firms and to their individual circumstances. Several of the firms had outside ownership, which influenced their activities, and some members were open about the lack of significance Argonautics had for them:

> I would say it is not very significant at all. As I said earlier, if things carry on as they are, we won't be there because it is quite a considerable chunk of our spend that we have to put into Argonautics each year (Argonautics member 5)

> [Argonautics is] not that significant to be honest. I mean we have taken the membership out so we will see how it goes for a year; we'll review it at the end of the year, that's what we've got to do (Argonautics member 7).

The firms had joined for very different reasons – to access a shared marketing resource, to win contracts jointly or to access grant funding, given that by 2000 Argonautics had received in excess of £300,000 of public funds:

> I get the feeling it was a vehicle to firstly take advantage of grant funding and secondly to allow some of the smaller companies to gain access to marketing resource which they would have otherwise been unable to pay for. To a certain extent the smaller companies still feel that way I believe and even the larger ones probably don't share our enthusiasm [...] to win work as Argonautics (Argonautics member 5)

> We joined Argonautics to get the wider brief because certainly [firm V] and [firm Z] have got agents scattered around the countryside, worldwide you know and also the extra input given the cluster Argonautics should be generating its own marketing structure and what have you (Argonautics member 4)

> We were looking for an increase in our profile, obviously ultimately an increase in sales, that's really it (Argonautics member 5).

The firms also differed in terms of their activities and on occasion this was seen as a problem:

> That has led to perhaps a questioning of whether it was the right thing to bring in as a member company an organisation that is involved in [something other] than the knowledge industry (Argonautics member 2).

In some cases there was suspicion between the members as to why firms had joined:

> The chaps are all excellent, they really are, but we're all different. They all have their own, I'd say agendas but that sounds bad, own constraints (Argonautics member 3).

As will be seen in the next section, the lack of consensus as to the purpose of Argonautics affected the activities that the cluster undertook and caused unresolved tensions within the group.

8.1.4 Selection and Implementation of Policy Instruments

In section 7.2.4 I suggested that the RSC's policy instruments were of three kinds. Firstly, the development of micro clusters able to undertake clustering activities that brought benefits of three kinds – borrowed size, relational assets and club goods; secondly, the provision of a research and information service and thirdly, attempts to improve the synergy between the private sector and the publicly funded business support sector.

I now want to look at the way in which each aspect of the RSC's activities impacted on Argonautics. I have already discussed the way in which the cluster had come together and I now want to look at the actual clustering activities undertaken by Argonautics under the headings of borrowed size, relational assets and club goods. I will then turn more briefly to the provision of research and information services and the relationships between the micro cluster and the RSC.

Development of the micro cluster

When considering the clustering activities undertaken by Argonautics it is important to note that the activities were influenced by the substantial amount of money that was available to the cluster in the early days of its operation. At the outset Argonautics, with the assistance and support of the RSC, applied for and received £265,000 in ERDF funding. As mentioned the group of companies located on Davy Bank were already informally working together but access to funds was seen as a way of developing the group:

> We were doing bits and pieces of work around the cluster as it was. so that was already working. We had some ideas of our own then about forming a marine park or marine grouping, but money was tight so the idea of funding was a very, very interesting one (Argonautics member 1).

The proposal was to use the funds for research and development, and marketing and publicity, although some of the funding went to the RSC for managing the project and substantial amounts were absorbed by financial and legal costs:

> We [...] for one didn't see a brass penny. Not a penny, it cost us quite a lot of money, just attending meetings and being active and that sort of thing. But we didn't seem to do anything, there was at least £300,000 of funding of which we saw not a penny (Argonautics member 1).

The RSC's early understanding of the benefits of clustering very much focused on the benefits that clustering would bring in terms of economies of scale in marketing and the ability to access larger contracts. Members did do work together, usually on a two way basis and, while the firms had often worked together before being mutual members of the cluster, this work was often attributed to the existence of the cluster:

> We had a phase of doing quite a bit of analysis work with [company Z] and we did some in-house training for them, structural analysis, yes it was always modest but there was an increase (Argonautics member 1)

> We probably had the relationship with [company Z] and [company X] so that we may have done [joint work] anyway without being in the cluster, but certainly [we've done] much more since we've been in the cluster (Argonautics member 5).

One member talked of undertaking joint contracts with other firms in Argonautics and when I asked whether these contracts would have been undertaken had the cluster not existed he replied:

> Probably not, it may have done, we may have thought of lifting the phone to another company but the chances are you can do it now because you are in close contact, very close contact (Argonautics member 3).

A different cluster member, when asked the same question as to whether joint contracts would have been undertaken in the absence of the cluster replied:

> Yes probably because of the proximity (Argonautics member 7).

Therefore it remains difficult to disentangle the impact of the personal relationships that existed, partly as a result of proximity, from the impact of the existence of the cluster. What was noticeable was that contracts were not won as Argonautics. This partially relates to the nature of the industry where liability is an issue and partially to the difficult state of the market, but also relates to the members' understanding of the purpose of Argonautics:

> I would like to see Argonautics become a contracting organisation in its own right. […] I don't think my views on Argonautics are maybe shared by the other member companies (Argonautics member 5).

The other areas where the benefits of borrowed size were anticipated to be beneficial were in marketing and image. An element of the initial ERDF funding was used towards the production of marketing brochures. These were undoubtedly of a high quality, but were produced before certain aspects of Argonautics' operation were thought out. The initial brochure was an eight page A4 sized document outlining the capabilities of the seven founding firms. However, as has been outlined, there were substantial changes of membership rendering the initial marketing material obsolete. The second attempt was an A4 folder into which loose-leaf sheets on the individual companies could be included. Even this version was not without its difficulties - one member mentioned that their firm never received updated sheets for the folders. However, the problems were more fundamental than that and reflected the fact that the member firms did not want to subsume their identity behind that of Argonautics.

In the early days of Argonautics:

> Every company would continue doing its own marketing and maybe mention Argonautics as an afterthought and it would never work (Argonautics member 1)

> The name is known, Argonautics is known, and we have, not a desperate success rate, but we have used the depth of the bigger companies to help us to sell and I think it could be successful if it were applied more properly (Argonautics member 3).

One member maintained that the cluster had been 'naïve' in their early marketing attempts and it appears that the RSC had underestimated the complexity of marketing micro clusters. Members did at times find it hard to quantify the benefits:

> [It's] very difficult to quantify. I think it's probably has raised our profile in that we've probably been introduced to companies that we would normally not have come across (Argonautics member 5).

As will be seen the marketing was more successful once the micro cluster had a shared resource to undertake marketing on behalf of the cluster. There was also perceived to be a benefit of being part of a micro cluster, and therefore part of an organisation of greater size, in attempting to gain influence with other agencies. and one member advised that the cluster was:

> quite keen to keep links going with organisations such as One NorthEast where we can, where there is a possibility of making sure the cluster is recognised in the infrastructure (Argonautics member 2).

Research and Development projects were also funded by the initial ERDF funding, but it was not a matter of combining the expertise of the firms on joint projects. rather the individual companies obtained funding for their individual research interests. It could be said that the member firms would not have individually obtained the funding. so indirectly they benefited for the cluster's size. but the initial projects were

far from the interactive model commentators such as Boekholt and Thuriaux (1999) and Capello (1999) identify as facilitating innovation, but instead involved individual companies working on their own individual research projects.

Therefore, although in theory the benefits of joint working were clear, in practice there were many complications of assuming the borrowed size of the cluster. There were also to be complications with the provision of club goods.

In section 7.2.4 I distinguished between the provision of a club asset available exclusively to members of the micro cluster and the provision of a club asset available to a wider community. I now want to discuss attempts by Argonautics to provide a club asset available to the wider community.

Argonautics obtained funding through a Skills Challenge Bid in 1995 to establish a Skills Centre. The initial project sought to provide training to the employees of the members of Argonautics in computer aided design techniques. The idea was also to train staff from the firms within Argonautics to be trainers. While there was an undercurrent of bad feeling, in that it was felt that the benefits had not been evenly distributed, the project was overall a success. The Argonautics Skills Centre was renamed the Argonautics Technology Transfer Centre in July 1998 and the remit of the project was widened to providing subsidised training to the marine industry on Tyneside. It was intended to provide a range of courses including those specific to marine technology industry and more general business courses (for example, team building and managing teams). A full-time project manager employed by the Argonautics companies, with financial support from the RSC, was appointed. All research continued to show an extensive and urgent requirement for training in the marine industry. However, there was a fundamental reluctance within the industry to invest the necessary money on training. The aim of the project was not only pecuniary, in that it was intended to become a fee earning business for the cluster, it was also more altruistic in that it demonstrated a commitment to maintaining the marine skills base of the whole region. However, the Centre failed to secure external participation in the courses it scheduled and income fell significantly below levels forecast. It was also felt that a number of the companies within Argonautics were not that enthusiastic about the project. As a result the RSC withdrew their support and the

project was placed in the hands of Tynemouth College. This caused substantial and lasting hard feelings towards the RSC from some members of the Argonautics cluster, there were strong differences of opinion between the member firms of Argonautics and the whole process had absorbed substantial Argonautics resources in the preceding 18 months:

> I don't just blame the RSC, I blame the companies, our own companies, 'yes we'll take training' and they didn't take any training up, outside companies were the same (Argonautics member 3)

> Certain members of Argonautics were very keen on developing the training centre for which funds came forward pretty regularly from RSC. We always felt that the market for that kind of thing was much more crowded than was appreciated either by RSC or by the people who were really calling for it. (Argonautics member 4)

> I think the members of Argonautics at that time were so disillusioned by what happened that are not very keen to consider approaching it again (Argonautics member 5).

It appears that the project was an ambitious one and again this calls into question whether a micro cluster type organisation has the sufficient resource in terms of time or expertise to establish a club good available for the wider community.

Notwithstanding the failure of the Argonautics Technology Transfer Centre, there were proposals mooted at the end of my period of research that Argonautics would establish a Marine Centre of Excellence. The plan was underdeveloped at the time but involved the creation of a physical centre designed to be a focal point of the marine industry in the North East and related to the idea, mentioned in section 8.1.2, that Argonautics should encompass a much wider range of marine firms in the region. The centre was to provide an interface with local universities and significant industry players, it was to offer reception services handling and distributing incoming commercial enquiries and it was to provide a training suite and to operate outreach activities with local schools. However, even Argonautics member companies

questioned the goals of the centre and Argonautics' role in it, recognising that substantial resource would be required to establish such a centre. It was felt that, in any case, with a restructuring exercise having taken place at the parent company of one of the significant Argonautics' firms and the demise of the RSC in its previous form, the proposal was unlikely to proceed. I would argue once again that, while the Argonautics cluster had strong ideas and a good understanding of the initiatives that would be valuable in their industry, they did not have sufficient scale of resource to introduce and manage those initiatives.

The members of Argonautics did, however, benefit from club goods that were available within the cluster. In this respect the appointment of a Business Development Manager was particularly significant. It is a well-known problem that SMEs do not have time to market their services and this was reiterated in interviews with the Argonautics' member firms:

> We don't have time, time to market (Argonautics member 3)

> One of our big problems is that we can't afford to have anybody dedicated to marketing. You know we thought of things like the Offshore and Renewable Energy conferences, various other things are of interest to us. We don't want to go to them all, we can't afford to go to them all, but somebody going and giving us a bit of feedback potentially would be quite useful (Argonautics member 7).

A Business Development Manager was appointed in November 2000 to market the services of Argonautics. His role, working three days a week, was heavily subsidised by the RSC, who contributed £10,000, and his role was to market Argonautics in its totality and then, having generated an interest in the services of the whole, he would aim to generate business for the individual firms. He talked through an example with me that arose after Argonautics had funded him to go on a trade mission to China:

> I've received an enquiry from China today from Shanghai and they're looking for some help out there training people so again by contacting Allan [MacDougall]. Dave Hewitt at ATA, and I'll also be contacting Brian Durose

> at AIMMS and I've spoken to Contract Design, we're looking at possibilities to fulfil that enquiry.

On the whole the appointment of the Business Development Manager was seen as a watershed and a success:

> They only really got the marketing going since we got the grant for the Business Development Manager and he started (Argonautics member 4)

> Steve Knaggs [the business development manager] who was on the last China trip was in effect selling Argonautics and he was extremely good at that as a matter of fact, because he skilfully placed Armstrong Technology or whoever it was in the right sort of context and customers didn't seem to get too hung up on [the structure of the cluster], they got it straight away (Argonautics member 1).

However, and in a further illustration of the fragile nature of the relationships within Argonautics another member told me:

> Because of the diverse nature of Argonautics [the business development manager] has tended to focus in one or two areas, which is fine, but those companies whose areas he has not been able to concentrate on feel perhaps a little bit neglected which has led to some friction (Argonautics member 2).

Interaction with other cluster organisations was also a club good that the members of Argonautics were able to benefit from. As mentioned in section 6.2 there are a large number of cluster organisations that firms in the marine and offshore cluster in the North East of England could be involved with, but such involvement, if it is to bear fruits, requires time and money to be expended. Argonautics had group membership of Northern Defence Industries, saving money for the Argonautics members and also time in that the business development manager attended NDI meetings on their behalf. There was a similar situation with Northern Offshore Federation

> You'll find that [Firm Z] are involved with the Federation and we feel that we don't need to be a member because one of our main members is a member (Argonautics member 3).

In this way membership of the cluster provided the member companies with links into other organisations that they might not otherwise have had.

Therefore while the micro cluster did not operate at a sufficient scale to provide club goods available for a wider community, members of Argonautics did benefit from club goods particularly following the appointment of a Business Development Manager. However, there were still tensions in the group and the role of Business Development Manager was heavily subsidised by the RSC.

I argued in Chapter 7 that activities within micro clusters could facilitate the development of relational assets at this very local level. Through cooperation between the parties in the groups untraded interdependencies could emerge, including open and honest communication, which in turn would facilitate trading relations within the cluster, facilitate the transfer of knowledge leading to innovation and lead to a mentoring network.

I also pointed out that relational assets are, by their very nature, intangible and cannot be quantified, but as with many of the other micro clusters facilitated by the RSC, many of the member firms of Argonautics reported benefits from the relations that existed. Some of the benefits were related to a reduction in feelings of isolation and the presence of a self-help peer group:

> In the beginning it just gave, it gave a little bit of confidence in the earlier days, that we were part of a, perhaps even before it was called Argonautics, but a cluster anyway (Argonautics member 1)

> AIMMS aren't on their own [...] being part of Argonautics (Argonautics member 4)

It's enjoyable for a start, forget the rest of it, it's good to talk to your colleagues, and they become your colleagues, especially in the small companies it's a pretty remote life (Argonautics member 3)

You get a fair amount of support between each other when you have the meetings and if you're on a high, or one of the members is on a high to a degree you share that high and if somebody's having a bad spell you help them keep their spirits up a bit – if these other people are getting things the work is around and all is not lost sort of thing (Argonautics member 4).

