

Towards a theory of peripheral, early stage clusters

Kasabov, Edward

Postprint / Postprint

Zeitschriftenartikel / journal article

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:

www.peerproject.eu

Empfohlene Zitierung / Suggested Citation:

Kasabov, E. (2010). Towards a theory of peripheral, early stage clusters. *Regional Studies*, 45(6), 827-842. <https://doi.org/10.1080/00343401003724651>

Nutzungsbedingungen:

Dieser Text wird unter dem "PEER Licence Agreement zur Verfügung" gestellt. Nähere Auskünfte zum PEER-Projekt finden Sie hier: <http://www.peerproject.eu> Gewährt wird ein nicht exklusives, nicht übertragbares, persönliches und beschränktes Recht auf Nutzung dieses Dokuments. Dieses Dokument ist ausschließlich für den persönlichen, nicht-kommerziellen Gebrauch bestimmt. Auf sämtlichen Kopien dieses Dokuments müssen alle Urheberrechtshinweise und sonstigen Hinweise auf gesetzlichen Schutz beibehalten werden. Sie dürfen dieses Dokument nicht in irgendeiner Weise abändern, noch dürfen Sie dieses Dokument für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen.

Mit der Verwendung dieses Dokuments erkennen Sie die Nutzungsbedingungen an.

gesis
Leibniz-Institut
für Sozialwissenschaften

Terms of use:

This document is made available under the "PEER Licence Agreement". For more information regarding the PEER-project see: <http://www.peerproject.eu> This document is solely intended for your personal, non-commercial use. All of the copies of this documents must retain all copyright information and other information regarding legal protection. You are not allowed to alter this document in any way, to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public.

By using this particular document, you accept the above-stated conditions of use.

Mitglied der

Leibniz-Gemeinschaft



Towards a Theory of Peripheral, Early Stage Clusters

Journal:	<i>Regional Studies</i>
Manuscript ID:	CRES-2009-0144.R2
Manuscript Type:	Main Section
JEL codes:	M13 - Entrepreneurship < M1 - Business Administration < M - Business Administration and Business Econ; Marketing; Accounting, O18 - Regional, Urban, and Rural Analyses < O1 - Economic Development < O - Economic Development, Technological Change, and Growth, O31 - Innovation and Invention: Processes and Incentives < O3 - Technological Change Research and Development < O - Economic Development, Technological Change, and Growth, O38 - Government Policy < O3 - Technological Change Research and Development < O - Economic Development, Technological Change, and Growth
Keywords:	biotechnology, regional identity, public sector policy, cluster branding, cluster periphery



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Towards a Theory of Peripheral, Early Stage Clusters

Edward Kasabov

Research Fellow,
ESRC/EPSRC Advanced Institute of Management Research (AIM)
London
United Kingdom

Lecturer in Marketing
School of Management
University of Bath
Bath. BA2 7AY
United Kingdom

ek253@bath.ac.uk
0044-7981568528

(Received January 2009; in revised form November 2009)

Abstract

This paper attempts to contribute to a theory of clusters in the biotechnology sector with special reference to those operating at the periphery and away from major and established centres. We identify causes of delayed and stunted development such as inadequate institutional support, lack of networking, diverging perceptions and cognitive disagreement among major players in a cluster. The conclusions are formalised into six propositions. This research has implications for public sector policy and theory of peripheral clusters, thus enriching academic research which frequently concentrates on established clusters which have grown organically. New concepts of “general periphery” and “liability of unconnectedness” are introduced.

Keywords: biotechnology, cognitive community, cluster periphery, cluster branding, regional identity, public sector policy

JEL codes: O18 - Regional, Urban, and Rural Analyses < O - Economic Development, Technological Change, and Growth, O31 - Innovation and Invention: Processes and Incentives < O38 - Government Policy < O3 - Technological Change|Research and Development

Introduction

Clusters are central to regional and national innovation and competitiveness (SAINSBURY et al., 1999; THOMAS, 2000; ZECHENDORF, 2004). Academics and practitioners treat them as key to technological-scientific and economic competitiveness. This is evidenced not only by the increase in public policy assistance of promising regions, clusters and networks but also by the volume and variety of analyses of such locations (COOKE, 2001a, 2001b; LAGENDIJK, 2001; PREVEZER, 2001; GITTELMAN and KOGUT, 2003).

Research on clusters tends to be dominated by the investigation of “positive” aspects of cluster organisation. An early example is Porter’s emphasis on the determinants of competitiveness, such as the involvement of companies, organisations and individuals in webs of collaborative interactions. Such issues still define the parameters of inquiry in this area. Prevalent is the analysis of various aspects of cooperation (MASKELL et al., 2006; MOLINA-MORALES and MAS-VERDU, 2008); innovation (MORENO et al., 2006; VIRKKALA, 2007; MOLINA-MORALES and MAS-VERDU, 2008; PREVEZER, 2008; QUÉRÉ, 2008; ROSIELLO and ORSENIGO, 2008); competitiveness (NORUS, 2006); and growth (GLASSON et al., 2006), among others. While academics tend to investigate successful and established clusters and rarely consider issues of cluster failure (BRESCHI et al., 2001), some academics working in the area discuss the compositional characteristics of emerging clusters (CUMBERS et al., 2007), peripheral clusters (LAGENDIJK, 2000, 1999; LAGENDIJK and LORENZEN, 2007) and less successful clusters (COMMISSION OF THE EUROPEAN COMMUNITIES, 2004). There are also occasional references to disagreement and “controversy” (TEIGLAND and LINDQVIST, 2007; FELDMAN and LOWE, 2008) and even politics (SUBRA and NEWMAN, 2008) in clusters. In spite of such growth and “maturation” of the area, analyses of failed clusters and

1
2
3 negative features of collaboration and growth are still rare.
4
5
6

7
8 The paper attempts to address the above mentioned gap by studying the obverse of what many
9
10 papers on clusters do. The author investigates “peripheral” and developing clusters which are
11
12 facing difficulties. It is argued that much can be learnt from analysing failed cases and negative
13
14 aspects of cluster organisation and their functioning.
15
16

17
18
19 Recent empirical findings for four biotechnology clusters in the UK and Ireland provide an
20
21 insight into cluster problems:
22

- 23 • lack of individual and collective agency;
- 24
- 25 • weak density and variety of relationships, actors, activities and resources;
- 26
- 27 • ineffective public sector and infrastructural support, coupled with “short-termism”;
- 28
- 29 • absence of agreement among key actors about the nature and future direction of a cluster;
- 30
- 31 • poor reputation and image.
32
33
34
35

36 The conclusions are formalised into six propositions which contribute to a theory of early stage
37
38 and peripheral locations but may also help managers, academics, public sector policy bodies and
39
40 any other advice and support organisations to understand better the areas where early stage,
41
42 developing clusters need assistance. New concepts of ‘general periphery’ and ‘liability of
43
44 unconnectedness’ are also introduced to the literatures of clusters.
45
46
47
48
49

50 Of the four clusters analysed by the author (the South West of England, Central Scotland, Ireland,
51
52 Oxford), the South West of England is the most obvious candidate for a “peripheral cluster”.
53
54 Even though there is a continuum of clusters in terms of the type and severity of the “problems”
55
56 and issues that they face, the less successful clusters (the South West of England) can be
57
58
59
60

1
2 distinguished from the more successful ones (Central Scotland, Ireland, and especially Oxford).
3
4
5
6

7 The following definitions of key terms are being used:
8

- 9
- 10 • “Cluster” is a “critical mass” of organisations which inhabit a “particular location”
11 (PORTER, 1998) and which are “mutually supporting”, benefiting from unanticipated
12 connections.
13
14
 - 15 • “Cluster difficulties” are described in terms of low density and variety of formal and
16 informal relations of the organisations and individuals in a cluster as well as the lack of
17 variety of actors, activities, and resources in a cluster.
18
19
 - 20 • “Cluster periphery” is defined with respect to the geographical location of the cluster in
21 relation to major successful clusters as well as its reputation.
22
23
24
25
26
27
28
29
30

31 The discussion starts by reviewing relevant areas of research of clusters. Survey findings and
32 interview comments made by managers, scientists, consultants and public sector managers during
33 an empirical research are then presented. Five areas contributing most to cluster periphery and
34 six propositions are introduced. Implications for theory development and practice are
35 highlighted.
36
37
38
39
40
41
42
43
44
45
46
47

48 Interest in biotechnology clusters

49
50 Our research programme on established and early stage clusters builds upon academic and
51 practitioner traditions on national and regional systems of innovation and national business
52 systems (UNGER, 2000), networks (HÅKANSSON and JOHANSON, 2001), and clusters
53 (LAGENDIJK, 2001, 2006; COOKE, 2001a, 2001b). It also reflects the increasing public policy
54
55
56
57
58
59
60

1
2
3 interest in nurturing clusters at the national (SAINSBURY et al., 1999) and EU level
4
5 (COMMISSION OF THE EUROPEAN COMMUNITIES, 2002, 2004b).
6
7

8
9
10 Whilst clusters in general are of interest, the importance of biotechnology clusters is assumed to
11
12 be even greater. KENNEY and PATTON (2005) note that biotechnology has received
13
14 considerable attention in terms of its “spatial configuration”. It suffices to mention ZUCKER et
15
16 al.’s (2002) and ROMANELLI and FELDMAN’s (2004) studies of life science and
17
18 biotechnology aggregation and its consequences. However, analyses of clusters remain largely
19
20 limited to the investigation of successful and thriving locations (LAGENDIJK and LORENZEN,
21
22 2007).
23
24
25

