In what sense ‘regional development?’: entrepreneurship, underdevelopment and strong tradition in the periphery

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Abstract

This paper explores whether entrepreneurship can help less successful regions improve their regional economic situation, without all the benefits which entrepreneurship brings being ‘stripped out’ to more successful regions. The paper uses the idea that peripheral regions possess qualities of tradition and underdevelopment, and that these help to anchor new firms into these regions, resistant to their concentration in core regions. The paper explores whether particular entrepreneurial events can be regarded as ‘densifying’ the regional entrepreneurial environment, thereby making a positive contribution to its economic development. The paper explores the role of these negative anchors to the entrepreneurial events and the densification process by following a sequence of high technology spin out firms in the North East of England. Using a realist methodology attempting to interview all the firms within the sequence which could be found, the paper discovers that quite positive advantages exist within these negative qualities. The paper then considers whether these processes, such as plant closure, might drive entrepreneurship in all regions.

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Key words

Entrepreneurial culture, peripheral development, densification, spin-offs, development trajectories, tradition.
Introduction

Entrepreneurship holds a privileged position in the new theories of regional economic development which account for the increasing importance of knowledge capital in explaining productivity and competitiveness (Solow, 1994; Gregersen & Johnsen, 1997). New paradigms of regional development, stressing learning, flexibility, knowledge and networking often assume a dynamism behind which Schumpeterian entrepreneurs lie as a driving force (Castells, 1996; Cooke & Morgan, 1998; Fontes & Coombs, 2001). By continually innovating and imitating, entrepreneurs prevent rent seeking, monopoly exploitation and economic stagnation (Maskell & Malmberg, 1999). In finding new combinations of existing assets, new niches and market needs, entrepreneurs drive efficiency and raise productivity (Bathelt, 2001). It is unsurprising that the OECD should regard entrepreneurship as ‘central to the functioning of market economies’ (1998, p.11).

Entrepreneurial cultures emerge in particular places over long time periods, and often reflect localised social morés and accumulated economic success which are not easily replicated elsewhere (inter alia Hobbs, 1991; Hassink, 1992; Hart & Harrison, 1993; Wood, 2002). The role played by entrepreneurs in successful places has been empirically established with reference to a very limited number of successful regions in which new high-productivity, innovative sectors have emerged. This raises the question of whether entrepreneurship can raise productivity in other, less successful regions. Across Europe, Mason (1991) highlighted how similar types of deindustrialised economy suffered from low rates of new firm formation, and Cooke (1995) could find very few concrete examples where these ‘rustbelt’ economies had been able to increase their rates of new firm formation. Can entrepreneurship play a
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significant role in revitalising deindustrialised regions, or is entrepreneurship one manifestation of a self-reinforcing division between core and peripheral regions (Massey, 1995)?

One insight into this is suggested by Anderson (2000), who uses the idea of a peripheral ‘mode of entrepreneurship’ to articulate how entrepreneurship can take place in a peripheral region and benefit that region. His argument is that ‘gravitation works to strip out higher order functions from the periphery, investing and reinforcing central power’ (Anderson, 2000, p. 94). Consequently, what remains are ‘left-over qualities such as tradition and underdevelopment, those very characteristics that made it peripheral in the first place’ (p. 92). Anderson illustrates his thesis with examples, of a Western Isles ferry and a laird’s folly, turned into a heritage excursion and gourmet restaurant/hotel respectively. Whilst these are clearly new and highly entrepreneurial businesses, it is harder to see how they promote regional development by increasing the productivity of local knowledge capital.

The question of how entrepreneurship can benefit less well performing regions is one with which new regional development paradigms do not extensively deal. It is not explicitly argued that peripherality prevents entrepreneurship, but there is a territorial presumption in that when benefits are created in such less favoured regions, they do not last long, and are easily lost from that region. This suggests a pressing need to explore how regions with unfavourable industrial structures engendering low rates of entrepreneurship, and with weak stocks of knowledge capital can improve their situation through entrepreneurship. I explore this issue in an old industrial region as a type of region weakly endowed with knowledge capital, to examine the extent to which entrepreneurship helps to drive regional economic development.
In this paper, I focus on one element of the linkage between entrepreneurship and territorial productivity, by exploring the link between entrepreneurial events and the wider entrepreneurial environment. I ask the question “how do particular entrepreneurial events create enduring assets in a weakly endowed entrepreneurial environments?” One electronics company is linked to the formation of over 40 other companies in the North East of England. Has the sequence of entrepreneurial events stimulated the kind of dynamic which will ultimately feed through into improved productivity by making the environment more favourable for entrepreneurial events? I use the idea of ‘densification’ of a regional entrepreneurial environment to examine whether these micro-scale entrepreneurial events and assets can be regarded as contributing to something which raises regional productivity more generally. I argue that tradition helps assets to remain, serving as anchors for entrepreneurs to strongly embed their new firms in the region, creating new territorial assets on which others can draw.

**Development in the periphery: significant change from small steps**

A range of theories of regional economic development which stress the importance of innovation and learning have become prominent in recent years (Mackinnon et al., 2002). Recent changes in the nature of economic activity has made knowledge capital increasingly important as a factor of production (Romer, 1994; Solow, 1994), and unlike other production factors, knowledge has increasing returns to scale. Productivity growth is increasingly dependent on firms’ abilities to deal with product, process and technique innovations. Where innovation requires incorporation of uncodified forms of knowledge, such as tacit knowledge, know-how and embedded knowledges, innovation rates are affected by trust and proximity. Firms are increasingly adopting networking organisational forms to bring in these uncodified
types of knowledge. Territories with formal institutions and informal cultures which support these networks have a tendency to higher innovation and productivity levels. Regions are increasingly regarded as the optimum territorial scale for such institutions and cultures, exemplified in theories such as learning regions (Asheim, 1996), new regionalism (Morgan, 1997), regional innovation systems (Cooke & Morgan, 1998), and new institutionalism (Amin, 1999).

