THE IMPOSSIBILITY OF INNOVATION: TOWARDS A KNOWLEDGE-BASED APPROACH

Chris Collinge

Centre for Urban and Regional Studies
University of Birmingham

27.3.06

Paper for EURODITE meeting 30-31 March 2006
DG Research, European Commission, Brussels

"New ideas can be good and bad, just the same as old ones" - Eleanor Roosevelt

Introduction

First of all let us say a few words about the meaning of the term 'innovation'. For Schumpeter an innovation is a change in the form of the production function such that old inputs can be combined in new ways through, for example, advances not only in scientific understanding but also in organizational methods (Schumpeter 1939). For Nelson and Rosenberg, however, innovation occurs primarily in reference to technology, and in their well-known book they ignore its institutional forms (Nelson and Rosenberg 1993). They do however draw an important distinction between things that are new within a particular setting (e.g. firm or place) and things that are new to the entire world – between what we might be call *local* and *global* innovations – and they note that the former may be at least as important as the latter for business profitability (Nelson and Rosenberg 1993, p.4). Likewise Carlsson and Stankiewicz (following Lundvall) stress the technological dimension of innovation, but include knowledge ('know-how' or 'software') alongside hardware within this notion (Carlsson 1995, p.3; Lundvall 1992). The concept of 'innovation' is therefore associated with certain tendencies as follows:

- the tendency to stress the significance of *technology* and to place this at the centre of the economic development process;
- the tendency to stress the significance of *change* over continuity (and over other variables such as performance);
- the tendency to equate change with improvements in performance, and to endorse a *teleological* view of history in which things are moving in a progressive direction;
- the tendency to assimilate *innovations* and *ideas*, with new technology being seen as a direct expression of new ideas;
- the tendency to fall back upon a model of economic development in which knowledge figures primarily as part of *product development* – either in an heroic conveyor belt from invention to innovation to marketable product, or perhaps in the prosaic incrementalism of learning-by-doing.

This last tendency has in particular meant that the investigation of knowledge in the economy has been treated as a continuation of the innovation problematic. In laying the groundwork for the EURODITE project it is therefore important to explore the differences between knowledge and innovation, and in the process to explore the different dimensions of each. In the present paper we begin the task of identifying the differences between knowledge-based and innovation-based approaches to economic change.

The Innovation Problematic

There is within the economic literature a complex interweaving of the concepts of knowledge, innovation and technology. It is for instance the general practice throughout endogenous growth theory to assimilate technology to ideas, and to assume that new technology comes about through the implementation of new ideas (Romer 1986, 1990; Grossman and Helpman 1991; Aghion and Howitt 1992; Jones 2004). This link is perhaps determined by the belief that it is ideas that have independent scale effects – that increased economic growth rates depend especially upon a supply of

additional ideas through R&D (rather than an increase in the volume of other factors). But ideas function within economic settings in complex ways, and there is for instance a big difference between:

- products and the ideas that inform products (old or new),
- product ideas and the ideas that products represent or convey,
- product ideas and the ideas – knowledge or culture – that sustains businesses as going concerns from one time-period to the next,

Ideas may therefore inform the design and construction of products but should not be assimilated to the latter for analytical or scientific purposes. Indeed both ideas and objects are open to innovation, and it would confuse our analysis of their interaction to equate either of these to innovations. The purpose of the EURODITE project is "to understand the role of knowledge in the economies of European regions, in order to inform policies to promote the transition of these regions towards a knowledge-based economy with enhanced social cohesion" (for a full statement see Appendix 1). We are in particular interested in the relationship of knowledge to business performance and thence to economic performance, whether or not this passes through what might be thought of as an innovation stage. We should not begin by assuming that product-related knowledge and the novelty of this is all important and therefore central to our concern. To emphasize new product ideas over business knowledge in general would be to beg the question of knowledge, to reduce the knowledge problematic to that of innovation.

Figure 1: The structure of novelty

	Ideas	**Objects**
Old		
New		

The emphasis of EURODITE upon knowledge rather than innovation, and so the novelty issue is of secondary importance. New knowledge is however one form of innovation, and so to understand the significance of new knowledge it is worth spending some time seeing if we can understand the concept of innovation. Perhaps innovations differ from knowledge in that the latter is not itself a kind of technology? But whilst we tend to think of technology in terms of hardware there is no reason why the term cannot be extended to include any instrument – material or social – that has been designed or selected for a purpose. Indeed if *instrumentality* is the defining characteristic of technology then it is hard to think of an economic good – including scientific knowledge itself – that is not an item of technology in some way. Ideas can therefore be regarded as a kind (perhaps a special, nonrival kind) of technology, in which case we are left with the question of novelty.