26
27
28 Our understanding of “cluster difficulties” and “cluster periphery” draws upon accounts of less
29
30 successful, peripheral or failed clusters. Though “cluster periphery” is not always equated with
31
32 “cluster failure” – the latter denoting more severe problems facing clusters when they fail to exist
33
34 or when employment declines and companies exit while new start-ups are not recorded – studies
35
36 of failed clusters may help to identify the difficulties faced by clusters and the factors which
37
38 contribute to success. BRESCHI et al.’s (2001) case study of the failure of biotechnology in
39
40 Lombardy is an atypical account of futile attempts to design a cluster. It is also interesting
41
42 because BRESCHI et al. attribute failure to hindering institutional conditions such as inadequate
43
44 and poorly coordinated state support, ill advised funding choices and corruption scandals.
45
46
47
48
49

50
51
52 The discussion of “cluster periphery” builds upon LAGENDIJK and LORENZEN’S (2007)
53
54 discussion of “geographical proximity” and “organisational proximity” of peripheral regions.
55
56 Arguments put forth by LAGENDIJK and LORENZEN have been applied, including that of the
57
58
59
60

1
2 relationship between periphery and geographic distance from major sources of knowledge. The
3 extent to which non-core clusters can develop relations and knowledge links with “core” areas,
4 possibly by utilising organisational channels and personal networks, is relevant. Development of
5 peripheral locations may be assisted by generating local capabilities through “global connections”
6 and local connections to institutions of knowledge dissemination and absorption such as
7 universities.
8
9

10
11 In an attempt to explain the link between “periphery” and “proximity”, LAGENDIJK and
12 LORENZEN (2007) apply TORRE and GILLY’s (2000) and TORRE and RALLET’s (2005)
13 concepts of geographical, social (“logic of belonging”), institutional (“logic of similarity”) and
14 organisational proximity (Table 1). Positions (1a) and (1b) of strong “organisational proximity”
15 and strong “geographical proximity” facilitate innovation. They are also the positions which
16 remain “too much hyped in the literature” (LAGENDIJK and LORENZEN, 2007: 460). The
17 difference between position (1a), originally identified by TORRE and RALLET (2005), and
18 position (1b), added by LAGENDIJK and LORENZEN, is the temporary character of
19 collaboration and, hence, proximity. Position (2) is one of high level of coordination and is
20 marked by strong organisational proximity and weak geographical proximity. Position (3)
21 characterises economic activity in spatially integrated locations where organisations co-locate in
22 order to benefit from the common exploitation of infrastructure and resources.
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50

51 -----
52 Insert Table 1 Here
53 -----
54

55
56 Of interest to us is position (4) of weak overall proximity. This is what the author refers to as
57 “general periphery”. The brief mention of this position in LAGENDIJK and LORENZEN’s
58
59
60

1
2
3 analysis was the starting point of this investigation of “cluster difficulties” and “cluster
4
5 periphery”. The rest of the analysis attempts to develop an understanding of:
6

- 7 • what exactly happens in position (4);
- 8
- 9 • why some clusters remain trapped in position (4) and do not progress beyond it.
- 10
- 11
- 12
- 13
- 14
- 15
- 16

17 The empirical research

18 Research set-up and the overall picture

19
20 Four clusters were empirically studied: Oxford, Central Scotland, the South West of England and
21
22 Ireland (including Republic of Ireland and Northern Ireland). Of these, only Oxford figures
23
24 prominently in reports, academic papers, and case studies (COOKE, 2001a, 2001b; ZELLER,
25
26 2001). Central Scotland, the South West of England and Ireland are rarely mentioned in the
27
28 academic literature, practitioner reports and public sector policy documents. For instance,
29
30 Central Scotland’s place is marginal in the 1999 *Biotechnology Clusters* report compiled by the
31
32 team of UK’s Minister of Science at the time, Lord Sainsbury. The South West of England is
33
34 even more side-lined in the report.
35
36
37
38
39
40
41
42

43 The empirical research consisted of the analysis of a survey involving 288 organisations in
44
45 Ireland in 2001 and 1,236 organisations in the three UK clusters in 2005. During separate
46
47 research stages, 29 in-depth interviews in Ireland in 2001 and 2004 and 23 in-depth interviews in
48
49 the UK (eighteen interviews with practitioners in the South West of England and five interviews
50
51 with public sector managers in Scotland and the South West of England) in 2005, 2006, 2008 and
52
53 2009 were carried out. The qualitative data used in this discussion were provided by key
54
55 stakeholders in the South West of England’s biotechnology sector such as service providers,
56
57
58
59
60

1
2
3 SME managers, scientists and consultants. They participated in telephone interviews which
4
5 lasted between 35 and 63 minutes and during which information was gathered about the history,
6
7 institutional frame, and resource composition of the cluster, its networking activities and its
8
9 general traits (see Table 2). Interviews were also organised with public sector policy makers,
10
11 lasting between 48 and 81 minutes and during which the findings from the earlier conversations
12
13 with practitioners were discussed.
14
15

16
17
18
19
20 -----
21 Insert Table 2 and Table 3 here
22 -----
23

24
25
26
27 Select survey findings for peripheral clusters
28

29
30 Among the UK clusters, the Oxford cluster is clearly differentiated, in terms of its scale, maturity
31
32 and importance, from the clusters of Central Scotland and the South West of England (Table 3,
33
34 Table 4). There is a noticeably lesser variety of actors, organisations, activities and resources in
35
36 the South West of England. The variety of organisations in Oxford and their involvement in
37
38 equally diverse activities are easily contrasted with the absence of research establishments at
39
40 phases of development close to commercialisation and knowledge transfer in the South West of
41
42 England (Table 4). The South West of England's lack of clinical testing establishments and the
43
44 small number of research establishments carrying out applied research, and not only blue skies
45
46 research, are two particularly significant findings.
47
48
49

50
51
52
53 -----
54 Insert Table 4 Here
55 -----
56
57
58
59
60

1
2
3 We use five measures of innovation inputs and six measures of innovation outputs (Table 4)
4
5 borrowed from analyses of innovation and clusters. They have been adapted from HAGE and
6
7 HOLLINGSWORTH's (2000) combined input and output innovation measures, POWELL and
8
9 BRANTLEY's (1992) input measures and KLEINKNECHT's (1996) operationalisation of
10
11 innovation. By incorporating a variety of innovation measures – “number of patent
12
13 applications”, “new products and services brought/not brought to market”, “investment in R&D
14
15 staff and machinery” and the “generation of high-profile publications” and “conference
16
17 presentations” – it was felt that findings would capture the contributions that clusters made to
18
19 science, the economy and society.
20
21
22
23

24
25
26 The South West of England cluster does not match the profiles of the Oxford and Central
27
28 Scotland clusters in terms of the number of innovation outputs such as new market offerings,
29
30 number of scientific publications, number of patent applications and patents granted. The
31
32 standing of the cluster of Oxford as a centre of knowledge generation and dissemination is
33
34 confirmed, both in absolute terms and relative to the South West of England and Central
35
36 Scotland. Oxford's readings for the measures of “Percentage revenues accounted for by new
37
38 products and/or services brought to market in last three years” (t-test, sig. 0.425; 0.098),
39
40 “Publications, in the scientific literature” (t-test, sig. 0.232; 0.199), “Conference papers and
41
42 addresses” (t-test, sig. 0.171; 0.114), and “Patents issued” (t-tests, sig 0.006; 0.709) are higher
43
44 than those of the South West of England and Central Scotland.
45
46
47
48
49

50
51
52 The only measure where the South West of England scores high is “New products/services
53
54 brought to market”. However, if this measure is analysed alongside it's the reading of the cluster
55
56 for “Percentage revenues accounted for by new products and/or services brought to market in last
57
58
59
60

1
2
3 three years”, the South West of England emerges as a cluster with a significantly weaker
4
5 contribution to economic well-being (lesser emphasis on new market offerings) and a less
6
7 noticeable impact on the scientific community (lower number of scientific publications and
8
9 patents).

10
11
12
13
14 The high readings for innovation outputs of the Oxford cluster (see Table 4, output measures 1-4)
15
16 cannot be explained in terms of higher innovation inputs only, because Central Scotland and the
17
18 South West of England report high innovation inputs as well. The innovation investments
19
20 (innovation inputs) made in the clusters of Central Scotland and the South West of England do
21
22 not seem to have been successfully translated into innovation outputs (see Table 4, input
23
24 measures 1-5 compared to output measures 1-4). The inability of these two clusters to translate
25
26 innovation inputs into innovation outputs raises two questions discussed in more depth later in
27
28 the discussion: firstly, if national and regional policy can successfully engineer high-tech
29
30 clusters; and secondly, whether the expectations about the timescale of ROI (return on such
31
32 innovation investments in clusters) may be unrealistic.
33
34
35
36
37
38
39

40
41 The last set of survey findings are about the level and type of networking of organisations that
42
43 inhabit clusters. The level and type of networking are measured in terms of “centrality in webs of
44
45 exchanges” (number of ties), “complexity of exchanges” (variety of exchanges), and “type of
46
47 relations” (long term, value adding, knowledge-generation-and-exploitation-focused relations or
48
49 the lack of such relations). There are significant differences among the three UK clusters with
50
51 respect to their networking arrangements. The responses of the companies from Central Scotland
52
53 indicate ‘lower connectedness’, or lower level of networking and centrality in the UK and
54
55 international systems of biotechnology knowledge generation and dissemination. Such findings
56
57
58
59
60

1
2
3 also imply reduced influence of this cluster. Similarly, the South West of England compares
4 unfavourably with the greater number of relations overall (t-test, sig. 0.534; 0.704), of regional
5 relations (t-test, sig. 0.190; 0.081), and of international relations (t-test, sig. 0.213; 0.208) of the
6
7
8
9
10 organisations inhabiting the Oxford cluster.

