

A century of cities

Urban economic change since 1911

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In the memory of Professor Sir Peter Hall (1932-2014), who dedicated his life to understanding growth and change in cities, and whose intellect and enthusiasm continues to be an inspiration to us all.

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Executive Summary

Over the last 100 years all cities have been buffeted by the winds of economic change. Globalisation and technological and transport developments have meant that they have had to continually adapt to these changes, both to continue to provide jobs and contribute to national economic growth.

These global changes have altered the role that our cities play in the national economy, meaning it is now proximity to knowledge rather than proximity to resources that is the primary driver of city growth.

Those cities that have adapted to this change have reinvented their economies, creating jobs in new, more knowledge-focused industries to offset losses in more traditional industries. These cities, such as Reading and Brighton, have thrived as a result, creating many thousands of jobs in higher-skilled, higher paying occupations.

Those cities that have struggled over the last 100 years have merely replicated their economies. They have replaced jobs in declining industries with lower-skilled, more routinised jobs, swapping cotton mills for call centres and dock yards for distribution sheds. Some cities have struggled even to do this – Burnley has half the total number of jobs in 2013 that it did in 1911.

The developing geography of knowledge has had long-lasting implications for the performance of cities across the country, giving rise to the ‘North-South divide’. Many have diagnosed the cause of this to the decline of the traditional industries that city economies of the North and Midlands were based around. But our weakest performing cities have struggled not because of the inevitable decline of manufacturing employment, but because of their inability to support jobs growth in new, more knowledge-focused industries.

The result is that the ‘South’ has been pulling away from the ‘North’ for a century. Since 1911, for every job created in the North, Midlands and Wales, 2.3 have been created in the South.

History matters in explaining these patterns. Firstly, those cities that have historically had a greater share of jobs in more knowledge-focused industries tend to have a greater share of knowledge jobs today. Secondly, the scale of more traditional industries in 1911 has cast a long shadow over some cities – Manchester lost around 400,000 jobs in manufacturing over the last century – creating a vast job-creating challenge.

But policy also matters. The post-war new town initiative has seen the huge growth of cities in the South. Crawley has seven times the number of jobs today than it did a century ago, while Milton Keynes didn’t even exist until the 1960s, but now has over

150,000 jobs within its boundaries. Public sector jobs, particularly through health and education, have also made big contributions – the public sector accounts for an estimated 900,000 of the 1.8 million extra jobs in London today compared to a century ago.

Policy that has more explicitly attempted to reduce the North-South divide, which can be traced back to the 1930s, has been much less effective. We've had 80 years of policy attempting to boost growth in the regions, but the gap in performance has widened over this time. This is because the majority of interventions have tended to re-enforce the existing industrial structure, replicating their economies with policies designed to support low-knowledge, more routinised activities only, as opposed to supporting reinvention by increasing their attractiveness to more knowledge-focused services jobs. These sentiments continue to echo in policy today, illustrated by George Osborne's call for a 'march of the makers'¹ and the overt focus of the Regional Growth Fund on manufacturers in the North and Midlands.

If policy wants to improve the performance of cities that have struggled in recent decades it needs to stop obsessing about returning to the past and look to the future by focusing on improving the attractiveness of these cities to knowledge-focused businesses. Successful cities of the future will be those that adapt to the constant change that the 21st century will bring, in the way London and latterly Manchester have done in recent decades.

To support the ability of cities to adapt, the long-term strategic objective of economic development policy should be to improve the stock of knowledge in cities and address the implications of industrial decline. This should centre on:

- 1. Improving the skills of the workforce.** Knowledge businesses require high-skilled workers. The ease with which they can recruit these workers is a key determinant of where they locate.
- 2. Supporting innovation.** High-skilled workers don't just work anywhere – they cluster in successful cities. This is because a worker isn't more productive just because of the qualifications that he or she holds, but also because of the workers he or she works with and the institutions that he or she works in. The 'knowledge networks' that workers are part of are place specific, and cities need to be able to facilitate innovation and the creation of new ideas via their knowledge networks to increase long-run productivity.
- 3. Dealing with the scars of industrial legacy.** The 21st century economy requires less employment space – an office has a smaller footprint than a factory. And this employment space tends to be in a different part of the city – jobs in our most successful cities have been concentrating in their city centres. This shift has left large swathes of empty land and buildings in some cities, so encouraging density of employment should be done alongside dealing with land remediation.

¹ A reference to the Chancellor's 2011 Budget speech where one of his final remarks was "A Britain carried aloft by the march of the makers".



Introduction

Over the last 100 years all cities have been buffeted by the winds of economic change. Globalisation and technological and transport developments have meant that cities have had to continually adapt, both to continue to provide jobs and contribute to national economic growth. As more traditional industries have declined, the challenge for cities has been to encourage jobs growth in new areas of the economy.

Much of the work by Centre for Cities shows the varying performance of cities in the UK. But while this is seen across a range of economic indicators, there is less collective understanding as to how this variation came about and for how long it has persisted.

Using historical data on cities this paper shows that some cities have been more successful than others at rising to this challenge. It looks at over 100 years of change in the urban areas of England and Wales, comparing cities in 1911 to their overall size and industrial make-up today.

Firstly, it sets out what has happened over the last century. It then explores why these patterns have occurred. Thirdly, it looks at whether these patterns are inevitable. And finally it offers three principles that should guide policy that attempts to support city growth over the next 100 years.

Box 1: Methodology

Defining a city

A fixed geographical definition of cities is used throughout the report based on their present day boundaries using the Primary Urban Area (PUA) definition. This is because we are interested in understanding how history affects the modern-day performance of a city, starting in 2013 and working back, rather than looking at how a city has expanded through time. 1911 administrative boundaries were matched onto current PUA boundaries. In instances where 1911 authorities straddled current PUA boundaries, only those authorities that had more than 50 per cent of their area in the PUA were included.

In total, 57 cities across England and Wales are looked at in this research. Milton Keynes and Telford are excluded because they were not established until the 1960s, and Scottish cities and Belfast are not studied because of a lack of data availability.

More detail on the PUA definition can be seen at www.centreforcities.org/puas

Collating jobs data for 1911

Data on occupations from the 1911 Census is used to look at the industrial structure of cities a century ago. The Census did not report occupational breakdowns for urban authorities below 5,000 in population or those districts classed as rural districts. Despite their classification, some rural districts – especially those that contained collieries – contained a large number of jobs in them, and not taking account of this would inflate the jobs growth figures presented in this report.

The Census did present figures for aggregated rural districts for every county in England and Wales. This allowed an estimation of the number of jobs and industrial structure of individual rural districts by doing the following:

- Firstly, the total population of each missing district (for which data is available) was multiplied by the average share of people in work for the aggregated rural districts of each county. This gave an estimate of the total number of jobs.
- Secondly, the estimated total number of jobs was multiplied by the share of jobs taken by women for the rural districts of each county. The total estimated jobs taken by men and women were then multiplied by the share of jobs in each industry by gender for the aggregated rural districts of each county. This gave an estimate of the industrial structure of each of the districts. Making the gender adjustment was important because of the very different occupations of men and women in 1911.

The data used is residence based, so it is assumed that those people living in the PUA also worked in the PUA.

Industry definitions

Industry definitions are listed in the Appendix.



1. A century of city performance

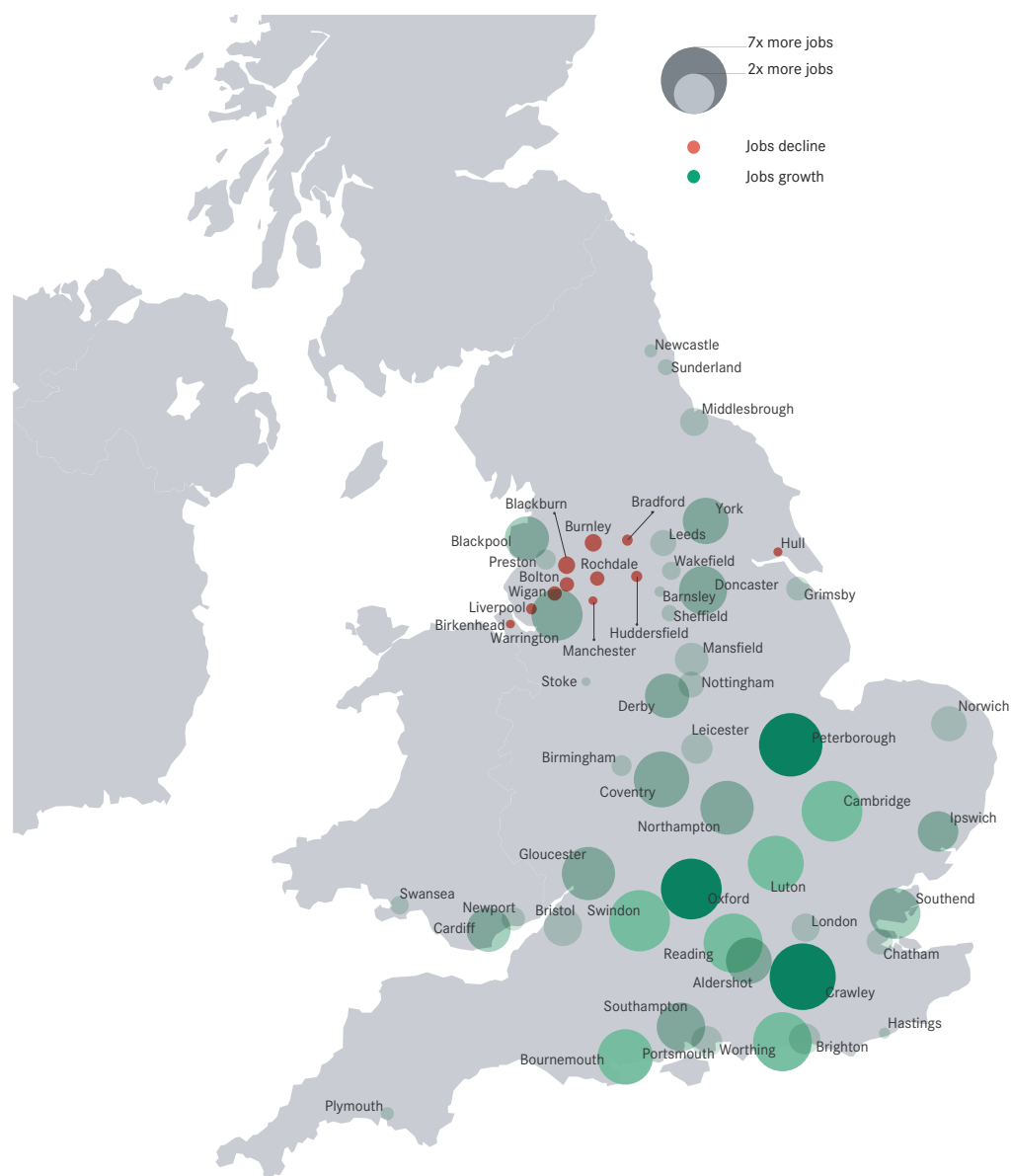
Job creation in cities over the last 100 years

The fortunes of cities have vastly diverged over the last 100 years. The majority of cities have grown over this period – 46 cities had more jobs in 2013 than 1911, and 22 have more than doubled their total. But 11 cities had fewer jobs in 2013 than 1911. As Figure 1 shows, Crawley has been the fastest growing city over the last century and is seven times its size in 1911, while Blackburn and Burnley, which have seen the largest falls, are now only around half the size they were 100 years ago.

Figure 1: Growth in jobs, 1911-2013

All jobs growth 1911-2013 (%)			All jobs growth 1911-2013 (%)		
City			City		
1	Crawley	598	48	Hull	-2
2	Peterborough	373	49	Birkenhead	-4
3	Oxford	323	50	Liverpool	-10
4	Cambridge	295	51	Huddersfield	-13
5	Swindon	293	52	Bradford	-16
6	Reading	273	53	Bolton	-20
7	Worthing	257	54	Wigan	-25
8	Luton	217	55	Rochdale	-30
9	Bournemouth	204	56	Blackburn	-44
10	Coventry	197	57	Burnley	-51

Source: Census 1911; ONS 2014, Business Register and Employment Survey

Figure 2: Growth in jobs, 1911-2013

Source: Census 1911; ONS 2014, Business Register and Employment Survey

As the map shows, there is a very clear geography to these patterns. While this geography has received a great deal of attention over the decades, it is not the cause of it – cities in the North have not contracted because they are located in the North. The aim of this paper is to uncover and understand the underlying patterns that have shaped the current geography of jobs.

The changing role of cities

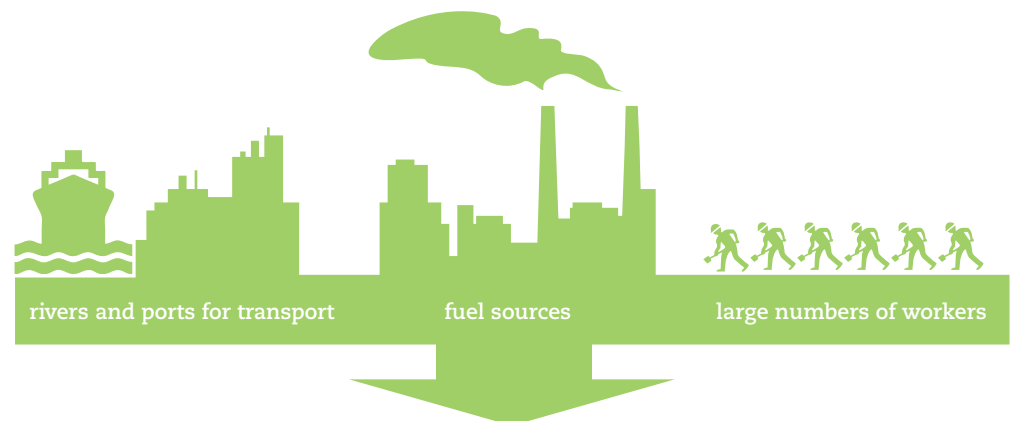
To understand why there has been such an extreme divergence in the performance of cities, we have to understand how a century of change has altered the role that cities play in the national economy.