While these benefits may appear intangible, members did attribute some of their success directly to the existence of the cluster:

One of the things which we gained was probably confidence and I mentioned earlier about having these other companies, small organisations, who had been along this path before and when we had problems we could talk to them and get confidence in our own abilities to solve those problems. So I think there would have been more of a hesitancy in growing [company Z] and the confidence to take on large projects, so I think it's those intangible things that are probably the biggest benefit (Argonautics member 2)

Amongst other things the presentation of Argonautics and marketing material was so good it meant we had to look the part, definitely no milk bottles on the table (or feet), no overalls and that sort of thing. The marketing stuff was so lovely that if you went to meetings you had to look like there were 20,000 of us back at the Cleveland Tower in Wallsend, so we were forced to be professional (Argonautics member 1).

The relationships that were formed did also appear to facilitate joint working and trading relationships between the parties because there was a pre-existing level of trust and knowledge between the parties:

We [...] were working in the oil and gas sector on some fairly major projects where we need additional resource and we got that through one of the cluster

members. And we felt comfortable with that because there was a degree of trust had built up – the fact that we were working alongside these companies and understanding their strengths and weaknesses gave us sufficient confidence to work with them (Argonautics member 2)

It's much easier to ring up somebody if you've met them and so on (Argonautics member 7)

> We've got one lead from [company Z] for a job in India which came about from us being members of Argonautics and their guy alone couldn't handle it anyway, so they needed to get into bed with somebody and their preference, knowing us, was for us and we'd like to work with them anyway (Argonautics member 4).

Argonautics had always operated on a very formal footing with chaired meetings, sub-committees and documentation for all eventualities and it was not until 1998 that it was decided that there should be an open forum for discussion of opportunities where no minutes would be taken. These 'networking meetings' offered a valuable meeting place for information to be exchanged and their benefits were recognised by members:

> With the networking meetings you do at times get some good information, good leads from them, it gives people a chance to get together and share the information or leads that they have, that they might not otherwise have time to do (Argonautics member 5)

> You have the opportunity to talk about [...] what's going on and some of the smaller companies can benefit if the bigger companies are making enquiries and there is work available (Argonautics member 6).

However, the format appeared little different from the formal board meetings and not all members were convinced of their use and benefit:

> Interesting but limited use from our point of view (Argonautics member 7)

> They weren't terribly successful to be honest about it, because there was very little difference between a board meeting and a networking meeting. We sat in the same room, we sat round the table and we looked at each other and somebody said 'well I've bid this particular job' and it went round the table and in 3 or 4 minutes the conversation dried up (Argonautics member 2).

It was much later, following a meeting with the much less formal Pegasus pipeline cluster, that meetings started to be on occasion held in a local pub:

> It has actually been better since we started having the informal meetings where we go after work and go down the pub and people are a little bit more amenable to that and it doesn't take away from your normal working day, you've finished and you're off down the pub at six o'clock, spend an hour an hour and a half in the pub and don't worry about that too much (Argonautics member 5).

> It's an atmosphere where you can sit and talk as a group or you can break up and individual conversations take place and in my view it's been a tremendous success in that people have opened up much more about not just formal opportunities but about some of the issues they see - what's happening in the industry, what's happening on the river (Argonautics member 2).

The network meetings were seen as 'a key part of the life and soul of the cluster' according to one member. They appeared to be the most appropriate atmosphere in which open and informal conversations could take place, and these conversations not only gave firms access to business opportunities but also strengthened relationships between firms.

The relationships that were fostered were directly useful to the firms because there was some evidence that they gave access to the resources of other firms, although it is notable that the examples revealed were between co-located firms:

[Company Z] have the basic package, now we're not using their package but somebody is going to come up and give us a bit of help to get started which is often useful (Argonautics member 7)

[Company Z] are very good to us in many respects in many respects – they'll print me a plan, they have all the services (Argonautics member 3).

It should also be noted that not all the members and former members reported such a positive experience. One former member found that the meetings did not generate work and were too time-consuming to attend. He considered the meetings to be 'just a talking shop' and considered that overall his firm had gained little work from the cluster and had therefore resigned its membership.

Therefore, while not all of those involved benefited from the development of relational assets through the cluster, most of the firms were able to identify intangible benefits from being part of the cluster. It is hard to disentangle the influence of the cluster from the impact of existing relationships and the effect of co-location, and it appeared that the benefits of the cluster were most apparent to firms who had existing relationships within the cluster and were co-located. What is also interesting is that the cluster members were aware that although these relational assets did exist, their true value lay in generating business between the companies:

> Where you've got to worry I think is when all we're doing is just networking and really acting as individual companies without working together on projects (Argonautics member 2).

Cooke (2003) argues that interdependencies and the use of social capital between firms tend to be pecuniary – if businesses go to a trusted 'competitor' to help when they have a capacity problem, they expect to share the commission. Argonautics demonstrates this aspect to an extent. There was a system of commissions for introducing business between the firms and joint work was undertaken on a commercial basis. However, there were examples of truly *untraded* interdependencies of a 'gift' kind where the provider of a service obtained no

pecuniary benefit for doing so as in the case of the printing of plans and assistance with software mentioned above.

In concluding the discussion on the benefits of clustering activities to Argonautics it can be said that at least some of the members of the cluster were still intending to operate, as the RSC had originally intended, as a group of similar companies developing a cooperative grouping able to access larger contracts (North Tyneside Real Service Centre, 1996) and some benefits of borrowed size had been obtained. The attempts to provide club goods were problematic in so far as the provision of club goods for the wider marine community had been concerned, but the provision of club goods accessible to cluster members only had been more successful, albeit heavily subsidised. The development of relational assets was a long and complicated process but most members, particularly amongst the smaller or younger firms, did appear to value the relationships that existed within the cluster and be able to achieve business benefits from them either in the form of joint work or less directly in the form of accessing resources and information. I now want to look at the benefits to Argonautics of the other elements of the RSC's service – the provision of research and information and the attempt to improve the synergy between the private sector and publicly funded business support.

Research and information

It was noted in section 7.2.1 that one of the original priorities for the RSC was to provide a research and information service for the clusters it facilitated. This element of the RSC's service was at its height in the early years of Argonautics and was valued by members:

I would ask them a question on marine statistics, marine market information in Europe and they did come up with some very good stuff, so for me that was of primary usefulness (Argonautics member 1)

The RSC opened up the smaller companies' minds to the fact that there was funding, there was government help, there was help with exports (Argonautics member 6).

However, this role changed both as the RSC's support of Argonautics became less resource intensive and also as technology made information more freely and cheaply accessible to the firms:

> With the Internet in the intervening years it is much better, so it's a bit easier now, but then it was a bit tedious (Argonautics member 1).

The lack of focus on this area also reflects a change in development of the RSC from that which was originally intended. As discussed in section 7.2.2 the initial intention for the RSC had been sectorally specific support for the marine design, pipeline technology and electronics sectors. RSC representative 1 advised that it had been envisaged that the Argonautics grouping would grow to encompass the majority of the marine firms in the region. Research undertaken by British Maritime Technologies in 1998 identified 50 marine businesses across the region and it was anticipated that Argonautics could work with a large number of these businesses and that the RSC would provide real services of the kind provided by Ceramico in Italy (cf. Pellow, 2005) to around 60 or 70 marine firms enabling specialist knowledge to be developed in the RSC. Because Argonautics did not develop in this way the specialist knowledge required to provide such detailed research services did not develop either.

Synergy between public and private sector

At the outset the RSC had a large role in Argonautics and was indeed the instigator of the cluster in its formalised form. In addition to the research services mentioned above they provided a large amount of administrative support:

> They also acted as secretariat for the cluster and organised, when we did organise any outing, or one or two exhibitions they helped to organise. So for me their main function was the secretariat and information. They were very helpful, very positive, no complaints (Argonautics member 1).

The RSC role was also one of facilitation and signposting to other opportunities and contacts and one member, in a comment that highlights some of the changes that were perceived to occur subsequently, stated:

> I think they were really useful to be honest because they had a bit more time, at the time they didn't have a lot of clusters to look after and they were able to come to all of the management meetings and all the board meetings and they certainly kept the group in touch with what was going on a bit more widely (Argonautics member 6).

The RSC did continue to provide this observational and motivational role:

> They encourage us, they attend all the networking meetings and come to some of the board meetings as well. They're invited; they don't *need* to come any more. They encourage, they point out possibilities (Argonautics member 3).

> I think they're quite useful at keeping us in some ways on the right track. That role diminishes as time goes by because the cluster becomes more mature and knows what its objectives are and how it's going to achieve those. I think there have been times in the past couple of years when we've been having mini crises over one aspect of business life or another and the RSC, sitting there as a dispassionate observer almost, has been able to input some useful thoughts to help us on our way (Argonautics member 2)

However, certain members felt there had been a deterioration in the relationship following staff changes and expansion at the RSC:

> The excellent service we had in the earlier years is not there because they became more expansionist, but maybe it's right I don't know, I don't know (Argonautics member 3).

Others believed that the role should in any case change over time as the micro cluster developed:

> I think their role is in pump priming and funding when the cluster is very young, steering and guiding it, but at some point the cluster has got to be launched out into the world to get on with its own life (Argonautics member 2)

While many of the members expressed the wish to be financially self sufficient from the RSC, the fact that the RSC was able to provide funding to Argonautics was clearly key:

> We're hoping to be self sufficient as far as the Development Manager [is concerned], apportioning the cost between the companies within the next three years maybe four years. In the meantime [the RSC] are pump priming (Argonautics member 3)

> We've always looked on the RSC as being an extremely friendly organisation that did have some funding that enabled Argonautics to keep trickling along and pay for some of the administrative, business development type costs (Argonautics member 2)

What became apparent was that the role of the RSC was valued most by those who had been involved with Argonautics from the outset. Newer members appeared to value the RSC more solely for the grant funding received:

> Well I think without the grants Argonautics gets it wouldn't function. I don't think the Regional Service for Clustering actually puts much into Argonautics other than the financial inputs and I'm not saying that that is necessarily a bad thing. The people in Argonautics are generally coming from that business specifically and I don't think that the RSC can really provide that in-depth and the day to -day contact (Argonautics member 7).

This again may have reflected a change in the role of the RSC to all clusters or may have reflected that as the cluster developed it needed less external support.

8.1.5 Evaluation and Learning

The RSC encouraged all the clusters with which it worked to regularly evaluate the performance of the cluster and to learn from experiences.

As a condition of receiving funding Argonautics had to keep detailed records of the amount of time allocated to the cluster and the amount of joint working undertaken. At times members found this aspect onerous:

> From the start the overhead was too high, which isn't helped by the fact that if you're an RSC cluster, you've got money from them, but the returns and the like that they want, my reckoning is that you've got to add 25% of the time that you would put in on the job, 25% of the time to cover the admin costs, or the admin time (Argonautics member 3).

And this aspect of the evaluation of the cluster was very much of an accounting nature to ensure that public money was being well spent. The RSC also conducted more qualitative reviews with the individual members of the cluster. However, as these were confidential, the information could not be given directly to the cluster.

As a business operation, Argonautics regularly reviewed its financial position and the markets in which it operated. Business plans were produced on an almost annual basis, often to meet the requirements of applications for funding from the RSC, and the RSC provided input and comment on these plans. The marketing strategy was regularly updated, particularly as new members joined. The cluster learnt, as any business should do, from this kind of review. Budgets were changed, subscriptions were amended and new functions, such as the Business Development Manager role, were added to the cluster.

As a legal entity Argonautics also reviewed its legal standing and over time the constitution was revised to meet the cluster's requirements. In February 2002 a new Memorandum of Understanding was adopted but prior to that the constitution was often informally put to one side:

> We've said notwithstanding [the constitution] there is a much simpler way we'd like to do it and we agree and there's a board minute produced (Argonautics member 2).

As well as attending Argonautics meeting to provide input into the discussions and to act as a sounding board, the RSC initiated a meeting between the Pegasus and Argonautics clusters so that the two clusters could learn from each other's experiences. As a result Argonautics did introduce the informal meetings in the pub, but overall the operation of Argonautics remained very formal. This formality was partly required because of the nature of the work some members wanted the cluster to undertake:

> I do believe it needs to be on a fairly formal footing. I don't think a loose grouping or an informal structure would work for this, especially as I would like to see Argonautics become a contracting organisation in its own right. It couldn't do that if it was just a loose collection of companies who were cooperating together (Argonautics member 5).

However, the formality appeared to be an outward sign that relationships between the members were still not entirely open and trust based. The formality also added to the cost of the operation of the cluster with basic administrative activities still estimated at £20,000 for 2000.

It was also not clear that Argonautics, even after ten years of operation, had been able to resolve a lack of consensus as to the purpose of the cluster. Even in 2005 one member told me:

> There are different schools of thought – some people think Argonautics should only ever be a marketing organisation and never take on any contracts. There are others, who maybe regard themselves as more progressive, saying the true role for Argonautics is to start winning work as a cluster – start taking on contracts – but that gap hasn't been bridged and is still perhaps one of the tensions that remains within Argonautics (Argonautics member 2)

Therefore a lack of consensus and, at times, strained relationships still existed and impacted on the operation of the cluster.

8.2 Conclusions

Argonautics was initiated by, and in many ways led to the initiation of, the RSC in that both organisations emerged at a similar time. Through the experiences of Argonautics the RSC learnt how difficult it was to bring together a group of companies to work together for mutually beneficial purposes.

The case of Argonautics demonstrates the significance of building relational assets and shows the value of those assets to the firms involved. However, it is difficult to disentangle the way in which those relational assets arose, and they may not have always been a direct result of the micro cluster. The existence of the micro cluster did appear to offer substantial support to embryonic firms when it, and they, were first established. However, the ongoing development of these relations appeared to result partly from the geographical proximity of a number of the firms, but more particularly from the nature of some of the key individuals within the cluster who appeared to be particularly adept at fostering relationships with other firms and organisations.