11 12 13 14 15 16 17 Empirical findings about cluster difficulties and cluster periphery

18
19 Three interview findings with a bearing on this discussion confirm the survey findings, as
20
21 illustrated in Tables 3 and 4. These are “low level of agency”, perceptions of “shortage of
22
23 institutional support” for cluster development, and “isolation”. Such findings draw attention to
24
25 problems which may contribute to early stage “cluster difficulties” and “cluster periphery”.
26
27
28
29
30
31
32

33 34 Area 1: Intra-regional networking, density and variety of relationships

35
36 Some interviewees attributed the problems of early stage clusters to inadequate local
37
38 “connectedness”. The hope for *future success* in this area was expressed by the MD of a provider
39
40 of scientific-technological services) (interviewee # 8; date: 2006) who noted
41
42 *things are growing in the South West ... we're not averse to having relationships with other*
43
44 *companies... as their needs arise.*
45
46

47
48 Another interviewee (interviewee # 3; date: 2006), a consultant working in the area, raised
49
50 similar concerns regarding the lack of local initiative-taking, networking and the generation of a
51
52 critical mass of relations among members of the cluster. Interviewees rarely mentioned intra-
53
54 cluster transfer of knowledge. The few references to such issues (interviewees # 4, 9, 12; date:
55
56 2006) appeared only in three interviews and almost invariably focused on planned developments
57
58
59
60

1
2 and future initiatives rather than on present schemes. The manager of a company providing
3 specialist chemicals (interviewee # 4; date: 2006) pointed out that
4
5
6
7 *we are thinking of opening negotiations [with other companies] ... I would think that we would*
8
9
10 *see a stronger relationship with other companies in the region.*

11
12
13
14 Recent interviews with a prominent scientist (interviewee # 19; date: 2008 and 2009) revealed
15
16 that, while *there's potential*, their organisation had not adequately explored the possibilities of
17
18 developing relationships that *could lead to something*. The same interviewee argued that
19
20 universities and research institutions in the South West of England were increasingly inclined to
21
22 move forward on their own, if they felt that they needed to proceed quickly on a project and were
23
24 not supported by the national and regional development agencies in their efforts. The scientist
25
26 conceded that regional development agencies and advice bodies had initiated schemes and had
27
28 commissioned reports. Nonetheless, much of that activity allegedly had to do with
29
30
31 *boasting about the figures and the metrics*
32
33
34
35 and relatively less with *consulting* local players as to what they really needed.
36
37
38
39

40
41 Though of recent origin and inadequately researched, intra-regional networking was described by
42
43 a public sector manager (interviewee # 18; date: 2008) as being *promoted* by the public sector.
44
45 The interviewee was eager to emphasise that current efforts were being targeted at making up for
46
47 the belated development of the cluster, including the promotion of industrial networks around
48
49 BioIncubators and the organisation of events with the SW Angel Investor Network (SWAIN
50
51 hereafter). This network is partly funded by the SW RDA and works closely with SW RDA with
52
53 the objective of connecting businesses with private investors. Another prominent example
54
55 discussed during two interviews (interviewees # 9 and 11; date: 2006) was the planned yet not
56
57
58
59
60

1
2
3 functioning Bristol & Bath Science Park 'SPark' which was described as *long needed*. Promising
4
5 mentoring schemes, such as those run by SWAIN and BusinessLink (a free business advice and
6
7 support service available throughout England), were assessed by an interviewee (interviewee #
8
9 19; date: 2009) as
10
11 *not always targeted, at least that is how some clients feel ... [but] probably useful*.

12
13
14 It appeared that the networking efforts of regional policy bodies and facilitators were frustrated
15
16 by the lack of resources. The authority and powers of regional public sector bodies and related
17
18 support organisations were described as largely *confined to brokering*.
19
20
21
22
23

24 Building upon the interview narratives and the survey findings for the three studied clusters
25
26 concerning the density and variety of networking ties, and following BAUM and OLIVER
27
28 (1992), we suggest that the empirical research provides a compelling illustration of what we refer
29
30 to as "liability of unconnectedness". Its magnitude in the South West of England is comparable
31
32 to the inadequate embeddedness and low complexity of relations uncovered for promising,
33
34 technology-driven populations in the Irish biotechnology cluster and may be linked to the
35
36 reported difficulties in accumulating regional know-how, innovating and commercialising
37
38 inventions.
39
40
41
42
43
44

45 We suggest the following proposition:

46
47 Proposition 1: Cluster periphery and the absence of growth of early stage clusters are associated
48
49 with unsuccessful attempts to develop local, dense and varied networks of actors, organisations
50
51 and activities. Particularly important to stimulating the development of a cluster may be the
52
53 existence of 'anchor' firms and research institutions.
54
55
56
57
58
59
60

1
2
3
4
5 Area 2: Extra-regional networking, density and variety of relationships
6

7 LAGENDIJK and LORENZEN (2007) maintain that organisations in “non-core locations” need
8
9 to develop strategies to gain access to the expertise in core areas, by nurturing knowledge
10
11 exchanges with them. The managers, consultants and scientists interviewed in the South West of
12
13 England acknowledged that events, conferences, and workshops were being organised. Networks
14
15 such as the Bristol Enterprise Network had been successfully set up, aimed at assisting
16
17 networking within and outside the cluster. However, interviewees’ reports of on-going, intensive
18
19 networking with outside bodies were infrequent (interviewee # 2; date: 2006). The problems of
20
21 poor networking appeared to be enduring (interviewee # 4, 9, 16, 19; date: 2006, 2008 and 2009).
22
23 During some of the interviews (interviewee # 3, 8, 19; date: 2006 and 2009), the South West was
24
25 contrasted with locations which had long standing institutions, established and recognised
26
27 traditions in science and commercialisation of research, a variety of participant organisations and
28
29 prominent actors working in biotechnology. This story of the *lack of success* in networking with
30
31 colleagues outside the cluster was linked to a narrative (interviewee # 19; date: 2008 and 2009)
32
33 about the *peripheral position* of the cluster and its *low visibility*. A mid-level manager of a
34
35 production facility (interviewee # 11; date: 2006) repeatedly pointed out that companies in the
36
37 region found it hard to develop contacts with *star scientists* and key multinational players. The
38
39 manager suggested that
40
41
42
43
44
45
46

47 *compared to Oxford and Cambridge obviously we’ve got a long way to go.*

48
49 Similarly, the MD of a service provider (interviewee # 8; date: 2006) noted that biotechnology
50
51 players at the international stage had to
52
53
54
55 *understand that there are companies here that are progressing and it is an area of interest for*
56
57 *them.*
58
59
60

1
2
3 There was little disagreement about the peripheral position of the cluster internationally, with the
4
5 interviewee noting that the cluster
6
7 *doesn't ... rate at all really ... I felt that scientific life more or less ended there* [in the South West
8
9 of England].
10

11
12
13
14 Problems may not be unique to the South West of England. When asked to reflect on their
15
16 experience in another UK biotechnology cluster, a scientist (interviewee # 19; date: 2008)
17
18 suggested that the start-up biotechnology company they used to work for faced similar issues
19
20 when attempting to liaise with and attract venture capitalists. There was no expectation that
21
22 current initiatives, at the time of the empirical research, such as the Trade Missions, the
23
24 delegation to the US in late 2008, and the facilitation of meetings with scientists and managers
25
26 outside the region would *work*, as locally available scientists with specific skills were allegedly
27
28 rare and hard to persuade to stay in the region.
29
30
31
32
33
34
35

36 We suggest the following proposition:

37
38 Proposition 2: Cluster periphery and the absence of growth of early stage clusters are linked with
39
40 insufficient or ineffective attempts to encourage networking with national and world-class centres
41
42 of excellence in the global system of knowledge creation and dissemination.
43
44
45
46
47
48
49

50 Area 3: Cognitive disagreement and fostering a cognitive community

51
52 Social and institutional proximity (TORRE and RALLET, 2005) as well as cognitive proximity
53
54 (BOSCHMA, 2005) contribute to the advancement or otherwise of clusters. There appear to
55
56 exist problems related to cognitive proximity in the South West of England. The policy makers'
57
58
59
60

1
2 views of cluster success were challenged by all interviewed practitioners. Such divergence of
3
4 views concerning the success of the cluster was uncovered during the interviews concerning the
5
6 Irish cluster as well, but it seemed to be particularly pronounced in the South West of England.
7
8 This conclusion about the disagreement among isolated “cognitive communities” rests not only
9
10 on the empirical findings but also on general claims about the nature and communication
11
12 limitations of “cognitive communities”, “epistemic communities”, and “communities of
13
14 practice”.
15
16
17
18
19