In 1911 there were two main benefits to businesses – known as agglomeration benefits – that arose from locating in a city. These were:

1. The lower costs of being based in a city as a result of:
 - Proximity to rivers, ports and railways for transport
 - Proximity to coal in the age before widespread access to electricity
 - Access to a large number of workers
 - Access to suppliers and customers
2. Benefits that resulted from being able to share ideas and information – known as ‘knowledge spillovers’. Broadly speaking there are two types of knowledge – codified knowledge and tacit knowledge. Codified knowledge can be communicated by books, for example, which allows it to be easily spread. On the other hand, tacit knowledge is best shared face-to-face. By concentrating people in one place, cities (and city centres in particular) allow the spread of tacit knowledge. This helps drive new innovations and long-run productivity growth.²

Figure 3: The changing role of cities

100 years ago the main benefit to business of locating in a city was lower costs, taking advantage of...



Today it's the ability to share ideas and information...



Given the industrial structure of cities a century ago, the former was much more important than the latter. Logistics jobs sprung up in coastal cities because of the presence of a port, while manufacturers based their location on where they could cheaply and reliably access fuel and get the workers they needed. In Birmingham, manufacturing accounted for 50 per cent of jobs in 1911, while in Barnsley two in

2. Schumpeter J (1942) *Capitalism, Socialism and Democracy*, New York: Harper 1975 (original published 1942), p. 82-85

every three jobs either mined coal or focused on making goods.

Over the course of the 20th century four factors, discussed in Box 2, have changed the benefits that cities offer to businesses. Advances in transport, logistics and power have reduced the cost advantages that cities were traditionally able to offer. And increasing globalisation has meant that businesses often find it cheaper to offshore lower-skilled, more routinised types of activity, such as assembly production lines.

But while these factors have reduced the low-cost benefits of cities, they have increased the importance of their second benefit – their ability to spread knowledge. As the national economy increasingly specialises in more knowledge-focused activities – such as in banking and creative activities, which have a greater requirement to access tacit knowledge – the role of cities as knowledge hubs is becoming increasingly important to the growth of the national economy.

Box 2: The drivers of change in cities over the 20th century

The spread of electricity and the rise of road transport. The spread of electricity released manufacturers from the ties of having to be near a fuel source, while the improvement in road transport – particularly through the advent of the motorway – made access to rivers and ports less important. This made proximity to these amenities less important for manufacturers, which because of the more routinised nature of their work, benefit more from access to large areas of land and good transport than from being close to other businesses.

Containerisation. The ports of London, Liverpool and Manchester were ill-equipped to deal with the increased size of ships introduced by the move towards containerisation from the early 1960s.

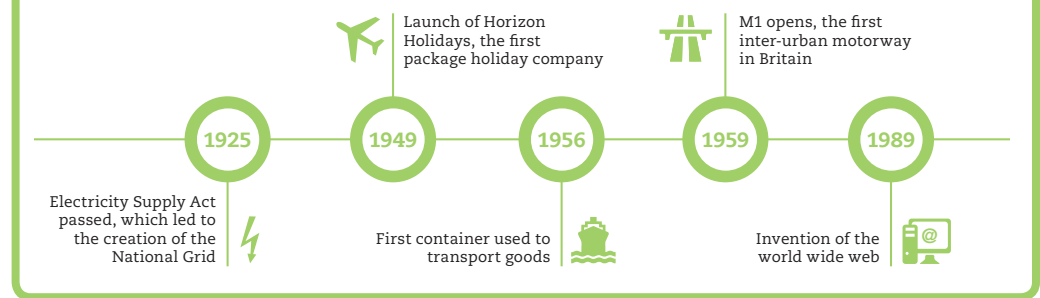
The aeroplane. The rise of the package holiday after the Second World War has had big implications for cities that expanded as seaside resorts, such as Blackpool and Southend. Meanwhile the aeroplane has meant that ports now play a much reduced role in the movement of people and goods.

Continued globalisation. Increased competition has squeezed UK manufacturing and low cost services,³ forcing it to become more productive to remain competitive. This has led to the structural change in the economy, where manufacturing makes a much smaller contribution to the national economy than it once did. In 1911, mining and manufacturing accounted for around 43 per cent of all jobs in England and Wales. Today it is less than 10 per cent.⁴ Globalisation has instead meant that the UK has moved towards specialising in more knowledge-intensive type activities, in which it is the production of the idea where the most value is added, rather than the production of the physical good that is important.

The internet. The web has created new digital industries and changed the way we work – making access to codified knowledge much easier. However, it hasn't reduced the importance of face-to-face interactions in sharing ideas and building networks, which is where the 21st century city comes into its own.

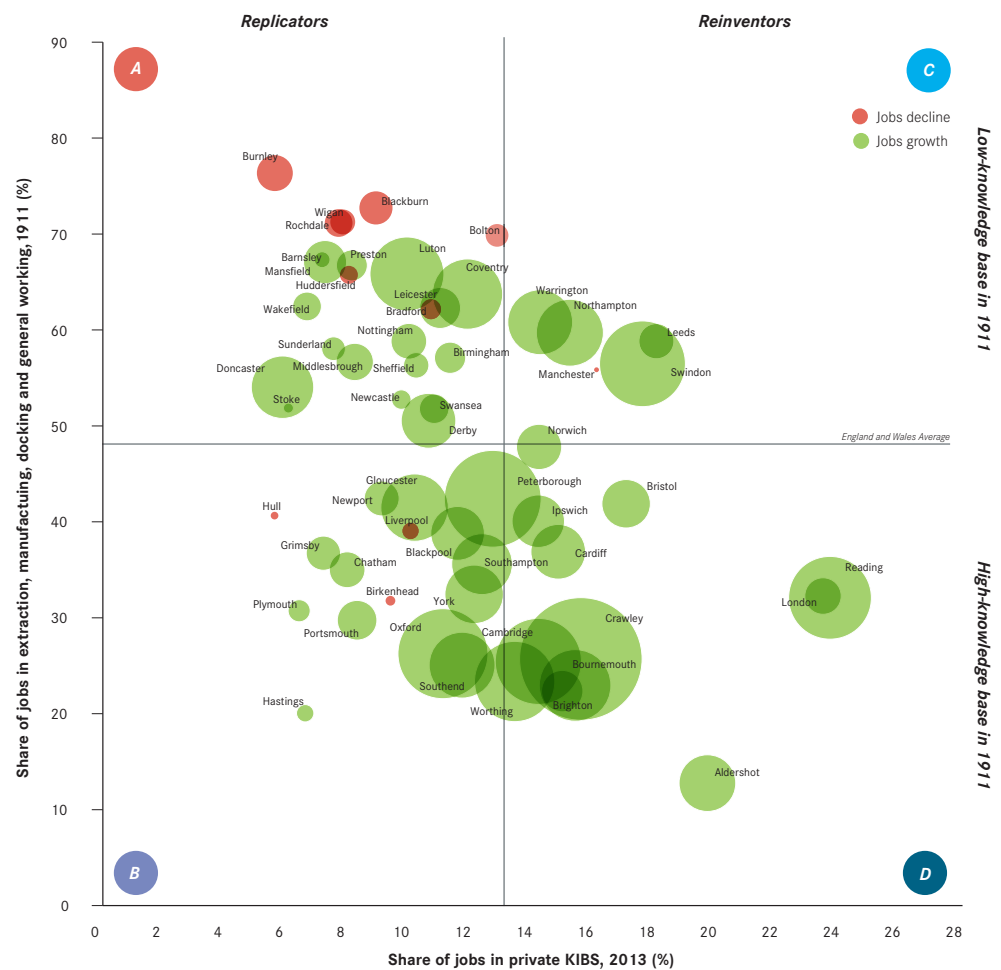
3. Those services that can be offshored, such as call centres, as opposed to 'non-tradable' services such as hairdressers

4. Source: Census 1911, NOMIS 2014, Business Register and Employment Survey

Figure 4: A century of change

Reinvention and replication

As the competitive advantages of cities and the national economy as a whole have shifted, the basic challenge for cities over the last 100 years has been to replace jobs in declining industries with jobs in new, more knowledge-focused, areas of activity. Globalisation, as well as technological and transport advancements, have reduced the advantages that cities offer as places of low-value production of goods and services but have increased their importance as places of ideas creation and knowledge exchange.

Figure 5: Jobs growth, reinvention and replication

Source: Census 1911; NOMIS 2014, Business Register and Employment Survey

Some cities have adapted to these changes far better than others. Those cities that have adapted have **reinvented** their economies, creating jobs in activities such as IT and digital media. Those that have struggled to adapt have **replicated** their economies, swapping cotton mills for call centres and dock yards for distribution sheds.⁵

Figure 5 shows which cities have replicated or reinvented their economies over the last century. It plots the share of jobs in lower-knowledge industries in 1911 – those industries hit hardest by the structural changes to the economy⁶ – against the share of private knowledge-intensive business services (KIBS) jobs in 2013. The size of the bubbles represents the growth in the total number of jobs over the period.

The lines creating the quadrants denote the England and Wales average for each indicator.

Quadrant A	Quadrant C
Barnsley, Birmingham, Blackburn, Bolton, Bradford, Burnley, Coventry, Derby, Doncaster, Huddersfield, Leicester, Luton, Mansfield, Middlesbrough, Newcastle, Nottingham, Preston, Rochdale, Sheffield, Stoke, Sunderland, Swansea, Wakefield, Wigan	Leeds, Manchester, Northampton, Norwich, Swindon, Warrington
Quadrant B	Quadrant D
Birkenhead, Blackpool, Chatham, Gloucester, Grimsby, Hastings, Hull, Liverpool, Newport, Oxford, Peterborough, Plymouth, Portsmouth, Southampton, Southend, Worthing, York	Aldershot, Bournemouth, Brighton, Bristol, Cambridge, Cardiff, Crawley, Ipswich, London, Reading

This chart can be split into quadrants. Two represent cities that have seen a replication of their economies, and two represent those that have seen a reinvention.

1. The replicators:

- **Quadrant A** shows the cities that had a high share of jobs in lower knowledge activities in 1911 and have struggled to reinvent their economies. Cities such as Burnley and Rochdale have not been able to fully replace the jobs they have lost in declining industries – mainly in textiles – and so are smaller today than they were in 1911. Other cities, such as Mansfield and Leicester, have managed to offset job losses in declining industries with jobs growth elsewhere – they have 36,000 and 92,000 more jobs in 2013 than in 1911 respectively. But their low shares of jobs in KIBS activities today suggests that the jobs created have been in lower-skilled, more routinised activities.
- **Quadrant B** shows those cities that have had a much smaller historical concentration in lower-knowledge industries – and so have had fewer jobs to replace – but have struggled to create jobs in knowledge-based industries. Almost all of the cities are or have been ports or seaside resorts.

5. Simme J (unpublished) Evolutionary growth theory and resilience in UK cities: re-invention, replication, recession and recovery, Oxford Brookes working paper (forthcoming)

6. These are defined as extraction, manufacturing, dock working and other general labouring. Tourism is not included in this classification as it wasn't possible to identify all tourist-related activities in the data

2. The reinventors:

- **Quadrant C** shows those cities that have managed to reinvent themselves despite having a historically high level of low-knowledge work, including Leeds and Manchester. As is shown by the overall contraction of jobs in Manchester, the number of jobs created in new industries has not been enough as yet to offset declines seen elsewhere.
- **Quadrant D** shows those cities that have moved to an increasingly knowledge-based economy but have had a much smaller legacy of low-skilled jobs. Examples are Reading and London.

Whether a city is a replicator or a reinventor has an impact on economic performance today. Figure 6 shows that cities in Quadrants C and D tend to have higher wages, more graduate workers, higher numbers of new businesses starting and higher productivity, while cities in Quadrants A and B have a higher share of workers with low qualifications and a higher share of working age population claiming benefits.