The development of each new idea, each novelty that is accepted as such within a tradition, draws upon a growing stock of knowledge in one form or another. Traditional knowledges do not reside simply in books or heads but inform objects and

processes that stretch out and constitute an entire world, and it is this system that is implicated in each act of novelty. Each tradition will inhibit some ideational innovations (perhaps because the easiest ideas have already been discovered, or because the force of authority discourages certain questions) but generally it will also encourage others (perhaps because in a Kuhnian manner old ideas become inconsistent with one another). In the process although some old ideas may be overthrown, the position of others will at the same time be reinforced and entrenched. It is this dynamic between the old and the new that has recently preoccupied growth theorists attempting to overcome the problems associated with knowledge scale effects (Jones 1995; Dinopoulos and Thompson 1998; for a review see Jones 2004). As soon as the problematic of innovation is introduced into any field then the interplay between old and new, continuity and change, must become central. In so far as there is a concern with new knowledge as part of the wider EURODITE study then it will examine how this develops within its tradition, and the relationship of old and new knowledge in this context. But the dynamic of old and new is only one strand of the dynamics of knowledge with which Eurodite is concerned, and the notion of stock and flow is a more embracing relation in which there will always be an intimate mixture of change and continuity.

Figure 2: The dynamics of knowledge

	Old	**New**
Stock	***archive***	
Flow	***circulation***	***innovation***

The focus of EURODITE – in for example WP6 – should be upon mapping knowledge within firms, establishing ways of describing the knowledge domains that are found, the relationships between stocks and flows and – in a very local sense – between continuity and change.

The Impossibility of Innovation

There are two reasons for wanting to shift the focus of attention away from innovation towards knowledge, and in the process to develop the knowledge problematic and paradigm. The first reason is the obvious importance of knowledge to every type of economic activity, and its strange neglect within economics at least until the 1980s. But the second reason is to be found in the difficulties that arise in working with the notion of 'innovation' itself. It is important here to say something about the nature of these difficulties (on this see also Blake and Hanson 2005).

'Innovation' is the process of bringing 'novelty' into being, but to analyse this a little further it is useful to recognise that novelty is a kind of 'difference', and to explore some of the issues which innovation raises in the more neutral language of sameness and difference. Differences between things can occur in space or time: one thing can differ from another that it is next to in space or that it succeeds in time. When one moment follows another without difference in content then we have 'continuity',

whilst if there is a difference then we have 'change'. 'Change' and 'novelty' resemble one another in that each involves the two dimensions of similarity and temporality – one thing must differ from others within its context *and* follow these in time to be regarded as a change or a novelty.

Figure 3: the dimensions of innovation

	SPACE	**TIME**
SAME	*IDENTITY*	*CONTINUITY*
DIFFERENT	*DIFFERENCE*	*CHANGE*

But 'innovation' also carries two further teleological implications that go beyond the process of change. It implies that the change is *designed* to some degree (in its inception or in its application) and not the result of (say) blind chance, and it implies that the change extends the forward motion or *progress* of the particular context within which it is set (whether this is local or global). In the first case the novel status of a product depends on – is relative to – the purposes of its producers, whilst in the second it is relative to the purposes (and so the sense of progress) of its users. Many innovations are (as Schumpeter observed) new combinations of existing materials or new applications of existing designs. Aspirin, for example, is now prescribed to reduce blood-pressure and avoid heart attack as well as to cure headaches. If this step is to be regarded as an instance of innovation then it has to be recognised that novelty lies in the reapplication of an old substance to a new purpose.

Furthermore, whilst an innovation is a kind of difference it has the additional implication of 'exclusivity', of being different to *all* others within the particular setting. The innovatory status of a change is therefore always relative to its context, dependant upon the field against which it is compared, whether this is local or global. A *global* innovation is new in a global context, and its difference does not reduce to the same in other (earthly) contexts. A *local* innovation is new to (say) a particular factory or place, and what is different (new) in one context will therefore be reduced to the same (old) in other contexts. Local innovations may arise either through discovery or duplication, whilst global innovations must arise only through discovery. The localness of innovation can also be temporal as well as spatial, such that repetition is precluded within a particular time horizon: bringing trams back to British cities is a temporally local innovation in the context of current transport pressures, not in the longer context of the modern era. But when trams were first introduced to British cities this was a temporally global innovation in that it did not repeat something that had been done earlier – in that particular country.