20
21 It is indicative that a public sector manager (interviewee # 18; date: 2008), when asked whether
22
23 they thought that a strong identity existed among individuals and organisations as well as
24
25 between the private and public sectors in the South West of England, suggested that shared
26
27 identity was
28
29
30
31 *extremely strong [but only] among some organisations.*
32

33 One example provided by the manager was the *natural grouping* of the Plymouth Marine
34
35 Sciences Partnership which unites seven organisations involved in marine biology research. The
36
37 manager also suggested that the identity of such groupings had been actively promoted through
38
39 *support of their work* and the generation of opportunities such as the aforementioned BioFlorida
40
41 mission in October 2008. However, no other major examples providing evidence for the
42
43 existence of a common, overarching identity of private and public sector organisations were
44
45 found.
46
47
48
49

50
51
52 We suggest the following proposition:
53
54
55
56
57
58
59
60

1
2
3 Proposition 3: Cluster periphery and the absence of growth of early stage clusters are attributed to
4 failed attempts to foster a “cognitive community” with collectively held perceptions being
5 encouraged early in the history of the cluster.
6
7
8
9

10 11 12 13 14 Area 4: Visibility and periphery of clusters

15
16
17 Visibility and periphery are issues which dominated many interviews (interviewee # 2, 3, 4, 8, 11
18 and 12; date: 2006). The low visibility and inadequate place branding or cluster re-positioning
19 initiatives were reported by three interviewees (interviewee # 11, 12 and 19; date: 2006, 2008 and
20 2009). It appears that there have been frustrated efforts to develop and diversify the portfolio of
21 actors, organisations and activities in the South West of England. Interviewees (interviewee # 11
22 and 19; date: 2006 and 2009) linked this issue with the problem of developing a strong regional
23 identity. This issue of identity of supra-organisational entities has only recently been analysed by
24 Organisation Theory and Strategic Theory scholars (POLOS et al., 2002; RAO et al., 2003;
25 HANNAN et al., 2004; HSU and HANNAN, 2005). Comments of
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
no meeting of minds, different agendas [of public and private sector organisations] and a *lack of*
collaboration (interviewee # 19; date: 2008 and 2009)

between these two groups because of differences in perceptions can be interpreted using
ROMANELLI and KHESINA’s (2005) definition of “regional industrial identity” as a “social
code” which affects economic decisions, if shared by stakeholder groups. ROMANELLI and
KHESINA view the strength of such an identity as a by-product of the size and the number of
observer groups which subscribe to a specific version of that identity. In the case of the early
stage cluster studied here, shared popular perceptions are of an area of natural beauty, sparsely
populated and without good infrastructure or links with the rest of the country. As described by

1
2
3 two interviewees (interviewee # 18 and 19; date: 2008 and 2009), it is a remote place which is
4
5 seen as distinct from the bustle of modern life and from traditional centres of excellence in
6
7 science and technology.
8
9

10
11 Partly in response to such widely held conceptions, regional public sector bodies appear to have
12
13 made recent attempts to re-define the cluster identity and “re-brand” the area. The South West of
14
15 England led the BioFlorida mission in October 2008, on behalf of all UK clusters. The area was
16
17 also popularised during an April 2008 event in Exeter, with participants such as NHS Innovations
18
19 SW and UK Trade & Investment taking part. A knowledge transfer network event was held in
20
21 September 2008. In the opinion of one public sector manager (interviewee # 18; date: 2008)

22
23
24
25
26 *One of the biggest hurdles is that the South West is seen as a holiday area – holiday destination.*
27

28
29 However, concerted efforts were being made to place a series of advertisements and articles in
30
31 industry trade journals attempting to place brand the area as a biotechnology specialist location.

32
33 Even though the interviewee in question stressed

34
35
36 *you need to raise awareness of your strengths and hold national meetings,*

37
38 it was felt that perceptions were changing very slowly and only recently, partly because of the
39
40 more recent efforts of public sector policy such as the promotion initiative of the region in the
41
42 *European Biopharmaceutical Review*. The interviewees working in the private sector did not
43
44 appear to be aware of these initiatives.
45
46
47
48
49

50
51 The realisation of the significance of the “periphery” problem is also reflected in recent public
52
53 sector documents. SW RDA (2006a, 2006b) singles out the ‘periphery’ issue as problematic and
54
55 has prioritised the need to “improve the way that the South West is perceived by investors,
56
57
58
59
60

1
2
3 businesses, potential workers and visitors” (2006b: 27). However, place re-branding attempts
4
5 still focus on the tourist sector, creative and leisure industries, and not on biotechnology.
6
7

8
9
10 The survey findings and interview narratives raise a question as to whether it is possible to
11
12 change long-standing and enduring perceptions. The narratives suggest that concerted efforts to
13
14 re-brand early stage clusters may not produce the immediate outcomes which are often desired.
15
16 To change long held perceptions concerning place brands is notoriously difficult. Collective
17
18 perceptions are path-dependent and resilient to overt influence. Therefore, policy efforts may
19
20 need to be long-term and not based on the frequent and periodic evaluation of short-term
21
22 deliverables (the *public sector short-termism* referred to by interviewee # 19; date: 2009).
23
24 Furthermore, as interviewees (interviewee # 8, 11, 12; date: 2006) suggested that national place
25
26 branding programmes designed in London appeared to sideline developments in the South West
27
28 of England, place branding programmes may need to be designed without expectations of active
29
30 involvement on the part of national public sector bodies. As demonstrated by recent branding
31
32 initiatives such as placing advertisements internationally, modest promotion may need to be
33
34 taken to gradually manipulating – in the positive sense of the word – the reputation of a cluster
35
36 rather than wait for the attention of and a more favourable attitude on the part of the national
37
38 administration.
39
40
41
42
43
44
45
46
47

48 We suggest the following propositions:

49
50 Proposition 4: Cluster periphery and the absence of growth of early stage clusters may be
51
52 associated with failed attempts to address visibility issues and re-position a cluster, both
53
54 internally in the region and internationally.
55
56
57
58
59
60

1
2
3 Proposition 5: Cluster periphery and the absence of growth of early stage clusters may be linked
4
5 to failed attempts to agree on a clear identity for the cluster and nurture shared understandings of
6
7 a “desirable” cluster “identity”.
8
9

10
11
12
13
14 Area 5: Regional and local support; the role of institutions
15

16
17 The dissatisfaction with the rate of growth of the cluster, number of new ventures, and the
18
19 absence of success stories was frequently associated by interviewees with the inadequate support
20
21 of regional and especially national development agencies. This matter of institutional support
22
23 and infrastructure, in terms of the provision of funding, business and technical assistance, the
24
25 assistance for key institutions such as universities, research establishments, teaching hospitals,
26
27 and suitably trained labour ranging from technicians and managers to star scientists was recurrent
28
29 across interviews (interviewee # 2, 4, 9, 12, 18, 19; date: 2006, 2008 and 2009).
30
31
32

33
34
35 Some respondents (interviewee # 18; date: 2008) identified regional policy initiatives aimed at
36
37 encouraging the creation of new ventures and assisting the actions of local managers and
38
39 scientists, but the majority of interviews revealed a pronounced frustration with the focus at the
40
41 *Government level* at what the interviewees referred to as the
42
43 *South East [England] and the golden triangle [of London, Oxford and Cambridge]* (interviewee #
44
45 8; date: 2006)
46
47
48

49
50 Respondents (interviewee # 8, 11, 12; date: 2006) repeatedly drew attention to the unsuccessful
51
52 efforts to involve national policy makers in regional schemes of company financing and creation,
53
54 specific project backing, relationship generation and nurturing.
55
56
57
58
59
60

1
2
3 Even though certain problems did not actually appear to be in the remit of regional development
4 agencies, interviewees (interviewee # 8, 12; date: 2006) stated their dissatisfaction with the
5 reticence of regional public sector policy bodies to make referrals, their limited autonomy and
6 decision making power when approached regarding specific projects, the low responsiveness on
7 the part of agencies and London-based agencies in particular, their alleged

8
9
10
11
12 *inertia in thinking inherited from the Thatcher period* (interviewee # 12; date: 2006)

13
14
15
16 and its bias towards established and mature service sectors with business models inappropriate
17 for small-scale biotechnology companies, the limited experience with biotechnology and the
18 resulting lack of understanding of scientists' and service providers' needs (interviewee # 12; date:
19 2006). One respondent stated that when useful support was provided, it was done *in a very round*
20 *about way* (interviewee # 11; date: 2006). A local consultant (interviewee # 3; date: 2006)
21 remarked

22
23
24
25
26
27
28
29
30
31 *They lack the physical sciences background to understand... what I'm doing really – ... so from*
32 *my perspective they're neither intellectual heavyweights on the science side nor do they have –*
33 *you know – 25 or 30 years of business experience.*

34
35
36
37
38
39
40 With respect to the efforts on the part of regional development and advisory agencies, a scientist
41 (interviewee # 19; date: 2008 and 2009) noted that their relatively short planning cycles and time
42 frames were at odds with the long-term frames in biotechnology. Such short-termism, it was
43 suggested, affected biotechnology programmes and the overall development of science in the
44 cluster. The same interviewee clearly distinguished between the role and impact of regional and
45 national policy bodies. It was noted that SW RDA had sub-regional teams linked closely to
46 universities, Innovation Centres, and Local Authorities. The frustration with London-based
47 public sector decision making was obvious when the interviewee added that