Figure 6: Replication, reinvention and modern economic performance

Quadrant	A	B	C	D
Workplace wages (2014)	£ 457	£472	£484	£637
Graduates in workforce (2011)	31	32	35	46
Low qualifications in workforce (2011)	27	26	25	19
Business starts (2013)	41.9	44.9	55.6	86.3
GVA per Worker (2013)	£44,700	£48,100	£48,800	£66,700
Share of working age population that claim DWP benefit (May 2014)	16	15	14	11
Rateable value, £ per sq m (2008)	48	57	63	124

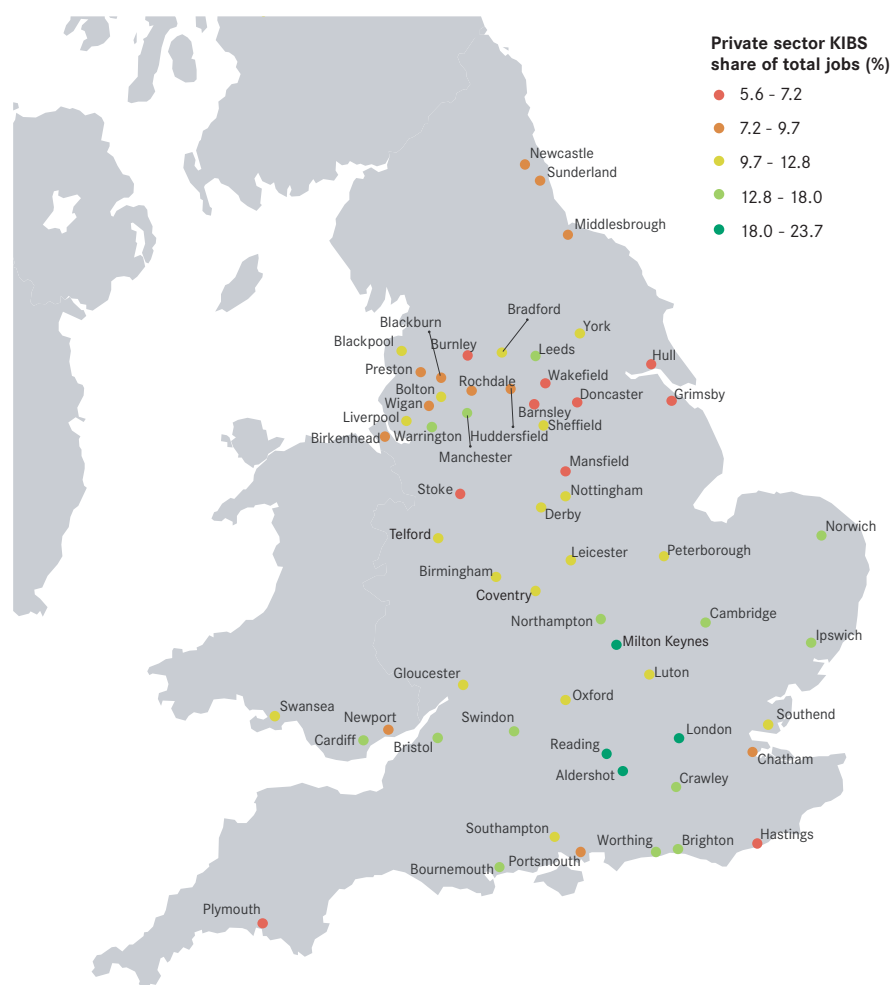
Source: ONS 2015, Annual Survey of Hours and Earnings; NOMIS 2014, Annual Population Survey; ONS 2014, Business Demography; ONS 2014, Regional Gross Value Added (Income Approach) NUTS3 Tables, NOMIS 2014, Business Register of Employment Survey, NOMIS 2014, Mid-year Population Estimates; NOMIS 2014, DWP Benefits; Neighbourhood Statistics 2014, Commercial and Industrial Floorspace and Rateable Value Statistics.

Note: Figures are weighted averages. Low qualifications is a combination of workers that have either no formal qualifications or level one qualifications.

The most striking thing about Figure 5 is the geography. Of the 41 cities classed as replicators, 30 are in the North, Midlands or Wales. And out of the 16 cities classed as reinventors, 11 are in the South.

The implication is that it is the geography of knowledge that has driven the widening 'North-South divide'. Growth in cities during the industrial revolution was based on the advantages they offered as low-cost places to do business or their proximity to natural resources. The struggle of many of these cities to reinvent their economies has meant that they perform much less strongly today than those cities that have been able to change.

Cities in the South have, with a few generally coastal exceptions, been able to shift from centres of low-cost production to centres of knowledge production (noting that many have not had as large an industrial legacy to deal with as their northern counterparts, as discussed later). They have been able to attract and support growth in more knowledge-focused activities as they have emerged. Figure 7 shows the geography of knowledge across cities.

Figure 7: The geography of knowledge, 2013

Source: NOMIS 2015, Business Register of Employment Survey. Crown copyright

It is for this reason that when looking at the broader regional performance, for every additional job created in the whole of the North, Midlands and Wales since 1911, 2.3 have been created in the South. In 1911, the North, Midlands and Wales accounted for 57 per cent of all jobs in England and Wales. By 2013 this had fallen to 47 per cent.



2. What determines the geography of knowledge?

While it is obvious that a coal mine has to go where there is coal, or a fishing industry by the sea, there is no inherent natural geographic factor that affects the geography of knowledge. And yet there are very clear geographic patterns as to where these jobs locate. This section looks at why this is the case.

Why businesses locate where they do

An often cited benefit of locating in cities in the North is that they are cheaper places to do business than in the South. As Figure 6 shows, both workers and commercial space is cheaper in those cities that have replicated their economies. And yet certain businesses have chosen to set up in these more expensive locations.

To understand why this is the case, we need to understand why businesses make the location decisions that they do. Splitting businesses into three broad groups helps to explain these decisions:

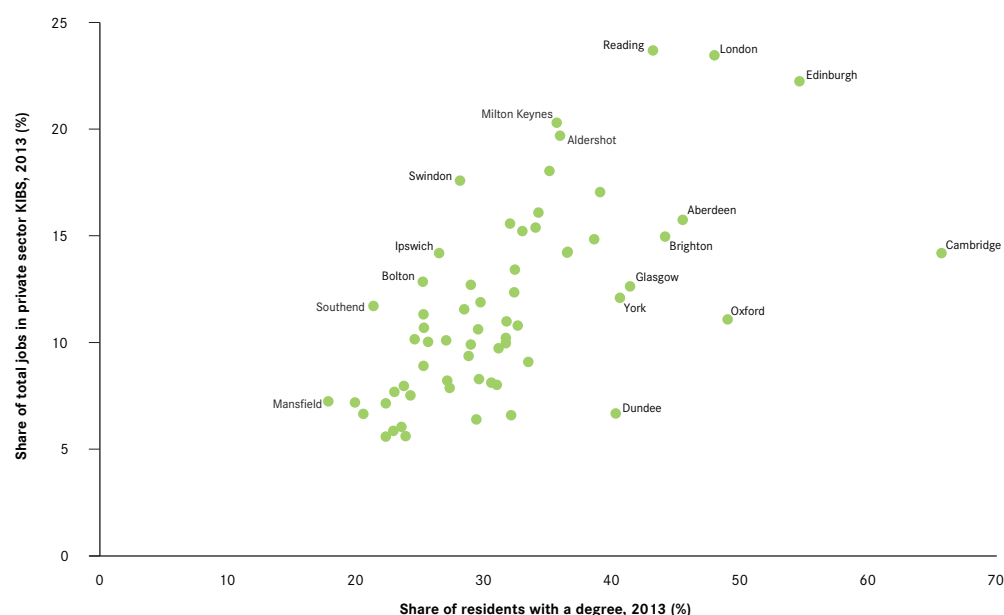
High-skilled, knowledge-focused businesses

Because the main input of knowledge-focused businesses is knowledge and ideas, such businesses are reliant on high-skilled workers. This means that a city such as Bristol, where 39 per cent of residents have a degree, is more likely to attract a knowledge-focused business than Doncaster, where only 23 per cent of residents have a degree. As Figure 8 shows, there is a strong correlation between the two.⁷

But access to workers isn't the only driver of location decisions for many of these firms – otherwise businesses would shun the high costs of central London for cheaper space on the M25, for example. The strength of the 'knowledge network' – the links between skilled workers – in a city is also an important consideration in firm location. The knowledge spillovers that are generated in these networks in strongly performing cities make knowledge-focused businesses more productive, more than offsetting the higher costs of doing business in such locations.

Knowledge-focused businesses are willing to pay a premium to access knowledge. The implication is that knowledge-focused cities compete primarily on their ability to give businesses access to knowledge, rather than on costs.

7. This does not imply causation – KIBS businesses are likely to locate where there are many skilled workers, and skilled workers are likely to be attracted to places with many skilled jobs

Figure 8: The correlation between skills and private sector KIBS jobs

Source: NOMIS 2015, Business Register of Employment Survey; NOMIS 2015, Annual Population Survey

Lower-skilled, more routinised businesses

Businesses that undertake more routinised activities, such as call centres and more traditional manufacturers, mainly require access to lower-skilled workers.⁸ And because they tend not to benefit from knowledge spillovers,⁹ there is little advantage to be gained from paying a premium to be based within a knowledge network.

Because these businesses are much more cost sensitive than knowledge-based businesses, the cost advantages that many northern cities have over southern cities make cities such as Barnsley and Wakefield a more attractive investment prospect to this type of enterprise. Indeed, this is why many companies split their head office location from their back office functions.¹⁰ So the cost benefits that the replicators offer does result in investment, but this investment principally comes from businesses that undertake more routinised activities. Box 3 discusses how this can be seen in patterns of inward investment.

Box 3: Patterns of foreign direct investment

Data on total investment by businesses in cities is not available. But by looking at the location of foreign-owned businesses, and the sectors they operate in, we can get an insight as to how attractive a city is to foreign investors.¹¹

Figure 9 shows the correlation between the share of employment in low-knowledge industries in 1911 and the share of employment in foreign-owned businesses that is in manufacturing. If cities that fall into Quadrant B in Figure 9 are discounted to begin with, there is a positive relationship between the two

8. These workers may be specialised, but not necessarily highly qualified. Duranton G and Puga D (2001) *Nursery Cities: Urban diversity, process innovation, and the life-cycle of products*, London: CEPR

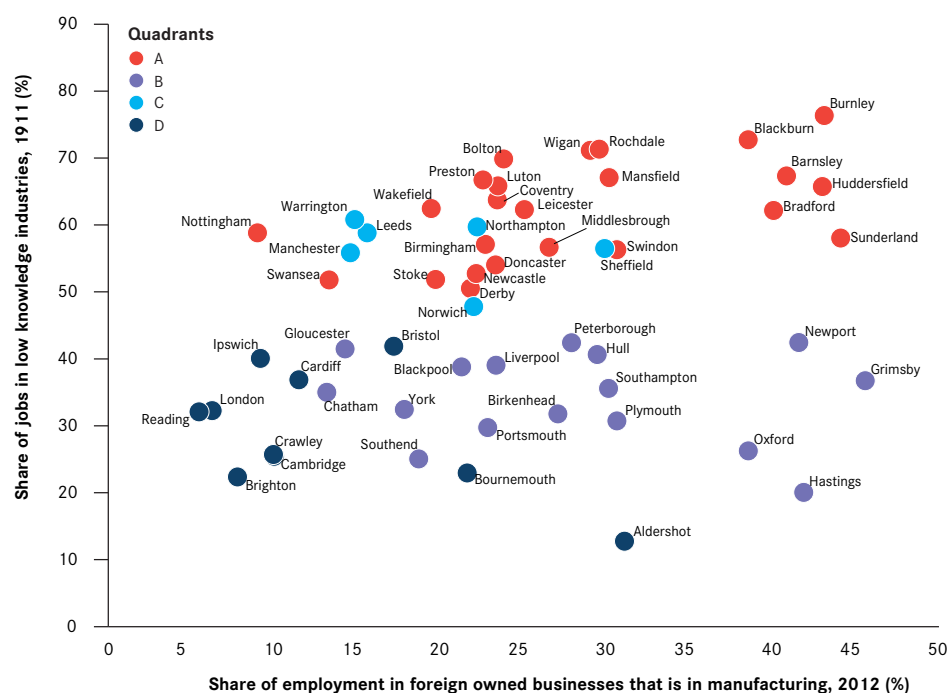
9. Graham D (2007) Agglomeration Economies and Transport Investment, *Journal of Transport Economics and Policy* 41 (3)

10. Leunig T & Overman H (2008), Spatial patterns of development and the British housing market, *Oxford Review of Economic Policy*, Volume 24, Number 1, 2008, pp 59-78

11. We note that because of foreign buy-outs of UK businesses this can only act as proxy measure

indicators. Those cities that have historically had a high share of employment in low-knowledge industries have been more attractive to foreign manufacturing investment, which typically would prefer access to cheap land and low-skilled workers over the opportunity to benefit from knowledge spillovers in a knowledge network.¹² The opposite trend is seen when looking at the share of jobs in foreign-owned businesses that are in KIBS activities.

Figure 9: Reinvention, replication and foreign investment



Source: Census 1911, ONS 2014, Business Structure Database

Cities in Quadrant B have been more attractive to foreign manufacturers than their past industrial structure would suggest. Given that the majority of these cities are either current or former port or resort cities, this would suggest that these places have swapped logistics and tourism for manufacturing when the former were squeezed by containerisation and the rise of air travel. This aligns with data on the performance of manufacturing employment as a whole since 1911. Bournemouth, Blackpool, Grimsby, Southend and Worthing are five of just 11 cities where the absolute number of manufacturing jobs is higher today than it was in 1911.

