
London,
UK
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Section credits:

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Photo, previous page: Brompton bike factory

«Places for making in a megacity.»

London is a highly successful global city. It is the seat of national government and a core part of the UK economy. In 2014, it accounted for more than one fifth of the UK's total GVA output[1]. On a comparable basis, the city's economy is larger than that of many European countries, including Belgium, Sweden and Norway[2]. The region governed by the Greater London Authority (GLA)3 covers 1579km².

London has a large population of almost nine million[4], much higher than other UK cities, and this is set to grow to around 10 million in the next decade as migrants are attracted from across the UK and further afield. This is a diverse population, the most diverse in the UK, with a wealth of culture and communities[5]. It is a well-educated population too, with the city topping European tables for levels of tertiary education attainment amongst its residents[6].

Today the city faces the challenge of adapting to continued population growth and accommodating both people and industries. It must also address significant inequality amongst its citizens. Despite its economic success, these fruits are not evenly distributed: a Londoner in the top 10 percent has 295 times the wealth of a Londoner in the bottom 10 percent, and 27 percent of the city's residents live in poverty (after deducting housing costs)[7]. If its citizens of tomorrow are to live happy and healthy lives then London must also improve its relationship with the environment, from tackling its serious air pollution breaches[8] to dealing with its waste.

Manufacturing has played a role in the city's economy and society throughout history. Like other UK cities London underwent deindustrialisation in the late twentieth century, but unlike many others it thrived in this new environment and has established itself as a leading global financial services centre. The story of manufacturing in London is far from over, however, and new technologies look set to shape a new chapter.

Along with the rest of the UK, the city is gearing up to exit the European Union in 2019. The implications of this transition are not yet clear but will have significance for the capital's manufacturers.

3.1 London's manufacturing: a brief history

With a heritage of trade, culture and productivity London has played an important role in UK industry for centuries. Whilst manufacturing in the city has changed, it remains part of London's economic foundations. This chapter explores these changes over time.

CENTRE OF MAKING

The Industrial Revolution began in Britain in the late 1700s and heralded dramatic changes in manufacturing. During the first half of the 19th century British-made goods dominated world trade. For a time the country was the world's largest manufacturer - dubbed 'the workshop of the world'9.

London was a leading centre of UK manufacturing from the late 18th to mid-20th century. In 1861 around one sixth of the country's manufacturing workers were employed in the capital[10]. Some large British cities were known primarily for one industry, like Manchester's textile production. London, however, was home to a diverse set of industries including garment, furniture, and jewellery making. These businesses were situated towards the end of the production chain and their location was driven by proximity to large markets or a large and skilled workforce[11]. London, during this period, offered them both.

London's port was an important part of the country's trading infrastructure. By the late 1700s more than half of England's imports and exports came through the city's docks[12]. The situation of manufacturing and industry influenced London's geography and its neighbourhoods. Today this heritage is visible in city street names like Cable Street, a 'rope walk' where businesses supplied cables for ships.

POST-WAR POLICIES AND DEINDUSTRIALISATION

In the period following the Second World War, a series of policy interventions attempted to constrain the growth of industry in core cities like London and to encourage growth in other regions of the country. This approach was taken in response to high regional unemployment, and an attempt to 'take the work to the workers'. For a period London's manufacturing sector grew at half the national rate and its overall employment levels grew at a lower rate than any other region bar one[13].

With the onset of deindustrialisation the ensuing decades signalled a period of transition for the UK's manufacturing