1
2
3 *The South East gets a lot of focus, due to the many multinationals in the pharmaceutical industry.*
4
5 *The DTI work with the multinationals, not with small companies and many of these MNCs*
6
7 *happen to be in the South East.*
8

9
10 Further evidence of such a bias, on the part of the national development bodies, is found in
11 publicly available documents. According to UK Trade & Investment (2007), the Marketing
12 Strategy Board is a pillar in delivering the new marketing strategy across sectors in the UK. The
13
14
15
16
17 author has discovered that the South West of England and small players in biotechnology seem to
18
19 have been sidelined from membership on the Board.
20

21
22
23
24 The literature tells us that institutions affect local dynamics and cluster survival (BRESCHI et al.,
25
26 2001). The absence of local institutions and support may negatively affect cluster growth, as
27
28 illustrated in the limited and fragile webs of knowledge creation reported by BENNEWORTH
29
30 (2007) in the case of Newcastle University. Fostering cluster development is also influenced by
31
32 the degree to which national policy has shifted from the traditional focus on large enterprises and
33
34 towards assisting dynamic SMEs and entrepreneurship (AUDRETSCH, 2002; GILBERT et al.,
35
36 2004; SOETE and STEPHAN, 2004). In this transition from a national to a local policy model,
37
38 some clusters seem to have lost out to “winner regions” with traditional, long term and long
39
40 standing advantage in the natural sciences.
41
42
43
44
45
46

47 We suggest the following proposition:

48
49
50 Proposition 6: Cluster periphery and the absence of growth of early stage clusters are associated
51
52 with public sector policy emphasis on “winner regions” and “national champions”.
53
54
55
56
57
58
59
60

Towards a theory of peripheral, early stage clusters

This discussion built upon current critique in the literature of clusters, more specifically in “new regionalism” research (LOVERING, 2001, 2007; LAGENDIJK, 2006; MACLEOD and MARTIN, 2007), and identified factors behind the hindered development of clusters. The author has suggested five areas of cluster formation difficulties and cluster periphery which can “make or break” an early-stage, developing cluster. This presents an alternative approach to the analysis of factors which are associated with successful clusters. Here the inductive propositions are extended. The aim is to contribute to the development of a body of knowledge of peripheral clusters and define the essential parts of such knowledge (Figure 1).

Insert Figure 1 Here

Propositions 1 and 2 suggest that early-stage cluster difficulties and periphery may be attributed to the unsuccessful attempts to develop local, dense and varied networks and to stimulate links with national and world-class centres of excellence as well as professional bodies located far from the cluster. However, the question remains as to why clusters such as the South West of England do not develop these dense networks internally. Survey findings and interview themes hint to problematic areas. One is the absence of ‘anchor’ firms in pharmaceuticals, medical device, diagnostics and other sectors of the life sciences. Not having such companies in an emerging cluster almost invariably hinders the development of SMEs. The absence of anchor multinationals, bringing in established links with their parent organisations and other companies, coupled with the scarceness of ties (i.e. low number of ties per organisation) with pharmaceutical and medical device multinationals outside the cluster, does not provide opportunities for local actors to connect with “externals”. As suggested by an SME manager (interviewee # 4; date:

1
2
3 2006), this presents problems in terms of *access to people* including managers, scientists,
4
5 technicians and subcontractors with valuable and specialised expertise. In fact, the South West of
6
7 England has recently lost multinationals previously located there which one interviewee
8
9 (interviewee # 19; date: 2009) attributed to inadequate subsidies and incentives. Though not
10
11 directly related to our research, an example that appeared during the interview sheds light on
12
13 some of the difficulties in attracting and keeping such companies. Amazon had had a distribution
14
15 centre in the South West of England which was recently moved to Swansea in south Wales.
16
17

18
19 *There's a need for a big incentive for someone to come here*

20
21 a scientist argued, adding that

22
23
24 *The South West isn't the first calling point to come to ... you need to engage their interest,*
25
26 *especially if they don't know who you are*
27

28
29 which, according to the respondent, contrasted with the carefully planned and executed provision
30
31 of incentives for Amazon to relocate to south Wales, much owing to the clear project
32
33 commitment of the Welsh Assembly Government.
34
35

36
37
38 Far from being able to attract and embed anchor multinationals, the South West of England has
39
40 lost key “anchor” SMEs. These businesses include knowledge-intensive and technology-
41
42 intensive micro-companies and spin-outs that have either left the region or have gone bankrupt.
43
44 Such loss may cripple early-stage, peripheral clusters in the long-term, for even though the
45
46 literature often assumes that only multinationals can play the role of anchor companies, dynamic
47
48 and innovative SMEs are often the engines of technological and scientific growth. In the words
49
50 of a manager (interviewee # 15; date: 2006), such SMEs can help
51
52

53
54 *a good network get going, by combining and bringing together commercial inputs, institutions*
55
56 *like the NHS, and scientists.*
57
58
59
60

1
2
3 By contributing to the generation of a critical mass of basic science and by actively
4 commercialising science, they also tend to attract representatives and distributors of multinational
5 companies. In the absence of such SMEs, it may make no economic sense for such distributors
6 and representatives to locate in the region.
7
8
9
10

11
12
13
14 A mid-level manager (interviewee # 17; date: 2009) in a service provider pointed out that
15
16 *A couple of years ago I attended an evening meeting at Bristol University highlighting some of*
17 *their spin-outs, which gave some encouragement, but then I noticed that one of the most*
18 *prominent companies migrated to Cambridge a few months later.*
19
20
21
22
23

24 A scientist (interviewee # 19; date: 2009) discussed two prominent chemistry SMEs companies
25 that had gone out of business, generating “a vacuum in bespoke and combinatorial chemistry”.
26
27 The first SME had closed down recently, while the second, owned by a US multinational,
28 allegedly disbanded the team and
29
30 *took the technology back to the US as it saw no opportunities [in the South West]*
31
32 prompting the interviewee to add that the cluster *has regressed.*
33
34
35
36
37
38
39

40 The author links this absence and loss of promising anchor SMEs to three issues. Firstly, they
41 help explain the relative isolation of the scientists in peripheral clusters from *the commercial*
42 *world.* Secondly, if these anchor SMEs are not indigenous companies but are subsidiaries of
43 multinationals, they may focus on retaining relations with the parent company and do not get
44 adequately embedded in the cluster which is a development noted by us with respect to the Irish
45 cluster discussed in an earlier publication. Thirdly, there is a danger that such non-indigenous
46 SMEs may withdraw back to base, especially in hard times, as there may be little embedded
47 value as such in being in a peripheral cluster which has been formed mainly on the basis of
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2 subsidies provided by a local development agency. Nurturing and retaining local and promising
3 SMEs at various stages of their development is vital but may prove difficult, as the specific case
4 of the peripheral cluster demonstrates.
5
6
7
8

9
10
11 Peripheral clusters also appear to suffer from the absence of experienced service provision SMEs
12 that assist scientists, connect them to other businesses and also instruct them in areas of
13 manufacturing, supply chain management, project management, and marketing. These
14 fundamental services are often overlooked by scientists who expect that their reputation in
15 scientific circles will automatically ensure successful commercialisation. Direct and proactive
16 involvement may be needed on the part of public sector policy in assisting such SME specialist
17 service providers to help address resource inadequacies in early-stage clusters. These should
18 include but not be confined to relationship management, informal networking (habitually
19 neglected in formal analysis) and trust building (see also LEAMER and STORPER, 2001;
20 MORGAN and HUNT, 1994; NOOTEBOOM, 1996) especially when approaching integrated,
21 diversified manufacturers.
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39

40 The absence of anchor firms of various sorts in the South West of England, with established
41 linkages outside the cluster, may be partly explained by the fact that the only historical
42 infrastructure inherited by the biotechnology companies is engineering, with an emphasis on
43 supplying the Navy. Such inheritance is inadequate, as the infrastructure provides few directly
44 transferable skills. More importantly, though, the absence is also attributed to the entrenched
45 nature of multinationals such as the big pharmaceutical companies. The South West of England
46 has neither the
47
48
49
50
51
52
53
54
55

56
57 *ready supply of highly qualified and low cost graduates of India and China*
58
59
60

1
2
3 discussed at length by one interviewee nor *the tax incentives of Ireland* (interviewee # 19; date:
4
5 2009)
6
7

8
9
10 This issue of “full competence” clusters (ROSSON, 2003) requiring the presence of anchor
11
12 organisations, upstream and downstream actors such as suppliers and distributors is also one of
13
14 power and the lack of local capacity. The author believes that the case of the South West of
15
16 England presents empirical backing for both claims. Private sector interviewees consistently
17
18 singled out the lack of “proper commitment” among the underlying reasons for the inability of
19
20 the South West of England to develop dense networks internally which is a question of the lack
21
22 of critical mass.
23
24