Such patterns led to the creation of the term ‘branch plant’ economies in the 1970s and 1980s because of the growing separation between the knowledge functions of a company and its production functions. While inward investment in production facilities undoubtedly brings the benefit of jobs, the wider impact on a local economy in terms of the knowledge created by such investment is questionable, especially where there has been no historical specialism in the activity that the investment introduces.¹³

12. Graham D (2007) ‘Agglomeration Economies and Transport Investment’ in *Journal of Transport Economics and Policy* 41 (3)

13. De Propis L and Driffeld N (2006) ‘The importance of clusters for spillovers from foreign direct investment and technology sourcing’, *Cambridge Journal of Economics* 30 277-291; Phelps NA, Mackinnon D, Stone I & Braidford P (2003) ‘Embedding the multinationals: Institutions and the development of overseas manufacturing affiliates in Wales and North East England’, in *Regional Studies* 37 27-40

Of course, it is absolutely crucial to note that not all manufacturing employment is low-skilled, and this is likely to explain why Aldershot appears to be an anomaly compared to other Quadrant D cities. Despite being a more knowledge-focused economy, it has received a higher than expected amount of inward investment from manufacturing companies. Much of this investment is likely to have created high-skilled job opportunities – manufacturing employment in Aldershot is much higher-skilled than most other cities,¹⁴ and has a concentration of aerospace companies.¹⁵

While such investment is invariably a good thing for the people who benefit from the jobs it creates, it serves to reinforce the replication of these economies. Such investment is likely to feel the pressures of globalisation most keenly in coming years too. While many northern cities are cheaper than southern cities, there are many locations around the world that offer an abundance of lower-skilled workers and land at an even cheaper price. Indeed, this is what has driven the offshoring of activities in the UK in recent decades.¹⁶

The opposite is the case for a knowledge-focused business. Although a software engineer costs three times as much in Silicon Valley as in Mumbai, most businesses do not transfer jobs to Mumbai because it isn't just the skills of the engineer that are important, but also the proximity to a network of software and other digital businesses (and the tacit knowledge contained within them) which increases the productivity of that person.¹⁷ The presence and embeddedness of knowledge networks means that it is much easier to move a call centre or textile mill than a knowledge-focused business.

Locally focused businesses

While the first two types of businesses are likely to have regional, national or even international customers, businesses such as hairdressers and newsagents serve a very local market. Their location decisions are decided predominantly by where their customers live, work or trade from, and their fortunes are dependent on the performance of the first two types of business.

History matters – The ability to create and transfer knowledge is a long running trend

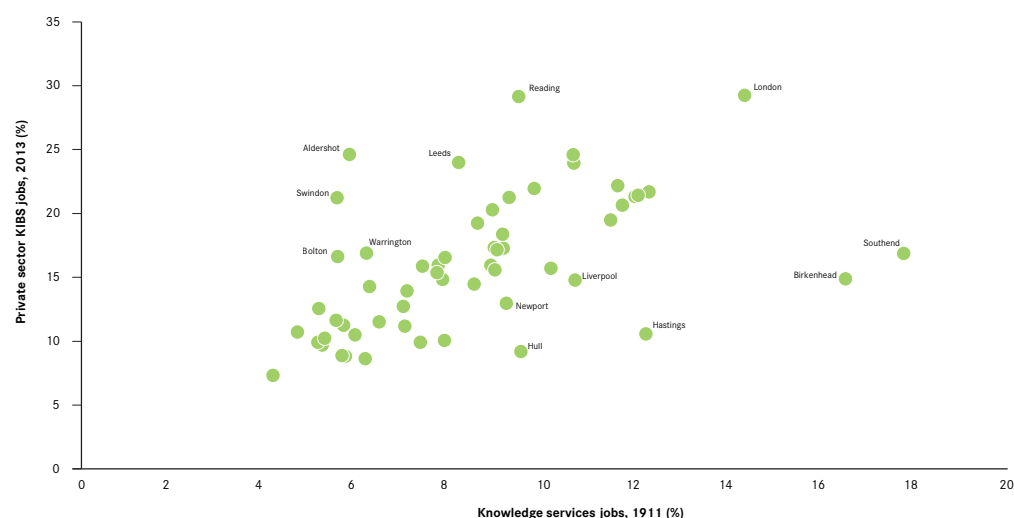
History has a large influence over the ability of cities to facilitate knowledge networks. Comparing jobs in knowledge services industries in 1911 and 2013, as is done in Figure 10, shows that those cities that had more knowledge-focused service economies in 1911 tend to have more knowledge-focused service economies today. For example, London, Reading and Bristol have historically been creators of knowledge, whereas Burnley, Huddersfield and Rochdale have not. Box 4 presents more detailed regression analysis on this finding.

14. In Aldershot there is one high-skilled manufacturing for every low-skilled job in manufacturing. For England and Wales, there are three low-skilled jobs in the sector for every high-skilled job. Source: ONS 2015, Census 2011.

15. Aldershot has a location quotient of 3.0 for aerospace, defined as sectors 3030 and 3316. Source: ONS 2015, Business Register and Employment Survey

16. We recognise here that other factors, such as transport costs, currency hedges and political stability also play a role.

17. Moretti E (2012), *The New Geography of Jobs*, Boston: Houghton Mifflin Harcourt

Figure 10: Knowledge services jobs in 1911 and private sector KIBS jobs in 2013

Source: Census 1911; ONS 2014, Business Register and Employment Survey

Box 4: The past as a predictor of the present

The industrial structure of a city 100 years ago is a good predictor of the share of KIBS jobs that are in a city today. Figure 10 shows the results of a regression of the share of KIBS jobs against 1911 industrial structure. There are three key findings:

Firstly, supporting the findings in Figure 5, those cities that were knowledge producers in 1911 tend to be so today, with the share of jobs in knowledge services in 1911 being a good predictor of the share of jobs in KIBS today.

Secondly, those cities that had more low-knowledge work in 1911 tend to have fewer KIBS jobs today. The share of jobs in extraction, dock working, light and heavy manufacturing and the share of workers classed as general labourers all have a negative and significant impact.

Thirdly, there is a big difference in the magnitude of these effects. The share of workers in general labouring and dock working have a much greater negative impact than those in extraction and manufacturing.

Figure 11: Regression of share of KIBS jobs, 2013 against 1911 industrial structure

Variable	Coefficient	Robust Std. Err.	t	P>t
Heavy industry	-0.124	0.064 *	-1.95	0.06
Light industry	-0.123	0.057 **	-2.14	0.04
Extraction	-0.203	0.063 **	-3.23	0.00
Dock working	-0.857	0.231 **	-3.71	0.00
Rail	0.066	0.196	0.34	0.74
Knowledge services	0.565	0.318 *	1.78	0.08
General labourers	-1.653	0.812 **	-2.04	0.05
Seaside dummy	-0.061	0.026 **	-2.32	0.03
Constant	0.173	0.055 **	3.12	0.00

Dependent variable: KIBS jobs' share of overall jobs in 2013. Regression run with robust standard errors.

* significant at the 10 per cent level ** significant at the 5 per cent level

The regression also included a dummy for whether a city was a Victorian seaside town. A curiosity of the data is that seaside towns – including those that do not fall in the Primary Urban Area definition of a city, such as Eastbourne – tended to have large shares of workers in knowledge services in 1911. But as shown by Hastings, Southend and Birkenhead in Figure 7, and by the negative coefficient on the dummy variable, this is no longer the case.

Differing levels of tacit knowledge across cities in 1911 are likely to have caused these patterns. According to economic complexity theory,¹⁸ new industries don't just appear out of nowhere – they evolve from industries that already have a presence in that country, with the tacit knowledge in the existing industry allowing the development of a new one. For example, it is easier to move from computer software development to smartphone app development, say, than it is to go from shirt production to app development.

Because tacit knowledge is best spread through face-to-face interactions, countries such as Bangladesh and Ghana cannot easily catch up to countries such as Japan and the USA. The same holds for cities within a country. This is why we have seen the long running divergence between cities such as Blackburn and Reading – the depth of the knowledge network is greater in the latter, which has supported the development of new industries as they have emerged.

The range of activities in each place is also likely to have a bearing on how cities develop. In Barnsley one in every two workers in 1911 was directly employed in mining. Mining is 'less complex' than many other industries and has few crossover skills with other industries. This has meant that there has been no natural development from mining into other more complex areas of activity in Barnsley once mining coal was no longer economically viable. The result is that the jobs that have been created in Barnsley have tended to be lower-skilled – 54 per cent of jobs in the city were lower-skilled jobs in 2013, the fourth highest of all British cities.¹⁹

Higher-knowledge businesses tend to have greater transferable skills with other industries, which makes the shift from software development to app development an easier move to make (what Jane Jacobs labelled as 'related variety'²⁰). This is one of the reasons why Bristol had the 8th highest share of higher-skilled jobs of all British cities in 2013.²¹ Box 5 uses IBM as an illustration to show how this evolution through innovation has occurred within one business.

18. Hausmann R, Higlado CA, Bustos S, Coscia M, Chung S, Jimenes J, Simoes A, Yildirim MA (2013) *The Atlas of Economic Complexity: Mapping Paths to Prosperity*, Cambridge: MIT Press

19. Defined as occupations in occupational groups Level 1 and 2 as classified in ONS (2010) Standard Occupational Classification 2010, Volume 1: Structure and descriptions of unit groups. Basingstoke: Palgrave Macmillan.

20. Jacobs J (1969) *The Economy of Cities*, New York: Vintage

21. Defined as occupations in occupational groups Level 3 and 4 as classified in ONS (2010) Standard Occupational Classification 2010, Volume 1: Structure and descriptions of unit groups. Basingstoke: Palgrave Macmillan.

Box 5: From punched cards to super computers - the progression of IBM²²

The history of International Business Machines (IBM) serves as a good illustration of how industries can develop. While the company is well known today for its computer software business, its current incarnation has evolved through a number of products over the last century.

IBM can be traced back to the merger of a number of companies dealing in time management and punched card technologies in 1911. From here it produced a range of products ranging from time recorders to scales and meat slicers.

The company's product line, through innovation, has become ever more sophisticated since. Calculation machines were followed by data storage and computer hardware development. This was followed by the personal computer, photocopiers and printers. The collection and management of data followed with IBM developing data encryption and barcode technology. And more recently this has evolved into computer services and software.

The IBM of today looks very different to the IBM of 1911. While examples of such businesses are rare (because those who don't adapt ultimately go out of business), it illustrates the wider development that occurs in industries through time.

High-knowledge and low-knowledge pathways

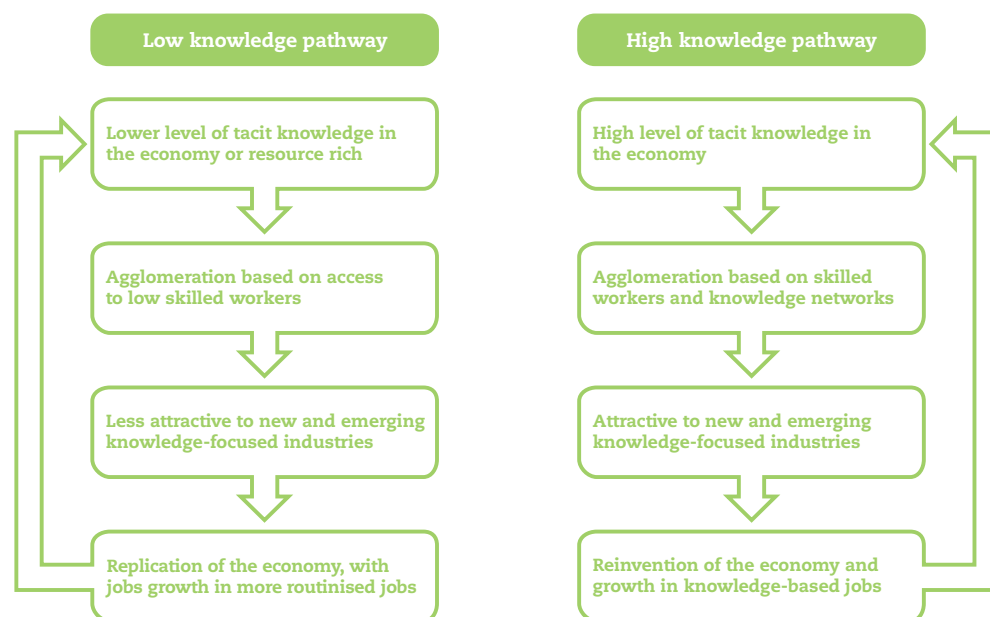
By bringing these different ideas together – economic complexity, tacit knowledge and knowledge networks – we can set out two stylised pathways that (over the last 100 years) cities have developed along. The reinventors have followed a high-knowledge pathway, while the replicators have followed a low-knowledge pathway.

Figure 12 sets out both pathways. Those cities that had a high level of tacit knowledge in their economies in 1911 have been able to maintain and enhance the development of a knowledge network. This has made them attractive to new industries as they have grown, and it has meant that they have seen growth in new industries as older industries have matured and declined. And so their economies have been reinvented, becoming increasingly knowledge-focused.

That the replicators are still home to many thousands of jobs, and in many cases have increased the total number of jobs in their economies over the last 100 years, shows that there are still benefits to many businesses to clustering within these cities – they provide access to a large pool of lower-skilled workers to hire from. But this has meant that they have been less attractive to more knowledge-focused businesses, and so their jobs growth has tended to be in less knowledge-intensive, lower-paid work.

While helping to characterise the historical development of cities in Quadrants A and D, the pathways in Figure 12 say less about cities in Quadrants B and C. Cities such as Manchester and Leeds appear to have moved from a low-knowledge pathway to a high-knowledge pathway, while cities such as Southend have not capitalised on the stock of knowledge in their economies in 1911 and have shifted to the low-knowledge pathway.