The case of Argonautics demonstrates the difficulties in providing 'club goods'. While the cluster appeared to provide a fertile environment for the generation of ideas of club goods that would be of benefit to the wider marine community, including the attempt to establish the Argonautics Technology Transfer Centre and the embryonic proposal for a Centre of Marine Excellence, the cluster operated at too small a scale to offer these club goods.

Argonautics, and the RSC, appeared at times to be disconnected from the policy-making and organisational framework in the region. This was recognised by certain members who saw both the difficulty and the importance of being involved with One NorthEast's cluster policy. One member talking of the One NorthEast's three-pillar strategy, discussed in more detail in 5.2.2, commented:

> It will affect Argonautics as a cluster of companies and if Argonautics has got some people in oil and gas but some people in other parts of the marine sector how will they be regarded – will they be regarded as all being in one group or

will they be seen by this new model as being involved in two separate groups (Argonautics member 2).

Other members highlighted that they thought the RSC could have had a role in linking Argonautics to other cluster organisations in the region:

> The other one that [the RSC] ought to be feeding us, or to my mind they should be feeding us, much more information on than they do is the Tyneside Maritime Cluster (Argonautics member 4).

The case of Argonautics also demonstrates the complex nature of attaining 'borrowed size' from operating as a micro cluster. There was never any consensus as to Argonautics' ability to operate as a contracting organisation, but to sustain the heavy administrative cost burden that the cluster operated under, the cluster had to obtain additional work for the member firms. Given the inability of the RSC to provide ongoing funding, the future of Argonautics is in doubt although, even in this respect, there is a lack of consensus:

> Without any funding the Argonautics cluster will rapidly collapse [...] I don't think people will want to stretch that any further for the potential returns that are there at the moment (Argonautics member 5).

> The demise [of the RSC] will have an impact on Argonautics – again it's not fatal (Argonautics member 2).

It is ironic that the RSC had attempted to provide real services, but had ended up providing money. More than ten years after the formation of the RSC's first cluster, the future of that first cluster is in doubt without ongoing financial support and, in a further irony, the future of the Swan Hunter shipyard is again in doubt, just as it was when the RSC was first initiated.

Argonautics has brought benefits to its members, but it has been funded to a large extent with public support. It has demonstrated that firms can benefit from club goods, borrowed size and the generation of relational assets, but it has also

demonstrated that this is a process that can absorb substantial financial resources. is difficult, time-consuming, operates over a long time scale and, as these two concluding quotes illustrate, it requires a lot of input from those involved to gain benefits that are largely intangible:

> It's difficult really, people are interested in making a success of their own business and if Argonautics isn't going to help with that in real terms then they are only going to be putting into it and not getting anything back from it. So it really depends how long you mind being in that position (Argonautics member 6).

> A lot of people are in clustering only for what they can get out of it. You've got to put in something. It's not a matter of being altruistic; it's a matter of being selfish. The more everyone puts into it, the more everyone will get out of it (Argonautics member 3).

9 Discussion and Analysis

In this penultimate chapter I want to compare the two cases of cluster policy development in order to consider firstly, what they tell us about the conceptualisation of cluster policy and the way in which cluster policy has taken into account theories around clusters, and secondly, to highlight practical recommendations arising from this research. When analysing the different ways in which these two cluster policies developed it is important to note that cluster policies have often developed in a way that has been isolated from the ongoing academic debate, and it is useful to recall Benneworth's (2003) caution that '[i]t is important not to over intellectualise the cluster approach [to policy] into a coherent philosophy, because the ideas have been driven by policy-makers and consultants, giving a very pragmatic feel to much of the work' (ibid., p.314). However, although the two policy approaches were not particularly developed in accordance with any given theoretical approach, the two cases were still inspired by cluster theories, do demonstrate a relevance of understanding concepts around clusters, and can add to the conceptualisation of cluster policy.

Chapters 5 and 7 have sought to answer the question of **how has the cluster policy that impacts upon the North East of England been developed?** Chapters 6 and 8 have sought to answer the question of **how has cluster policy impacted on the marine and offshore engineering cluster in the North East of England?** I now want to reflect on this empirical work in the light of the literature reviewed in chapters 2 and 3. In the first half of the chapter I want to consider the different implications of the two approaches throughout the cluster policy-making process. In the second half of the chapter I want to analyse how the specificity of the marine and offshore engineering cluster may have influenced the impact of the policy on the cluster and draw out some conceptual implications.

9.1 The Cluster Policy-making Process

9.1.1 The Decision to Take a Cluster Approach

In both cases the context in which the policies were fashioned had a considerable impact on the way in which they have developed. Both policies were linked to an academic concept of clusters in the first instance – the Industrial Districts model of real services in the case of the RSC and a more vague Porterian notion in the case of One NorthEast, although it has been noted that the process in the United Kingdom, whereby the DTI have 'delegated' the delivery of cluster policies to Regional Development Agencies, 'separates the formulation of policy tools from the intellectual process that had identified a cluster strategy as important for UK competitiveness' (AIM Management Research Forum and WERU, 2005, p.25).

However, both policies came to be largely shaped by factors other than the academic concept of clusters. They were shaped firstly by previous policies, particularly in the case of One NorthEast where the cluster development programme initially emerged from a programme to develop a supply chain of endogenous businesses to embed inward investment. A history of promoting sector support organisations was also highly influential. Secondly, policies were shaped by the specific context in which they were designed, particularly in the case of the RSC where attempts to mitigate the impact of large scale plant closures were the precursor of the cluster policy initiative. Thirdly, funding considerations and numerical targets were influential in the ongoing development of the cluster policies. One NorthEast's regional economic strategies were written in the light of European Structural Fund requirements, and the funding for the cluster development programme was limited due to the concentration of resource on the Strategy for Success programme of Centres of Excellence. The RSC was at all times dependent on external funding and therefore subject to the requirements and targets of the European Structural Funds and other external funding bodies, including One NorthEast. The RSC was beset by the short term nature of its funding and this is particularly significant given the wide acceptance of the long time scale required to implement cluster policies and the recommendations that a long term approach should be adopted (Rosenfeld, 1996b; Lagendijk and Charles, 1999; Lagendijk, 2000). Fourthly, policies were influenced by policy from higher governance levels – the RSC were influenced by One NorthEast, who in turn were

influenced by the DTI, and as mentioned above both the RSC and One NorthEast were influenced by the European Union, particularly due to guidance for the awarding of Structural Funds. Although policies were influenced by higher governance levels. this is not to say that there was coordination between levels, as will be explored further below.

Section 3.5.3 highlighted various rationales for pursuing a cluster based approach ranging from the impact of government regulation on particular clusters to a lack of self awareness in clusters (Boekholt and Thuriaux, 2000). The RSC's rationale for intervention was well understood within the organisation and restricted to one particular aspect – that collaborative working amongst SMEs would increase the competitiveness of the firms involved, which would be beneficial to the local economy, but that such collaboration was likely to be limited without some public intervention due to a lack of trust, the cost of building relationships and a lack of awareness of the opportunity to work together. One NorthEast's overriding aim was to effect a structural change in the region's economy to bring the performance of the North East up to the average of the English regions in terms of Gross Value Added (GVA) per capita, and clusters *per se* were seen as a 'good thing'. However, the specific rationale for One NorthEast's cluster policy is hard to determine. In One NorthEast's second Regional Economic Strategy (RES2), *Realising Our Potential*, the rationales were clear and varied in accordance with the type of cluster. For the few 'truly globally competitive industries' the rationale for intervention was to remove barriers to growth and provide suitable framework conditions. For embryonic clusters, emerging largely from university research the rationale was to reduce risk, which would otherwise lead to under investment, and for the remaining, particularly SME, population intervention to encourage 'clustering' was recognised as beneficial. However, this clarity was not common and on the whole the rationales for One NorthEast's intervention were unclear and this impacted on the ability of the agency to understand its role and possible policy interventions.

The goals of the RSC had to be couched in terms of job creation because of the focus of ERDF funding, although, particularly at the outset, there was also a concern to retain technical expertise to act as the basis for further innovation and entrepreneurship. In the case of One NorthEast the goals changed between Regional

Economic Strategies, mirroring changes in emphasis at the DTI, from the 'knowledge economy' (RES1), to 'productivity' (RES2) to 'sustainability' (RES3). This illustrates again how the policies were influenced by context rather than concept, and indicates the inconsistency that was to be one of the key problems in obtaining the involvement of actors in the policy-making process.

The different influences on One Northeast's and the RSC's decision to take a cluster approach are summarised in Table 9.1 below. Overall, we might conclude that the policy context in which the policies were designed was more significant for the development of the policy initiatives than any academic concept, and we can concur with the suggestion of Fromhold-Eisebith and Eisebith (2005) that 'the influence of the cluster concept on the design and delivery of regional economic promotion policies is minor compared to that of general institutional and strategic environments and pre-existing policy trajectories' (ibid. p.1255). Porter and the Italian Industrial Districts variously served as inspiration for the policies but their development was highly context dependent. This conclusion gives rise to concern, because the literature emphasises the need for a long term perspective in developing cluster approaches, while the short term funding regime for the RSC and the instability in approach of One NorthEast gravitated towards 'short-termism', which may well have impacted on the relatively disappointing outcomes of the approaches.

Table 9-1 Aspects of the Decision to Take a Cluster Approach

Area	One NorthEast	RSC
Conceptual Background	Porterian influenced by the DTI	Industrial districts (Brusco, Becattini, Pyke), particularly the notion of providing real services
Policy background	Inward investment promotion. Supply chain development. Support for sector working groups and sector association	Novel approach to mitigate the impact of large scale closures
External Considerations	DTI, EU Structural funds	Availability of EU structural funds. Need to fit into larger sub-regional and regional framework
Rationale for intervention	Various and unclear. Removing barriers to growth and providing framework conditions; gap filling; commercialisation of R&D	Limited and narrow. Increasing collaboration amongst SMEs which would not otherwise occur due to barriers including lack of trust, knowledge and time
Goals of intervention	Variously 'building the knowledge economy', productivity, sustainability	Formation of micro clusters through which there would be an increase in firm competitiveness leading to job creation. Improvement in business support
Financial framework	Financially relatively autonomous. Initially specific additional funding from Objective 2 Structural Funds for cluster development. With move to single pot funding cluster policies funded from core budget. Budget for Strategy for Success substantial, but remaining cluster development programme low budget in comparison to other RDAs.	Generously funded but financially lacking in autonomy and subject to short term funding. Short term funding from a variety of sources including ERDF, ONE, local authorities
Timescale of approach	Desire for quick results led to instability in approach with implications for participant mobilisation	Recognition of time taken to develop micro clusters but approach hampered by targets and short term funding

9.1.2 Identification, Selection and Analysis

Identification and selection

There is much discussion on the methodologies that can be applied to identify clusters. These are not entirely objective, value-free processes and Feser and Luger (2003) make it clear that the aims of the policy-maker influence the choice of methodology.

In the case of the RSC, the groups of firms that came together were largely self-selecting and there was a bottom up approach to identifying clusters. The groups came together for self-interest, often motivated initially by the availability of grant funding. The groups they formed tended to be formalised, small and closed; although on occasions larger organisations emerged with open membership, as in the case of the Environmental Industries Federation. The small, closed nature of these micro clusters was not necessarily what had been intended by the RSC at the outset, and firstly, it limited the wider impact of the initiative, where I would concur with the findings of Lagendijk (1999), who studied the same organisation at an earlier stage of its development and concluded that such groups do not lead to the modernisation of wider clusters, which is only achieved through larger scale cluster associations. Secondly, the formal and closed nature of the groupings did not allow for dissent and, where disagreements within the micro clusters arose, this usually resulted in the departure of one or more members, whereas the role of 'no-sayers' could have encouraged the exploration of different and potentially more challenging options for the group. The formal nature of the micro clusters could therefore be seen as ensuring sustainability (Huggins, 2000), but it could also prevent the emergence of radical ideas and the expansion of the micro cluster to a scale that could have had a more significant impact.

There was little screening of the groups that came forward for assistance and although, at the outset, the RSC had intended to act in a strategic manner, the approach became one of assisting any groups that came forward for assistance. Not maintaining a focus on specific regional clusters caused problems for the RSC because it meant that they found it difficult to operate within the cluster framework of One NorthEast, although they did retrospectively try to show a fit between the micro

clusters they worked with and the clusters selected for development by One NorthEast. By operating predominantly reactively it was difficult to achieve the strategic focus that had been intended, but a compensatory factor was that the RSC process provided a way for embryonic clusters to emerge and be recognised. Also, in an area such as the North East of England, renowned for lacking entrepreneurial spirit and taken to be imbued with an employee culture, the demonstration effect and ability to publicise success stories was beneficial.

The adoption of a bottom up approach to micro cluster development was appropriate for the RSC because they were looking to identify any groups of SMEs that could beneficially work together. However, the approach tended to non-strategic, although it offered a mechanism through which embryonic clusters might be recognised.

In the case of One NorthEast the identification and selection of clusters was problematic, and it appears that this was partly as a result of a lack of understanding within the organisation as to the nature of clusters, and partly due to the lack of obvious candidate clusters in the region. As mentioned above, One NorthEast's overriding aim was to effect a structural change in the region's economy in order to bring the performance of the North East up to the average of the English regions in terms of Gross Value Added (GVA) per capita and the cluster development programme was seen as contributing to that aim. Feser and Luger (2003) call for transparency in terms of the methodology used to identify clusters, but not only was there no transparency in this respect, there was also a continuous change in the clusters identified.

One NorthEast took a 'top down' approach to selecting clusters in that it took the region as a whole and sought to identify clusters therein. Waits (2000) argues that powerful interest groups exert influence on policy-makers' selection of clusters for support, but although One NorthEast was considered to have been influenced by such groups, it was also in a powerful position to select clusters for support. There was no consistency in approach and the clusters selected for support changed numerous times. The way in which clusters were selected was never made transparent, although it was research by Arthur D Little Consultants (2001) that identified the areas covered by the Strategy for Success. There was also no obvious mechanism by which

emerging clusters could be recognised within One NorthEast's cluster development programme.

The lack of clusters is an acknowledged problem for peripheral regions attempting to undertake a cluster development programme in that they may lack clusters with a 'critical mass' and the requisite number of actors and level of complexity (AIM Management Research Forum and WERU, 2005). This issue is related to the quandary of boundaries discussed in section 2.2.2. There is a tendency in policy terms to try to identify clusters within a predetermined territory rather than starting from a key firm or core of firms and tracing linkages outwards, irrespective of administrative boundaries. Given the lack of obvious candidate clusters, One NorthEast was faced with an immediate problem. One NorthEast's designated energy cluster, of which the marine and offshore industries came to be seen as a part, was seen as too disparate to function as a recipient of policy measures. This echoes Bathelt et al.'s (2004) assertion that there is both a threshold and a ceiling for inter-firm knowledge creation – firms must be sufficiently different for interaction to be worthwhile, but not so different that interfirm learning ceases. The energy cluster therefore lacked the requisite clear focus and common identity (European Commission, 1999a) because it covered too great a range of sectors and industries to be coherent.