25
26 *There doesn't seem to be much happening on the ground level*
27

28
29 a mid-level manager (interviewee # 11; date: 2006) contended, mainly because of the inadequate
30
31 academic base in the region. In Oxford, the interviewee added, a large number of academics
32
33 worked on projects and commercialisations. The underlying biochemistry basis in the South
34
35 West of England, on the other hand, was described as *extremely limited*, with a weak chemistry
36
37 culture, a lack of high quality and small volume chemical production, and no adequately
38
39 resourced research institutions. An interviewee (interviewee # 19; date: 2009) pointed out that
40
41 the key input of critical intellectual mass was missing. Intellectual fervour, in terms of the
42
43 number of scientists and technicians and also with respect to the variety of ideas, was also often
44
45 absent.
46
47
48

49
50
51
52 Periphery also means that some clusters find it difficult to attract not only star scientists but also
53
54 early stage scientists and mid-level managers. This question of power, among other things, was
55
56 revealed in the story of a company in the South West of England which attempted to attract a
57
58
59
60

1
2 mid-level manager, as noted during an interview (interviewee # 19; date: 2009). The company
3
4 discovered that there was
5
6
7 *the problem of someone wanting to come to green pastures.*

8
9 The company had to compete with the
10
11 *opportunities in the South East, even if your company fails.*

12
13 This inability to persuade capable cadre to move to peripheral locations has to do with the paucity
14
15 of opportunities in such clusters. The possibility to recombine resources, even when a new
16
17 venture fails in an established cluster, is obviously absent in a peripheral cluster. Additional
18
19 deterrents to attracting scientists, managers and clinical staff to the region have to do with family
20
21 considerations.
22
23

24
25
26 *If you're in your mid-to-late 40s [manager], a scientist (interviewee # 19; date: 2009)*
27
28 *commented, you take into consideration the effect that relocating to South West England may*
29
30 *have on family members.*

31
32 The scientist provided an example of a mid-level manager who moved to a promising company
33
34 in Central Scotland but had to move south again, as his children found it difficult to adapt. The
35
36 absence of local opportunities for family members, the interviewee noted, means that
37
38 *you can't necessarily rely on managers from outside the cluster.*

39
40 This appears to be frequently misunderstood by the general public and the development agencies.
41
42 They assume that tourist areas provide an appropriate and desirable place to live permanently.
43
44 This may not always be the case, especially if the cognitively and socially peripheral cluster is
45
46 also geographically peripheral (isolated), as is clearly the case with the South West of England.
47
48 Last but not least, such geographical isolation may negatively affect not only the spouses and
49
50 children of potentially valuable individuals (scientists, technicians, managers, etc.) but also the
51
52 prospects for promotion for the scientists and managers.
53
54
55
56
57
58
59
60

1
2
3
4
5 Propositions 3, 4 and 5 identify additional inhibiting factors for peripheral clusters, more
6 specifically the absence of a cognitive community and shared understandings of a common
7 cluster identity, both among members of the cluster and by players outside of the cluster such as
8 the public sector, the private sector and the general public. These need to be discussed with a
9 view to the role of the public and private sector in encouraging proximity as well as the role of
10 agency. This is a topic which was already noted with respect to Propositions 1 and 2. The
11 section on empirical findings discussed at length the role of the public sector. Here the author
12 emphasises investment in networking and infrastructure, marketing a cluster, and mechanisms for
13 fostering a cognitive community. These are areas where regional and especially national public
14 sector agency and involvement may be critical to early stage and peripheral clusters.
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

31 Our understanding of state involvement in developing a cognitive community and thus fostering
32 the development of peripheral clusters goes beyond PORTER's view that the state only needs to
33 ensure that the basic requirements such as input factors are in place. The survey findings clearly
34 demonstrate that at least some of the input factors at the level of the individual firm are as
35 adequate in the South West of England as they are in Oxford. Interviewees consistently
36 emphasised that input problems were at the level of the cluster and not at the level of the
37 individual companies, as measured by the survey and as reported here. Examples include
38 investments in knowledge and not only in physical infrastructure, such as first class universities,
39 a mass of
40 *intellectuals* [scientists] *who are prepared to be entrepreneurs, specialised labs and science*
41 *parks.* (interviewee # 17; date: 2009)
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 It appears that public sector policy makers do not recognise the importance of the aspects of
4 cluster development discussed above which are less frequently associated by policy makers with
5 the development of peripheral clusters but which are precisely those clearly missing in the case of
6 certain early stage locations. For instance, there is failure to consider the role of knowledge
7 infrastructure, resources, and regional and place branding initiatives. Such initiatives may need
8 to be designed by speaking to private sector actors like those studied and interviewed here and by
9 asking them to identify deficiencies in terms of the support provided by RDAs, in light of the
10 remit of regional development bodies and the instruments available to them. Furthermore, it
11 seems that lessons from other locations and the manner in which they have dealt with “inhibiting
12 ingredients” such as distance, remoteness, scarcity of resources, lack of history of industrial
13 infrastructure and local entrepreneurship (i.e. Northern Finland) have not been studied by public
14 sector bodies in the UK. While Scotland seems to have marketed itself successfully in the US
15 and has attracted a number of large companies to base their headquarters there (interviewee # 19;
16 date: 2009), the South West of England has failed in doing this.

17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38 Proposition 6 emphasises the effect of the public sector bias towards winner regions and
39 “national champions” on the difficulties and periphery that some early stage clusters face. We
40 link this proposition to initiatives in the South West of England noted by interviewees which
41 have been allegedly hindered by the recent and inadequate transfer of powers from the national to
42 the regional public sector bodies supporting biotechnology (interviewee # 8; date: 2006). The
43 lack of initiative-taking may thus be attributed to the unclear boundaries of obligations and
44 expectations towards the national and regional bodies, as suggested by a number of interviewees
45 (interviewee # 8, 9, 12; date: 2006). Similar are the stories of

1
2
3 *only initial contacts* [developed, with] *lots of meetings and sub-groupings in SW RDA, meetings*
4
5 *with stakeholders*

6
7 and no outcomes (interviewee # 19; date: 2009). Such comments are frequently accompanied by
8
9 comparisons with Scotland and Wales where significant funding has been made available for the
10
11 development and commercialisation of new technology. Emerging clusters in England, we were
12
13 told, struggled with the effect of national level decisions, more specifically with the lack of
14
15 freedom of regions to set up financial incentives autonomously.
16
17

18
19
20
21 The proposition also raises the issue of the (im)possibility of developing a cluster, especially in
22
23 locations where an adequate skills and knowledge base may not exist, where anchor firms are not
24
25 present, where useful resources have not been inherited from other industries that have populated
26
27 or continue to populate a region, and where regional initiatives are limited and hindered by
28
29 national decision making. This is particularly true for the South West of England which has not
30
31 got a long-standing history of accumulation of expertise and resources in any of the areas of the
32
33 natural sciences, even though the SW RDA takes pride in the alleged heritage and history of the
34
35 region as a centre of engineering excellence in the UK.
36
37
38
39
40
41
42
43
44

45 Conclusion and Avenues for Future Research

46
47 Though based on a limited number of case studies, the discussion filled a gap in analysis about
48
49 struggling locations. Rather than contributing to the identified “positiveness bias” in the area of
50
51 inquiry, the paper analysed the less often researched “negative” issues of cluster failure,
52
53 emerging, peripheral and less successful clusters.
54
55
56
57
58
59
60

1
2
3 The author suggested a body of knowledge about the drivers of cluster periphery, including the
4
5 absence of anchor firms and incentives for attracting them, loss of anchor SMEs, inadequate or
6
7 inappropriate inherited infrastructure, lack of local capacity in basic science, and difficulty in
8
9 attracting star scientists and managers. Private sector managers and public sector officials may
10
11 also be interested in lessons such as the recommended drive away from the present, rather limited
12
13 understanding of cluster development, the exclusive focus on input factors, and the failure to
14
15 apply lessons from other locations which have had to struggle with similar problems.
16
17
18
19

20
21 The future development of such a theory will depend on the refinement of the concepts and
22
23 arguments presented here and on empirically testing them across sectors, contexts and stages of
24
25 cluster development. The author invites scholars to study in more detail the role of individual
26
27 and collective (private and public sector) agency in such clusters, and more specifically:
28
29

- 30
31
- 32 • role of anchor indigenous SMEs and the impact of their death or migration to other
33 locations;
34
 - 35 • balance of power between regional and national policy, and making best use of EU
36 regional policy initiatives which aim to develop ‘fringe’ and ‘Objective 1’ areas of the EU
37 some of which are also the areas where peripheral clusters are located;
38
39
 - 40 • effectiveness of place branding. In spite of specific examples of place branding being
41 provided and incorporated in this discussion, much remains to be written about this
42 exciting topic, especially with respect to emerging clusters.
43
44
45
46
47
48
49

50
51 We conclude by suggesting two additional areas of future research. Firstly, there is a clear
52
53 distinction between “cluster periphery” and “cluster failure”. Peripheral clusters differ from
54
55 failing ones mainly because they may still function relatively well. Even though they may not be
56
57
58
59
60

1
2
3 on the scale of Silicon Valley or Oxford, they exhibit corporate activity. Cluster failure instead is
4
5 indicated by symptoms such as declining employment, company exits, and few start-ups. While
6
7 this discussion analysed periphery, questions to be conceptualised and empirically examined
8
9 include differences between “cluster periphery” and “cluster failure”, implications for theorising
10
11 different types of proximity, and implications for public sector support. Secondly, the research
12
13 provided some empirical evidence for the various types of proximity. It demonstrated the role
14
15 that social, institutional and cognitive proximity played to the advancement or otherwise of
16
17 clusters. Further empirical evidence may be needed in order to test the proposition that a failure
18
19 to develop a cognitive community means that a successful cluster also fails to develop.
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Acknowledgements: The author would like to express his gratitude to Alexander J Warlow and Tom Donnelly for their advice and comments on an earlier version of the manuscript as well as to the Regional Studies reviewers for their constructive feedback and suggestions.