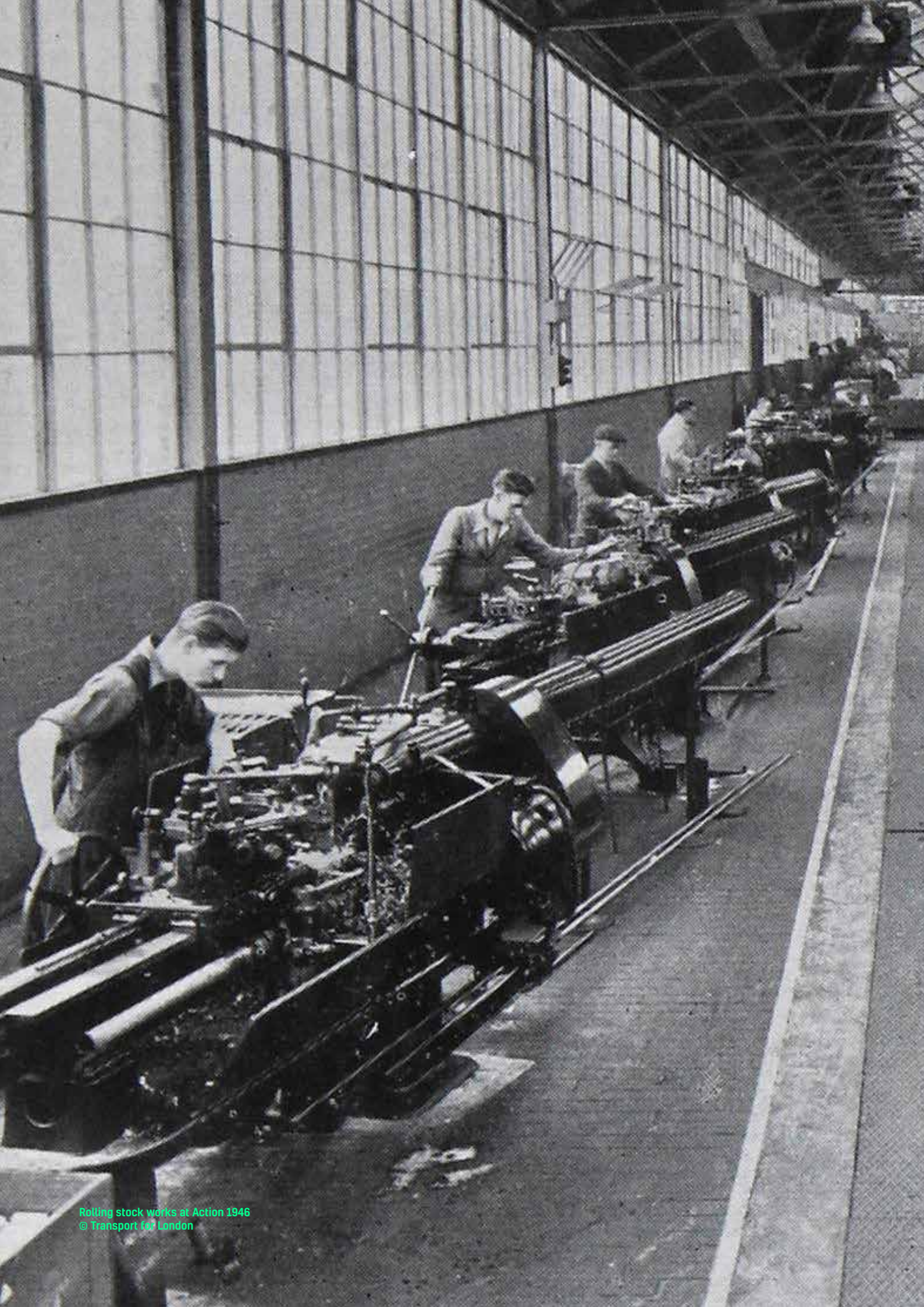
Garment Factory
© Jim Linwood

base[14]. During this period manufacturing began to take advantage of an increasingly globalised world and move overseas in search of lower production costs. Although the sector remained important for the economy (in 1970, manufacturing still accounted for 27 percent of the UK's economic output[15]) during the 1960s and 70s it began to see a relative decline in its share of output and employment[16]. These factors contributed to the decline of manufacturing activity within London.

Between 1971 and 1996 London shed around 600,000 manufacturing jobs[17]. The city's population was also declining, a trend which began during the war[18]. By the 1970s and 80s concerns about inner city decline led to policy strategies to preserve and improve what was left of the city's manufacturing base in order to retain employment opportunities. An Industrial Strategy developed by the Greater London Council (GLC), the city's governing body at the time, was developed in response to these challenges. It identified a range of key sectors and developed actions for each, including interventionist-style policies to boost industry. Its implementation was curtailed when the GLC was abolished in 1986[19].

URBAN REGENERATION

The1990s saw London and its centre become a desirable place to live once again. Its population began to grow and, with this, housing provision became the dominant focus[20]. This led to the release of vacant employment sites in favour of residential development and it became increasingly difficult to protect industrial space. Industry, including manufacturing, continued to decline, particularly in the centre.



