ECONOMIC GEOGRAPHY AND INNOVATION CLUSTERS

Roger Smith

Department of Industry, Innovation, Science, Research and Tertiary Education

Working Paper 2012–01

April 2012

Economic Analysis Section
Industry Policy and Economic Analysis Branch
Industry and Small Business Policy Division
Department of Industry, Innovation, Science, Research and Tertiary Education
Canberra, Australia

The views expressed in this paper are those of the author and do not necessarily reflect those of the Department of Industry, Innovation, Science, Research and Tertiary Education or the Australian Government.

The author can be contacted at mailto: roger.smith@innovation.gov.au
Abstract

The development of new economic geography over the last two decades has regenerated interest in the role and importance of geography in economics and in the analysis of the spatial distribution of economic activity.

New economic geography has seen the development of useful new models that help to explain how and why agglomerations of industrial activity occur based on increasing returns to scale and the positive externalities associated with firm and knowledge linkages. In a broader sense, economic geography also helps to explain the paradox of the ongoing, or even increasing importance of place and proximity in economic activity—despite the advent of cheap communications technology.

These ideas have particular relevance for the development of industry clusters and innovation hubs which have gained renewed interest in Australia in recent years with the current Australian Government’s emphasis on industry and public sector collaboration to drive innovation. Successful clusters, however, also often grow organically without government assistance.

This paper applies the new economic geography to Australia’s most ambitious ever cluster project, the Multifunction Polis or MFP—a joint concept developed in the late 1980s by Australia and Japan for a futuristic high-tech city originally to be located on the Gold Coast. A site in Adelaide was eventually chosen for the MFP in 1990, but it failed to generate significant public funding or private sector interest and was finally discontinued in 1998. A better understanding of economic geography, particularly the importance of incentives for creative human capital formation and movement, enhanced access to sophisticated market needs and the role of deep technological and scientific infrastructure, could potentially have led to better outcomes for the MFP. It also provides guidance about possible future directions in the development of innovation clusters in Australia.
# Contents

Introduction .................................................................................................................................................. 1

Outline of the Theory ................................................................................................................................ 1

  The basic theory developed by Krugman ................................................................................................. 1

  Economic geography and clusters ........................................................................................................... 2

  Highly skilled and creative human capital as a driver ............................................................................. 3

Industry Policy Implications in Australia ................................................................................................... 4

  Innovation cluster policy in Australia ...................................................................................................... 4

  Case study: The Multifunction Polis ....................................................................................................... 5

  Why did the MFP fail? ............................................................................................................................... 7

Conclusion .................................................................................................................................................. 9

References .................................................................................................................................................. 10
Introduction

One of the more intriguing economic theories to emerge in recent years is the theory of economic geography. The ‘new economic geography’, as it is often referred to, ambitiously seeks to answer one of the key gaps of the neo-classical framework. Going beyond traditional models that explain how the market addresses ‘what to produce’, ‘how much to produce’ and ‘for whom to produce’, economic geography raises the hitherto largely neglected question of how economic systems determine ‘where to produce’.

Originally considered part of the study of geography and regions, the theory has developed in the last two decades as more integral to the study of economics since it attempts to explain the distribution and spatial orientation of economic activity. The theory therefore introduces the additional variable of space into economic thinking.

New economic geography has implications for industry policy, particularly with regard to innovation hubs and industry clusters. This paper examines the theory of economic geography with particular reference to the case study of the Multi-Function Polis project in Australia during the late 1980s and 1990s.

Outline of the Theory

The basic theory developed by Krugman

Over the last 20 years, Paul Krugman has been at the forefront of placing geography within a clear economic analytical framework (Krugman 1991; Fujita et al 1999). He has basically sought to explain why industrial development tends to be uneven (Martin & Sunley 1996, p.260-261).

At its core, the new economic geography is the study of the emergence of agglomeration caused by increasing returns to scale and transportation costs and it emphasises linkages of firms to both their suppliers and their customers (Schmutzler 1999). With transportation costs as a key variable, location decisions of producers are based on proximity to customers and to suppliers. As more labour, a mobile factor of production, is attracted to the centre of production, it becomes even more attractive to produce there due to these workers becoming consumers. Other firms, suppliers and workers are also attracted to the same location further accentuating the benefits of being close to markets, supply chains, sources of employment and sources of information and knowledge (Krugman 1993, p.294; Schmutzler 1999, p.356)¹.