The adoption of a top down approach was appropriate for One NorthEast as they were taking a strategic approach to cluster development within the region. However, it might be concluded that a more open method of identifying and selecting clusters and a more nuanced understanding of the nature of linkages within the clusters could have assisted One NorthEast in operationalising its cluster policy. It could also be suggested that they were hampered by the structure of cluster policy-making in the United Kingdom, which tended towards bounding clusters by regional administrative borders (cf. section 9.2.).

Analysis

Cluster analysis is seen to serve two purposes in the literature. It is used to obtain a detailed understanding of the cluster in order that tailored policy measures can be designed (Brown, 2000a), and it can be used as the starting point for discussions with

cluster actors and stakeholders on potential policy interventions (Roelandt et al., 1999). Because the RSC only acted in a sectorally specific manner for a short time, its analysis tended to be restricted to an analysis of the needs of the firms involved in the individual micro clusters, which did then determine the activities undertaken by the micro cluster. The RSC felt that a coherent information framework for detailed analysis and monitoring of key sectors should be provided at a regional level. One NorthEast attempted a much more detailed analysis by commissioning the series of mapping studies. However, as noted in section 5.2.2, these were of varying standards, were not all made publicly available and were only occasionally used as a starting point for discussions with cluster actors.

Therefore in both cases analysis was limited and this was particularly problematic for One NorthEast who were trying to develop clusters covering actors and organisations across the region, rather than the RSC's micro clusters, which were very small scale. The body of literature I have taken to be of use in understanding clusters highlights both the complexity and multi-faceted nature of the processes occurring within clusters and the context dependent nature of these processes, and suggests that they can only be uncovered by detailed analysis using the different 'lenses' suggested by the cluster literature. Indeed research has suggested, not only the need to study clusters through different lenses, but also the need to take into account further nuances including different types of local 'buzz' (Bathelt et al., 2004) and different innovation styles (Spielkamp and Vopel, 1999). It could be concluded that flaws in the analysis of clusters left One NorthEast without the detailed understanding of individual clusters required to tailor policy instruments to the requirements of each cluster, and less able to obtain the participation of cluster actors.

The contrasting methods of identification, selection and analysis employed by One NorthEast and the RSC are tabulated below in Table 9-2.

Table 9-2 Aspects of the Identification, Selection and Analysis of Clusters

Area	One NorthEast	RSC
Selection of clusters	Top down approach. Attempt to be very inclusive at outset. Selection changeable and methodology not specified. Partly from Arthur D. Little research on university research strengths, partly result of politicised process.	Bottom up approach. Mainly reactive, non-strategic, but micro clusters screened by RSC for suitability for support.
Size of cluster and nature of actors	Variable according to cluster. Aiming to cover all key actors in each cluster including - firms, organisations and academia	Usually 3-10 firms
Geographical coverage	Regional	Local to regional. Partially determined by funding regime
Breadth of sectoral coverage	Wide, on occasion leading to fragmentation and incoherence	Narrow, non-specific
Analysis	Letting of small research contracts to analyse selected clusters. Variability of methodology and the extent to which they were participative or used as a springboard for action.	Initially detailed analysis of clusters and environment they operated within, but this level of research reduced as nature of the organisation changed.

9.1.3 Participant Mobilisation, Cluster Animation and Relation Building

Because a cluster policy approach suggests a move to a demand driven policy design with participation from actors within the cluster, it has been noted in section 3.5.5 that adopting a cluster approach requires a different role from policy-makers – that of 'animateur' (Morgan, 1997b) or catalyst (European Commission, 2003). This appeared to be a difficult role for One NorthEast to adopt and my research concurs with Cooke's (2002) assertion that regional administrative bodies take time to acquire the competencies to perform this role. The RSC were much clearer as to their role, which was consistently considered to be that of facilitator, but as targets for the organisation increased there was pressure to spend less time with each group and this appeared to be detrimental.

In a demonstration of the interlinked nature of the stages of the cluster development process, I would argue that One NorthEast had particular difficulty in building consensus amongst cluster actors and securing their participation because of the

continuous change in the clusters selected for support. There was also an acknowledged bias towards strategy and planning within the agency and there appeared to be difficulty in switching from analysis to action (Gilsing, 2001). This also led to disillusionment at the lack of progress amongst those who had been prepared to participate.

Partly because of the inconsistency in identifying and selecting clusters One NorthEast did not appear to be in a position to generate the 'talk' and 'confidence' (Storper, 2002) that could have led to action, and this finding concurs with the conclusions of AIM Management Research Forum and WERU (2005) that '[i]f the language and emphasis of DTI and other agencies continues to shift (and shift differentially) over time and space, there is unlikely to be widespread 'buy in' to the cluster agenda' (ibid. p.27). In so far as the offshore cluster was concerned, One NorthEast, while expressing a desire, particularly at the outset, to be inclusive, did not appear to appreciate the steps required to obtain consensus as to a vision and way forward for the cluster.

The RSC was dealing with much smaller groups of firms who, in coming forward to the RSC, had already demonstrated their willingness to participate. However, in a demonstration of the difficulty of obtaining consensus as to a vision within some micro clusters, it has been noted that there were, on occasion, strong disagreements as to the way forward in micro clusters. There was also a need for a leadership role within the micro cluster to drive it forward and this role was not always fulfilled.

I have concluded that the RSC recognised that this stage of building up relationships within the groups, was a critical stage in developing micro clusters. It was also acknowledged that both time and substantial resource were required to build the trustful relationships that would permit untraded interdependencies to operate within the micro clusters. However, the short term funding and target driven regime under which the RSC operated, militated against taking time to develop relationships and was not compatible with a process that took time.

Even where cluster actors participated in the policy initiatives, it might be concluded that cluster animation, or the identification of an individual, or in the terms of

Andersson et al. (2004) a 'clusterpreneur', or organisation that could drive forward the cluster and maintain unity, was problematic for both the RSC and One NorthEast. The role could potentially be performed, on a short-term basis, by individuals from One NorthEast or the RSC, where those individuals had the right attributes (Huggins, 2000). However, the micro clusters developed by the RSC often suffered from a lack of leadership. Within the marine and offshore industries I also came across examples of individuals from the private sector and other organisations, who were performing a cluster animation role, in terms of being facilitative, and performing a bridging and bonding role between other cluster actors, but it was unclear how their role fitted with the approach of One NorthEast.

The contrasting approaches to participant mobilisation, cluster animation and relation building of the two policy initiatives are tabulated below in Table 9-3.

Table 9-3 Aspects of Participant Mobilisation, Cluster Animation and Relation Building

Area	One NorthEast	RSC
Role of policy-maker	Strategic, unclear how to operationalise.	Facilitator of small groups of collaborating SMEs. Initially intensive support to build relationships within micro clusters, increasingly under pressure to achieve quick results
Participants	No formal membership. Intention to include all key actors within cluster including firms, organisations and academia. In practice difficult to obtain ongoing participation	Within micro clusters - self-selection, closed, competitors excluded. Sometimes subscription based e.g. Argonautics
Methods of Participant Mobilisation	Initial involvement of sector associations. Large scale meetings. Difficult to identify continuing process	Attempts to formalise micro clusters and to develop projects for mutual gain.
Role of Cluster Animators	Recognition of insufficient external involvement, but continued tendency to draw up strategy within the agency rather than identify animators outside the Agency	Recognition of difficulty in ensuring micro clusters became self-sufficient. On occasion animation role performed by RSC staff. Tendency to lack of leadership within micro clusters

9.1.4 Selection and Implementation of Policy Instruments

Although there is no specific cluster policy instrument, and cluster policy interventions should be tailored to the individual requirements of the clusters as established from detailed analysis, policy instruments should relate to the concepts that seek to explain the apparent benefits of operating within a cluster. I maintain that it is at this stage in the process that an understanding of the theories underlying clusters is particularly important and a lack of understanding can impact detrimentally on policy delivery and implementation.

It has been seen in section 3.2.1 that the work of Porter (1990;1998), while contributing to the popularity of the cluster approach to economic development, leaves many questions open with regard to policy and it has been suggested that his work should be used as a 'starting point', rather than as a 'manual'(Brown, 2000b). There are areas of possible intervention identified in all three areas of literature that I have discussed using Storper's 'Holy Trinity' of technologies-organisations-territories including within the technologies aspect – intervention to provide elements missing from an innovation system and measures to improve the operation of linkages within that system; within the organisations aspect – policy interventions to resolve market failures which would otherwise reduce the benefits of agglomeration and within the territories aspect – interventions to improve the interaction logic, collective learning dynamic and institutional framework

Using Boekholt and Thuriaux's (1999, 2000) 'cluster policy models' it has been seen that, whereas One NorthEast's cluster development policy comprised aspects of the *Industry-Research Link* and *Regional Development* models, the RSC's approach was very much an *Inter-firm Networking Model*. The RSC model was not a complete model of cluster development because, as has been highlighted in section 3.7, successful clusters cannot be accounted for on the basis of cooperation alone. The RSC model was particularly focused on developing relational assets between firms in the micro cluster and the provision of cluster assets at the level of the micro cluster.

It has been seen that relational assets arise in different ways in different agglomerations. Silicon Valley is seen as having a particular pattern of networking: relationships in the Italian Industrial Districts are seen as a function of culture and

history, and in the United Kingdom a particular pattern of relationships has been seen to occur in Motor Sport Valley because of career moves (Henry and Pinch, 2000). In section 3.2.2, I considered the ways in which policy-makers can purposefully develop an institutional framework of trust, social capital and untraded interdependencies. The RSC approach did take into account aspects of the literature, because the need to build relational assets in the form of social capital, trust and untraded interdependencies between firms was recognised. The approach the RSC used to develop these assets was the facilitation of these small tight knit groups through a staged development process. There was not only a recognition of the benefits of trust, but also an acknowledgement of the time taken and measured steps required to build up such trust and untraded interdependencies between parties. Even with the small numbers involved in each group this proved difficult, and the process took time both in terms of absorbing resources and operating over a long time scale.

The activities of the micro clusters were predominantly driven by the self-interest of the members, although particularly within the earlier clusters, including Pegasus and Argonautics, there was a surprising level of altruism and a desire to provide a wider benefit to the region. However, overall there was a recognition that, while the clustering promoted by the RSC could be beneficial in increasing interactions at a *local* scale and building and projecting an identity at a *small* scale, common resources available to a wider cluster could not be provided at the scale at which the RSC and associated micro clusters were operating.

The RSC acknowledged the need to vary, particularly the level of, support in accordance with the development stage of the cluster, but in practice it proved difficult for most of the clusters to become self-sufficient, possibly as the result of lack of leadership. The nature of the benefits of clustering also meant that the RSC's model appeared particularly appropriate in certain industries. This concurs with the assumption of Fromhold-Eisebith and Eisebith (2005) that different types of cluster promotion policy may be beneficial in different sectors.

It has been noted in section 5.2.4 that the Centres of Excellence arising from One NorthEast's Strategy for Success could be considered to be a cluster approach based on an *Industry-Research Link Model* and as such focused on fostering, albeit very

narrow, links with universities, the provision of venture capital and incubation facilities, and to an extent inward investment promotion and brand building. The selection and implementation of policy instruments within the remaining cluster development programme, which operated as a *Regional Development Model*, largely appeared unrelated to cluster concepts, but rather offered a generic set of business support measures to individual firms within particular sectors. This could be accounted for by a number of reasons. The difficulties in gaining participation of cluster actors could have limited the ability of the agency to devise tailored solutions. There may not have been the skills within the agency to move beyond the provision of generic measures. The relatively small budget for cluster development and the apparent lack of recognition within the agency of the cross-departmental nature of cluster policy may also have had an impact, particularly as other organisations, such as the Learning and Skills Council, with responsibility for initiatives that could have been used as a cluster development tools, did not, at least initially, take a cluster based approach.

Within the Strategy for Success, which related largely to embryonic rather than established clusters, policies were adopted that could be considered appropriate for emerging clusters. However, within the remaining cluster development programme One NorthEast did not appear to be tailoring policy instruments to the stage of the cluster life cycle. Within the 'energy cluster', One NorthEast placed an emphasis on the need for diversification, given decline in aspects of the marine and offshore industries, and it was true that in offshore construction and shipbuilding there may have been elements of functional, cognitive and political lock-in (Grabher, 1993b) for example, the expectation of future naval contracts influenced the response of the residual shipbuilding industry to the need to adapt. However, it was not clear that One NorthEast were best equipped to identify alternative markets or opportunities for diversification. As will be discussed further in section 9.3, it also appeared difficult for One NorthEast to take account of the institutional framework, particularly the formal organisations, that had evolved alongside the marine and offshore industries.

The contrasting approaches to the selection and implementation of policy instruments are tabulated below in Table 9-4.

Table 9-4 Aspects of the Selection and Implementation of Policy Instruments

Area	One NorthEast	RSC
Range of policy instruments	*Centres of Excellence* Academic-industry links (narrow) Brand building and projecting Inward investment promotion Incubation facilities and venture capital *Cluster Development Programme* Lack of coherent tailored programmes Some supply chain work Ad hoc funding of cluster activity	Inter-firm Networking Tailored facilitation of micro clusters to obtain borrowed size club goods relational assets Research and information provision
Sectoral applicability	Centres of Excellence model appropriate for research based clusters	Networking model worked well in creative and tourism industries
Tailoring to stage of cluster	Embryonic, university research related clusters supported through Centres of Excellence model. Need for diversification in face of decline recognised.	Acknowledgement that level of support would vary depending on development stage of micro cluster

9.1.5 Evaluation and Policy Learning

In section 3.5.7 the various issues around the evaluation of cluster policies were rehearsed, including the need to identify an appropriate level of analysis, the inability to isolate the impact of policy intervention and the difficulties in measuring the intangible benefits of clusters. In many cases evaluation frameworks have not been established for cluster policies, partly because many such policies are relatively new and experimental, although there are increasing moves to develop appropriate evaluation frameworks (Learmonth et al., 2003, Pickernell et al., 2005, Cassidy et al., 2005).