For Peer Review Only

1
2
3 REFERENCES

4
5 AUDRETSCH D. (2002) The dynamic role of small firms: evidence from the US, *Small Business*
6
7 *Economics* 18, 13-40.

8
9
10 BAUM J. and OLIVER C. (1992) Institutional embeddedness and the dynamics of organizational
11
12 populations, *American Sociological Review* 57, 540-59.

13
14 BENNEWORTH P. (2007) Seven samurai opening the ivory tower? The construction of
15
16 Newcastle as an entrepreneurial university, *European Planning Studies* 15, 487-510.

17
18
19 BRESCHI S., LISSONI F. and ORSENIGO L. (2001) Success and failure in the development of
20
21 biotechnology clusters: the case of Lombardy. nt-notes.liuc.it/ricerca/Istituto
22
23 [Economia.nsf/0/a13ef9d5ce2843aec1256a14006878de/\\$FILE/Stuttbook.PDF](http://Economia.nsf/0/a13ef9d5ce2843aec1256a14006878de/$FILE/Stuttbook.PDF).

24
25
26 COMMISSION OF THE EUROPEAN COMMUNITIES. (2004) *Creating Smart Systems: A*
27
28 *Guide to Cluster strategies in Less Favoured Regions*. CEC, Brussels. [www.competitiveness.org/](http://www.competitiveness.org/article/archive/27/)
29
30 [article/archive/27/](http://www.competitiveness.org/article/archive/27/).

31
32
33 COMMISSION OF THE EUROPEAN COMMUNITIES. (2002) *Observatory of European SMEs*
34
35 *2002 /No. 3: Regional Clusters in Europe*. CEC, Brussels. [www.competitiveness.org/](http://www.competitiveness.org/article/archive/27/)
36
37 [article/archive/27/](http://www.competitiveness.org/article/archive/27/).

38
39
40 COOKE P. (2001a) Regional innovation systems, clusters, and the knowledge economy, *Industrial*
41
42 *and Corporate Change* 10, 945-74.

43
44
45 COOKE P. (2001b) Biotechnology clusters in the UK: lessons from localisation in the
46
47 commercialization of science, *Small Business Economics* 17, 43-59.

48
49
50 CUMBERS A., LEIBOVITZ J. and MACKINNON D. (2007) Institutional features, path
51
52 dependencies and regional industrial change: comparing mature and embryonic clusters in an old
53
54 industrial region, *International Journal of Entrepreneurship and Innovation Management* 7, 424.

55
56
57 FELDMAN M. and LOWE N. (2008) Consensus from controversy: Cambridge's biosafety
58
59

1
2 ordinance and the anchoring of the biotech industry, *European Planning Studies* 16, 395-410.

3
4 GILBERT B., AUDRETSCH D. and MCDOUGALL P. (2004) The emergence of
5
6 entrepreneurship policy, *Small Business Economics* 22, 313-23.
7
8

9
10 GITTELMAN M. and KOGUT B. (2003) Does good science lead to valuable knowledge?
11
12 Biotechnology firms and the evolutionary logic of citation patterns, *Management Science* 49,
13
14 366-82.
15

16
17 GLASSON, J., CHADWICK, A. and LAWTON SMITH H. (2006) Defining, explaining and
18
19 managing high-tech growth: the case of Oxfordshire, *European Planning Studies* 14, 503-24.
20

21
22 HAGE J. and HOLLINGSWORTH R. (2000) A strategy for the analysis of idea innovation
23
24 networks and institutions, *Organization Studies* 21(5), 971-1004.
25

26
27 HÅKANSSON H. and JOHANSON J. (2001) *Business Network Learning*, Pergamon, Amsterdam.

28
29 HANNAN M., PÓLOS L. and CARROLL G. (2004) *Toward a theory of forms: similarity and*
30
31 *categorization*. Annual organizational ecology conference, Washington University, St. Louis.
32

33
34 HSU G. and HANNAN M. (2005) Identities, genres, and organizational forms, *Organization*
35
36 *Science* 16, 474-90.
37

38
39 KENNEY M. and PATTON D. (2005) Entrepreneurial geographies: support networks in three
40
41 high-technology industries, *Economic Geography* 81, 201-28.
42

43
44 KLEINKNECHT A. (1996) *Determinants of Innovation: The Message from New Indicators*,
45
46 Macmillan, London.
47

48
49 LAGENDIJK A. and LORENTZEN A. (2007) Proximity, knowledge and innovation in
50
51 peripheral regions. On the intersection between geographical and organizational proximity,
52
53 *European Planning Studies* 15, 457.
54
55
56
57
58
59
60

1
2
3 LAGENDIJK A. (2000) Learning in non-core regions: towards 'intelligent' clusters addressing
4 business and regional needs, in BAKKERS S., RUTTEN R., MORGAN K. and BOEKEMA F.
5
6 (Eds) *Learning Regions, Theory, Policy and Practice*, pp. 165–191, Edward Elgar, Aldershot.
7

8
9
10 LAGENDIJK A. (1999) Regional anchoring and modernization strategies in non-core regions:
11 Evidence from the UK and Germany, *European Planning Studies* 7, 775-93.
12

13
14 LOVERING J. (2007) The relationship between urban regeneration and neoliberalism: Two
15 presumptuous theories and a research agenda, *International Planning Studies* 12, 343.
16

17
18 LOVERING J. (2001) The coming regional crisis (and how to avoid it), *Regional Studies* 35,
19 349.
20

21
22
23 MACLEOD G. and MARTIN J. (2007) Territorial, scalar, networked, connected: In what sense a
24 'regional world'?, *Regional Studies* 41, 1177.
25

26
27
28 MASKELL P., BATHOLT H. and MALMBERG A. (2006) Building global knowledge
29 pipelines: the role of temporary clusters, *European Planning Studies* 14, 997-1013.
30

31
32
33 MOLINA-MORALES F. and MAS-VERDU F. (2008) Intended ties with local institutions as
34 factors in innovation: an application to Spanish manufacturing firms, *European Planning Studies*
35 16, 811-27.
36

37
38
39 MORENO R., PACI R. and USAI S. (2006) Innovation clusters in the European regions,
40
41
42 *European Planning Studies* 14, 1235-63.
43

44
45 NORUS J. (2006) Building sustainable competitive advantage from knowledge in the region: the
46 industrial enzymes industry, *European Planning Studies* 14, 681-96.
47

48
49
50 PORTER M. (1998) Clusters and the New Economics of Competition, *Harvard Business Review*
51 Nov-Dec, 77-90.
52
53
54
55
56
57
58
59
60

1
2
3 POWELL W. and BRANTLEY P. (1992) Competitive cooperation in biotechnology: learning
4 through networks?, in NOHRIA N. and ECCLES R. (Eds) *Networks and Organizations: Structure,*
5 *Form, and Action*, pp. 366-394, Harvard Business School Press, Boston.
6
7

8
9
10 PREVEZER M. (2008) Technology policies in generating biotechnology clusters: a comparison
11 of China and the US, *European Planning Studies* 16, 359-74.
12

13
14 PREVEZER M. (2001) Ingredients in the early development of the U.S. biotechnology industry,
15 *Small Business Economics* 17, 17-29.
16
17

18
19 QUÉRÉ M. (2008) Innovation networks in the life sciences industry: a discussion of the French
20 genopoles policy, *European Planning Studies* 16, 411-27.
21
22

23
24 ROMANELLI E. and KHESSINA O. (2005) Regional industrial identity: cluster configurations
25 and economic development, *Organization Science* 16, 344-60.
26
27

28
29 ROMANELLI E. and FELDMAN M. (2004) *Anatomy of cluster development: the case of US*
30 *human bio-therapeutics, 1976-2003*. Conference on cluster genesis: The emergence of
31 technology clusters and the implication for government policies, Waxholm, Sweden.
32
33

34
35 ROSIELLO A. and ORSENIGO L. (2008) A critical assessment of regional innovation policy in
36 pharmaceutical biotechnology, *European Planning Studies* 16, 337-57.
37
38

39
40 SAINSBURY D. et al. (1999) *Biotechnology Clusters: Report of a Team Led by Lord Sainsbury,*
41 *Minister for Science*. Department of Trade and Industry, London.
42
43

44
45 SOETE B. and STEPHAN A. (2004) Introduction: entrepreneurship, innovation and growth,
46 *Industry and Innovation* 11, 161-5.
47
48

49
50 SOUTH WEST OF ENGLAND RDA. (2006b) *Delivery Framework 2006-2009. Regional*
51 *Economic Strategy for South-West England*. [http://www.southwestrda.org.uk/what-we-](http://www.southwestrda.org.uk/what-we-do/policy/res-review2005/draft-res.shtm)
52 [do/policy/res-review2005/draft-res.shtm](http://www.southwestrda.org.uk/what-we-do/policy/res-review2005/draft-res.shtm).
53
54
55
56
57
58
59
60