¹ This model does, however, apply more to goods production than to other forms of economic activity.
The choice of the original location may initially be related to its access to natural resources like a water source. But eventually its growth and the concentration of economic activity are factors of the centripetal forces described above in the form of increasing returns to scale and the increasing intensity of interaction between producers, their suppliers, workers and consumers at an industrial centre, rather than access to sources of natural capital (Krugman 1991).

Because of the cumulative effects of increasing backward and forward linkages of firms to both suppliers and to consumers, there is said to be path dependency toward agglomeration that resulted originally from the historic accident of a particular region's emergence, rather than through constant returns to scale in the competitive equilibrium of the neo-classical model. The geographic distribution of economic activity therefore becomes locked in, although it is still possible for change to occur (Martin & Sunley 1996, p.264).

The process of agglomeration has often been described in the context of an economy characterised by agricultural industries at the periphery and manufacturing at the centre. In pre-industrial, pre-railway times when transportation costs were high, it may have made more sense for manufacturing to be dispersed close to where agricultural communities were located. But as transportation costs fell, agglomeration became more likely since it was increasingly more affordable to service the peripheral communities from a centralised manufacturing belt (Krugman 1991, p.486-487; Schmutzler 1999, p.362-363).

Counterbalancing these centripetal forces are centrifugal forces that could negate the advantages of agglomeration and move the equilibrium back away from the manufacturing centre. Agglomeration, in addition to the positive externalities outlined above in terms of proximity to factor inputs, consumers, markets and supply chains, also generates negative externalities. The emergence of large centres drives up housing costs due to increasing demand and competition for available land. Wages need to be increased to compensate for these increased costs. There is increasing congestion, commuting times, environmental degradation, crime and reduced quality of life. This can then generate centrifugal forces. There is therefore said to be a ‘discontinuous change in the equilibrium structure’ and total agglomeration rarely occurs (Schmutzler 1999, pp.265, 373).

**Economic geography and clusters**

Economic geography does not only describe the interactions of firms, suppliers, workers and consumers that are advantaged by agglomeration. Firms also gain positive externalities from locating in proximity to other firms that are involved in the same or a similar industry. This is because there are knowledge spillovers as a result of various firms with similar production processes clustering in a single region. The theory of clustering is intertwined with the theory of economic geography, but the former focuses more on agglomeration of economic activity within a particular or related industry rather than across industries (Schmutzler 1999, p.357). Cluster
theory is one field of economic geography that has been of particular interest to industry policy-makers (OECD 2007).

Porter (2000) describes clusters as ‘geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions (eg. universities, standards agencies, trade associations) in a particular field that compete but also cooperate’ (p.15). He describes the paradox that such geographic concentrations retain their relevance even where vastly improved technology, communications, transport and globalisation would have predicted the demise of location as a primary factor in the business success of firms.

Porter’s conclusion is that in a world where all firms can gain similar potential advantages from the spread of the internet and cheap communications technology, geographic clusters generate a specific competitive advantage in terms of privileged access, informal channels of communication as well as peer and community-generated incentives that can drive innovation and productivity (Porter 2000, p.32). Globalisation paradoxically makes ‘the attributes that determine whether a given place will benefit or suffer from the globalising and localising tendencies’ actually more important in determining regional economic development (Enright & Roberts 2001, p.67).

Clusters often involve the creation of positive externalities in terms of access to shared physical infrastructure, tax breaks and regulatory environment, but there are other less tangible competitive strategic benefits that flow from optimal location due to enhanced dialogue with related companies, trade associations, research centres, vocational training bodies, standards associations and government agencies (Porter 2000, p.16). Clusters in designated zones can stimulate innovation, drive exports and attract foreign investment. The whole of the cluster therefore becomes greater than the sum of its parts (Porter 2000, p.21).

A number of specific factors have been identified as instrumental in the productivity-augmenting advantages of clusters. Firstly, they enhance the availability of specialised skills sets in the workforce as well as specialised components, services and other inputs. Secondly, they enhance channels of communications and special relationships through local communities by creating an enabling milieu. Clusters may, for instance, allow firms to gain more sophisticated knowledge about specialised customer needs. Thirdly, there is often greater access to public goods and institutions, such as research and training bodies. Fourthly, peer pressure and community creates incentives to excel and engage in innovation and continuous improvement (Porter 2000, pp.21-23). However, clusters can also in some cases retard innovation where inter-related firms within the cluster ‘lock in’ outdated business practices (OECD 2007, p16; Porter 2000, p.24).