If however we put these connotations to one side and limit ourselves to a simplified notion of novelty as change, then to operate with this concept a series of decisions must be made regarding what will count as new, decisions that are prompted by the following experiences:

1. **Churning.** Let us think of the most unchanging socioeconomic environment we can imagine, perhaps the palaeolithic phase of hunting-gathering that occupied most of early human history (and is discussed in for example Kremer 1993 or Jones 2004). The process of sustaining something that can be regarded as the same, the process of sustaining continuity from one time period to the next, depends upon replacing parts that wear out by others that are effectively the same. This process of replacement might be referred to as 'churning', in which each unique person or thing, each word or thought is over time replaced by another that does more or less the same job. But of course each person or thing, each word or thought, is distinct from those others it replaces, and the very act of identifying two singular things as 'the same' presupposes that they are also distinct from one another. This is not just a matter of semantics: lumping together all palaeolithic practices as 'hunting-gathering' does violence to the singularity of our ancestors' lives, and misses the crucial point that continuity may have been their greatest achievement, permitting practices and ideas (e.g. about survival) to endure beyond a single generation. Continuity is therefore dependent upon – enfolds – the change process identified as churning, and the experience of novelty is relative to the churning that achieves its absence.

2. **Iteration**. Over recent years a novel or innovative approach to design and marketing has been one that harnesses designs from the past, designs with particular positive associations, and places these in a new market context (e.g. presenting nostalgic echoes through hot-rod design in family saloon cars). But this exposes the way that applying an existing design in a new setting will always involve it in new meanings – for example nostalgia – and therefore enable it to be regarded as innovation. To repeat something in a new setting where it unavoidably acquires new meanings and purposes is the process of iteration. At the lowest most local level innovation occurs in this process, which stops something from being 'the same' (allows its singularity to appear) from one setting to another.

3. **Categories**. The stability and continuity of Palaeolithic society, like that of anything else, is therefore a practical accomplishment that depends not only upon churning but also upon decisions about the types of changes that will be acknowledged as such and the types that will be ignored – about changes that will be counted as change and changes that will be counted as continuity. Indeed this applies at every level of abstraction: there are for example continuities that involve constant change and departures from these continuities (e.g. accelerating economic growth rates) that represent meta-changes or perhaps innovations. The iteration process may not be regarded as innovation, even though it introduces the novelty of singularity with each use of a product, but to reduce it to continuity depends upon the imposition of such categories of identity. The experience of novelty is therefore relative to the concepts of identity, the levels of abstraction and the thresholds of change with which one is attempting to work. The continuity of a product or idea is therefore relative in that, given the pervasive experience of churning, continuity depends upon how similar it is, the mixture and balance between change and continuity that it is thought to manifests, and the standards that are set for this judgement.

4. **Strategic Continuity**. Likewise it is important for a business to retain a context of continuity over time whilst strategically engaging in change and novelty. An example of crucial continuity would be the *standards* that establish common infrastructures (in the widest sense including customer familiarity) within which differences can be recognised as novelties or innovations. Another example would be that of the *brands* (e.g. The Financial Times; or Rolls Royce) that are familiar and reassures the customer that what will be purchased is of a certain set of qualities. A third example of crucial continuity is however closer to the innovation process, and concerns the guarding of the innovation. As growth theorists have argued in their models of inter-temporal equilibria, firms are discouraged from investing in new product development if they expect further products to come along soon to replace these (e.g. Aghion and Howitt 1992). Firms therefore seek ways of preserving the novelty of their innovations over time – of establishing the continuity of their products against future innovations – through use of IPR, through the establishment of standards, and through barriers-to-entry (e.g. advertising). An innovation that is ephemeral and gives an ephemeral advantage is little use to a firm, and just as change (churning) is folded within continuity so continuity is therefore folded within change.