Although the notion of the entrepreneur is important in these theories, different disciplines use the notion of entrepreneur in very different ways. In orthodox economics, entrepreneurs are agents which change economic systems in significant ways, often referred to as Schumpeterian entrepreneurs (cf. Schumpeter, 1945). In management and business studies, entrepreneurship is often synonymous with new firm formation. In geography, entrepreneurship is often taken to be a cultural factor behind economic development (cf. Harrison & Hart, 1993). Common to these positions is that an entrepreneur is someone who creates a new organisation; the creation of this organisation in turn raises regional productivity and competitiveness levels. Entrepreneurs have a vital, if implicit, role as active nodes in these territorial innovation networks, their activity building new network elements, and destroying redundant linkages and nodes. Building new linkages and assets creates additional network capacity, whilst creative destruction prevents lock-in to negative development trajectories (Grabher, 1993).

Territorial differences in entrepreneurship are a ‘product of a wide variety of social, cultural, political and economic factors which are both interdependent and mutually reinforcing’ (Mason, 1991, p. 99). Explaining uneven entrepreneurial rates involves an inter-linked and segmented mix of personal and environmental factors (Shapero, 1984; Borooah & Hart, 1999). Malecki (1997) offers an overview of what could be
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termed factorial approaches, the features of particular places which seem to promote entrepreneurship. Entrepreneurship arises because particular place-specific factors facilitate entrepreneurs being entrepreneurial, offering factors such as a good technological infrastructure, high-technology firms, skilled workers and finance capital.

A factorial approach is useful at the regional level because it establishes a concrete link between entrepreneurship and territory; a territory possesses ‘assets’ (factors) and know-how about those assets; entrepreneurs configure these assets in new networks in creating new firms. In turn, these new networks of firms sustain and add to the territorial asset base. However, factorial approaches are not good at explaining the interdependence between the factors driving entrepreneurship (Mason, 1991; Borooah & Hart, 1999; Lawson, 1999; Saxenian, 2000). Regional differences in entrepreneurship can also be thought of in terms of the way the factors cohere into the environment in which entrepreneurs operate. Dubini (1989) classed good environments as ‘munificent’, whilst Johannisson (1993) used the idea of a ‘diverse’ environment to describe places with a higher tendency to new firm formation. This perspective implies that geography matters, and that location — in some way more than the sum of these factors — affects entrepreneurial performance.

A systems approach to understanding entrepreneurial environments

If the way factors cohere is important, this raises the question of how entrepreneurship in peripheral regions, with poor entrepreneurial environments, can promote innovation and hence economic development. A lack of entrepreneurial assets suggests that individual outcomes will be harder to achieve, and less likely to result in a fully munificent entrepreneurial system (Lawson, 1999; Hudson, 2002). I assume
that entrepreneurship promotes innovation, because of entrepreneurs’ key roles in building territorial networks. Even if the relationship between entrepreneurship and innovation is only a tendency, it is a good first proxy for improved productivity.

Rather than making a totalising shift from a sparse to a munificent environment, is it possible to quantify instead whether the environment is becoming more munificent? Johannisson et al. (2002) use the notion of ‘embeddedness’ to track and quantify the depth of interactions between firms in territories as an indicator of entrepreneurial environmental strength. Social networking approaches use ‘trust’ and ‘untraded interdependencies’ as examples of assets which can build up and which are beneficial when they accrue precisely because they increase the productivity and competitiveness of local firms (Fukuyama, 1995; Klein Woolithuis, 1999). Amin & Thrift (1994) suggest ‘institutional thickness’ to explain how evolutionary shifts in formal institutions and cultural norms affect economic development. Bjarnar & Gammelsæter (2003) argue that it is the convergence between economic and social pressures for collaborative activity that promotes territorial economic success, and mapping the gap between functional and ethical cultures of collaboration quantifies progress through this development process.

These approaches allow changes to be quantified, and an iterative accrual of these assets over time to correspond to an improvement in the entrepreneurial environment. Event-specific outcomes are broadened to become territorial collective competences more open to others in that particular territory (Lawson, 1999; Maskell & Malmberg, 1999). Storper’s (1995) example of the creation of a ‘regional specialised labour market’ is beneficial because it allows others to benefit directly from the recruitment effort originally expended, without reincurring that expenditure. Fontes & Coombes’ (2001) offered the notion of ‘densification of the techno-economic network’ (p. 84),
in referring to the process of universities and firms working together to create new innovation assets. This idea of ‘densification’ provides a means to bridge between micro-scale activities and meso-level developments in particular regional economies.

‘Densification’ is not a singular process, and it possible to think of a number of different dimensions along which network densification can vary. Within any network, some densification involves actions on nodes, whilst some may involve actions on linkages. The second variant in densification is whether the densification involves creating new elements (nodes or linkages) or increasing the strength of those that already exist. Within a territorial entrepreneurial network, for example, a new joint venture represents a new node, whilst a new profit centre within an existing firm strengthens the existing node. Likewise, in terms of linkages, a novel collaboration represents a new linkage, whilst changing the collaboration with a partner from product supply to co-development is a strengthening of that linkage. This 2x2 scheme ( {node, linkage}; {more, stronger} ) provides a means to explore the extent of densification activity involved in particular entrepreneurial networks.

**Methodology & analytic framework**

In this research, I am interested in whether a set of entrepreneurial activities have created cultural/ institutional regularities contributing to a densification of the entrepreneurial environment. I use the densification scheme developed above to question whether densification in one particular entrepreneurial network was sufficiently extensive to warrant being regarded as a densification of the entrepreneurial environment. My case study is of one sequence of spin-off firms which emerged over fifty years from one parent firm, Joyce-Loebl. During its life, over forty firms were formed in the North East of England (a declining branch-plant
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region) by individuals who had worked at one point for a firm earlier in the sequence.