**Highly skilled and creative human capital as a driver**

There is another important contribution to the debate about economic geography, clusters and the power of location as a driver of economic growth. Any discussion of
how to implement ideas of economic geography into the practical realities of industry policy needs to consider the theory of the ‘creative class’ as developed by Richard Florida. This is one of the most influential but controversial recent contributions to the debate around economic geography.

Florida (2002) postulates that, rather than increasing returns to scale, transportation costs and linkages of firms to suppliers and consumers, the emergence and congregation of pools of highly talented, skilled and creative labour is a dominant driver of regional economic growth. Florida’s theory focuses particularly on the importance of knowledge workers to modern economies rather than the more traditional focus, in Krugman’s work for instance, on agricultural and manufacturing sectors. Further, Florida argues that creative hubs that attract knowledge workers may be even more important in a modern economy than the availability of government-induced drivers like physical infrastructure and tax breaks (Florida 2002, p.221).

Florida’s ideas accept that access to the right kinds of people with their formal and informal channels of information are drivers, but he distinguishes this from traditional concepts of social capital developed by Robert Putnam (2000) in the sense that creative class linkages are based on shorter term relationships (2002, p.220). His ideas also go further than traditional concepts of human capital in that lifestyle factors are prime motivators of where ‘creative’ workers choose to live thereby driving economic growth and structural change in those cities. Other factors identified by Florida as determinants of where the ‘creative class’ choose to reside include the presence of a ‘thick’ employment market, places for social interaction like good bars and restaurants, as well as cultural and lifestyle diversity (2002, pp.223-234).

Florida postulates that ‘creative class’ cities are likely to have greater innovation, high-tech industries and economic growth (2002, p.246). Consistent with Porter and Krugman, the creative class theory accepts that geography is central to economic growth despite the rise of sophisticated information, communications and transportation technology that would ostensibly diminish the role of location as a driver of innovation and growth.

These types of network and interdependence effects distort the normal workings of the perfect competition model. But crucially, they also add dynamism to the process of growth and structural change and this has implications for industry policy.

Industry Policy Implications in Australia

Innovation cluster policy in Australia

The core theory of new economic geography as developed by Krugman has had few explicit applications in industry policy either in Australia or elsewhere (Schmutzler 1999, p.374). By far, the most important application of economic geography in its broader sense as discussed in this paper is with respect to the development of industrial clusters which have been particularly influential in many advanced
industrialised economies (OECD 2007), but not particularly in Australia until recently (Marceau 1999).

Roberts & Enright (2004) cite some examples of industry clusters that developed in Australia during the period of post-World War Two industrialisation. These include whitegoods and automobile industries in Melbourne and Adelaide, textiles and garment manufacturing in Melbourne and chemicals in Sydney and Melbourne (2004, pp.101-102). In terms of small regional clusters, Roberts and Enright (2004) identify the high-speed catamaran industry in Cairns, Hobart and Fremantle, the equine cluster at Scone, New South Wales as well as a series of marine industry and other clusters developed in Far North Queensland by the Cairns Regional Economic Development Corporation during the 1990s (pp.107, 112-114). One of the key factors identified in the relative success of this latter cluster was the entrepreneurial nature of the local business community in Far North Queensland and local private sector buy-in (Roberts & Enright 2004, pp.112-114).

However, hub and cluster development, as well as industry policy in general, is now increasingly being linked to policies to create framework conditions designed to boost capacity for innovation (OECD 2007, pp.46-51). This idea is central to the approach of the Labor Government since 2007 with its renewed emphasis that ‘innovation policy is industry policy’ (Australian Labor Party 2007, p.1).

Much of the thinking around the development of an enhanced national innovation system, as envisaged in the government’s Powering Ideas (DlISR 2009) document, draws on the ideas of collaboration and knowledge spillovers associated with clusters of business networks and their links with public sector research (p.24). Drawing on Porter’s ideas about the power of privileged access and informal channels of communication, Powering Ideas states that the ‘Australian Government will … (improve) links and (promote) collaboration between groups and individuals; between institutions and sectors; between researchers and industry; and between businesses and their customers, suppliers, and competitors … Formal collaboration is the tip of the iceberg, which is underpinned by many less formal links’ (p.60).