5. **Otherness**. Winding the clock forward we may feel that the present is the most changeful socioeconomic environment that there has so far been, with the diversification of sciences, accelerating design and product cycles, new media and new ways of working. For contemporary society a new object or activity is one that develops the tradition to which it belongs by departing from this to a certain degree – whether vertically or horizontally – and that by virtue of this can be classed as 'new'. Something that departs too little from the past will not be new because it will be seen (e.g. by customers or by the Patents Office) as too similar to its comparators and will therefore fall back into the category of churning, of the same old stuff. But something that is too different, that departs too far from the past will not be discernable as new – as a development from those others that it to some degree resembles and against which its difference is being measured. Just as the process of identifying two singularities as the same acknowledges that they are to some degree distinct and so different (continuity is a mixture of continuity and change in this generalised sense) so identifying two similarities as different also acknowledges that they are to some degree comparable and therefore the same (change is a mixture of continuity and change in this generalised sense). The difference and novelty of a product or idea is therefore relative in that it depends not only upon the set of other things against which it is being compared within its context, but upon how different it is, the mixture and balance between continuity and change that it is thought to manifests, and the standards that are set for this judgement within the setting. Each novelty is regarded as a mixture of the new and the old, the same and the different, and if it cannot be so regarded then it is not 'new' (i.e. related to something in existence) but simply one-off or 'other'.

6. **Lawfulness**. It might be argued that there are rules for deciding between continuity and change or novelty, and for handling the problems of churning, iteration and otherness, that the categories which allow us to distinguish between continuity and change settle this in an orderly way. But each reapplication of any rule is itself unruly or unlawful – no application can be determined in advance by means of a generalisation unless we postulate a second-order law of law-applications, which

leads immediately into an infinite regress – and is therefore open to iteration and alteration. Once again we see the relativity and perspectivality of innovation.

The phenomena of sameness and difference, of continuity and change, are so bound up with one another that in the end it becomes impossible to determine with confidence what combination of each is involved in any product or activity. All we can say with certainty is that *any* product or activity will be a *complex mixture* of the two, without it being especially useful or feasible to determine what the proportions are within this mixture, or where the split between them exactly lies.

Social Construction of Novelty

Whilst it may be interesting to consider what is the same and what is different, the key question for the firm and the economy is how to survive and grow. The novelty of a product is more important, and is therefore more of a preoccupation, in some fields of endeavour than in others – in for example drug development rather than (say) management consultancy or public transport. But in either context the primary concern is less to develop novelty for its own sake more to develop solutions to particular problems, and it may not matter whether the solution is old or new as long as it can be produced profitably.

An interesting and important topic is therefore the reasons why the 'novelty' of an item becomes an important focus for participants, the ways and processes through which this happens, and the practices through which novelty is defined and accredited. The Patent Office, marketeers or consumers (including peer reviewers) may for example be the arbiters of novelty – consumers because they will tell whether their problem has been solved better than before, the marketeer because 'novelty' (like continuity) may be a selling point, and the Patent Office because patent-novelty grants the monopoly power that derives from ownership of the IPR.

A way of testing whether the focus of a study is really upon innovation as against product development is to see whether steps have been taken to demonstrate the novelty of the product. Studies which take the novelty of products as given – which accept practitioners' notions of novelty and their claims as to product innovativeness – are contributing to and reinforcing the *rhetoric* of innovation whilst actually focussing upon the solution of problems in the product development process. Given the imponderable nature of novelty and innovation, any study that is truly focussed upon innovation (rather than the process of product or business development in general) will want to understand how this becomes an issue for participants and how they seek to resolve it – how the producers and arbiters of novelty define this and attempt to persuade each other of their accomplishments.

Elements of a Knowledge Paradigm

The purpose of the EURODITE study is to develop an understanding of regional economic development by highlighting the role of knowledge. The focus of such a study will therefore be upon the ways in which knowledge contributes to business and thence to economic success. Rather than assuming that this contribution is mediated primarily through the product development or innovation process, the study will therefore want to examine the different domains and levels of knowledge within firms,

and to understand the ways in which these operate dynamically with one another in the course of building business success. The kinds of ways in which knowledge participates in business survival and expansion include some or all of the following:

- the different fields of expertise that are involved in making a business run successfully,
- the ways in which branding and the defence of brands – as aspects of our knowledge of products, and of a firm's self-knowledge – are constructed and defended,
- the ways in which firm identities are constituted by harnessing (for example) positive aspects of an image and embroidering or defending this,
- the significance of standards – as inter-firm knowledge frameworks – and the ways these are negotiated, changed or sustained,
- the ability that managers must have to guide – empower and restrain – R&D and other engineering-driven activities, or the marketing activities, of firms if they are to remain profitable,
- the knowledge that is required to determine when it is tactically correct to undertake new product development for oneself, or to take over other firms or inventor's product ideas,
- more generally the knowledge that managers and entrepreneurs need to have regarding the other knowledges that they draw upon – the meta-knowledges and reflexive knowledges of participants – and the place of these within the knowledge that comprises the business strategy.