22. Pugh, EW (1995) *Building IBM: Shaping and Industry and Its Technology*, Cambridge: MIT Press

Figure 12: High- and low-knowledge pathways

The ability of cities to switch pathways is likely to have been based on a change in the first two boxes of Figure 12 – that is a change in the levels of tacit knowledge and a change in the way that a city supports the growth of a knowledge network. The paper now turns to consider some of the elements that are likely to have influenced these changes.



3. Are cities bound by these pathways?

While there is a natural reinforcing nature to the two stylised pathways, there are a number of cities that have not followed them consistently over the last century. This section investigates these cities in more detail.

City growth is not deterministic or linear

If the basic challenge for cities over the last 100 years has been to replace jobs in declining industries with those in new, more knowledge-focused, areas of activity, then the scale of the challenge is dependent on the size of the decline. And some cities have seen much larger and more dramatic declines than others.

Manchester is a good example of this. The city has lost around 400,000 jobs in manufacturing over the last 100 years. This has meant that even with the creation of jobs in new areas, the process of reinvention has not been able to keep pace with the speed of decline in more traditional areas of employment. The result is that today Manchester has 1 per cent fewer jobs than a century ago.

But the problem that Manchester has faced is not that it hasn't been able to attract knowledge-focused businesses, but that it hasn't, as yet, generated enough of these jobs to offset losses in more traditional industries. Since 1991, Manchester has seen jobs growth of 24 per cent, the majority of which have been in more knowledge-focused activities. So while the city has fewer jobs than it did a century ago, it appears to have passed through a turning point. Box 6 discusses Manchester in more detail.

Box 6: A century of change in Manchester

During the 19th century, the city of Manchester was a major cotton producer and trade centre, well connected on the river Mersey, and supported by its Victorian port, railways and canals. Dubbed “cottonopolis”, Manchester and its surrounding Lancashire mill towns were responsible for the spinning of 32 per cent of global cotton production in the late 19th century.²³ In 1911, 22 per cent of the city's jobs were in textiles. Textile production also supported a logistics industry associated with the movement of goods, which in 1911 employed over 8 per cent of all workers.

Textiles and logistics, as Manchester's key drivers of growth, began to falter during the interwar period, as a result of the Great Depression and growing competition from international trade. Although the city had around 80,000 more jobs in 1951 than in 1911, there were 90,000 fewer in textiles and logistics. These losses were

23. Lowe J (1854). “A Manchester warehouse”. *Household Word* 9: p.268–72. Cited by Williams M; Farnie DA (1992). *Cotton mills in Greater Manchester*. Preston: Carnegie. p. 20.

offset by growth in chemical and electrical engineering. There was a 60 per cent increase in jobs in engineering and electrical goods between 1911 and 1951, and by 1951, this sector employed around the same proportion of workers as the textiles industry. Firms such as the Westinghouse Electrical Corporation and the Ford Motor Company in particular contributed to growth in this area.²⁴

This diversification into new manufacturing industries did not last, however, and the 30 years after the war were disastrous for Manchester. Overall jobs declined by 22 per cent between 1951 and 1981; jobs in engineering and electrical goods nearly halved, and jobs in the textile industry declined by 86 per cent. By 1981, it was a city in desperate need of change.

The city's response to this post-industrial decline was highly proactive. The Central Manchester Development Corporation was created in 1988 in order to redevelop the city centre, converting neglected buildings into offices and building new offices to allow businesses to thrive, and improving the public realm.²⁵ These changes enabled the city to support a knowledge network, which alongside a period of strong national economic growth during the 1990s, helped in the creation of jobs, particularly in KIBS. Some small growth was seen during the 1990s, with 2 per cent growth in total jobs between 1991 and 1998, as new KIBS jobs in insurance and finance started to locate in Manchester.

The reaction to the IRA bombing in the city has also helped shape its recent history. The 1996 disaster devastated a large area of the city centre, but also prompted a massive regeneration project. A city centre masterplan created a new mixed-use space with leisure and cultural activities as well as offices,²⁶ while many warehouses, relics from Manchester's distribution history, were converted into city centre residences during the 1990s.²⁷ Further developments such as Spinningfields have attracted the regional offices of companies such as The Royal Bank of Scotland and Barclays.²⁸

The result is that Manchester is now experiencing a process of reinvention, having seen a 24 per cent growth in jobs between 1991 and 2013, including 77,000 more jobs in private sector knowledge-intensive service industries. It also had the second fastest growing city centre of all British cities between 1998 and 2008, driven by growth in KIBS.²⁹

The scale of the deindustrialisation challenge was such that the city still has some way to go; in 2013 Manchester still had 90,000 fewer jobs than it did in 1951. However, its recent successes suggest that it is on a new pathway of knowledge-based economic growth.

24. University of Manchester, (2013). Industrial Heritage in the Manchester Region. Manchester: 24th International Congress of History of Science, Technology and Medicine. <http://www.ichstm2013.com/explore/industrial-local/>

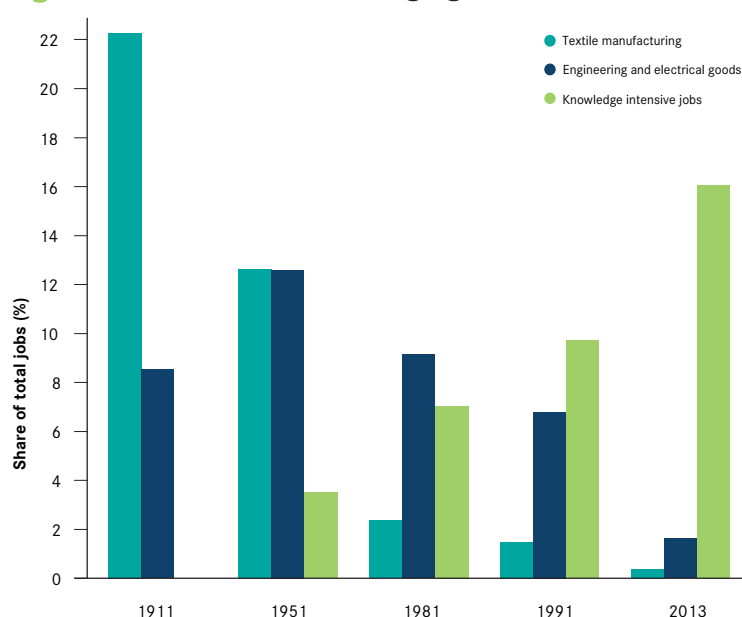
25. HL Deb 18 March 1996. Central Manchester Development Corporation (Area and Constitution) Order 1996. Col 1113. <http://www.publications.parliament.uk/pa/ld199596/ldhansrd/vo960318/text/60318-09.htm>

26. McGough L and Thomas E (2014). *Delivering change: Putting city centres at the heart of the local economy*. London: Centre for Cities. <http://www.centreforcities.org/wp-content/uploads/2014/12/14-12-11-Delivering-Change-City-Centres.pdf>

27. Henshall N (n.d.), Review: Manchester: Pevsner Architectural Guides by Clare Hartwell. *History Today*. <http://www.historytoday.com/nicholas-henshall/manchester>

28. 'Spinningfields becomes the city's new centre of gravity.' London: *Financial Times*, 26 April 2007. <http://www.ft.com/cms/s/0/3f3a9866-f393-11db-9845-000b5df10621.html>

29. Swinney P and Sivaev D (2013) *Beyond the High Street: Why our city centres really matter*, London: Centre for Cities. <http://www.centreforcities.org/publication/beyond-the-high-street/>

Figure 13: Manchester's changing industrial structure

Source: Census 1911; Census 1951; Nomis Census of Employment; Nomis Business Register and Employment Survey
 Note: 1911 data for knowledge-intensive jobs is not included, as definitions are not comparable to the later definition.

The decline and growth of Manchester offers an interesting insight into Birmingham, categorised as a replicator in Figure 5. Birmingham both grew much faster than Manchester during the interwar period and was not hit as hard during the post-war decline. But while it has grown since 1981 – it had 2 per cent more jobs in 2013 than it did three decades earlier – this growth has been propped up by the public sector. By 2013 it had over 90,000 fewer private sector jobs than it did in 1981.

But there are signs that Birmingham may too have reached a turning point. Like Manchester, Birmingham's city centre has seen very strong jobs growth in recent years, driven by knowledge-intensive business services.³⁰ The current problem is that the growth of jobs in its core has not been large enough to offset the decline of more traditional jobs in the city. This suggests that Birmingham's economy is also going through a process of reinvention, but it continues to grapple with a large industrial hangover. Box 7 discusses Birmingham in more detail.

Box 7: A century of change in Birmingham

In 1911, half of Birmingham's jobs were in manufacturing. Known as the "city of a thousand trades", which no doubt reflected its entrepreneurial dynamism, a large share of its jobs in 1911 were in tools, dies, arms and other miscellaneous metal industries.

During the 20th century, the coming of the motor car enabled the city to capitalise on their history in metal manufacture and take the lion's share of the national motor industry. The city saw its population grow by 39 per cent between 1911 and 1951, while its jobs increased by nearly 50 per cent. By 1951, the vehicle industry, which had barely existed in 1911, made up around

30. Swinney P and Sivaev D (2013), *Beyond the High Street: Why Our City Centres Really Matter*, London: Centre for Cities. <http://www.centreforcities.org/publication/beyond-the-high-street/>

12 per cent of Birmingham's jobs. The city also produced aircraft, and during the Second World War, the Castle Bromwich Aircraft Factory was the largest Spitfire factory in the UK.³¹

Although Birmingham grew during the first half of the 20th century, its reliance on low-knowledge manufacturing industries was also deepened. The low skills of the labour force, already negatively affected by the historical division of labour in Birmingham's manufacturing, were intensified by the replacement of Birmingham's numerous small manufacturers by large firms,³² and by 'knowledge-destroying'³³ assembly line manufacturing of vehicles.³⁴ This was seen in firms such as the Austin Motor Company, which employed 18,500 people in 1948.³⁵ This increasingly routinised nature of work affected the growth of knowledge-intensive service jobs in Birmingham. Although total jobs in Birmingham nearly doubled between 1911 and 1951, less than 3 per cent of jobs were in knowledge-intensive services in the middle of the century.

The city's expansion up to 1951 sharply reversed in the next three decades. Total jobs had fallen by 9 per cent by 1981, including the loss of around 40,000 jobs in vehicle manufacturing, symbolised by the decline of companies such as British Leyland.³⁶ While globalisation squeezed the city's traditional manufacturing base,³⁷ policy also had a hand in this decline – concerned about the size and success of Birmingham, the Distribution of Industry Act and the 'Brown Ban' attempted to shift industrial and office activity away from the city to other parts of the country.³⁸ Despite these interventions, however, Birmingham's growing knowledge base still saw around 30,000 additional KIBS jobs created between 1951 and 1981.

More recently, this growing knowledge sector has been supported, rather than held back by policy. From the 1980s, policy has focused on improving the performance of Birmingham's city centre. A series of initiatives, such as the building of the International Convention Centre,³⁹ and the Highbury initiative, a symposium which sought to improve the city centre's connectivity and accessibility and led to the breaking of the ring road or "concrete collar" to the city centre, have been implemented.⁴⁰

Despite these improvements, Birmingham has still struggled to respond to de-industrialisation. The city's private sector had around 93,000 fewer private sector jobs in 2013 than in 1981, and 300,000 fewer jobs in manufacturing.

31. 'How Birmingham hands crafted our greatest fighter plane the spitfire'. *Birmingham Mail*, 15 January 2013. <http://www.birminghammail.co.uk/news/local-news/how-birmingham-hands-crafted-our-greatest-1205947>

32. Stephens WB (ed), (1964). "Economic and Social History: Industry and Trade, 1880-1960" in *A History of the County of Warwick: Volume 7, the City of Birmingham*. London: Victoria County History, pp. 140-208.

33. Glaeser E (2011), *Triumph of the City*. New York: McMillan

34. Berg M (2005), *The Age of Manufactures, 1700-1820*. London: Routledge, p. 234.

35. Stephens WB (ed), (1964). "Economic and Social History: Industry and Trade, 1880-1960" in *A History of the County of Warwick: Volume 7, the City of Birmingham*. London: Victoria County History, pp. 140-208.