Case study: The Multifunction Polis

There is one prominent example of a classic and very bold innovation hub model that was attempted in Australia, but is generally considered to have failed. This was the Multifunction Polis (MFP) originally developed as a concept jointly by Australia and Japan in the late 1980s. The MFP is a powerful model of how industry policy-makers formulated an innovative hub / cluster model. They deployed some of the ideas encapsulated around the concept of positive externalities, but failed to consider many of the newer ideas of economic geography that take account of innovation and human capital eco-systems, the necessity to incentivise creative human capital and achieve commercial buy-in.

The idea of the MFP was first proposed at a Japan-Australia Ministerial Committee meeting in Canberra in January 1987 by Japanese Minister for International Trade
At its core, the MFP city would have combined the key features of creative urban residential housing, high-tech research and scientific facilities as well as innovative manufacturing production. It would also have provided a base for cultural and technological exchange (Parker 1998, p.5-6). Industries envisaged for the high-tech city included computers and information technology, biotechnology and health sciences and new and rare materials. It was also to contain so-called ‘high-touch’ industries like tourism, entertainment and sport (Castells & Hall 1994, p.207).

The proposal was viewed favourably by the Hawke Government since it fitted in well with its policies to restructure Australian industry, develop new internationally competitive elaborately-manufactured export industries and enmesh our economy with the dynamic Asia-Pacific region. It also provided potential benefits to Japan in terms of expanding its ‘technopolis’ urban design concept to an Australian setting, extending its engagement with Australian markets, providing enhanced exposure to an English-speaking environment and creating lifestyle opportunities for Japanese workers (Parker 1998, pp.5-6). As originally envisaged in 1987, it would have been a very large-scale project worth as much as A$9.5 billion with a population of 250,000 (Parker 1998, p.22).

In January 1988, Japan and Australia agreed on a joint feasibility study that was finally completed in December 1989. The Joint Steering Committee comprised two Domestic Steering Committees for Australia and Japan respectively with substantial corporate representation on each (Parker 1998, p.7). The MFP generated intense community and political debate in Australia and even became a major issue of the 1990 Federal Election campaign. Despite domestic opposition, the Joint Steering Committee presented its final report in July 1990 with a recommendation that the project had merit (Parker 1998, p.7).

The Japanese especially saw the lifestyle benefits and so proposed a site at the northern end of the Gold Coast. However, the Queensland Government refused to fund purchase of this site (Roberts & Enright 2004, p.104). In 1990, a 1,840 hectare site was chosen at Gillman/Dry Creek located just to the east of Port Adelaide, South Australia. One of the advantages of this site was that most of the land was already government-owned and was located ‘only’ 12 kilometres from the centre of Adelaide with good access to Adelaide airport (Parker 1998, p.6). The choice was endorsed by the Joint Steering Committee in September 1990 (Castells & Hall 1994, p.214). The MFP Adelaide Management Board was then formed with the chair and deputy chair being business representatives and other members drawn from business, trade union and community interests as well as the CSIRO and Federal and State Government departments (Parker 1998, p.8).

In July 1991, the South Australian and Federal Governments announced that the project would go ahead, but with an initial budget allocation of only $12 million (Parker 1998, p.8-9). It was clear that by this time the MFP had become a lower priority for the Federal Government (perhaps due to political controversy) and it
contributed only $4 million per annum to the MFP from 1992 to 1996. Designated Federal funding was then cut all together with the election of the Howard Government in 1996 (Parker 1998, p.13-14).

In addition, the MFP failed to attract anything like the kind of Japanese private sector investment that had originally been envisaged. Among the factors cited for this failure of Japanese investment were the end of the 1980s Japanese economic boom, renewed Japanese interest in investing in Asia and the lack of Australian public sector funding (Parker 1998, p.13-14).

There was, however, ongoing interest in the project at the state level. The MFP Development Corporation was formed in 1992. It expanded the MFP site at Gillman to also incorporate the existing South Australia Technology Park adjacent to the University of South Australia campus at The Levels and the Science Park adjacent to Flinders University in the south of Adelaide (Parker 1998, pp.14-15). The awarding of the MFP to Adelaide was seen as an opportunity to rejuvenate the city’s manufacturing base by developing new technology industries (Enright & Roberts 2001, p.74-75).

Once the project was largely in the hands of South Australian stakeholders, it did make some headway at the local level, notably through the construction of innovative and environmentally-friendly housing at the Mawson Lakes Urban Development (Parker 1998, pp.18-21). However, the MFP Development Corporation was eventually wound up in 1998 having failed to achieve anything approximating the futuristic-style city that had originally captured the imagination of MFP planners back in the late 1980s (Roberts & Enright 2004, p.104).

Why did the MFP fail?