1
2 SOUTH WEST OF ENGLAND RDA. (2006a) *Regional Economic Strategy for South West*
3
4
5 *England, 2006-2015*. [http://www.southwestrda.org.uk/what-we-do/policy/res-review2005/draft-](http://www.southwestrda.org.uk/what-we-do/policy/res-review2005/draft-res.shtm)
6
7 [res.shtm](http://www.southwestrda.org.uk/what-we-do/policy/res-review2005/draft-res.shtm).
8

9
10 SUBRA P. and NEWMAN P. (2008) Governing Paris - planning and political conflict in Île-de-
11
12 France, *European Planning Studies* 16, 521-35.
13

14
15 TEIGLAND R. and LINDQVIST G. (2007) Seeing eye-to-eye: how do public and private sector
16
17 views of a biotech cluster and its cluster initiative differ? *European Planning Studies* 15, 767-86.
18

19
20 THOMAS K. (2000) Creating regional cultures of innovation? The regional innovation strategies
21
22 in England and Scotland, *Regional Studies* 34, 190-8.
23

24
25 TORRE A. and GILLY J. (2000) On the analytical dimension of proximity dynamics, *Regional*
26
27 *Studies* 34, 169-80.
28

29
30 TORRE A. and RALLET A. (2005) Proximity and localization, *Regional Studies*, 39, 47-59.
31

32
33 UNGER B. (2000) Innovation systems and innovative performance, *Organization Studies* 21, 941-
34
35 69.
36

37
38 UK TRADE & INVESTMENT. (2007) *UK Life Science Marketing Strategy Global Potential*.
39

40
41 VIRKKALA S. (2007) Innovation and networking in peripheral areas - a case study of
42
43 emergence and change in rural manufacturing, *European Planning Studies* 15, 511-29.
44

45
46 ZECHENDORF B. (2004) Biotechnology policy in European countries: an assessment, *Journal*
47
48 *of Commercial Biotechnology* 10, 340-51.
49

50
51 ZELLER C. (2001) Clustering biotech: a recipe for success? Spatial patterns of growth of
52
53 biotechnology in Munich, Rhineland and Hamburg, *Small Business Economics* 17, 123-41.
54

55
56 ZUCKER L., DARBY M. and TORERO M. (2002) Labor mobility from academe to commerce,
57
58 *Journal of Labor Economics* 20, 629-50.
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

TABLE 1.
PROXIMITY AND PERIPHERIALITY OF CLUSTERS

Geographical proximity	Organizational proximity	
	Strong	Weak
Strong	(1a) Local systems of innovation/production (1b) Temporary co-localization	(3) Co-location without (<i>direct</i>) interaction
Weak	(2) Non localized interactions	(4) Activities in isolation

(LAGENDIJK and LORENZEN, 2007: 461).

TABLE 2.

SOUTH WEST ENGLAND BIOTECHNOLOGY

Location and numbers of biotechnology organisations in SWE	
Bristol	26
Salisbury	16
Plymouth	13
Exeter	8
Somerset, other	14
Devon, other	10
Cornwall, other	8
Dorset, other	8
Wiltshire	8
Gloucestershire	6

(BIOAPPROACHES SOUTH WEST, 2005).

TABLE 3.

SOUTH WEST ENGLAND BIOTECHNOLOGY

Key demographic traits of biotechnology organisations in SWE	
Average age	14.8 years
Average size (#employees)	168 employees
Organisations with 250 or more employees	4
Organisations with turnover of GBP 20m or above	2
Supply chain composition of organisations (number of companies):	
Manufacturers	7
Research establishments (basic research)	2
Research establishments (applied research)	5
Research establishments (clinical trials)	0
Service providers	12
Suppliers, distributors	4
Sectoral composition of organisations (number of companies):	
Agriculture	1
Bioinformatics	0
Chemicals	2
Diagnostics	2
Environment/waste management	3
Finance provision	0
Food & Drink	0
Governmental agency, NGO	1
Independent research centre	2
Medical devices	0
Pharmaceuticals/healthcare (therapeutics)	1
Research hospital	8
Support (legal, consultancy, business)	0
University department	7
Veterinary	2

(Source: Survey findings of the authors).

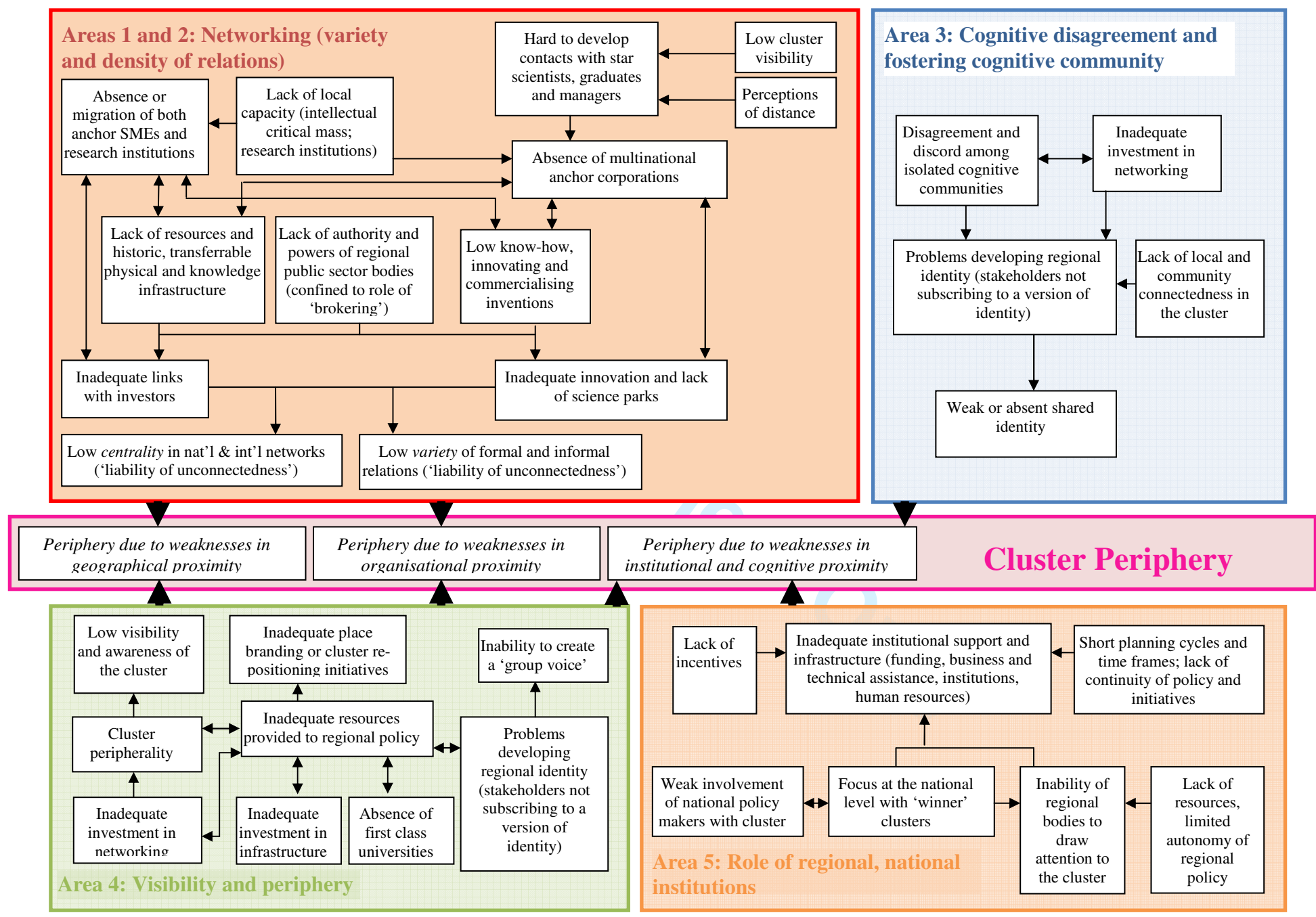
TABLE 4.

INNOVATION OUTPUTS AND INPUTS FOR BIOTECHONLOGY CLUSTERS (2003-2005)

	Oxford (n=56)	Central Scotland (n=77)	SW England (n=32)
INNOVATION OUTPUTS:			
Percentage revenues accounted for by new products and/or services brought to market in last three years	50.9	37.2	38.3
Publications, in the scientific literature	571.3	23.8	55.9
Conference papers, addresses, etc	83.3	9.9	13.7
Patent applications	9.3	6.3	6.6
Patents issued	4.4	3.6	1.7
New products/services brought to market	21.9	9.4	32.3
INNOVATION INPUTS:			
Percentage of total salary expenditure on research staff	45.7	37.7	38.1
Percentage total training expenditure on research staff	31.8	36.1	30.5
Training expenditure as per cent of total revenue	11.6	7.68	8.60
Percentage staff holding first degree or higher	48.2	46.4	45.4
R&D and engineering spend as per cent of total revenue	26.8	32.9	31.0

(Source: Survey findings of the authors).

FIGURE 1. FACTORS FOR CLUSTER PERIPHERY *



* Five areas affect 'cluster periphery', itself positioned in the middle of the diagram. <http://ms.manuscriptcentral.com/rds> Email: regional.studies@fm.ru.nl