Figure 1 below provides an overview of the sequence and shows the distribution of new firm starts through the period. My question is whether this superficially impressive network has changed the overall entrepreneurial environment of the North East of England in a way which can be regarded as a development [1].

[Figure 1 about here]

The four largest companies in the sequence are all externally owned by companies headquartered in various ‘sunrise’ regions (Massachusetts, Berkshire and California), suggesting a branch plant industrial structure underling the sequence. Further complexity is added by the fact that these firms have been externally owned for long periods of time, without falling prey to stripping out and run-down predicted by branch-plant theories (Foley & Watts, 1996; Anderson, 2000). A number of locally owned spin-offs experienced periods of rapid growth and became key players in particular high technology niches which could never be interpreted as reducing to some kind of ‘traditional’ asset.

Rather than trying to decide whether one or other explanation best fits the facts, I consider how the observed sequence has moved the entrepreneurial environment between the two poles of ‘sparse’ and ‘munificent’ entrepreneurial environments. In the first stage of the analysis, I present a micro-scale analysis of the spin-offs over time, to examine the changes in the network which accompanied the formation of the companies. This forms the basis for a second-cut analysis focusing more closely on the types of network densification involved in these new firm formation processes, classifying the types of behaviour by which the spin-off companies have been produced. I use this second-cut analysis to examine how the ‘vacant space’ of the North East has been occupied by an entrepreneurial network, to question whether
entrepreneurial events have created enduring territorial entrepreneurial assets in an otherwise weakly endowed environment.

The research methodology

My initial stimulus was that I found by chance that a number of electronics firms in the North East of England had had been established by founders who had worked for a relatively limited set of firms (Charles et al., 1997; 1998; Charles & Benneworth, 1998; Potts, 1998). In my study, I aimed to map all the companies emerging from the most fertile parent, to determine what had driven the sequence forward. I sought to determine whether the sequence was in any way significant by theorising the events in terms of entrepreneurial explanations.

Such a research project is inevitably grounded in realist methodologies, recognising that places containing similar underlying causal relations and structures will in practise appear different (Scott, 2000). My approach was also informed by critiques of unselfconscious realism embedded in a number of ‘new regionalist’ analyses, in which empirical findings have been overly structured by theoretical frameworks, ignoring significant differences between places (Lovering, 1999; Hudson, 2003; Lagendijk, 2003). In the paper, I have attempted to establish a single if partial history for the sequence, and using similarities in firms’ behaviour as hinting at potentially similar relationships in other similar places. I use ‘entrepreneurial networks’ and ‘environments’ as conceptual mechanisms for structuring relationships between phenomena. I assume that similar phenomena are linked through similar underlying causes and structures, allowing analysis of the historical narrative through how successive generations of parent company lay the foundation for future entrepreneurial activities and new firms.
This paper draws on research undertaken between 1999 and 2002, which involved interviews with individuals who had established companies linked back to the parent firm, Joyce-Loebl, along with interviews with those involved with the start-up firms in other capacities, including joint venture partners, university collaborators and business support organisations. The interviews were undertaken in two phases, 1999 and 2000-02; I performed 54 interviews over the two phases. The interviews ranged in duration between one and four hours. A number of other sources were used. Firstly, during the research I found a number of interesting documents, including a scrap-book of cuttings presented to the firm’s founder, Herbert Loebl, on his retirement from the business in 1974 (cf. endnote 6). Secondly, the cuttings archive of the local newspapers (Journal and Chronicle) were used. Thirdly, three interviewees had written memoirs of the company from their own perspective; Loebl’s (2001) was published, whilst Gordon Ridpath’s (2001) and Jimmy Hambleton’s (2002) much shorter documents were not. Finally, a number of interviewees, notably Loebl, David Gurwicz, and Ridpath provided me with documents from their own archives.

The firm and the region: exploring intuitive understandings

The over-riding reason why the sequence in figure 1 above might be significant is that it is located in the North East of England, which is, in both economic and European spatial terms, a peripheral industrial region. What is significant about the North East is its’ economic peripherality, a specific regional economic problem composed of several distinct elements, including its domination by mature manufacturing activity and branch plant employment, high levels of unemployment and a poor track record in entrepreneurship and technology development. It is peripheral in this specific instance in terms of the European high-technology, high-productivity core (Sharp,
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1998); core and peripheral are heuristics for referring to places with similar regional advantages and problems rather than a rigid spatial delineation.

This regional problem emerged as a consequence of the North East’s early industrialisation, initiated in the 18th century by coal, and later through shipbuilding and steel. Although for a time the North East led global markets in these industries, their ownership structure discouraged investment and innovation; the 20th century was a long period of run-down and closure for many firms (Hudson, 1995). The government responded to this ongoing decline by creating Development Areas (1936) which targeted the attraction of inward investment, replacing lost jobs, but also reinforcing the anti-entrepreneurial culture in the North East (Charles & Benneworth, 2001). This manifests itself in the regional problem today; with 2.6m inhabitants and a per capita GDP of c. £10,000 (2000), the North East is both the least populated and the poorest British region, and repeatedly places very weakly in geographical surveys of entrepreneurship (cf. Mason, 1991, 1992).