Despite its extremely high political profile 20 years ago, the MFP is now largely forgotten and there have been few, if any, comprehensive studies of why the project failed to deliver on its original promise of technological innovation through the creation of a high-tech industrial and residential urban cluster. However, some of the ideas of new economic geography, mostly developed after the MFP concept came about, offer insights into this interesting policy question.

Firstly, policy-makers designing the MFP failed to adequately address the issue of how it could realistically add value in terms of Australian location to an international supply chain. What particular advantage did Australia offer? The original Japanese planners seemingly had an answer to this question in their idea of the MFP. Australia had a lifestyle advantage over other countries. This is why the original idea of locating the MFP at the Gold Coast was so attractive to the Japanese. This location offered climatic and lifestyle advantages combined with the educational, workforce and institutional (eg. political stability, strong legal system and property rights) framework of a developed country.

This latter combination was one that few locations around the world, and certainly few in the Western rim of the Pacific, could match. This links in with Richard Florida’s
It might also tie in with Porter’s (2000) theory that location has become paradoxically more important with the exponential growth of cheap information and communications technology since it is one factor that can give firms an edge over competitors. Further to this, global supply chains have become increasingly complex and this means that slight geographic competitive advantages in the price, quality and quantity of inputs—such as intermediate goods, skilled labour, infrastructure and services—can have a relatively significant impact on productivity (Jones 2008). The decision therefore to locate the MFP at Adelaide instead of the Gold Coast with the latter’s perceived lifestyle advantages, at least in the eyes of the Japanese, may have negated this slight geographic edge that Australia’s MFP might otherwise have had.

Secondly, Krugman’s concept of agglomerations has relevance to an analysis of why the Adelaide-based MFP was relatively unsuccessful. It could be argued that economies of scale sufficient to generate positive externalities in terms of access to a large skilled labour force, sophisticated consumer markets and suppliers, consistent with the grand vision for the MFP, could only be found in Australia along the east coast from Melbourne to Brisbane. South Australia can be said not to benefit from any significant centrifugal forces that might attract skilled high-tech workers toward it and away from Sydney and Melbourne. The state continues to suffer from net outflows of residents through interstate migration. In fact, since 1971-72, there have only been four years when South Australia experienced positive net interstate migration (ABS 2010). In this respect also, the planners of the MFP may have forgotten the extent to which geography matters.

Thirdly, and related to the above, for such an ambitious project to succeed, there needs to be an enabling milieu for innovation to flourish. This includes economies of scale in terms not just of the size of the market, but also the breadth, depth and historic roots of the scientific and research infrastructure and proximity to other high-tech firms and institutions. The OECD has identified these latter factors as important to the location decisions of high-tech firms, especially those engaged in innovative research and development (OECD 2010, p.6). The OECD also notes that ‘economic clusters emerge most often where there is a critical mass of firms allowing economies of scale and scope, a strong science and technology base, and a culture conducive to innovation and entrepreneurship. … Many successful clusters have long historical roots and the emergence of new clusters takes time’ (OECD 1999, p.7).

Although the Mawson Lakes MFP site was close to an existing Technology Park and a campus of the University of South Australia, the area around Gillman was mostly blue-collar low income and had little in common with an academic and technocratic workforce that the MFP might want to attract (Parker 1998, p.12). Contrast this with the Silicon Valley in Northern California and its location close to major universities, population centres, lifestyle attractions and entrepreneurial culture.
Conclusion

The new economic geography has broadened our horizons over the last few decades about the factors driving the distribution of industrial activity. In addition to formal models that facilitate analysis of the forces at work in determining where factors of production are located, the new economic geography in its broader sense also introduces important new concepts about how human interactions and collaborations at a given location can drive innovation, structural change and economic growth.

These ideas have gained renewed interest among industry policy-makers in Australia in recent years. A better understanding of economic geography, particularly the importance of incentives for creative human capital formation and movement, enhanced access to sophisticated market needs and the role of deep technological and scientific infrastructure, could potentially have generated better outcomes with respect to Australia’s most ambitious ever cluster project, the Multifunction Polis. In addition, examples such as Cairns Regional Economic Development Corporation indicate that, while policy initiatives have a role in promoting collaboration, successful clusters often develop organically through the market and good framework conditions.
References

ABS, see Australian Bureau of Statistics


Australian Labor Party 2007, New directions for innovation, competiveness and productivity, ALP, Canberra.


DIISR, see Department of Innovation, Industry, Science and Research


10