36. Carley M, Christie I, Fogarty M, Legard R (1991) *Profitable Partnerships: A Report on Business Investment in the Community*, London: Policy Studies Institute. <http://www.psi.org.uk/publications/archivepdfs/Profitable/BIC7.pdf>

37. Hothi N (2005). *Globalisation and Manufacturing Decline: aspects of British industry*. Bury St Edmunds: Arena.

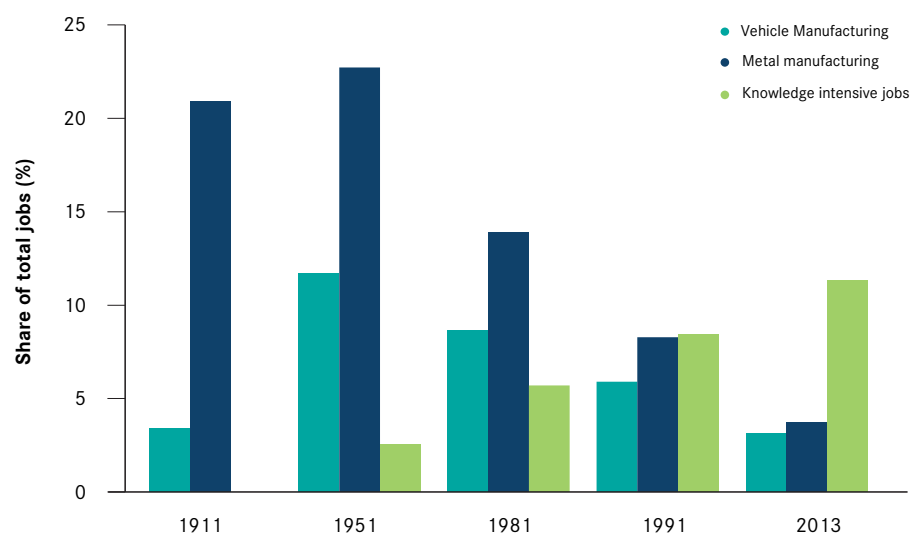
38. Living Heritage (n.d.), *Programming redevelopment after World War II*. London: Hansard. <http://www.parliament.uk/about/living-heritage/transformingsociety/tradeindustry/industrycommunity/overview/afterworldwar/>

39. Carley M, Christie I, Fogarty M, Legard R (1991) *Profitable Partnerships: A Report on Business Investment in the Community*, London: Policy Studies Institute. <http://www.psi.org.uk/publications/archivepdfs/Profitable/BIC7.pdf>

40. CABE and DETR (2001), *The Value of Urban Design*, London: CABE and DETR. <http://webarchive.nationalarchives.gov.uk/20110118095356/http://www.cabe.org.uk/files/the-value-of-urban-design.pdf>; Corbett N (2004), *Transforming Cities: Revival in the Square*. London: RIBA.

However, building on the steady growth of KIBS, and supported by a strong city centre, the number of KIBS jobs in the city has nearly doubled since 1981. Driven by KIBS jobs, between 1998 and 2011, the city centre saw private sector jobs growth of 17 per cent.⁴¹ Birmingham now attracts 40 per cent of the national conference trade, is Europe's second largest insurance market, and has over 500 law firms.⁴² The strong growth of knowledge-intensive services jobs in its city centre suggests that the city has passed through a turning point and is now better placed to grow in the coming decades.

Figure 14: Birmingham's changing industrial structure



Source: Census 1911; Census 1951; Nomis Census of Employment; Nomis Business Register and Employment Survey
 Note: 1911 data for knowledge-intensive jobs is not included, as definitions are not comparable to the later definition.

Public policy has played a role

As set out earlier, globalisation and technological advancement have been the two drivers of change over the last 100 years. But policy has also had a role to play. There are two policy interventions that, without having an explicit regional focus, have had a large influence on job creation in cities. The first is the new towns policy in the 1940s, 50s and 60s. And the second is the expansion of the welfare state, and the jobs that resulted, after 1945.

The new towns initiative was mainly designed to ease pressure on London, with a number of existing settlements around the capital – such as Crawley, the fastest growing city of the last 100 years, and Peterborough – designated for growth. Crawley and Peterborough have benefited from a great deal of infrastructure investment through their new town designation, while they both have had very small industrial legacies to deal with. The large infrastructure investment in both places is likely to have increased their attractiveness as places to do business.

The most extreme examples of new towns without an industrial legacy are the ones that were built from scratch, including Milton Keynes and Telford. Neither had any industrial

41. Clarke E, Swinney P & Sivaev D (2013) *Beyond the High Street: Birmingham Analysis*, London: Centre for Cities. <http://www.centreforcities.org/publication/beyond-the-high-street/>

42. The Work Foundation (2006). *Ideopolis: Birmingham Case Study*. London: The Work Foundation. http://www.theworkfoundation.com/DownloadPublication/Report/127_127_ideo_birmingham.pdf

legacy to deal with, and so the challenge for these cities has been to invent, rather than reinvent, their economies. Box 8 discusses the development of both cities in more detail.

Box 8: The blank slates – Milton Keynes and Telford

Milton Keynes and Telford were created during the third wave of new towns in the 1960s,⁴³ and so do not feature in this study. But their performance since their creation is interesting to compare against that of more established cities.

Both in terms of employment and GVA they have been the fastest growing cities in Britain since 1981.⁴⁴ This growth has meant that, by 2013, Telford was home to 79,000 jobs, while Milton Keynes had over 150,000.

The benefit that both cities have enjoyed is the absence of an industrial legacy to deal with, so the challenge for these places was not to offset the decline of more traditional industries with jobs growth in new areas, but to create new jobs.

Interestingly, despite both starting with a clean slate upon their formation, this job creation occurred in different sectors in the two cities. Today Milton Keynes' economy is much more knowledge-focused than Telford's – over one in five jobs in Milton Keynes is in KIBS, while in Telford it is around one in 10. And Telford has the third highest share of manufacturing jobs of all cities in Britain, while Milton Keynes ranks 48th.

While both have seen fast-paced growth in recent decades, the question is whether both will be able to sustain this growth in the future. Given the more knowledge-focused economy that Milton Keynes has developed, the trends explored in this paper would suggest that it is in a better position to sustain its strong growth than its new town cousin.

The expansion of the state after the Second World War and the subsequent creation of public sector jobs has also had a big impact in many cities. For cities such as London these jobs have complimented the growth of jobs in the private sector – of the 1.8 million increase in jobs in the city over the last 100 years, around 900,000 have been in public administration, defence, health and education. In other cities, such as Liverpool – the public sector has played a very different role, softening its decline. There are 41,000 fewer jobs in the city today than in 1911. But without the expansion of public sector jobs this would have been much worse – the private sector has an estimated 141,000 fewer jobs than it did 100 years ago.

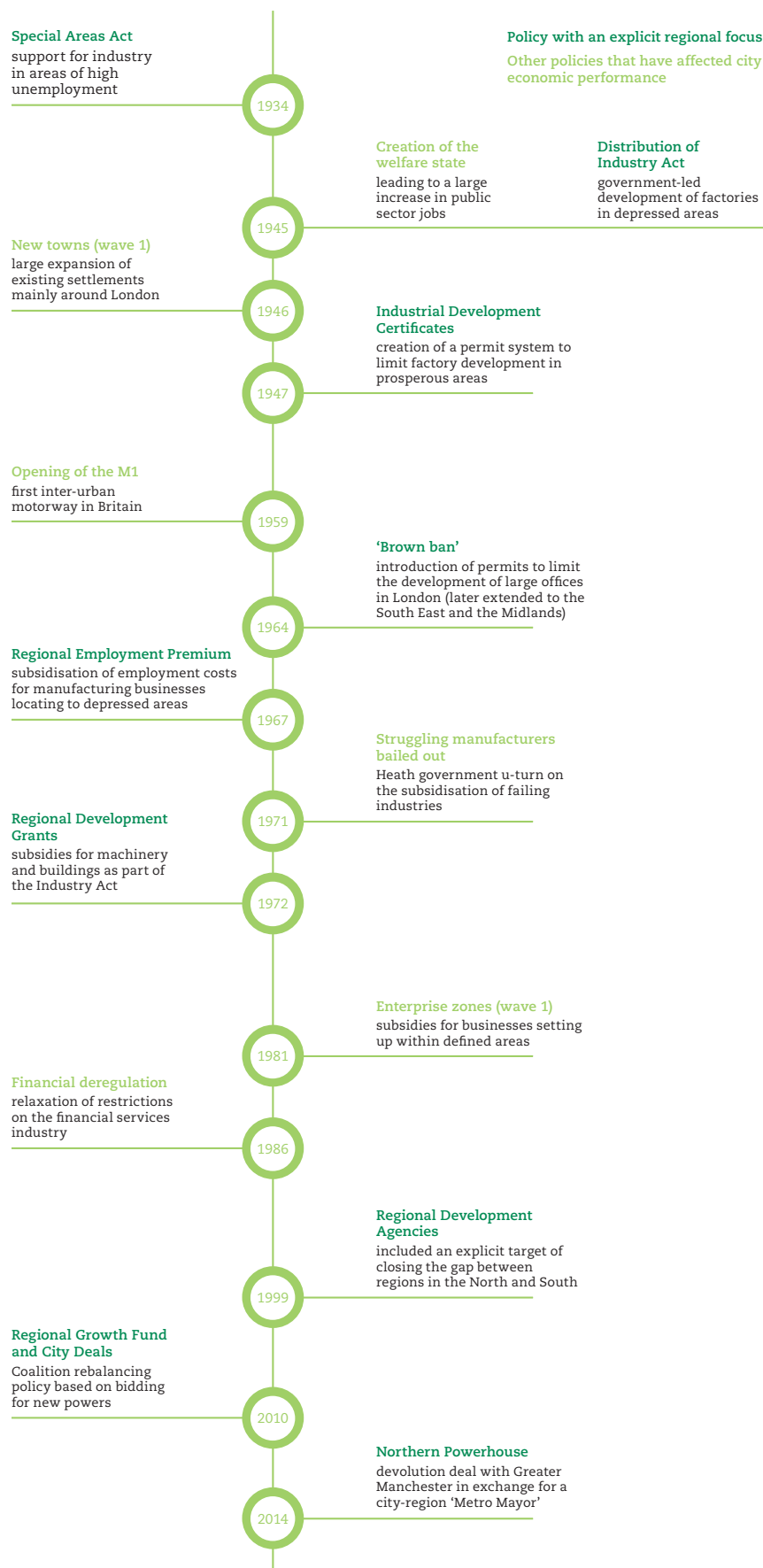
The impact that this has had on the ability of a city to reinvent itself depends on the type of jobs created. Research-based hospitals and universities are likely to have increased the stock of knowledge in an economy. But the relocation of lower-skilled public administration jobs, such as HM Revenue and Customs jobs to Liverpool and Department of Work and Pensions jobs to Newcastle, while no doubt welcome, are likely to have reinforced replication. In this vein it will be interesting to see what impact the relocation of parts of the BBC to Salford will have on the Manchester economy in the coming years.

43. The London Gazette: no. 44233. p.827. 24 January 1967; The London Gazette: no. 44735. p.13433. 13 December 1968.

44. Martin R and Gardiner B (2014) *The evolving economic performance of UK cities: city growth patterns 1981-2011*, London: The Stationery Office

Policies explicitly designed to close the 'North-South divide' have not fostered reinvention

Figure 15: 80 years of policy attempting to rebalance the economy



The expansion in the number of public sector jobs and the new towns policy have not, for the most part, explicitly attempted to redistribute economic activity around the country, but have nevertheless had an impact on where jobs are located. There has been another subset of policies that have explicitly attempted to boost growth in places that are struggling economically, as shown in Figure 15. But these policies have had little positive impact because, in many cases, they have reinforced replication rather than encouraged reinvention.⁴⁵

Manufacturing, industrial policy and the ‘march of the makers’

As has been set out above, the problem for those cities that have struggled over the last century has not been the inevitable decline of extraction, logistics and manufacturing employment, but rather their inability to support jobs growth in new industries.

But this has not stopped governments of different political colours attempting to either limit the decline in low-skilled manufacturing employment or indeed encourage its expansion in poorly performing cities. Examples of this range from the Special Areas Act of 1934,⁴⁶ which attempted to encourage industrial growth in areas of high unemployment, through to the current Government’s rhetoric around rebalancing the economy towards manufacturing and the ‘march of the makers’.⁴⁷

Following on from previous administrations the Coalition has introduced a number of policies that have attempted to boost manufacturing in the North and Midlands. The Regional Growth Fund has been most explicit about this – of the £720 million allocated in the first three rounds of the fund across England, 42 per cent was allocated directly to manufacturers in the North and Midlands. In the North East, 73 per cent of the £114 million allocation to the local enterprise partnership was given to manufacturing.⁴⁸ Enterprise zones have had a similar focus – of the 16 that are located in the North and Midlands, 15 explicitly cite manufacturing or engineering as their sector focus.⁴⁹ And a number of the deals struck in Wave 2 of the City Deals programme included an explicit focus on manufacturing and energy, as discussed in Box 9.

Box 9: City Deals Wave 2

City Deals were introduced by the Coalition Government to strike bespoke deals with individual cities to pass down policy powers and freedoms to the cities.

The first eight deals – known as Wave 1 – were struck with England’s Core Cities, and tended to focus on a broad package of interventions around investment vehicles, skills and business support. Wave 2 deals were struck with a further 20 cities. Unlike Wave 1, these deals tended to focus on one specific issue or site rather than offering powers over a wider range of areas.

There was a distinction between the types of deals the cities struck depending on whether they were reinventors or replicators. Of the 20 cities, 13 are classed

45. For example, for the impact that Regional Selective Assistance had, see Criscuolo C, Martin R, Overman H and van Reenan J (2012) *The Causal Effects of an Industrial Policy*, CEP Discussion Paper No 1113

46. Living Heritage (n.d.), *Supporting industry: the inter-war years*. London: Hansard. <http://www.parliament.uk/about/living-heritage/transformingsociety/tradeindustry/industrycommunity/overview/interwaryears>

47. A reference to the Chancellor’s 2011 Budget speech where one of his final remarks was “A Britain carried aloft by the march of the makers”.