In the case of One NorthEast the evaluation of the cluster development programme was undertaken as part of the wider evaluation of the Regional Economic Strategies, but there was no obvious framework for the evaluation of the progress of individual clusters.

The RSC was also required to undertake evaluation of an 'accounting' kind and, as its funding regime became ever more complicated as it battled for short term funding, the

amount of numerical returns required escalated. Evaluation of micro clusters was seen as a key part of their development and this was built into the process in an increasingly participative and qualitative manner, rather than just seeking financial information to input into the RSC's own returns. In this way the RSC intended that the micro clusters should learn from their experiences and latterly there were also attempts to enable the micro clusters to learn from each other.

The RSC was also keen to act as a learning organisation itself and not only sought external qualitative evaluation of their policy process, but also regularly conducted internal reviews. Whereas One NorthEast were seen by a range of respondents as impervious to outside influences, the RSC were open to new ideas.

Within the RSC as an organisation, at least in the early stage of its development, there appeared to be a clear understanding of their rationale for intervention and attempts were made to pass on knowledge about their *modus operandi* to new staff. The codification of the understanding of the service they provided into a formal 'Cluster Development Programme' was a further attempt to embed tacit knowledge into the organisation. However, to a large extent this process broke down during a period of high staff turnover and uncertainty over future funding.

In the case of One NorthEast it appeared that the inability to stabilise the understanding of the cluster development policy, which may have resulted from rapid turnover of staff, substantial corporate restructuring, an (unobtainable) desire for quick results and an apparent lack of understanding of the cluster concept, reduced the opportunity for organisational learning. These factors appeared to result in continuous attempts to 'reinvent the wheel' as far as cluster policy was concerned, rather than building on previous experiences.

The contrasting approaches to evaluation and policy learning are tabulated below in Table 9-5.

Table 9-5 Aspects of Evaluation and Policy Learning

Area	One NorthEast	RSC
Nature of Evaluation	Limited measurement against numerical targets. Cluster strategy as a whole evaluated as part of evaluation of Regional Economic Strategies by consultants with some reference to stakeholders.	Performance of the organisation evaluated against a range of numerical targets. External qualitative evaluation sought. Participatory evaluation of micro clusters seen as key part of process of development and built into the process. Acknowledged difficulty in evaluation impact on the wider region
Level of analysis	Evaluation based on performance of the region. No in depth evaluation of the cluster development programme as a whole. No evidence of evaluation of individual clusters.	Organisation and micro cluster
Policy Learning	Internal review. Lack of stability in understanding of cluster policy	Internal and external review. Attempts to codify the process incorporating learning from experiences

9.1.6 Conclusions on the Cluster Policy Process

Therefore it can be seen that using a cluster policy process model is a useful approach to analysing the ways in which the two cluster policy initiatives developed. It has been seen that the policies were very different at each stage of the cluster policy process and were heavily influenced by the context in which they were designed. Indeed the development of both policies was determined more by specific context than by particular academic conceptualisations of clusters and cluster policy. However, it can be seen that, in comparing the two policies, the RSC's policy measures were more in accordance with an understanding of the social and relational processes within clusters than those of One NorthEast and it is these aspects that I have highlighted as being particularly significant within clusters.

I now want to discuss two particular themes that have arisen from the consideration of the development of the two policy initiatives, and particularly from the consideration of the impact of the policies on firms, organisations and other actors within the marine and offshore engineering cluster. The first of these themes is that of scale, and within this theme I want to discuss the role of national cluster policy in the United Kingdom, coordination of cluster policies at different scales within the North East of England, the scales at which clusters exist and the role of non-cluster policy at the national scale. The second, interrelated, theme is the role of cluster organisations.

9.2 Questions of Scale

Unlike in other countries, such as the Netherlands (Gilsing, 2001), where the need for cluster thinking to be applied across government departments has been recognised. in the United Kingdom cluster policy has been viewed as a peripheral and discrete policy delegated to Regional Development Agencies. This approach has several implications that I want to consider in turn.

9.2.1 Cluster specific not cluster informed

In section 3.5 I highlighted that Feser (1998) distinguishes between cluster specific policies and cluster informed policies. In the United Kingdom the emphasis has been on cluster specific policies at a regional scale and it appears that cluster thinking has remained an adjunct to, rather than the core of mainstream policy. In other countries (for example, the Netherlands) public procurement is one element of mainstream policy that has been used to stimulate cluster development. However, in the United Kingdom the interdependency between public procurement and cluster, or wider regional, development has been ignored as illustrated by procurement policy for the naval shipbuilding programme.

9.2.2 Duplication

Although the UK national government did undertake a mapping exercise of regional clusters (Department of Trade and Industry, 2001) the approach of delegating the identification of clusters to regional authorities appears to have contributed to a worrying tendency for all Regional Development Agencies to 'select' particularly popular clusters. At various times, eight of the nine Regional Development Agencies have identified a biotechnology, biosciences or pharmaceuticals cluster within their region (Benneworth and Whitehurst, 2002). It is ironic that a policy approach

predicated on an understanding of the unique attributes of a region has produced such an overlap between Regional Development Agencies in the clusters identified: it is incredulous in that '[i]t stretches credibility to believe that the UK could be home to half a dozen or more globally successful biotech clusters' (AIM Management Research Forum and WERU, 2005, p.28) and it represents a duplication of effort that might have been avoided had there been a central coordinating role from the DTI in this respect.

In the Netherlands the national government has had a role in providing evaluation tools for cluster policy in the form of ClusterMonitor (den Hertog and Brouwer, 2001) and, given the difficulty in establishing evaluation frameworks for cluster policies, a further potential role that could have been fulfilled at a national level in the United Kingdom was the provision of an evaluation framework for regional cluster policies.

9.2.3 Coordination of cluster policies at different scales within the North East of England

As was mentioned in section 5.1.2 there were many cluster policy strategies operating at different scales within the North East, but there was no evidence of an attempt to coordinate these initiatives. Although Lagendijk (1999) had recommended that the RSC should develop closer links with sector oriented centres of expertise in the region and should participate in the development of regional cluster strategies, in practice the RSC found itself in a weak position in relation to One NorthEast and was unable to engage with the regional cluster development programme. The RSC was perceived, partly as a result of its own internal difficulties, as performing a marginal business support role at a local level, whereas the skills of its staff in facilitating groups of businesses to work together might have been utilised by One NorthEast to perform a clustering promotion role within a pre-identified sector or cluster. Clustering promotion by organisations such as the RSC is certainly not sufficient as a cluster policy, but it can form an element within a wider framework for cluster policy development.

However, it was not just relations between the RSC and One NorthEast that were problematic. Raines highlights that, where there are several cluster programmes in a

territory, there is the need to have a single agency responsible for coordinating the programmes and also notes that 'the policy structure itself is an important determinant of the success of the cluster approach' (2000, p.33). While One NorthEast provided funding to cluster organisations, and indeed to the RSC, there was no evidence of any attempt to coordinate cluster policy at different scales with cluster policies at local, sub-regional, regional and supra-regional operating in a seemingly uncoordinated manner. This was despite the fact that in the initial CURDS paper for North Tyneside Council, dating back to 1993, there had been an acknowledgement that local clustering activity required complimentary activity at a regional level (Tyneside Real Service Centre, 1996). The RSC had also acknowledged within eight months of its existence that there was a difference between the types of clustering activity that could be conducted at a regional and local level (The Real Service Centre, 1996). Overall there appeared to be a lack of coordination between the many cluster strategies within the region, which may have contributed to the disillusionment and confusion surrounding cluster policy, and it appears that One NorthEast could have performed a coordinating role in this respect.

9.2.4 The scale of clusters

I have argued in section 2.2.1 that clusters are a functional, rather than geographical phenomena, and that their boundaries can only be identified by tracing the linkages and relationships between firms and other cluster actors. The method of identifying regional clusters in the United Kingdom runs contrary to this methodology and the enforced nature of the way in which clusters were identified within specific regions gave rise to particular problems for the marine and offshore industries. They lacked a sufficiently critical mass within the North East of England to merit inclusion as a regionally strategic cluster. However, because of the structure of cluster policy-making in the United Kingdom, rather than look for complementarities with other marine or offshore clusters in the country, One NorthEast subsumed the offshore and marine industries into a larger 'Energy Cluster' leading to problems because it ignored the need, emphasised in section 9.1.2, to identifying clusters that are wide enough in industrial scope, but not too wide. The very structure of policy-making in the United Kingdom engendered an approach by One NorthEast that both failed to account for these insights and ran contrary to the strictures of Fromhold-Eisebith and Eisebith (2005) who maintain that 'cluster promotion should be delivered by the

governance level most closely matched to the geographical extent of the cluster' (ibid. p.1259).

There are some promising signs that an alternative approach may be beneficial. In section 4.5.4, I mentioned research initiated by Durham Business School into the subsea technology cluster in the North East. As a result of the project, local companies and authorities have recently established a committee representing the subsea technology cluster in the North East,[51] a cluster which had not been taken to be significant by One NorthEast, even though it was mentioned in the Offshore Cluster mapping exercise conducted on their behalf. The activities planned accord with those suggested by Raines (2002) as suitable policies for the development of different aspects of clusters and are represented in Table 9.6.

Table 9-6 Proposed Policies for the Embryonic Subsea Cluster in the North East of England

Aspect of a cluster	Objective of policy	Proposed Policy Measures
Interactions amongst cluster actors (firms, trade associations, universities)	Increase interaction by creating conditions for cooperation and increasing or highlighting incentives for cooperation	Provision of forum for knowledge exchange Use proposed joint facilities to promote shared innovation and culture of collaboration
Presence of common competitive advantages in the form of specialised labour markets, research expertise, specific tacit knowledge	Development of common resources to improve competitiveness of the cluster	Work with firms, support institutions and universities to address the dramatic shortage of skills and competences Develop infrastructures e.g. testing centres for deep water technologies
Collective awareness and understanding of the cluster, and sense of belonging to the cluster	Building internal awareness of the cluster (identity building) and projecting the identity of the cluster (identity projecting)	Use the forum to build a shared identity Raise the profile in and outside the region by 'selling' it as a success story Encourage interaction and integration with national and international initiatives

[51] Interview with Frank Siedlok, Durham Business School

The project is of interest for many reasons. It involves the emergence of an embryonic cluster from the offshore construction industry, which had in turn emerged from the shipbuilding tradition in the area. It highlights the weakness of statistical data in identifying such emerging clusters. It shows the potential for collaboration even when two of the leading players in the cluster are direct competitors and it has implications for the existing cluster organisations in the offshore industries. It is far too early to evaluate the outcomes of this initiative but I have chosen to mention it at this juncture for two reasons. Firstly, it shows the possibility of cluster initiatives evolving in a bottom up manner and secondly, illustrates the identification of, and policy development for, a regional cluster that is part of a significant[52] national cluster, for which there is a national cluster organisation, Subsea UK. This again demonstrates that clusters do not have boundaries that are incorporated within regional administrative boundaries. This is recognised in the literature where, as discussed in section 2.2.1, Asheim (1999) points to a distinction between national clusters concentrated in a particular region; regional branches of a national cluster and regional clusters. I would argue that it is important that policy-makers recognise and understand the implications of this distinction.

9.2.5 The role of non-cluster policy at the national scale

The case of the marine and offshore industries in the North East also demonstrates the significance of policy, other than cluster policy, at a national scale. Offshore construction was seen to be dependent on rates of exploration for oil and gas in the United Kingdom Continental Shelf, which were in turn considered to be largely dependent on HM Treasury taxation policies. Shipbuilding in the North East was seen to be entirely related to the controversial and convoluted process of awarding contracts for the new naval shipbuilding programme, controlled by the Ministry of Defence, with the guiding hand of the Treasury also being in evidence. Examples of national government influence in other areas, including renewable energy and nuclear decommissioning, also abounded. Therefore there were many policy drivers within the clusters that a Regional Development Agency could not influence. In addition, there were clearly many commercial drivers, including not least the oil price, that were crucial to the offshore cluster, but completely outside the sphere of influence of

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[52] National subsea revenues are estimated at £5 billion per annum (source: Subsea UK/NEKS project)

a Regional Development Agency, acting as a reminder that the possibilities for policy induced regional cluster development are constrained by economic realities. Interestingly there appears to now be a recognition of the need for a national strategy for the marine sector and a Marine Sector Technology Plan was produced by the DTI in 2005.

9.3 The Role of Organisations

One theme that continually arose in my research into the marine and offshore engineering cluster was the role of formal organisations. These organisations were not always publicly run organisations although, possibly as a result of being in a region eligible for European Structural Funds, many of them were in receipt of public funding. Not all of these organisations used a cluster 'label' but, if we return to the five-part typology outlined by Benneworth et al. (2003), and consider the kind of activities that these organisations were undertaking, these organisations can be considered to be cluster organisations in so far as they organised cluster activities.

These organisations represented *implicit bottom-up* cluster initiatives (cf. Fromhold-Eisebith and Eisebith, 2005) These organisations (including NDI and NOF) contributed to cluster development due to their specialist knowledge, which gave them a particular ability to enable member firms to access 'global pipelines' (Bathelt et al., 2004) and make external linkages, which they could not have otherwise forged. These organisations also had the ability to foster 'buzz' by providing the necessary meeting places (Eklund et al., 2002), permeated with social relations (Huggins, 2000), for networking and information exchange to take place. It was organisations such as North East Maritime Group, rather than the Regional Development Agency, that appeared potentially able to generate 'talk' and 'confidence' (Storper, 2002) in order to help build the 'conventions' that lead to successful economic 'coordination'. These organisations also had a complicated role in relation to the concept of lock-in. Some authors argue that these formal organisations pose a problem because they may not represent the cluster community, and recommend the use of 'champion' firms or institutes instead (Gilsing, 2001). However, my research, although restricted to a mature cluster in the North East of England, suggests that, while organisations could be part of the problem, as they were part of the structure that could lead to political lock-in, they had a potential to be part of the solution as they provided a suitable

forum for foresight exercises, could provide targeted support for the exploration of new markets and most importantly were part of the local buzz and in a position to generate 'talk' and 'confidence'.

The role of the Regional Development Agency in respect of these organisations was unclear. My interviews revealed that, although some of the organisations were highly thought of and included within One NorthEast's strategy development, others felt excluded. There were examples of these organisations becoming very vulnerable to a reduction in funding and therefore One NorthEast, as a provider of funding, was in a powerful position in relation to many of these organisations.