The relationship of knowledge stocks and flows, and the role of (for example) knowledge spillovers, will occur in each of these fields. It may be that our field-work can open up a knowledge paradigm in economic development by examining these kinds of issues. To develop such a knowledge-based approach to economic development it is perhaps especially useful to think about the knowledge dynamics of firms (and regions) that involve knowledge-intensive business services, and to apply this model to other (perhaps manufacturing) sectors.

Conclusions

The innovation paradigm is long established and tends to impel researchers and policy-makers in a certain direction – towards the centrality of technology and of change to economic development in which (in particular) there is a flow from scientific knowledge or invention through innovation and product development to the market. The emphasis then is placed upon (for example) the linking of scientists in universities (say) to particular markets via their bright ideas. Now whilst of course this process does occur, and whilst knowledge is crucial to it, it would distort our understanding of the role of knowledge in business – or regional – success to stress this paradigm. There is much more to knowledge dynamics than the contribution of new ideas to new products, and it is this 'much more' that the EURODITE project should identify and explain.

At the same time, there are serious problems with the innovation paradigm itself. Given the degree to which continuity and change are interwoven, and given the hyper-relativity of innovation (its dependence upon purposes and context, upon categories that are supposed to manage the problems of churning, iteration and otherness)

anything that counts as innovation from one point of view will at the same time count as non-innovation from several other available angles. The decision as to whether something is to count as innovation is therefore political, is usually confined to particular settings, and is usually taken as given by social scientists rather than tested. When social scientists buy uncritically into this terminology they add a further twist to the rhetoric of the novel whilst diverting attention away from wider questions of business and economic development.

Novelty is in practice less important than the contribution of ideas as products as well as factors to the performance of firms and economies – which may involve the perception of novelty on the part of firms or their customers, in which case the emphasis will be upon how this perception is constructed and accomplished.

Glossary Notes

Disinnovation: Corporate strategies often concern the limitation of innovation – withdrawing innovations from the market, or preventing them from reaching it, in order to defend market dominance amongst big players – e.g. ICT or biotech firms buying up new starts and closing them down for this reason; e.g. auto firms refusing to disclose their architectures to the public, suppliers and competitors – a disclosure that would facilitate further innovation – in order to protect their control over parts and their brands. Ditto Open Source software. We mustn't forget that the point of business is not knowledge or products but profits and power.

Annovation: The introduction of a new product that the customer does not want, and that – if they were able to choose – and perhaps if they knew about it – they would avoid – e.g. GM rice getting into British shops because of the collusion of the Food Safety Agency (Sept 2006).

References

Aghion P, Howitt P 1992, A Model of Growth Through Creative Destruction, *Econometrica*, 60.2, 323-351

Aghion P, Howitt P 1998, *Endogenous Growth Theory* Cambridge MA: MIT Press

Blake M, Hanson S 2005, Rethinking innovation: context and gender, in *Environment and Planning A*, 37, 681-701

Carlsson, B. (ed) 1995, *Technological Systems and Economic Performance: The Case of Factory Automation*. Kluwer, Dordrecht

Dinopoulos E, Thompson P 1998, Schumpeterian Growth without Scale Effects, *Journal of Economic Growth*, 3.4, 313-335

Grossman G, Helpman E 1991a, *Innovation and Growth in the Global Economy* Cambridge MA: MIT Press

Jones C 1995, Time Series Tests of Endogenous Growth Models *Quarterly Journal of Economics* **110**.2 495-525

Jones C 1999, Growth: With or Without Scale Effects, *American Economic Review* 89.2 139-144

Jones C 2004, Growth and Ideas, in Aghion P and Durlauf S (eds) *Handbook of Economic Growth*, web-based

Kremer M 1993, Population Growth and Technological Change: One Million B.C. to 1990, *Quarterly Journal of Economics*, 108.4, 681-716

Lundvall, B. (ed) 1992, *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, London: Pinter

Nelson R, Rosenberg N 1993, Technical Innovation and National Systems, in Nelson, R. (ed.) *National Systems of Innovation: A Comparative Study*, Oxford: Oxford University Press

Romer P 1986, Increasing Returns and Long-Run Growth *Journal of Political Economy* **94.5** 1002-1037

Romer P 1990b "Endogenous Technological Change", *Journal of Political Economy* **98.5**, pt. 2, S71-S102