The firm in the region: a brief history of the firm

The firm Joyce, Loebl and Co. was founded in 1951 by two electrical engineers in the North East of England, Captain Robert Joyce, and Mr. (later Dr.) Herbert Loebl. Both studied electrical engineering at King’s College, Durham (later part of Newcastle University). Loebl was a member of a Jewish refugee family who had emigrated from Germany after their grandfather’s electrical business (Hugo Löbl Söhne GmbH) was expropriated in 1938 by the Nazi Government. Loebl’s family had been dispersed to the North East as part of a Government evacuation scheme for Jewish businessmen willing to locate (and re-establish their former businesses) in Development Areas. Loebl’s father and uncle together established a new firm
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(Loblite) on the Team Valley Trading Estate. Loebl took a degree in electrical engineering at King’s College, intending to work in Loblite after graduation. Shortly after the war, Loebl Snr. died, and ‘after his death, Herbert Loebl decided to seek his fortune elsewhere’ [4], creating Joyce-Loebl with an acquaintance met through a former housemate.

The firm was initially a small-scale operation, founded with £200 working capital in a lock-up garage, but growing very rapidly from 1953 onwards, when it won a large Government military electronics contract. Over the course of the 1950s and 1960s, the firm built up three joint ventures, two with local companies and one with the Italian optics company Optica. The firm shifted in this time from low-technology to high-technology manufacturing, using the joint ventures to access new technologies as well as developing close linkages with universities to gain access to cheap research, problem-solving and consultancy activity. This growth was interrupted — or at least changed in direction — in 1969, when the firm (and its remaining subsidiary joint venture) was bought out by Tech Ops, a US research-active firm with whom Joyce-Loebl had been collaborating for some years. The worsening of Tech Ops’s financial position led them to separate Joyce-Loebl and Sevcon, and to sell Joyce-Loebl to Vickers (a filing-cabinets-to-fighting-vehicles conglomerate) in 1977.

Sevcon focused its electric vehicles business around one component, the controller, divesting other related activities. Divestment took a decade to complete, and led to the formation of inter alia EVS, Temco and Nada (cf. Figure 1). Tech Ops sold all its non-profitable businesses, and in 1988, Tech Ops sold all their other businesses except Sevcon, making Tech Ops a holding company for ‘Tech Ops Sevcon’ a Gateshead-based, AMEX-listed company [5].
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From 1977, Joyce-Loebl’s new parent (Vickers) chose also to divest their least profitable manufacturing assets, whilst trying to develop new products as cheaply as possible, achieved by developing successive products in close concert with a university. This cheap but convoluted process left the firm leading the global market for computer image analysis in the early 1980s, but without a properly funded R&D programme (cf. Benneworth, 2001). From 1985 to 1992, the company faced extremely turbulent times as Vickers sold the company to one group of managers, who in turn broke up the business for resale. During this decade, a number of disgruntled engineers left to establish businesses in markets which they felt their managers were overlooking, in a number of sectors from biomedical reagent sales (M&I Scientific) to genetic imaging software (Non Linear Dynamics).

A subset of the management buy-out team bought the defence assets, the biology imaging assets were sold to an American venture capital-backed shell company, Applied Imaging, and the industrial vision assets were sold to the Technical Director (see Appendix 1). These last two new spin-offs were both formed from tangled groups of technologies, staff and organisations; one went through liquidation to sort out that mess, separating out a streamlined industrial vision business from a hostile spin-out. Applied Imaging also gradually coaxed out a high-technology spin-off firm in a peripheral technological field, calcium fluorescence imaging. By 2001, over forty firms had spun out from Joyce-Loebl and its children, employing around 1,000 staff (cf. figure 1).

Towards a first cut analysis: the value of a temporal sequencing.

This narrative does not have a simple single message. The parent company, Joyce-Loebl, has passed through multiple ownership, and is currently owned by a
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Berkshire-based firm, Screen plc, perhaps suggesting that the assets are not strongly regionally embedded. However, Joyce-Loebl is currently the only profitable part of Screen plc, implying the sequence is more than the run-down of local assets by external actors [5] (Firm, 1975; Anderson, 2000). It could conversely be argued that in the course of the sequence, local actors enjoyed autonomy to thrive and develop new niche businesses which could not easily be stripped out. In 1952 Joyce-Loebl might have seemed like an anomaly, by 1969 it had incubated three other firms, and by 2001 it was at the centre of a blossom of 46 spin-offs. One way to gauge the significance is to look at whether the entrepreneurial network evolved over this time to be more dense, with more and stronger nodes and linkages.

Joint ventures and early growth (1951-1969)

The first phase in the formation of spin-offs came in the early years of the firm, as the company expanded very rapidly through a range of different collaborations, with universities for technical development and commercialisation, and with other businesses in the formation of joint ventures. The company grew quickly during this period, imprinting two characteristics on the firm. Firstly, because there were very few local companies capable of supplying components to the necessary quality, many activities had to be done in-house. The company encompassed the full range of the production cycle, cutting metal, polishing glass, stoving paint finishes and wiring electrical harnesses (stronger node). Secondly, the firm entered into a range of alliances with much larger partners who could provide resources to grow the business, and the company expanded into a group. Two partnerships were with local electrical engineering firms; in each case Joyce-Loebl provided the technological development knowledge whilst the local firm provided the sales and marketing expertise, as well as much of the finance (new linkages).
In reality, each of these activities involved a mix of both new and stronger nodes and connections:

- System Computers was created to exploit analogue computer technology developed at the Sunderland Technical College for the nationalised electricity generating industry, as a joint venture with a local electrical engineering company (new node, new linkages, deeper linkages)

- Sevcon was formed jointly with Smith’s Electric Vehicles (SEV), and then passed into sole ownership of Joyce Loebl (new node, stronger node, new linkages)

- Optica (UK) was created as a third joint venture with the Italian firm Optica, but was closed after four years, with Joyce-Loebl taking over the imaging assets (stronger node, new linkages).