It may be because of the policy background of encouraging sector associations and the availability of European Structural Funds that there were a particular plethora of these organisations in the North East of England, which had arisen from the public, private and academic sectors. In addition, the marine and offshore industries had reached a mature, in some aspects declining, stage in the life cycle of the cluster and the institutional framework for the clusters had developed over many decades. What was difficult to determine was whether this structure of organisations represented institutional thickness of a 'thick and works' variety or 'thick and does not work' variety (cf. Amin and Thrift, 1995 and section 2.6.4 above). However, it appears that the institutional structure in the marine and offshore cluster could demonstrate the 'strength of weak ties' (Grabher, 1993b) particularly because 'linking different institutions may uncover potentials for cooperation between firms of different size and technological specialization' (ibid. p.274).

There was evidence that One NorthEast was latterly coming to appreciate the benefits of these organisations and, while my research would not necessarily lead to the recommendation made by Fromhold-Eisebith and Eisebith (2005) that '[s]imultaneous combination of *explicit top-down* and *implicit bottom-up* is not recommendable [because] this bears the danger of counterproductive rivalry of different cluster coordinators, a malcoordination of efforts, and a clash of (private against public) cultures that irritate firms' (ibid. p.1266), I would argue that public policy-makers should take note of the existing institutional framework and work with the organisations therein. While cluster policy can contribute to institution building

(Lagendijk, 2000), One NorthEast appeared, at times, at risk of damaging the institutional tissue of the marine and offshore engineering cluster.

These regionally based cluster organisations were also able to overcome some of the problems that beset the micro clusters facilitated by the RSC. In the case of Argonautics the scale of the operation was too small to enable the provision of club goods for the wider regional cluster. However, cluster organisations at a regional scale were better resourced to deliver such assets. Also the larger cluster organisations were better able to incorporate a range of views without members having to resort to 'exit' (Hirschman, 1970) as a response to disagreement. However, the regional cluster organisations were able to still generate relational assets, which One NorthEast found difficult to achieve.

9.4 Conclusions

Therefore the examination of the development of two cluster policy initiatives in the North East of England demonstrates both that policies can develop in very different ways depending on their initial inspiration and that the development of policies is heavily influenced by the context in which they are designed.

Although cluster policy approaches have developed in a pragmatic way away from the academic debate surrounding clusters, the need for detailed academically informed analysis of clusters, particularly where a top down cluster development programme is proposed has been highlighted, as has the need to develop policy instruments in light of the academic concepts around clusters.

My research has also highlighted the weaknesses in the national approach to cluster policy in the United Kingdom and leads to a recommendation for much more coordination between the scales of cluster policy-making. The complicated issue of scale also applies to the clusters and the experience of the 'energy cluster' in the North East has shown the inappropriateness of achieving a critical mass for a regional cluster policy by expanding the industrial scope of the cluster beyond reasonable boundaries, whereas the development of the subsea committee in the North East has illustrated the bottom up recognition of a regional cluster that is part of a national

cluster. Both cases lead me to conclude that policy-makers require a much better understanding of scale issues in relation to clusters.

The experiences of the marine and offshore industries and Argonautics have also emphasised the significant role of cluster organisations, certainly in mature clusters. This highlights the need for public policy-makers to take into account the existing institutional framework and, just as Morgan (1997b) suggests that innovating in the periphery may mean 'working with what exists, however inauspicious, in an effort to break the traditional institutional inertia in the public and private sectors, fostering interfirm networks which engage in interactive learning, nurturing trust and voice-based mechanisms, which help to lubricate these networks and promoting a cultural disposition which sets a premium on finding joint solutions to common problems' (1997b, p.501), so cluster policy, in a peripheral region and with mature industries may mean working with existing organisations, even if flawed, to design tailored solutions to the specific issues faced by clusters.

The future for designated cluster *policy* in the North East of England is uncertain. The Regional Service for Clustering, having in any case evolved in a way that did not reflect the initial intentions for the organisation, has reduced to a staff of two and will cease to operate at the end of March 2006. One NorthEast has reverted to an overtly sectoral policy, although I have argued that the 'three pillars' of energy and environment, processing industries and healthcare and health sciences, is implicitly based on the concept of clusters and should be informed by an understanding of clusters and the cluster policy process required to support them. However, even in the absence of a dedicated cluster development policy, policy from all levels of government will continue to impact upon what clusters there are in the region. Cluster *organisations* ranging from Argonautics to Northern Defence Industries continue to foster cluster *activities,* as do other actors, including the region's universities.

The concept of clusters as a policy tool, at least in the North East of England, appears to be falling from favour. I would suggest that this is as a result of dissatisfaction with the outcomes, which may have been relatively disappointing as a result of failings in the cluster policy process. I would also suggest that academic concepts of

clusters still offer significant insights into the operation of economies and can still be usefully employed in policy circles.

10 Conclusions

In this thesis I set out to analyse the development of two policies taking a cluster-based approach to economic development in the North East of England and to consider their impact on firms and organisations, particularly those within the marine and offshore engineering industries in the region.

From a review of cluster theory literature in Chapter 2, I concluded that we need language and tools to describe and explain specialised concentrations of economic activity, which we might term 'clusters', and which might be defined as comprising a pronounced and recognisable mass of firms and associated support organisations and research and education establishments, who, by their interactions, create cluster specific assets available for exploitation by actors within the cluster, depending on the actors' capabilities and strategies. I went on to argue that, given the context dependent individuality of clusters, a multi-layered approach to clusters, akin to Storper's (1997) holy trinity, was required in order that the explanatory strands (including proximity, relational assets, processes of learning and knowledge transfer, notions of systemness) can be separated and evaluated. I therefore concluded that the explanations of clusters will be specific to the territory, and cluster, involved and can only be uncovered by detailed empirical work.

From a review of the cluster policy literature in Chapter 3, I highlighted that there has been a burgeoning interest in cluster concepts in policy circles since the 1990s. I demonstrated that the application of cluster concepts has ranged from simple renaming of existing policies at one end of the spectrum, to a more academically informed approach to policy-making at the other end of the spectrum. I concluded that it was appropriate to consider a cluster approach as a process including overlapping and continuous stages: firstly deciding to take a cluster approach; secondly identification, selection and analysis of clusters; thirdly the mobilisation of participants, cluster animation and relationship building; fourthly design and implementation of policy interventions; and finally evaluation and policy learning, with the overall aim of the process being to stimulate and facilitate the kinds of processes believed to be occurring within successful clusters, in order to generate

cluster specific assets for the benefit of the cluster. I concluded that, while not a policy panacea, there is an identifiable cluster approach to policy, which can be beneficial if properly applied.

Chapter 5 examined the development of One NorthEast's cluster development programmes and concluded that there have been continual difficulties in the cluster policy-making process within One NorthEast, particularly due to problems in identifying, selecting and analysing clusters within the region, which appeared to lead to an inability to stabilise a cluster development policy and an associated inability to demonstrate progress in cluster development. These factors contributed to the decision by One NorthEast to move away from the explicit use of the term 'cluster'.

Chapter 7 examined the development of an alternative cluster policy, that of the Regional Service for Clustering. The Regional Service for Clustering was an unusual and ambitious project. Its service was predicated not on developing particular *clusters*, but on the understanding that groups of firms could come together to achieve mutual benefits by *clustering*. The effectiveness of the service was difficult to demonstrate quantitatively and the benefits produced were not necessarily those targeted by the funders of the project causing difficulties for the RSC in meeting targets. As a result, by 2005, the organisation was reduced to two members of staff operating under the auspices of another enterprise agency in order to complete an outstanding ERDF contract. However, while the organisation has not necessarily had a long term impact on policy, the legacy of the organisation remains in the micro clusters it developed and it remains a model of cluster policy that appears to have potential benefits.

As well as examining the development of the two policy initiatives, I wanted to examine the impact that the policies had on firms, organisations and other actors in the marine and offshore engineering cluster in the North East of England. In Chapter 6, I concluded that One NorthEast's process of developing a cluster policy for a cluster incorporating the marine and offshore industries was highly flawed. Some of the issues that arose were those highlighted in chapter 5 as generic and applying across the cluster development programme. However, there was a particular lack of understanding of the marine and offshore industries and the composition of any

cluster of which they could be considered a part. I concluded that some of the issues originated from within the marine and offshore engineering cluster, particularly given the cyclical downturn in some of the key components of the cluster at the time cluster policy was being introduced in the North East, the fragmented nature of the industry within the region, and the extent to which the industries were highly influenced by events, and policy, at a national and international scale. I did however identify that sub-clusters, such as the firms involved in subsea technology, seeing an upturn in work driven by a high oil price and changes in oil and gas extraction technology, had potential to feature within a cluster strategy, but were not recognised by One NorthEast.[53]

In Chapter 8 I examined the development of a micro cluster, Argonautics, which encompasses a group of predominantly marine design firms that form part of the region's marine and offshore cluster. The case study of Argonautics demonstrated that firms can benefit from the club goods, borrowed size and generation of relational assets that arose from operating as a micro cluster facilitated by the Regional Service for Clustering, but it also demonstrated that this is a process that can absorb substantial financial resources, is difficult, time-consuming, operates over a long time scale and requires a lot of input from those involved to gain benefits that are largely intangible.

To conclude the thesis, I now want to consider the implications of my research for cluster theory and the conceptualisation of cluster policy. I will then reflect on the research process and discuss further areas of research before drawing out some practical lessons for policy-making.

10.1 Implications for Cluster Theory

As discussed in Chapter 2, there is a theoretical and methodological divide between, on the one hand, those who see the concept of clusters as ambiguous, chaotic and incapable of being rigorously tested (Martin and Sunley, 2003) and, on the other hand, those who see value in the cluster approach because it permits that there are many

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[53] This was finally rectified in 2006

strands of explanation for individual clusters, each of which can be scrutinised separately, establishing a rich understanding of that particular cluster and, in doing so, adding to our understanding of 'clusters' (Benneworth and Henry, 2004, Chapman et al. 2004).

My research supports the adoption of the latter approach and has particular implications for three areas of the current theoretical debate around clusters. These areas, which are intertwined, are boundaries and scale, terminology, and the role of individual cluster actors, and I will look at each area in turn.

10.1.1 Boundaries and Scale

My research points to the conclusion that, no matter which methodology is chosen to identify clusters, clusters can not be expected to have clear boundaries either in geographical or industrial terms. For Martin and Sunley (2003) this is problematic. However, from my understanding of clusters as a locus of interactions through which cluster specific assets (for example, tailored infrastructure, specialised support organisations and untraded interdependencies) are generated, I would suggest that any boundary that might be drawn would inevitably be both blurred and only arrived at by detailed empirical examination. The boundary will be blurred because the intensity of interactions, and particularly the intensity of interactions that include a social element, which I have highlighted as being significant in understanding clusters, tends to gradually decline with a reduction in proximity.[54] Given the context dependent nature of clusters, I would suggest that such a creative process to establish boundaries is acceptable. I would also conclude that my research supports Malmberg's (2003) assertion that geographical proximity should be considered to be a variable attribute of a cluster rather than part of its definition.

My research suggests that clusters exist at a range of spatial scales from the local to at least the national. Martin and Sunley (2003) suggest that to use the same term to refer to phenomena at any spatial scale is to assume that clustering processes are scale-

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[54] I am predominantly referring to geographical proximity, but this thesis has demonstrated that proximity in other senses is also significant (see also, Boschma, 2005).

independent. While I conclude that clusters exist at different geographic scales, and that boundaries can only be drawn around clusters following detailed empirical investigations, I would argue that, at each scale, the nature of the relationships and 'clustering processes' are distinct. At a national level, the processes of interest are those that link the cluster to the overall macroeconomic picture (Feser, 1998). At a sub-national level, the processes of interest may be around a value adding production chain or linkages into a territorial innovation system (Roelandt and den Hertog, 1999). At a local level, the processes of interest may be those within networks of tightly linked firms. At each geographical scale what is of interest is the way in which actors interact within clusters and how those clusters relate to their wider environment. However, different processes operate at different scales and there are links running between the scales, with actors operating and events occurring simultaneously across different scales (Bunnell and Coe, 2001). I would suggest that local clusters are embedded in sub-national clusters and sub-national clusters are embedded in national clusters and therefore, not only is there a need to understand the different processes at different scales, but also, if we wish to understand clusters, it is inadequate to concentrate on processes occurring at one scale alone and a move away from a tendency to consider clusters as regional phenomena is required. If we do take an approach that examines clusters at a range of scales, it may be possible to avoid abstracting 'clusters from the rest of the economic landscape, so that they often appear as isolated and self-contained entities' (Martin and Sunley, 2003, p. 17).

10.1.2 Terminology: Unpacking the Clusters Concept

In order to theorise clusters at any geographical scale in a meaningful way I conclude that we need to be much clearer about the terminology that we use to analyse clusters, processes within clusters and cluster policy. In section 3.3 I outlined Benneworth et al.'s (2003) five-part typology, which breaks down the cluster concept into five theoretical elements: the cluster, clustering, cluster activities, cluster organisations and cluster policy. My research has shown that the ability to break down the concept in this way reduces the ambiguity that rightly causes concern amongst critics, such as Martin and Sunley (2003). The distinction between clusters and clustering is particularly significant for our conceptualisation of clusters and my research leads me to conclude that we can progress the theorisation of clustering further. Benneworth et

al. (2002) define clustering as '[t]he general behaviour of firms who are collaborating in innovation' (ibid., p.513). Clustering is a process, a verb, and does not solely take place within agglomerations. I would suggest that clustering describes the process of fostering and maintaining relationships, which are more than arm`s length associations, between actors. It is through these relationships that untraded interdependencies and social capital in the form of conventions, understandings, reciprocity, dependability, and open communication can form. Trust appears particularly significant and it has been theorised that it can evolve to such an extent that shared trust exists and firms can experience trustful relations, without investing in individual relationships (Maskell and Malmberg, 1999). These relationships, and the assets that develop from them, have many benefits: they may facilitate innovation; they may lead to the establishment of specialist support organisations; they provide a level of self-help between firms and they may facilitate traded relations. Therefore these relationships can be considered as a collective asset for that group of actors. Actors have the ability to benefit from this collective relational asset, depending on their individual capabilities and motivations.

I would make two additional observations - while it is not possible to have a cluster without clustering, clustering is neither exclusive to clusters, nor is it sufficient to account for clusters. Taking the first observation, I would simply suggest that, given that clustering can occur outside agglomerations, clarity of terminology might be improved by identifying a different verb to describe the process of relational asset building that I have outlined. Turning to the second observation, it is important to theorise the non-collaborative processes occurring within clusters, for example, treacherous learning, and transfer of knowledge through labour mobility.