48. Source: Regional Growth Fund Secretariat

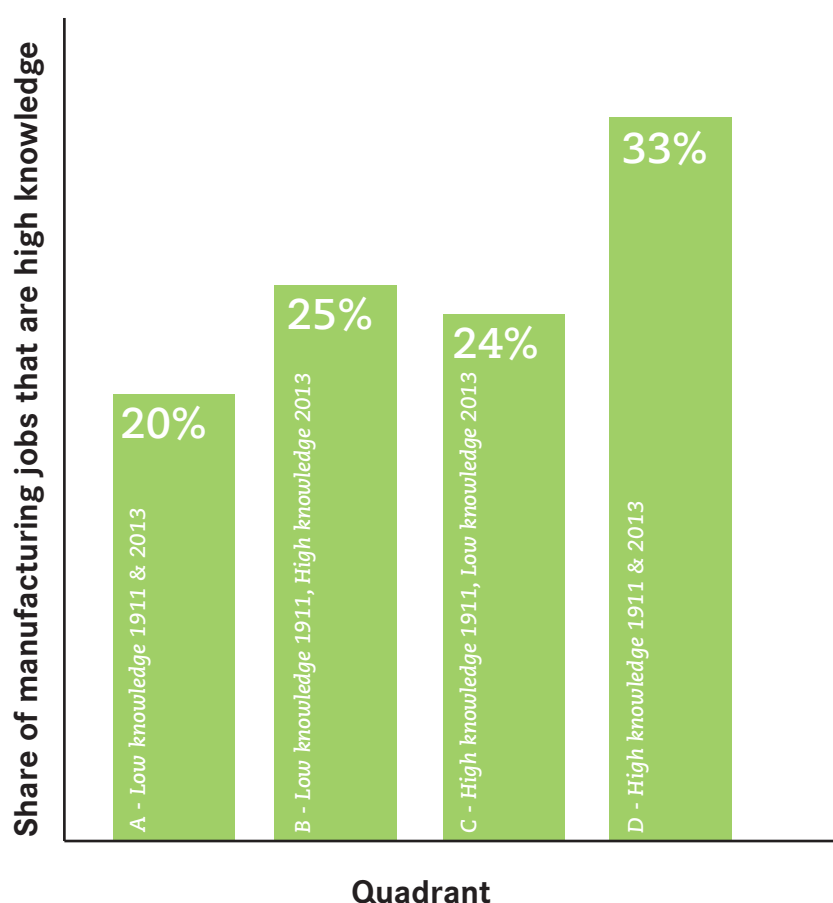
49. DCLG (2015). *Looking for a place to grow your business?* London: DCLG. <http://enterprisezones.communities.gov.uk/enterprise-zone-finder/> accessed 14th January 2015

as replicators in this paper. Of these 13, 10 had supporting the manufacturing or energy sectors as a central element of their deal.

The City Deals process offered a unique opportunity to cities to tailor policy to help the process of reinvention in their economies. Unfortunately the deals are likely to reinforce replication instead.

These jobs have usually been branded as ‘advanced manufacturing’ – a buzzword in economic development circles – but sadly do not tend to be particularly advanced. There are undoubtedly very high-skilled jobs in UK manufacturing. But these jobs tend to be based in the very cities that have been able to adapt and reinvent their economies, most likely because of the more highly skilled workforces in these cities. As Figure 16 shows, one in five jobs in manufacturing in Quadrant A cities are classed as high-skilled, whereas it’s one in three in Quadrant D cities. As such, these policies have tended to reinforce low levels of knowledge, rather than encourage the creation of new knowledge.

Figure 16: Share of manufacturing jobs that are high-knowledge, 2011



Source: ONS 2014, Census 2011

Note: High-skilled jobs are defined as jobs in occupation categories managers, directors and senior officials, associate professional and technical occupations and associate professional and technical occupations.

Box 10: A century of change in Sunderland

Sunderland's rapid growth through the 19th century was mainly due to the mining and export of coal and shipbuilding, and because of the latter it was known as 'the largest shipbuilding town in the world'.⁵⁰ In 1911, around 33 per cent of jobs were in shipyards or collieries.

Both industries did expand through the interwar period, despite the Great Depression, and by 1951 the number of shipbuilding jobs on the Wear had increased by 34 per cent to almost 14,000. This was in part spurred by demand created by the Second World War – the city produced more than a quarter of the nation's total tonnage of merchant and naval ships during World War Two,⁵¹ and was supported by public investment in creating a new deep water quay.⁵²

In the decades after the Second World War shipbuilding in Sunderland was increasingly exposed to global competition, particularly from the Far East. This led to a series of yard closures or mergers. In 1977 the shipbuilding industry was nationalised, and in 1980, the last two shipyards in Sunderland merged. This single company lasted only eight more years before its closure brought an end to 600 years of shipbuilding on the Wear.⁵³ In return for the granting of an aid package, the European Commission placed a ban on shipbuilding and repair in Sunderland.⁵⁴

Mining suffered similar declines. A number of collieries closed across the city after the Second World War. The last closure was Wearmouth Colliery which closed almost 160 years after it opened in 1993. Sunderland AFC's Stadium of Light now stands on the site.

The decline of both industries was the key driver of the overall job losses seen in Sunderland. By 1989, there were over 17,000 (16 per cent) fewer jobs in the city than in 1951, with mining and shipbuilding seeing a combined loss of around 30,000 posts.

There were a number of policy responses to offset these closures. The first was to convince Nissan to locate its car plant on Wearside over Humberside or Wales.⁵⁵ The second was to create a number of enterprise zones including Doxford International, which has been particularly popular with call centres. Together Nissan and the call centres are estimated to directly account for around 15 per cent of all jobs in the city today.⁵⁶

50. The History of Shipbuilding in the North East, BBC, 2 April 2008. <http://www.bbc.co.uk/nationonfilm/topics/ship-building/background.shtml>

51. The History of Shipbuilding in the North East, BBC, 2 April 2008. <http://www.bbc.co.uk/nationonfilm/topics/ship-building/background.shtml>

52. Cookson G (2010) Sunderland: building a city. Chichester: Phillimore and Co

53. 'History of shipbuilding on Wearside', BBC: 16 January 2008. http://www.bbc.co.uk/wear/content/articles/2008/01/16/shipbuilding_has_been_20_years_feature.shtml

54. HC Deb 29 March 1994, vol 240 cc899-910. *Shipbuilding (Wearside)*. London: Hansard. <http://hansard.millbanksystems.com/commons/1994/mar/29/shipbuilding-wearside>

55. 'UK manufacturing: Nissan has led renaissance in car production'. *Financial Times*, 19 November 2013. <http://www.ft.com/cms/s/0/0bdb80d6-4ad8-11e3-ac3d-00144feabdc0.html#axzz3Q2rYEeAG>

56. 'Nissan's 7,000 job Sunderland plant starts Qashqai full production', *Northern Echo*, 22 January 2014. http://www.thenorthernecho.co.uk/business/news/10951642.Nissan_s_7_000_job_Sunderland_plant_starts_Qashqai_full_production/; 'Call centres in Sunderland look to recruit 200 people'. BBC, 23 January 2011, <http://www.bbc.co.uk/news/uk-england-wear-12262202>; ONS 2015, Business Register of Employment Survey

While these interventions have helped the city's economy to grow again – there were 23,000 more jobs in 2013 than in 1989 – they have encouraged the replication of Sunderland's economy. New jobs have tended to be in lower-skilled work on out of town sites, and it's for this reason that 57 per cent of jobs in the city are in lower-skilled jobs, the 2nd highest of all UK cities.⁵⁷

Recent policy has continued in this vein. Sunderland's recent city deal centred around the creation of the International Advanced Manufacturing Park on a site neighbouring Nissan. Given the structure of manufacturing in Sunderland (the city has the lowest share of high-skilled jobs in its manufacturing sector out of all cities in England and Wales), it is likely that this policy will also reinforce the past rather than looking to the future.

Grants, inward investment and business relocation

The use of grants and other financial incentives have been another tool used to encourage business relocation. While by no means alone in doing so, this was a popular tool used by the Welsh Development Agency and then by the Welsh Assembly Government.⁵⁸ The location of Amazon in Swansea is a good example of this – the company received £8.8 million from the Welsh Assembly Government in 2008 to set up a distribution centre in the city, as well as having a new road funded by public investment.⁵⁹

But as shown above, those businesses that are more cost sensitive, and so are likely to be most attracted by such incentives, are likely to be lower-skilled, more routinised businesses. And so such policies again encourage replication, rather than supporting reinvention.

Subsidisation of business parks

Business parks became an increasing priority in the 1980s, led by the introduction of enterprise zones. At a time of inner-city decline these low-density, out-of-town sites were earmarked as the hi-tech employment sites of the future. All 38 of the first wave of enterprise zones were either in rural areas or on the urban fringe,⁶⁰ and local authorities and Regional Development Agencies subsidised a number of business and science parks.

These interventions have had three main impacts. Firstly, they incentivised economic activity to spread across a city, rather than concentrate within its centre. Secondly, they incentivised the oversupply of office space in certain areas, pushing rents far below what developers would require to make an investment, which hindered subsequent office development in the city centres of some cities. And thirdly, these parks tended to be attractive to lower-skilled, more routinised businesses such as call centres. The combination of these factors has meant that such interventions have – on the whole – encouraged replication.

57. Clayton N, Smith R and Tochtermann L, (2011). *Access All Areas: Linking People to Jobs*. London: Centre for Cities. <http://www.centreforcities.org/wp-content/uploads/2014/09/11-09-14-Access-all-areas-Linking-people-to-jobs.pdf>

58. Simme J, Carpenter J, Chadwick A and Martin R (2008) *History Matters: Path dependence and innovation in British city-regions*, London: Nesta; 'Grants culture over' warns Jones, BBC, 12th October 2009, <http://news.bbc.co.uk/1/hi/wales/8301385.stm>

59. 'My week as an Amazon insider', *The Observer*, 1st December 2013, <http://www.theguardian.com/technology/2013/dec/01/week-amazon-insider-feature-treatment-employees-work>; 'Ffordd Amazon £3m link road completed ahead of schedule', Welsh Assembly Government, 28th November 2012, <http://wales.gov.uk/newsroom/businessandconomy/2012/121128amazon/?lang=en>

60. DCLG (2009) *Enterprise Zones Monitor Report*, London: The Stationery Office

Cluster and sector policies

Attempts to create clusters and specific sector support have also been popular policy interventions at both the national and local level in recent years. The creation of TechNorth – designed to encourage a cluster of technology businesses as part of the Coalition’s Northern Futures initiative – is the latest example of this.

Unlike many of the policies above, these policies have aimed to reinvent rather than replicate the city economies they have been applied to. But such approaches have had two general problems. The first is that the sectors selected haven’t been based on current assets within a city. And the second is that they have overly focused on buildings, marketing and specific sector ‘niches’, rather than attempting to increase the stock of knowledge across a number of areas.

In contrast, efforts by the private sector and civic institutions in this area have tended to focus more on building the stock of knowledge in cities. TechCity (the inspiration for TechNorth), based around Old Street in London, sprung up as a cluster based on knowledge long before it was rebranded by government. Current private sector led networks such as Birmingham Futures, which encourages networking between professional services firms, are more encouraging. So too is the Engine Shed in Bristol, which provides office space and networking events to encourage co-location of existing businesses across a number of sectors in the city.⁶¹

Restricting growth in London (and Birmingham)

Under the so-called ‘Brown Ban’ of the 1960s the national government actively restricted new office building in the capital.⁶² The thinking behind this approach was that if London was constrained, then businesses would choose to locate elsewhere in the UK. But if other cities were unable to offer both skilled workers and access to knowledge, then restricting the reinvention of London is unlikely to have made these cities any more attractive to investment from more knowledge-focused businesses. The result is that this approach is likely to have not only restricted the growth of the capital but of the national economy overall.

Such a restriction does not seem to have had long-lasting impacts on the performance of London. However, the ban was extended to Birmingham, and given the city’s struggles in recent decades (discussed in Box 7) the policy may have had a longer-lasting negative impact there.

61. The Engine Shed is a collaboration between Bristol City Council, the University of Bristol and the West of England Local Enterprise Partnership. Bristol City Council provides finance, but the delivery is led by the university. Clarke E and Williams M (2014) *Delivering change: Supporting links between universities and high-growth firms in cities*, London: Centre for Cities

62. In November 1964, Secretary of State for Economic affairs George Brown introduced the Office Development Permit which was required for the development of any office over 2,500 feet in London. Source: The Location of Offices Bureau was also created to encourage office-based business to move away from the capital. English Heritage (2015) *The Late 20th-Century Commercial Office*, London: English Heritage

Box 11: A century of change in Blackpool

Blackpool's growth as a tourist town began back in the 18th century. Its first visitors were middle-class holidaymakers to the seaside, but it was the arrival of the railway in the mid-19th century that spurred Blackpool's rapid expansion, with its population quadrupling between 1851 and 1911 to 125,000. Iconic attractions such as the Grand Theatre⁶³ and the Pleasure Beach⁶⁴ were built in the closing years of the 19th century, and by 1910, Blackpool had 4 million visitors a year, most staying for a few days or a week.⁶⁵

Blackpool owed much of its success as a tourist destination to the Lancashire tradition of wakes week, in which the mill towns would close down for a week in the summer. Each town's mills shut during a different week, ensuring a steady stream of visitors to Blackpool during the summer, supporting the growth of its tourist industry and the city.⁶⁶

Blackpool retained its tourist base throughout the interwar period. By the 1930s, around 7 million people visited annually.⁶⁷ And by 1951, there were over 7,500 more jobs in tourism and entertainment in the city compared to 1911.