In this first phase, Joyce Loebl used external linkages to create new local nodes within the entrepreneurial network (joint ventures and profit centres) as well as linkages (with universities, the Government and customers). By the 1960s, these new spin-offs represented a significant amount of densification of the entrepreneurial network, a marked shift from the 1950s during which time the entrepreneurial network was entirely contained within the firm. The joint ventures and collaborative culture created the basis for further future growth from four distinct major nodes. In the three cases above, external partners were critical to the creation of these new firms as nodes, and they were underpinned by new and deeper linkages with partners and supportive agents; the failure of the Optica joint venture was precipitated by the Optica parent withdrawing support.
The second phase of spin-offs began with the sale of the firm in 1969, the departure of Herbert Loebl as MD and the necessity to provide profits to the new owners, Tech Ops. The first spin-out of this period was driven by Joyce, who anticipated the cost-cutting intent of the new owners, and gave away the wiring shop to its’ foreman. The purchase by Tech Ops precipitated a wider change in management; the sales director (Chris Beadle) became MD in 1971 seeking to rid the company of its least profitable elements (the paint, metals and optics shops), a process which took until the mid-1980s. These later divestments resembled Joyce’s 1969 divestment of the wiring shop; individuals were given whole parts of the business, and in return, assumed the responsibility for the employment of the staff. A second simultaneous driver of spin-off came in the early 1980s recession, in which the firm experienced significant financial difficulties. There was an extensive round of redundancies when those outside the core business were sacked. Out of both these divestments and closures came a group of start-ups clustered during 1981-1985 (cf. figure 1). The situation was similar in Sevcon, with both redundancies and divestments leading to the formation of a range of firms at this time.

Within Joyce-Loebl, Beadle lacked resources to properly fund R&D. In the early 1970s, Joyce-Loebl developed a novel image analysis computer (Magiscan); they had worked closely with Manchester University which minimised development costs because they used a range of university and commercial grants to fund its development (new linkages). The manner of that development demonstrated how few funds Tech Ops had available for R&D, and Vickers continued to deny fund to Beadle. He was under pressure to sustain the technological position of the firm, developing new products without incurring significant expenditure. To relieve this
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pressure, he deepened the strategy of drawing on external partners’ R&D resources to cheaply build up assets and competitive advantage. When Vickers refused to fund the next generation of Magiscan product development, Beadle arranged for the project team (a mix of academics and Joyce-Loebl employees) to do it in their spare time in return for a royalty agreement (effectively free of charge). This project culminated in the very successful Magiscan 2 system, marking Joyce-Loebl’s full transformation into an image analysis company (stronger node). The creation of the Magiscan system greatly strengthened the entrepreneurial activity in Joyce-Loebl, with Paul Gregory creating a whole new project team which later formed the sole basis of the assets merged into Applied Imaging (new node). This period can however be regarded as a period of renewal of the core focus of the most significant businesses.

Many of the new firms formed in this period represented relatively limited densification; many of those marginalised by restructuring within the main firms continued their work by setting up their own firm. In some cases, this strengthened the particular node; Stovright grew from four people in Joyce Loebl to a maximum of 24 employees by the 1990s. Indeed, many of the other spin-offs from this time did not change the shape of the network; typical of this was EVS, a Sevcon spin-off which created very little new activity by being spun-off. EVS is, however, significant, as it indicates that Sevcon had become a major node in the network, thereby suggesting the network was qualitatively larger in the second period than in the first.

Contesting gravitation to the core (1987-present)

The third phase in the life of Joyce-Loebl came after 1987, when the second external owners of the firm, Vickers, sold the firm as part of a corporate re-organisation. From
1982, Vickers’ own precarious financial position meant that they were keen to offload the business. In 1985 they entered into discussions with the Joyce-Loebl management team to sell them the business, a convoluted process which took six years to complete. During this convoluted disposal, they lost a number of their key staff, who were disappointed by the foregone technical opportunities, leading to the next wave of spin-off companies.

Following this period, Sevcon was reinvented as the headquarters for what remained of the Tech Ops group. Applied Imaging bought out Joyce Loebl’s image analysis assets, spinning off the industrial imaging and defence assets to their respective managers (two spin-offs). They integrated Joyce-Loebl with a competitor in the North East, changing the image analysis assets from being peripheral within a small engineering conglomerate to being an R&D site in a leading image analysis company. Other firms remained in the North East, although taken over by outside interests; although IRD was closed by Rolls-Royce in 1999, their industrial controls division (formerly Systems Computers) remained opened and technologically vibrant. Nada was sold to Turbo Genset, a Canadian power engineering concern, which increased its Gateshead employment and R&D spending.

This third phase can be regarded as an aggressive reassertion of the stripping-out process over the assets which had hitherto built up in the region. The most stable elements of the entrepreneurial network, which best resisted the stripping out, were those elements which were already well embedded and interconnected. By this stage, it is possible to identify five major nodes which were continuing to act as a source of new spin-off activities, alongside a much higher number of less dynamic firms:

- Joyce-Loebl, the defence systems became the core element of the group, and increased to 120 employees (strengthening node, new linkages)
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- Sevcon, received new headquarters functions and responsibilities, and increased level of R&D spend (strengthening node, deeper linkages with local university),

- Applied Imaging, new high technology company with R&D centre in the region which spun off a number of new firms (new and stronger nodes, stronger linkages),

- Nada, continued growth even following takeover by Canadian firm (stronger node, new linkages), and

- System Computers, closure of Rolls Royce Industrial Controls, but spin-off of two successor companies (new node, new linkages), one of which won a series of awards for its high-technology vehicle displays.

Joyce-Loebl as a coherent development

This first-cut analysis hints at a change in the nature of the entrepreneurial environment in the North East of England. There is evidence that the network has grown, from one node in 1953 to five major nodes by 1992. How does this correspond with a densification and embedding of a regional entrepreneurial environment? It is to this question that this paper now turns.