There are other relations between the different elements of Benneworth et al's (2003) typology. I have stressed the importance of the soft institutions that are developed by clustering, but my research has led me to conclude that formal cluster organisations are also important within clusters and that they have a role in the development of the soft institutions (Cooke et al., 1998). Similarly, cluster activity may lead to clustering, but may also result from clustering. A particularly interesting area in my research was the relation between cluster organisations and policy and this will be examined in section 10.2.2.

10.1.3 Individual Cluster Actors

My research has continually highlighted the importance of key individuals within clusters. This is also an area of growing interest in the literature and, as outlined in section 3.5.5, Eklund et al. (2002) discuss the role of the cluster 'animator' and Andersson et al. (2004) discuss the role of the 'clusterpreneur'. A similar concept is found much earlier in the literature in the form of Camagni's (1991) 'collective agent'. Although Eklund et al. posit that an organisation might perform the role of cluster animator, I would suggest that it is the role of particular individuals within firms and organisations that is significant. The cluster animators I identified in my research were able to draw together divergent individuals and interests around a common cause or vision. They were able to maintain unity and drive the group forward. This kind of individual appears rare, but I found examples in private firms, cluster organisations and policy-making bodies.

While not wanting to over-extend Benneworth et al.'s (2003) typology, I would propose that the concept of 'cluster animator' is sufficiently significant to be considered as a sixth distinct theoretical element of the cluster concept. I use Eklund et al.'s (2002) term of 'cluster animator', as opposed to Andersson et al.'s (2004) term, 'clusterpreneur', to signify that the role is not necessarily performed from within a private sector firm.

10.2 Implications for the Conceptualisation of Cluster Policy

Having considered the implications of my conclusions regarding scale and boundaries, terminology and individuals for our conceptualisation of clusters, I now want to consider the implications of my findings for our theorisation of cluster policy. The main implication of my research is that I maintain that cluster policy should be conceptualised, not as a discrete policy instrument, but rather as a process including overlapping and continuous stages: firstly deciding to take a cluster approach; secondly identification, selection and analysis of clusters; thirdly the mobilisation of participants, cluster animation and relationship building; fourthly design and implementation of policy interventions; and finally evaluation and policy learning, with the overall aim of the process being to stimulate and facilitate the kinds of processes believed to be occurring within successful clusters, in order to generate cluster specific assets for the benefit of the cluster. This particular conceptualisation

of the cluster policy making process has permeated the whole thesis and I consider it to be a valuable contribution to cluster policy research. However my research has further implications for cluster policy theorising. The literature discussed in Chapter 3 indicates the wide range of policy approaches that are implicitly or explicitly based on clusters. I have highlighted that many of these policies are pragmatic responses by policy-makers to the perceived needs of their territories. However, the performance of cluster policy in practice may be hindered by an inadequate theorisation of cluster concepts and consequent inadequate theorisation of cluster policy. Therefore I want to consider the implications of my conclusions regarding scale and boundaries and terminology, as before, and also to consider the implications for cluster policy of seeing clusters as context dependent, multi-layered phenomena.

10.2.1 Boundaries and Scales

Recognising that clusters have fluid boundaries, and that there are different scales at which clusters exist, has considerable implications for our conceptualisation of cluster policy. Despite theoretical guidance to the contrary, cluster policy is usually implemented with the assumption that clusters are bounded in accordance with administrative territories. My research has shown that cluster boundaries do not accord with territorial boundaries. Therefore a cluster policy approach should be applied not only at a range of geographical scales, but also in accordance with the spatial coverage of the cluster, rather than in accordance with administrative boundaries. If this is not done, the 'policy defined' cluster may be incoherent to actors within it, as it will not incorporate all the key cluster relationships that would have been identified by an approach that sought to identify the 'real' cluster and was sensitive to the need to consider clusters as functional entities, rather than complying with a set administrative boundary.

Given that clusters are also seen to exist at different spatial scales and the processes within them vary with scale, we can theorise that cluster policy should be different at different spatial scales (Roelandt and den Hertog, 1999). This is acknowledged in Boekholt and Thuriaux's (1999, 2000) typology of cluster policy models outlined in section 3.5.3 and particularly in the work of Lagendijk (1999) outlined in section 2.2.1. If policy is implemented for clusters at a national level. the main interest is in

the relationship between the national cluster and framework conditions at a national level and therefore policy can be conceptualised as removing barriers to cluster development. If policy is implemented at a sub-national scale, relationships within the cluster are more significant and tailored policy initiatives can be used to develop or maintain cluster specific assets including relationships between cluster actors, a cluster identity or brand, an infrastructure of support organisations, shared facilities and a specialised workforce. If policy is implemented at a small, local scale it can focus on encouraging interactive learning processes between firms and facilitating network formation. Therefore the nature of cluster policy should vary according to scale and, given that relationships exist across scales and actors operate simultaneously at different scales (Bunnell and Coe, 2001), we can conclude that there should be coordination between the different scales at which policy is developed and implemented.

In addition to concluding that the nature of cluster policy should vary with scale, there are also implications from my conclusion that clusters should be viewed through different lenses in order to build up multi-layered explanations for their existence and evolution. If there are multiple explanations for clusters, there are multiple roles for policy-makers. The way in which policy is conceptualised should vary therefore, not only in accordance with the scale at which the cluster is viewed, but also in accordance with other cluster specificities, including the stage of the cluster within a cluster life cycle (Pouder and St. John, 1996; Chapman et al., 2004) and the innovation style of the cluster (Roelandt et al. 1999).

10.2.2 Terminology: Unpacking the Clusters Concept

In section 10.1.2 I concluded that unpacking the clusters concept into five distinct theoretical elements (Benneworth et al. 2003) was useful theoretically and that such an approach was supported by my research. I now want to consider the implications for cluster policy theory of unpacking the concept in this way. Once again the distinction between clusters and clustering is significant. We can conclude that a policy to promote a cluster or 'clusters' will look very different from a policy to promote clustering. Because I have argued that we cannot envisage a cluster without clustering, I would suggest that a policy to promote clusters needs to give due consideration to clustering. I have suggested that clustering involves fostering and

maintaining relationships between actors and it is a process that is most likely to occur where there is some proximity. This has implications for how we conceptualise cluster policy, particularly at the sub-national and lower scales, which are the scales at which clustering, or 'relational asset building', is most intensive. Encouraging clustering is essentially a relation building and trust building activity and, while policymakers can introduce particular initiatives in order to introduce proximity between firms (for example, provision of incubation units), the very process of trying to build trust and untraded interdependencies is a valuable outcome, but one that is difficult to achieve quickly or measure quantitatively.

I have suggested that cluster organisations may be significant in generating 'buzz', providing cluster specific knowledge, offering opportunities for collective learning and providing the meeting places and networking opportunities required to generate 'talk' and 'confidence', and that they may have the necessary connections and specialist knowledge to plug firms into global pipelines (Storper, 2002; Andersson et al. 2004, Bathelt et al., 2004). However, the relationship between these organisations and cluster policy is problematic. These organisations can be seen as contributing to a lock-in of the cluster and hampering adaptation, or as contributing to an institutional framework with the necessary 'redundancy' and loosely coupled networks to enable adaptation to occur (Grabher, 2003b). Both policy makers and cluster organisation may have a role in cluster development (Fromhold-Eisebith and Eisebith, 2005), but the relationship between the two is not yet clear.

10.3 Reflections on the Research Process and Areas for Future Research

The understanding of clusters as highly context dependent phenomena, incorporating many intangible factors, and the variations in cluster policy approaches, pose substantial methodological challenges. In attempting to meet those challenges, I have focused on trying to gain a rich understanding of only two policy initiatives, within one region, and their impact within one particular cluster. The conclusions I am able to draw reflect the limited coverage of these case studies, but I would suggest that the benefits of obtaining a rich understanding outweigh the limitations.

10.3.1 Further Empirical Research Possibilities

The focus on the marine and offshore engineering cluster has opened many interesting avenues for exploration, particularly around the role of cluster organisations. The focus on a mature cluster also adds to moves, particularly by Chapman et al. (2004) and Tödtling and Trippl (2004), to redress the balance away from studies of successful clusters based on new technologies. However, my research has focused on a cluster where there is a considerable impact from exogenous forces (particularly the price of oil) and from policies at a national level. I have highlighted that national taxation policy, national energy policy and the operation of North Sea exploration licences have a strong effect on the offshore engineering industry. The shipbuilding industry in the North East is almost entirely reliant on government procurement policies and even areas that have been identified by One NorthEast as offering opportunities for diversification – nuclear decommissioning; wind, wave and tidal energy; and naval decommissioning – are heavily regulated. This has impacted on my research as it reduces the likelihood that policy at a sub-national level can significantly influence the cluster. Research into a less regulated, less exogenously influenced cluster may have yielded very different results.

There are many ways in which the empirical work from this thesis could be extended. Within the North East, further work could be undertaken on analysing the marine and offshore engineering cluster itself. Work on adaptation in the Aberdeen oil complex has been conducted by Chapman et al. (2004) and while they concluded that firms' attitude to change are influenced by existing institutional conditions and note a significant role for social networks in the process of adjustment, there are fewer cluster organisations in operation in the Aberdeen oil complex than in the North East Marine and Offshore Cluster and it would be particularly interesting to further consider the role of organisations in the process of adaptation (or possibly in hindering adaptation) in this mature cluster.

Detailed research could also be undertaken to consider whether it was peculiarities in the marine and offshore industries that made it so difficult to develop a cluster development policy, or whether there are problems within cluster policy *per se*, problems with cluster policy as delivered by English Regional Development Agencies or problems specific to One NorthEast. I would argue that the success or otherwise of

cluster policy, and particularly the causality of that success or otherwise, can only be determined by a detailed investigation of each cluster and the development of policy for that cluster and that it will often be a combination of issues in policy development and the specific cluster that cause problems. Indeed, Chapman (2005) highlights this combination in his work on the Teesside chemical industry in the North East of England. However, in addition to the concerns raised with regard to One NorthEast's cluster policy during interviews with their own staff and other actors in the region, and the concerns highlighted in the evaluation reports of RES1 and RES2 (SQW Limited, 2002: Frontline Consultants 2005), my research did lead me to talk to individuals who had been involved in the food and drink cluster and the creative industries cluster in the North East and they also identified problems with the way in which One NorthEast developed cluster policy.

Were these issues peculiar to One NorthEast or did other English regional development agencies have similar problems? Further research could consider whether other regional development agencies in the United Kingdom were more successful in introducing cluster policy. A review of the agencies' own documentation and literature suggest there are mixed results. While Yorkshire Forward, the regional development agency for Yorkshire and the Humber still emphasises its cluster strategy,[55] the East of England Development Agency[56] and the North West Development Agency[57] appear, like One NorthEast, to have reverted to an overtly sectoral, rather than cluster based, approach to providing segmented and focused business policy. In a report for *emda,* the regional development agency for the East Midlands region of England, DTZ Pieda Consulting (2005) highlighted significant problems in cluster development policy, including a failure to identify and support potential high growth areas in the region. Where there has been success, they attribute it to well run networking organisations and the role of key individuals. adding strength to my conclusion that organisations and cluster animators are significant. DTZ Pieda also conclude, as I do, that there is a need for an evaluation

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[55] <http://www.yorkshire-forward.com/www.view.asp?content_id=113&parent_id=37> accessed 18.8.06

[56] <http://www.eeda.org.uk/press_pub_366.asp> accessed 18.8.06

[57] <http://www.nwda.co.uk/RelatedContent.aspx?&area=86&subarea=133&item=20028061004717181> accessed 18.8.06

process that is sensitive to the long timescale required to produce results from cluster policy and the 'soft' nature of some of the outputs.

Tully & Berkeley (2004) highlight difficulties in the cluster policy of Advantage West Midlands, the regional development agency for the West Midlands region of England. again noting a difficulty, shared by One NorthEast, in defining clusters. However, in an evaluation of Advantage West Midlands' key delivery mechanisms, GHK (2006), while noting that there had been significant difficulties in establishing those clusters that were not already established, identified that most of these difficulties had either been overcome or were in course of being overcome. GHK also used a qualitative approach to identify how partners and key stakeholders rated the strategic value added by clusters and, while there were differences between clusters, they noted that firms identified benefits from the clusters in terms of marketing opportunities, inter-firm networking and, to a lesser extent, collaborative working.

Therefore there is evidence that, while there are significant difficulties to be overcome, regional development agencies in England can develop effective cluster strategies. Interestingly one of the clusters that is highlighted as particularly successful is the motorsports cluster, the policy for which has been developed by a number of regional development agencies. This supports my conclusion that cluster policy is most effective where the boundaries of the cluster are drawn in such a way as to reflect the true functional cluster, rather than to reflect a 'policy' cluster determined by administrative boundaries.

The cluster policy within the English regional development agencies could be compared with other regional policy-making bodies internationally, particularly to examine the apparently problematic issue of coordination between cluster policies. organisations and activities. Chapter 3 outlined how cluster policies are used internationally. Tödtling and Trippl (2004) demonstrate that cluster policy has been effective in the automotive cluster in Styria, Austria, but again they stress the influence of the institutional background to the cluster and the role of a cluster organisation in implementing cluster policy. They also note that the metal cluster has been less successful. partly because of its complexity and heterogeneity, features it shares with the marine and offshore cluster in the North East of England.

It would be particularly interesting to compare cluster policy in the North East with that of other regions or territories with marine related clusters in the United Kingdom, or with that of other nations, with marine and offshore construction related clusters, such as Norway or Germany, to investigate whether more could have been achieved for a marine cluster in the North East of England. Certainly the South West Regional Development Agency (SWRDA) has provided £4M over three years to create and fund Marine South West.[58] Its strategy includes skills, training, education and life long leaning; development of networks of clusters/supply chains; provision of a 'voice' for the South West marine industry; accessing best practice: marketing (including for recruitment) and it has also created four local marine networks. The South East Regional Development Agency (SEEDA) also has a sector group covering marine industries (including marine leisure services). Policies include the provision of a full time co-ordinator and taskforces on best practice, cluster development and cost-effective training. SEEDA also led the Campaign for South Coast Shipbuilding to champion marine businesses in the region and ensure Vosper Thorneycroft, a local firm, played a key role in naval construction projects. The North West Regional Development Agency commissioned an analysis of maritime companies in the north west in December 2002 and the ensuing strategy now revolves around initiatives accessible through a portal[59] including Sail NW, Seafood NW and Mersey Maritime, a private sector led organisation drawing together a cluster of around 930 maritime businesses to act as a catalyst for business growth and investment. Within the North West there is also a campaign to ensure naval contracts are awarded in the North West. The 'Keeping our Future Afloat Campaign' is a consortium of trade union, local authority and local community interests in the North West of England.[60] While formal evaluation of these policies has not been made available, it would be interesting to contrast these strategies with those of One NorthEast.