But the boom did not last. Between 1951 and 1981, total jobs in Blackpool declined by two per cent, reflecting a decline in sectors including logistics and construction. Despite the advent of package holidays this decline was not led by tourism, which saw its number of jobs increase by three per cent. The nature of the tourist trade did change though: the decline of the textile industry saw the end of wakes weeks; the building of the M55 motorway in 1958 brought about more day trippers than week-long holidaymakers; and the growth of package holidays and later on budget airlines in the 1990s drew tourists away from the seaside and towards the continent.⁶⁸

One of Blackpool's responses to this decline has been to increase investment in tourism and entertainment, investing in infrastructure and tourist attractions, including a failed bid for Britain's first supercasino.⁶⁹ Despite this investment, and an increase in visitor numbers to 13 million in 2014,⁷⁰ there were over 2,500 fewer jobs in tourism and entertainment in 2013 than in 1991.

The city's population has increased, in part due to a growing reputation as being a cheap place to live. An abundance of guesthouses, which are now much less popular due to changes in tourism, leave their own legacy. During the Second World War hundreds of hotels and guesthouses were commandeered by the government to house civil servants that were evacuated from the bombs falling

63. The Grand Theatre Blackpool (n.d.), *A Grand Introduction*. <http://www.blackpoolgrand.co.uk/about/an-introduction>

64. 'The History of Pleasure Beach Blackpool: the UK's Number One Amusement Park.' Entertainment Staff, 28 January 2012. <http://entertainmentdesigner.com/history-of-theme-parks/the-history-of-pleasure-beach-blackpool-the-uks-number-one-amusement-park/>

65. Cross G and Walton K, (2013). *The Playful Crowd: Pleasure Places in the Twentieth Century*. New York: Columbia University Press.

66. Ashworth E (2005). *Wakes Weeks: From the Saints to the Sea*. <http://www.timetravel-britain.com/articles/history/wakes.shtml>

67. Sharpley R (2009). *Tourism Development and the Environment: Beyond Sustainability?* London: Earthscan.

68. Sharpley R (2009). *Tourism Development and the Environment: Beyond Sustainability?* London: Earthscan.

69. Blackpool Council (2006). *Blackpool Local Plan 2001 – 2016*. <https://www.blackpool.gov.uk/Residents/Planning-environment-and-community/Documents/Adopted-Local-Plan.pdf>; 'Blackpool Rocks: Why 13m visitors come every year', Daily Express, 16 July 2014. <http://www.express.co.uk/travel/beach/489116/Blackpool-Rocks-Why-13m-visitors-come-every-year>; 'Blackpool: 'It's like someone has died''. BBC: 20 January 2007. <http://news.bbc.co.uk/1/hi/england/lancashire/6313439.stm>

70. 'Blackpool Rocks: Why 13m visitors come every year', Daily Express, 16 July 2014. <http://www.express.co.uk/travel/beach/489116/Blackpool-Rocks-Why-13m-visitors-come-every-year>

on London.⁷¹ Now they have become attractive to housing benefit claimants, with implications for welfare dependency.⁷² In 2012-13, Blackpool had the highest welfare bill per capita of any UK city.⁷³

Box 12: A century of change in Brighton

Brighton's tourism industry first developed during the 18th century, when claims that the seawater had healing benefits drew in wealthy visitors. By 1911, tourism and entertainment made up nearly 10 per cent of all jobs, and the industry remained largely unaffected during the First World War.⁷⁴

Tourism and entertainment was not Brighton's primary employer, however, and right from the early 20th century the city supported a number of light industries as well as knowledge-intensive services. Growth in these sectors helped drive an overall increase of around 13,000 jobs in the city between 1911 and 1951.

The city underwent a significant reversal of fortunes in the post war period. Between 1951 and 1981, Brighton saw a net loss of 14,000 jobs, 14 per cent of its total, with many of these losses in manufacturing and tourism and entertainment. However, the city did see some growth in KIBS jobs in this time, which increased by over 3,000, and by 1981 made up 11 per cent of all jobs.

The more recent about turn in Brighton's economic performance has been even more spectacular. Since 1991, Brighton's total number of jobs has nearly doubled from 78,500 to nearly 150,000. This has been driven by the rapid expansion of private sector KIBS activities, which saw a net increase of around 10,000 jobs (70 per cent growth). Large employers in this area are American Express, which has had its European headquarters in the city since 1977 and employed 3,500 people in 2010, and Legal & General and Lloyds TSB.⁷⁵

Brighton's city centre has played a significant role in this growth. Between 1998 and 2011, the city centre accounted for all of the city's overall growth in private sector jobs, and one quarter of this total growth was in KIBS jobs.

Tourism-based jobs have also continued to grow in the city, expanding by nearly 200 per cent between 1981 and 2013. But unlike in Blackpool, Brighton has complemented the further expansion of the tourist industry with the expansion of KIBS jobs too.⁷⁶

71. Ellis E (2013) *Blackpool at War: A History of the Fylde Coast during the Second World War*, Stroud: The History Press

72. 'How Blackpool became a "dumping ground" for the socially excluded', *New Statesman*, 12 December 2013, <http://www.newstatesman.com/politics/2013/12/when-lights-go-out>; 'Why Blackpool has asked the Treasury to slash residents' housing benefit', *The Guardian*, 10 February 2015, <http://www.theguardian.com/public-leaders-network/2015/feb/10/blackpool-treasury-slash-residents-housing-benefit>

73. DWP (2015), *Benefit Expenditure by Country, Region and Local Authority, 2012-2013*.

74. Visit Brighton (n.d.), 'The History of Brighton's Tourism', Brighton: Visit Brighton. <https://www.visitbrighton.com/xsdbimngs/history%20of%20brighton%20tourism.pdf>

75. BHEP (2010), *Brighton and Hove Economic Strategy 2008 - 2016, Socio-Economic Context*. http://www.brightonbusiness.co.uk/brochures/b&h_socio-economic_overview.pdf

76. Clarke E, Swinney P and Sivaev D (2013) *Beyond the High Street: Brighton Analysis*, London: Centre for Cities. <http://www.centreforcities.org/publication/beyond-the-high-street/>

Brighton responded to its decline by focusing not on one pathway, but by seeking to support a broad range of industries and services. Its recent growth across a number of sectors means that today it has nearly 70 per cent more jobs than it had in 1911, and is well positioned to adapt to future changes in the economy.



4. Implications for the direction of policy

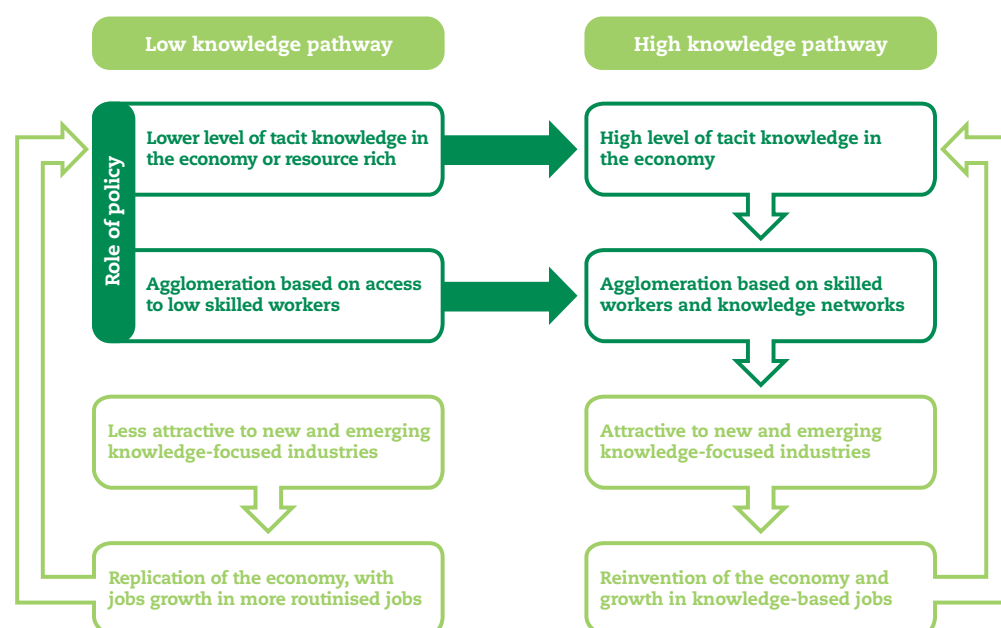
Knowledge has been the key driver of economic performance over the last 100 years. In general, cities in the South – such as Brighton – have been much more successful at replacing jobs lost in declining industries with jobs in new, more knowledge-focused activities. And this has meant that knowledge has driven the widening ‘North-South divide’ seen over the last 100 years.

Globalisation is likely to mean that the UK will continue to specialise in ever more high-skilled activities, while more routinised jobs that are exposed to international competition will come under increasing pressure to either be automated or offshored. Given the industrial make-up of our cities, these trends mean that without new approaches the ‘North-South divide’ will continue to widen. And the ever-widening relative performance of cities has implications on wage levels and standards of living across the country.

The economy is not static – it constantly evolves, and cities have to evolve with it. This means that in order to be successful, cities need to constantly encourage growth in new areas as older areas of activity inevitably decline, as Manchester is increasingly doing.

If policy is to improve the performance of cities across the country, supporting them to play a larger role in the national economy, then it needs to encourage the reinvention of their economies. It needs to break the natural reinforcement of a low-knowledge pathway by increasing the stock of knowledge in a city, as shown in Figure 17.

Figure 17: Knowledge pathways and the role of policy



And so the long-term strategic objective of economic development policy should be to improve the stock of knowledge in cities and address the implications of industrial decline. This should centre on:

- 1. Improving the skills of the workforce.** Knowledge businesses require high-skilled workers. The ease with which they can recruit these workers is a key determinant of where they locate.
- 2. Supporting innovation.** High-skilled workers don't just work anywhere – they cluster in successful cities. This is because a worker isn't more productive just because of the qualifications that he or she holds, but also because of the workers he or she works with and the institutions that he or she works in. The 'knowledge networks' that workers are part of are place specific, and cities need to be able to facilitate innovation and the creation of new ideas via their knowledge networks to increase long-run productivity.
- 3. Dealing with the scars of industrial legacy.** The 21st century economy requires less employment space – an office has a smaller footprint than a factory. And this employment space tends to be in a different part of the city – jobs in our most successful cities have been concentrating in their city centres. This shift has left large swathes of empty land and buildings in some cities, so encouraging density of employment should be done alongside dealing with land remediation.

It is unlikely that all cities will successfully reinvent their economies in the face of the requirement to continue to adapt to the changing economic conditions. But there are a number of cities that currently punch well below their weight, and their reduced contribution reduces the overall size of the national economy. This will not change until economic policy stops looking backward to the past and instead looks forward to the future.

Appendix

Definitions of 1911 Census data

Extraction

VII. Agriculture (on farms, woods, and gardens)

VIII. Fishing

IX. In and about, and working and dealing in the products of, mines and quarries

Manufacturing

X. Metals, machines, implements, and conveyances

XI. Precious metals, jewels, watches, instruments, and games

XIII. Wood, furniture, fittings, and decorations

XIV. Brick, cement, pottery, and glass

XV. Chemicals, oil, grease, soap, resin, etc.

XVI. Skins, leather, hair, and feathers

XVII. Paper, prints, books, and stationery

XVIII. Textile fabrics

XIX. Dress

Dock working

VI. 4 Conveyance of men, goods, and messages – dock labourers, wharf labourers, coalheavers, coal porters, coal labourers

General labouring

XXII. Other, general, and undefined workers and dealers

Knowledge Services

III. Professional occupations and their subordinate services

V. 1, 3, 4. Merchants, agents, accountants; banking, etc.; insurance

V. 2. Commercial or business clerks

Definition of private sector knowledge-intensive business services (KIBS)

This definition is based on the Centre for Cities definition of KIBS used in other research (itself based on the definition used in the State of the English Cities report),⁷⁷ excluding higher education and with other small adjustments made to achieve as much comparability with earlier years where possible.

4110 : Development of building projects

5821 : Publishing of computer games

5829 : Other software publishing

6201 : Computer programming activities

6202 : Computer consultancy activities

6203 : Computer facilities management activities

6311 : Data processing, hosting and related activities

6312 : Web portals

77. DCLG (2006) State of the English Cities, London: The Stationery Office

6411 : Central banking
6419 : Other monetary intermediation
6420 : Activities of holding companies
6430 : Trusts, funds and similar financial entities
6491 : Financial leasing
6492 : Other credit granting
6499 : Other financial service activities, except insurance and pension funding, n.e.c.
6511 : Life insurance
6512 : Non-life insurance
6520 : Reinsurance
6530 : Pension funding
6611 : Administration of financial markets
6612 : Security and commodity contracts brokerage
6619 : Other activities auxiliary to financial services, except insurance and pension funding
6621 : Risk and damage evaluation
6622 : Activities of insurance agents and brokers
6629 : Other activities auxiliary to insurance and pension funding
6630 : Fund management activities
6810 : Buying and selling of own real estate
6832 : Management of real estate on a fee or contract basis
6910 : Legal activities
6920 : Accounting, bookkeeping and auditing activities; tax consultancy
7010 : Activities of head offices
7021 : Public relations and communication activities
7022 : Business and other management consultancy activities
7111 : Architectural activities
7112 : Engineering activities and related technical consultancy
7120 : Technical testing and analysis
7311 : Advertising agencies
7312 : Media representation
7320 : Market research and public opinion polling
7490 : Other professional, scientific and technical activities n.e.c.
9511 : Repair of computers and peripheral equipment



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