The scale of activities seems to have increased over the fifty years of the sequence, with rapid initial growth followed by reorganisation and then further growth as the sequence matured. However, the chronological sequence obscures events which do not fit neatly with the developmental phase in which they occurred. Firms have been set up by individuals exploiting personal skills throughout the sequence, including Gordon Brooks Instruments (phase 1), Cassidy Scott Instruments, Curry & Maughan (phase 2) and Gilligan Engineering and Cellpower (phase 3). To control for this
temporal structuring effect, in the second phase of the analysis, I instead focus on the strategies which individuals have used to create their companies, and relate the firm-based strategy to type of densification. I classify the new firm formation process into three main mechanisms [7], representing three very different processes of densification, with three very different footprints upon the regional entrepreneurial environment.

The least unexpected: firms set up by firms

The first form of spin-out (fourteen of the 48 [8]) was the more formal ‘intrapreneurial’ process, in which new businesses become institutionalised within parent companies and then divested to allow parent and child to pursue divergent paths (cf. Moncada-Paterno-Castello, 1999). There were very few genuine ‘intrapreneurial’ companies in the sequence; Sevcon was the only true one, and although a joint venture, was incubated within Joyce Loebl for a long period (qv). Although Systems Computers and Optica were similar in using existing Joyce-Loebl staff and partner funds, they were a degree removed from the parent company. At a third level of remove as intrapreneurial businesses were those firms which were formed from particular assets which had once been integral to the firm, but were ‘made’ into those assets into intrapreneurial businesses by handing over those assets to shop managers with medium-term supply contracts [9].

In short, the number of individuals enacting entrepreneurial behaviours was increased by creating well-connected new nodes in which individuals already sat. They became entrepreneurs when the firm span out; the significant event was the preceding network-building within the parent firm. By forming new companies within the boundaries of existing companies, the parents acted as incubators, mentors and
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financiers for these new start-ups, building new nodes, embedding them in new
linkages and compensating for the shortages of suitable support, advice and start-up
finance in the North East of England. With the intrapreneurial spin-offs, the barriers
to individuals enacting entrepreneurial repertoires were lowered; given bundles of
assets (well-linked nodes), the parent companies effectively incubated the firm and
facilitated the entrepreneurial event.

What the spin-off process did was to free the firm from the resources of its parent,
allowing it to grow, and allowing it to develop new linkages (cf.
Lindholm-Dahlstrand, 1999). Some of these firms did subsequently grow and
succeed, building new links with universities and suppliers, to become significant
parent nodes in their own right (such as Sevcon, Nada and Applied Imaging). This
seems to suggest that becoming an entrepreneur in a peripheral region is difficult but
not impossible, involving building nodes in the entrepreneurial system. In several
cases (e.g. from Sevcon), further (non-intrapreneurial) spin-offs emerged from
individuals who had become entrepreneurs through an intrapreneurial event [10].

‘Smash and grab’: the antagonistic spin-outs

The second form of spin-out (ten from 48) can be characterised as being antagonistic
or hostile spin-outs, by individuals who became marginalised as the parent companies
consolidated their foci. In each of the cases, the bundle of assets the entrepreneur
began with was rather more denuded than in those cases above of spun-out
operational business units. The spin-off process did not densify the networks per se,
but saved the assets from dissolution, therefore at least preserving the network’s size.
A number of individuals found it easy to take assets (skills, customers and
technologies) formed in the business, without significant resistance from the parent.
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There have been periods in this sequence when the parent companies have themselves (and by their managers’ own admissions) been badly managed, and the antagonistic spin-outs have preserved assets jeopardised by weak management. This had a territorial benefit, embedding those assets more strongly in regional systems. This is a sustaining rather than a growth mechanism, preserving elements of the network within the region, although not visibly improving the density of that network.

This emphasises that the constraints of peripherality are negotiable, and that ‘core’ actors do not always control and/ or strip out all the key assets. In some cases, external actors abandoned particular assets, especially during plant or operation closure, allowing local actors to negotiate their preservation through re-embedding them in the regional entrepreneurial networks, outside the parent. Thus, although the sequence in figure 1 does not show this, the antagonistic spin-outs densified the regional environment to the extent of assembling particular regional financial, technological and management support assets outwith the parent node.

Aggregating to the regional scale, we might have expected a peripheral region to lose many smaller nodes, but the system seems more self-sustaining than this. Although the sequence is not a totalising shift in the organisation of production from ‘branch-plant’ to ‘technopolis’, it does suggests a second-tier form of network dynamic which represents a densification beyond the bounds of the existing network. Moreover, it questions the value of a binary division (‘core’/ ‘periphery’) for exploring power and control in entrepreneurial networks; ‘peripheral’ actors clearly enjoyed a degree of autonomy, and were not forced into roles dictated by dominant external actors.
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The tension of the traditional: new markets for old skills?

The third type of spin-off (fifteen of 48) were those formed by individuals who had particular skills on which they sought to capitalise. These differed from the antagonistic firms in taking away very little from the parent node. These newly formed firms had the loosest connections back to their parent companies, and were variously a consequence of redundancy, retirement, or disenchantment with their current occupations. Given that these firms began with the smallest bundles of assets from the parent, it is unsurprising that they also achieved the least. At least ten of the firms formed in this way experienced succession problems and were unlikely to outlive the retirement of their founders, suggesting that they were not involved in strengthening regional networks. In a number of cases, firms were formed some time after their founders had worked at Joyce-Loebl, and the technologies with which those firms worked were typically related to their more recent employments. The linkages of these individuals back to the parent nodes in the entrepreneurial network are the weakest, often limited to witnessing the past success of other companies in the sequence. In that regard, this is densification in which individuals are able to attach themselves to the network, albeit very loosely, extending slightly the scope of the network.