Looking at marine cluster policy internationally, Hassink (2005) notes that, while regional industrial policy in Mecklenburg-Vorpommern, Germany largely related to providing huge financial subsidies to the shipyards of the former East Germany, there

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[58] <www.marine-south-west.co.uk>

[59] <www.maritimenw.com>

[60] <www.navalshipbuilding.co.uk>

were also projects (e.g. Maritime Alliance) which did support innovative small companies in the marine sector. Karlsen (2005) highlights the role of path dependency, as does Hassink in the case of Mecklenburg-Vompommern. in the diverging development trajectories of two marine clusters in Norway, but found that regional policy instigated in the North Norwegian maritime cluster to encourage diversification into offshore markets was unsuccessful. Santisteban (2006) notes the importance of cluster organisations and mentions the ADIMDE-Foro Marítimo Vasco (Basque Maritime Forum of ship building and related industries) as an example of a cluster association which has emerged from the Basque Country's policy of supporting 'self-organizing cluster-associations' to link business actors and provide assistance to public policy makers in developing policy. Therefore nationally and internationally there are examples of strategies being developed, at a regional level, for marine clusters and the international cases above confirm my conclusions that the institutional environment, both in terms of formal organisations and conventions, habits and routines are key to the development trajectories of clusters.

10.3.2 Further Theoretical Research Possibilities

My research has suggested that our understanding of clusters and the implementation of cluster development policy might be enhanced by an examination of the role of the particular types of individuals in the cluster process. As mentioned above, recently emphasis has been placed on individuals who can animate clusters (Eklund et al., 2002, Andersson et al., 2004), but there may be other roles that are significant. For example, insights from management studies into the operation of different roles within teams[61] could represent an interesting avenue of exploration. The roles of individuals could be considered alongside the cluster life cycle models to investigate whether, and how, the required roles within clusters might change with the stage of the cluster and consider the implications for policy, given that the participatory nature of the cluster policy process suggests new roles for the public and private sector in the design and delivery of policy. I have suggested that an understanding of clusters can only be obtained using qualitative methods and this area in particular would require

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[61] Belbin lists eight roles that are needed for a fully effective group in Belbin, R. M. (1981) *Management Teams*, Heinemann.

the use of intensive research methods and an ethnographic approach might be appropriate.

My research has highlighted the need for policy-makers to have an understanding of cluster concepts. The need for organisational learning amongst policy-makers appears to be particularly significant when adopting a cluster approach because the timescale over which cluster policies are likely to achieve an effect far exceeds a normal policy cycle. Therefore an examination of the processes by which organisations absorb academic concepts and transmit them throughout the organisation, including to new members of staff, would be an interesting area of research.

10.4 Policy Lessons

A cluster-based approach to economic development has had great appeal to policy-makers, but it appears that cluster concepts have been used, and misused, in cluster policy-making. While the precise causality of the difficulties in developing cluster policy for the marine and offshore industries in the North East of England may be difficult to determine, the case studies in this thesis and comparator examples do suggest lessons for policy making.

The need for different policies at different scales should be recognised, as should the need for coordination between policies at different scales. An associated point is that the boundaries of clusters for policy measures must be drawn in accordance with the 'real' cluster, not in accordance with administrative convenience. Clusters will not necessarily map on to a region. The challenge for regional policy makers is firstly, to identify key concentrations of economic activity contained within their region, possibly at a sub-regional level, that they can work with and secondly, where there are concentrations of economic activity that cross over their boundaries, to work with other regional authorities to develop cluster policy.

Having identified the 'real' cluster, policy makers must recognise the specificities of clusters. These specificities include those dimensions to clusters identified by Enright (2000) and set out in Table 2-1 above, including scope, density, breadth, depth, activity base, growth potential, innovative capacity, industrial organisation, and co-

ordination mechanisms. Policy makers also need to be aware of the historical development and institutional framework of the cluster, given that these aspects have been identified as key to future developmental trajectories. I would also therefore recommend that policy makers work with existing organisations, even if these organisations appear 'inauspicious' (Morgan, 1997a), and would suggest that they should look to foster links between organisations. Where possible, key individuals should be identified by policy makers to take on the role of 'cluster animator', although considerations of equity and power relations should be taken into account to ensure that all voices within the cluster are heard.

Above all policy makers should view the cluster policy as a process and give adequate weight to each stage of the process. They should not expect a neat programme of quickly implementable fixes. Cluster development and the facilitation of clustering take time and shortcuts will not lead to relation building. A related issue is that cluster policy should be evaluated over a long time scale and cluster policies should not be evaluated using only quantifiable measures. The *process* should be valued and evaluated and softer measures should be considered, as well as purely quantifiable outcomes.

10.5 Final Conclusions

In the United Kingdom clusters remain on the policy agenda, but their value as a policy approach is contested. From the evidence of my research I would draw the conclusion that cluster concepts do have the potential to add value in policy terms, but that a misuse, or lack of understanding, of the concepts around clusters has impacted both on the development of cluster policy and its outcomes. Through this thesis I have tried to contribute to the theory of clusters and cluster policy by demonstrating that it is only if we have a deep understanding of clusters and the scale dependent nature of processes within them that we can conceptualise what cluster policy might be. If we cannot adequately conceptualise a cluster-based approach to policy-making, it is unlikely to realise its potential. Cluster policy-making has certainly been fashionable. However, a combination of adequately conceptualised theories of clusters and cluster policy, and practical lessons for policy-making are required. Otherwise, the fate that Martin and Sunley (2003) anticipate for cluster concepts

appears likely to come to fruition – 'fashionable ideas tend to share one thing in common: they all eventually become unfashionable' (ibid. p.30).

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Appendix A: Cluster Firm Interview Outline

BACKGROUND (Firm & Cluster) Firm history –services/products; age (why started); t/o; location; key events; recent performance/growth How do you know other cluster members, when from? Motivations for working with [name of firms] Whose idea? Goal for [name of cluster]? Change over time Formal Organisational structure of the cluster? Has this changed? Opinion	**RSC** How did you hear about the RSC? When? Other experiences with business support? How does the RSC differ? How knowledgeable are they about your sector (compared to others)? What do you see as their key role? Other roles? What services of the RSC do you find most valuable? What other services could the RSC provide? Are you aware of having followed a structured programme to develop the cluster? Have you seen a change in the way the RSC has operated?
DAY TO DAY CLUSTER WORKING In what areas do you work together? (people, product, infrastructure, finance, marketing etc) How often do you see each other? How do you communicate? How do you manage the order flow? Who does that work? How do you apportion the costs/income from business generated through the cluster? Is that fair? Does any one firm take the lead in the cluster? Do you share any resources – capital equipment/staff? What marketing do you do? Is it cluster or firm? Why? What proportion of your work is done in conjunction with other cluster members? (by T/O or time) What are the specialities of each firm in the cluster? Who are your main competitors? Any competitors in the cluster?	**OTHER RELATIONS** If you need a new supplier or provider of a business service (solicitor, architect, IT advice) how do you find them? Are you aware of suppliers in the local area? Could you do business with other clusters? If you need help with a problem you encounter whom do you turn to? Where do you get ideas from for new products, new markets, and new designs? Are you, or have you been, part of any larger groups/trade associations on a National or Regional basis. (Nature/Benefits) Have you worked with any universities or other education/research establishments, locally or otherwise? (Benefits) Do you work with any other businesses now or previously at more than an arm's length normal business transaction level? [Why not? Or how has this worked?]
BENEFITS What benefits can you identify from working as a cluster that you would not have had working as a single firm? If not why continue? How has working with other firms in the cluster changed the way you do business? How has working with the RSC changed the way you do business? Has working with the RSC changed your view of business support? Has anything else changed the way you do business?	**FUTURE POSSIBILITIES** Membership changes? How have new members come in? Why did old members leave? What about potential members? What are your main barriers to growing the business at present? What could help you surmount those barriers? What are the main issues facing the cluster at present? Would you like to collaborate more? What stops you from doing so? What sort of help would enable you to do so? Do you see [NAME OF CLUSTER] as having a finite life span or do you see it as continuing for as long as the individual firms?
CLOSE AND ANYTHING ELSE?	

This was the original guide that was designed for my interviews with members of the micro clusters facilitated by the Regional Service for Clustering.

Appendix B: List of Interviewees

Name	Organisation	Date of Interview	Case study used for
Ratnatunga, Sanjee	North Tyneside Council	February-01	1b
Gartside, Howard	Small Business Service	September-01	1b
Thomas, Jean	Small Business Service	September-01	1b
Howells, Phillip	HPR Media Limited Micro Cluster	October-01	1b
Palmer, Slim	HPR Media Limited Micro Cluster	October-01	1b
Halcrow, Terry	Pegasus Pipeline Micro Cluster	October-01	1b
Corbridge, Angela	Eurocrafts Micro Cluster	October-01	1b
Knaggs, Steve	Argonautics Micro Cluster	October-01	2b
McDougall, Allan	Argonautics Micro Cluster	October-01	1b,2a
Smith, Trevor	Pegasus Pipeline Micro Cluster	October-01	1b
Diggory, Ian	Pegasus Pipeline Micro Cluster	December-01	1b
Hewitt, David	Argonautics Micro Cluster	December-01 /June-05	1b,2a,2b
Roxborough, Ann	Eurocrafts Micro Cluster	December-01	1b
Rossiter, Linda	Argonautics Micro Cluster	January-02	2b
Durose, Brian	Argonautics Micro Cluster	January-02	2b
Wagstaff, Dave	Flooring by Design Micro Cluster	January-02	1b
Lutz, Fiona	Ministry of Design Micro Cluster	January-02	1b
Gaunt, Lynne	Ministry of Design Micro Cluster	February-02	1b
Thompson, Andy	Pegasus Pipeline Micro Cluster	February-02	1b
Herron, Don	Flooring by Design Micro Cluster	February-02	1b
Greig, Martyn	Pegasus Pipeline Micro Cluster	March-02	1b
Carr, Carole	Ministry of Design Micro Cluster	March-02	1b
Byrne, David	Argonautics Micro Cluster	April-02	2b
Douglass, Peter	Argonautics Micro Cluster	April-02	2b
Carr, Paul	Ministry of Design Micro Cluster	April-02	1b
Muir, Ian	Flooring by Design Micro Cluster	April-02	1b
Allan, Peter	Argonautics Micro Cluster	April-02	2a, 2b

Name	Organisation	Date of Interview	Case study used for
Jose, Pam*	Environmental Industries Federation	April-02	1a. 1b
Rutherford, Phil	Probe Industries Limited	April-02	1b
Wayman, Malcolm	Advanced Engineering Solutions Limited	April-02	1b
Williams, John	NEMI-CAI	January-03	1a, 1b
Dersley, John	University of Newcastle upon Tyne	November-03	1a
Bridge, John	One NorthEast	December-03	1a
Reed, Bruce	EEDS Limited	December-03	1a
Goddard, John	University of Newcastle upon Tyne	January-04	1a
Pittis, Janice*	University Of Essex	February-04	1a
Athey, Dale	Orla Proteins Limited	February-04	1a
Shakeshaft, Phil	One NorthEast	February-04	1a
Jamieson, Ron	Resource Centre for Innovation & Design	February-04	1a
Pywell, Chris	One NorthEast	March-04	1a, 2a
Turnbull, Alec	One NorthEast	March-04	1a,1b
Morris, Keith	Centre for Excellence in Life Sciences	March-04	1a
Robson, Ian	Centre for Excellence in Life Sciences	March-04	1a
French, Chris	University of Newcastle and NaREC	March-04	1a, 2a
Hills, Bill	Engineering Design Centre	March-04	1a, 2a
Armstrong, John		April-04	1a

* Interviewed by telephone

Name	Organisation	Date of Interview	Case study used for
Beresford, Bob	Jobs on the Riverside	May-04	2a
Steele, Bob	Jobs on the Riverside	May-04	2a
Pearson, Mark	One NorthEast	May-04	1a, 2a
Rodgers, Alastair	Northern Offshore Federation	May-04	2a
Kroese, Japp	Swan Hunter (Tyneside) Limited	May-04	2a
Alderman, Lesley	One NorthEast	May-04	1a, 2a
Bowles, David	Northern Defence Industries	June-04	1a, 2a
Brown, Paul	Regional Service for Clustering	July-04	1b
Austin, Allan	Regional Service for Clustering	July-04	1b, 2b
Dinsmore, Sandy	Regional Service for Clustering	July-04	1b
Shevels, Alex	Regional Service for Clustering	July-04	1b
Briggs, Peter	Regional Service for Clustering	July-04	1b
Syme, Avril	Regional Service for Clustering	July-04	1b, 2b
Kirkbride, Neil	British Engines Limited	August-04	2a
Elton, Liz	Newcastle City Council	October-04	2a
Taylor, Kevin	Imtech Marine and Offshore UK Limited	October-04	2a, 2b
Shepherd, Bruce	Shepherd Offshore Services Plc	October-04	2a
Brennan, Tom	GMB Union	October-04	2a
Goodwin, Paul	Newcastle City Council	October-04	2a
Richardson, Barry	Newcastle City Council	October-04	2a
Hanwell, Jack	Northern Offshore Federation	March-05	2a
Rowan, Kevin	Trades Union Congress (TUC)	March-05	1a, 2a
Vaughan, Roger	University of Newcastle upon Tyne	May-05	2a
Brannigan, Ian	One NorthEast	May-05	1a
Bruce, George	University of Newcastle upon Tyne	May-05	2a
Williamson, Andy	One NorthEast	June-05	1a, 2a

Name	Organisation	Date of Interview	Case study used for
Stables, Dave	DUCO Limited	June-05	2a
Pellow, Nathan	Enabling Concepts Limited	October-05	1b, 2b
Campbell, David	Regional Service for Clustering	Various	1b
Garrett, Angus	Regional Service for Clustering	Various	1b
Haddon, Andy	Regional Service for Clustering	Various	1b
Siedlok, Frank	Durham University Business School	Various	1a, 2a