These type of firms can be regarded as traditional, following Anderson, because of their regional use of ‘left over qualities … that made it peripheral in the first place’. They are ‘traditional’ in two senses; firstly in having a pre-Fordist essence, being what Loebl called ‘technological artisans’ (2001, p. 72); secondly, they had skills unique to the region either through its history or forgotten elsewhere. These types of businesses tend to be characterised in negative ways in regional development analyses – lifestyle, dead-end, hobby, satisficing (inter alia Coe & Townsend, 1998; Keeble &
Nachum, 2002), hiding that many firms did not use ‘traditional’ technologies, but high technology fields such as electronic controls, nuclear power and industrial vision. Secondly, as new nodes formed and grew, ‘left-over qualities’ were transformed into entrepreneurial assets, strengthening the overall network, embedding those entrepreneurs in the regional economy.

**The relationship of peripherality and entrepreneurship**

All three types of firm contributed differently to the densification of the network, and all suggested they had broader territorial impacts beyond the particular sequence:-

- Antagonistic firms helped condition regional financial, technological and managerial assets,

- Technological artisans embedded themselves in the regional economy with a stronger sense of entrepreneurship than had they been working in large firms,

- Key larger ‘node’ firms acted as sources of the other two types of firm, as well as building and developing strong linkages with local technological actors, especially universities and technical centres.

The densification process is thus more diverse than anticipated at the outset; different types of real activity with distinct impacts on the entrepreneurial environment all combined elements of the four archetypal densifications (new node, stronger node, new linkage, stronger linkage). Big events involving three or four types of densification initiated the observed sequence, with other smaller-scope (one or two elements of densification) sustaining and embedding the network, changing its shape and slightly extending its scope. A few entrepreneurial events created a critical mass driving larger changes: the question is the extent to which this can be considered an improvement in the entrepreneurial environment.
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These assets do have a broader scope than the firms who have created them, which arises from the fact that they have been created by interactions with external agents – financial, corporate, academic — without allowing those external agents to dominate their activities and strip them out from the region. This durability is a key aspect of the sequence, because despite all the changes of ownership, the network continued to deepen and grow in the region. In all three types of firm, ‘tradition’ featured in the creation of the firms, fixing nodes firmly in the regional economy. Even in the intrapreneurial firms, those businesses included traditional elements, particularly integrated high-technology design and manufacturing activity. This gave the newly founded firms a strong location within the region; in this sense, peripherality can be an asset when creatively combined by entrepreneurs to fix networks in place.

In this paper, I have focused on firms as the analytic unit, but other elements of entrepreneurial environments have benefited from the presence of the sequence. Local universities have benefited greatly from this sequence, creating novel university-based assets on which other firms have drawn (Benneworth, 2001). At least nine[11] of the firms were adept at going into universities and making them do new things to their benefit, quite different to universities being the source of high-science content spin-off firms (Fontes & Coombs, 2001). The sequence also solidified particular forms of finance, creating local private capital [12], encouraging national venture funds to have local agents, and in helping local firms access global equity funds.

This suggests that ‘denser entrepreneurial environments’ are stimulated in events which take a range of assets and which reconfigure them in a way which extends the scope of the networks. By blending unique and general assets, some firms were able to create assets which were sufficiently embedded or anchored in the region to be self
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sustaining even under external ownership. This helps to refine the issue of why those assets are resistant to gravitation; being built by blending in specifically local features to high technology assets, those assets cannot easily be stripped out. This blending process has created new entrepreneurial assets in the regional environment which can be available for others to use, creating regional development benefits. The apparent small scale of the outcomes densified in particular regions does not necessarily mean they are insignificant. Once a network with several growth nodes emerged, then it was easier for smaller scale activities to constellate around those leaders, building the network through discrete new linkages. Through this uptake and use, the culture became (recognised as being) more entrepreneurial (Bjarnar & Gammelsæter, 2003).

The second feature of the analysis is that not all the assets in the entrepreneurial network had previously been identified in factorial taxonomies of denser entrepreneurial environments. Features associated with peripherality (i.e. currently regarded as negative) have been used by entrepreneurs in a positive way in establishing their firms. It is only because the microdensitometer design did not change substantially over forty years that one business received a guaranteed income stream for servicing and maintenance which was invested in new R&D activities. Likewise, although the ‘technological artisans’ firms could be portrayed as inconsequential hobby businesses, they were better than the obvious alternative which was employment of those technicians in large, anti-entrepreneurial branch-plants. This can be understood by restating the negative factor in terms of the way it has been used as a peripheral region-specific anchor.
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**Concluding discussion**

It is very difficult to draw firm conclusions, because there is still a gulf between the scale of the sequence in this paper and that of the regional economy [13]. Bearing this in mind, it is possible to pursue two avenues in using this peripheral sequence to refine our understandings of entrepreneurship and regional development. Given that this is a single study of a single sequence in a single region, only limited claims can be made to the generality of the findings. Notwithstanding these constraints, the first finding is that entrepreneurship is more than an emergent property of successful regions. The sequence of entrepreneurship in the North East did have elements of the dynamic, self-reinforcing and productivity-raising qualities observed in more successful regions. This happened in two ways, firstly by improving the innovativeness of existing assets, but also increasing the scope of entrepreneurial networks and allowing other participants to benefit from those networks. Embeddedness was an important feature of the network, with traditional assets approximating to some kind of informal institution (cf. Johannisson et al., 2002). Although the North East retained some tradition, this does not mean that the entrepreneurial businesses in the region necessarily had ‘second-best’ qualities; rather, as entrepreneurial environments built up around the traditional background, those peripheral qualities were actively reconstituted by entrepreneurs as beneficial territorial assets.

Secondly, and related to this, is that factorial analyses of entrepreneurship may have much to learn from the micro-level analysis of entrepreneurship in peripheral regions. Although exemplar analyses capture many features of entrepreneurial environments, this research suggests that some factors which are present in core regions may be obvious as factors only in less successful regions. Thus, although plant closure may
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drive entrepreneurial activity in Cambridge or Maryland, academic analyses tend to focus on the strong venture capital markets and supportive infrastructure in these regions, overlooking the role of closure in the entrepreneurial event (Wicksteed, 2000; Franklin et al., 2002) [14]. Given that the canon of exemplar regions is continually evolving, factorial categorisations also evolve and co-opt their features into existing factorial frameworks. There is thus scope to examine how these ‘negative’ events and factors have positive outcomes; less successful regions are good laboratories in this regard because their histories are dominated by ‘negative events’.

The assets I have identified are undoubtedly derived from the strengths of the existing regional economic base - the North East has built genuinely global expertise in genetic image analysis, both academically and commercially. However, these micro-scale strengths are easily dismissed as being ‘weak’ at a meso/regional scale. I argue that this suggests tradition has acted as a strong variable, as a positive feature in entrepreneurship in the North East of England. The economic strength is the uniqueness and innovativeness of their products and processes, but partly derives from factors found in the North East of England as a less munificent entrepreneurial environment. Although a few significant events – involving many types of densification – were necessary to trigger the development of the entrepreneurial network, their impact was greatest when they allowed the broadest range of local entrepreneurs to draw on the assets within the network, blurring the boundary between the entrepreneurial network and entrepreneurial environment. This is best exemplified by the ‘unique skills’ start-ups, who drew on the entrepreneurial demonstrations of former entrepreneurs in setting up their own businesses. Whilst these were not a great addition to the entrepreneurial network, they were a more
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significant addition to the overall (sparse) entrepreneurial environment of the North East of England.

The challenge for factorial approaches to entrepreneurship is then to produce a grammar and language of (meso-scale) regional development and entrepreneurship which can encompass the ‘strength’ of peripheral assets. How then can we map out the directions in which future research might explore this potential of ‘strong traditionalisation’ to capture the invisible entrepreneurship assets in the periphery? Such a project would require a reappraisal of the development potential of assets understood in such value-laden terms as branch-plants, mass-production cultures and peripheral regions, and examining the potential in these activities to produce ‘anchors’ resistant to gravitation which entrepreneurs can use to innovate and raise productivity. It is possible to evaluate the role of particular non-core features by examining the way in which they are incorporated into successful ventures. Critically, there is potential for these kinds of assets to promote entrepreneurship more generally across different types of territory. This seems to provide a means to further expand the factorial categorisations of geographies of entrepreneurship. Entrepreneurship in peripheral regions is complex, contingent and uncertain, but that complexity potentially offers a mechanism to explore more closely the general relationships underlying entrepreneurship and regional development.
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Endnotes

[1] To reiterate, my model of economic development is in creating new assets which make it easier for other firms to access the types of assets they need to innovate, and ultimately increase the productivity of their knowledge capital.

[2] Although the mistake was frequently repeated in the press that the company was founded in 1952, Loebl insists that the firm was founded in 1951.

[3] It has not been possible to trace and speak to Joyce, with the result that Loebl comes through as the much more active of the two founding partners in the narrative. However, the majority of the interviewees who had been at JL before 1974 (Loebl’s departure) concurred that Loebl was the more influential of the two in company decisions.

[4] This phrasing in quotation marks was agreed with Herbert Loebl on 30th January 2003 to as the best way of encompassing what had happened.


[6] Screen plc experienced problems with profitability, including having trading in its shares suspended from the UK’s Alternative Investment Market in 2002. There was a change of management, and the renegotiation of its share relisting and banking facilities were contingent on the performance of Joyce-Loebl within the group. ‘Screen, parent of Tyneside screen developer is returning to the Alternative Investment Market after an 11-week suspension … It is clearly that acquisition of Joyce-Loebl in Gateshead last year that transformed the position’ The Journal (qv), ‘Screen on market and ready to go forward’ December 18th 2002, p.27.

[7] There is a fourth, merger and take-over, which involved negligible entrepreneurship, and which was primarily a technical/accounting fix; no further spin-offs emerged from merger-take-over spin-offs.

[8] The 48 comprises the 46 spin-off firms, Joyce-Loebl itself, and Loblite, (the grandparent firm). The link to Loblite was that his father’s death had left his mother well provided for through the father’s various successful businesses in Germany and the UK, and she provided them with a relatively small investment.

[9] Only one of those companies, Washington Optics, actually failed; around half maintained their level of performance, and two of the more leading edge firms managed to achieve high levels of growth.

[10] David Gurwicz, for example, was involved in the separation of Sevcon from Joyce-Loebl, and then set up a number of other businesses, two of which — at the time employing 40 staff — were later sold off to a Canadian power engineering firm.


[12] When one owner sold up, he became a significant business angel, and was also instrumental in getting together with other business angels in the North East to create a business angels network, which in turn increased the accessibility of venture finance in the North East. The network he created outlived his eventual departure from the management position. In terms of accessing global equity markets, two firms are listed on US bourses; Applied Imaging is listed on NASDAQ as AICX, and Tech Ops Sevcon is listed on AMEX as TOS.

[13] There is a further unresolved issue of how long opportunities remain available for entrepreneurs to re-embed in the periphery before they are stripped-out through gravitation.

[14] Wickstead (2000) analyses the Cambridge (UK) biotechnology and electronics industries, telling the story in such a way that the closure of two firms, Pye Laboratories and Cambridge Instruments, are seen as being positive, despite both being negative events. Likewise, in Maryland, USA, Franklin et al. (2002) relate the case of Life Technologies Inc (LTI), a local company bought out and closed down by Californian rivals (i.e. framed as a peripheral event in a core region). ‘As Mark Berninger, a former LTI employee who has started a new company called AnhydroCyte, Inc., puts it, ’I believe strongly that the net affect [sic] of the Invitrogen acquisition will be more jobs in the local area, not fewer.’” (Franklin et al., 2002, p. 2).
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Figure 1 The intrapreneurial sequence of the Joyce-Loebl spin-out family.