Rolling stock works at Action 1946

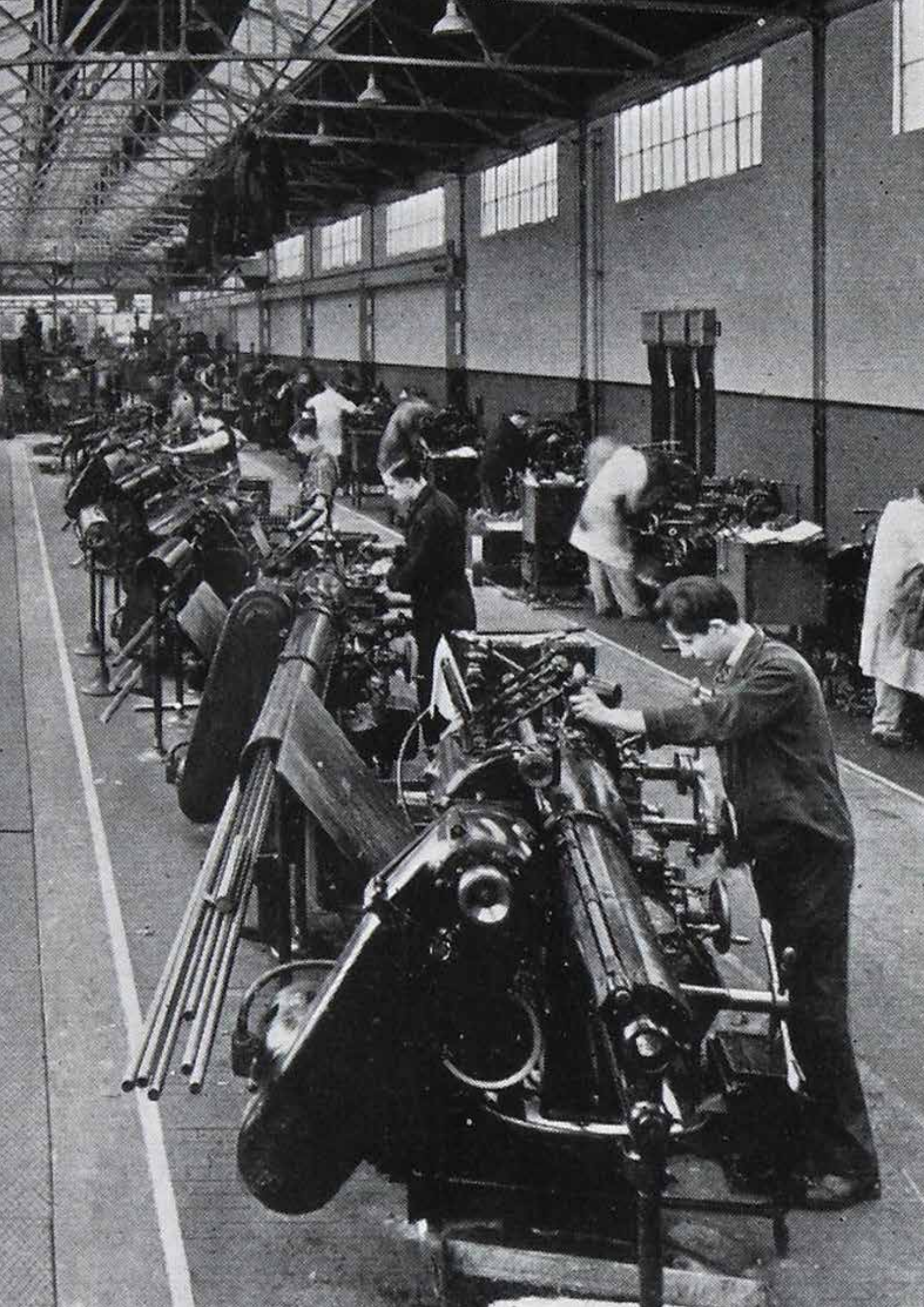
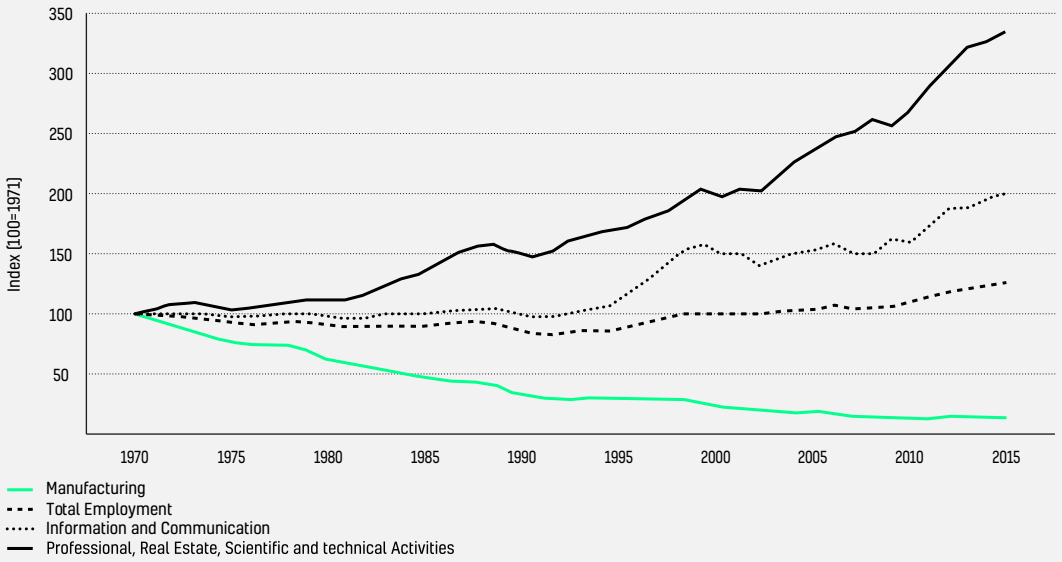


Figure 1: Changes in employment in London since 1971



Source: ONS Workforce Jobs (2017), GLA estimations and RSA calculations

Over this period knowledge sectors, including professional services, more than doubled their employment footprint (see Figure 1). This shift to 'higher-skilled, higher productivity employment'[21] has enabled London to thrive as a post-industrial city.

MANUFACTURING IN LONDON TODAY

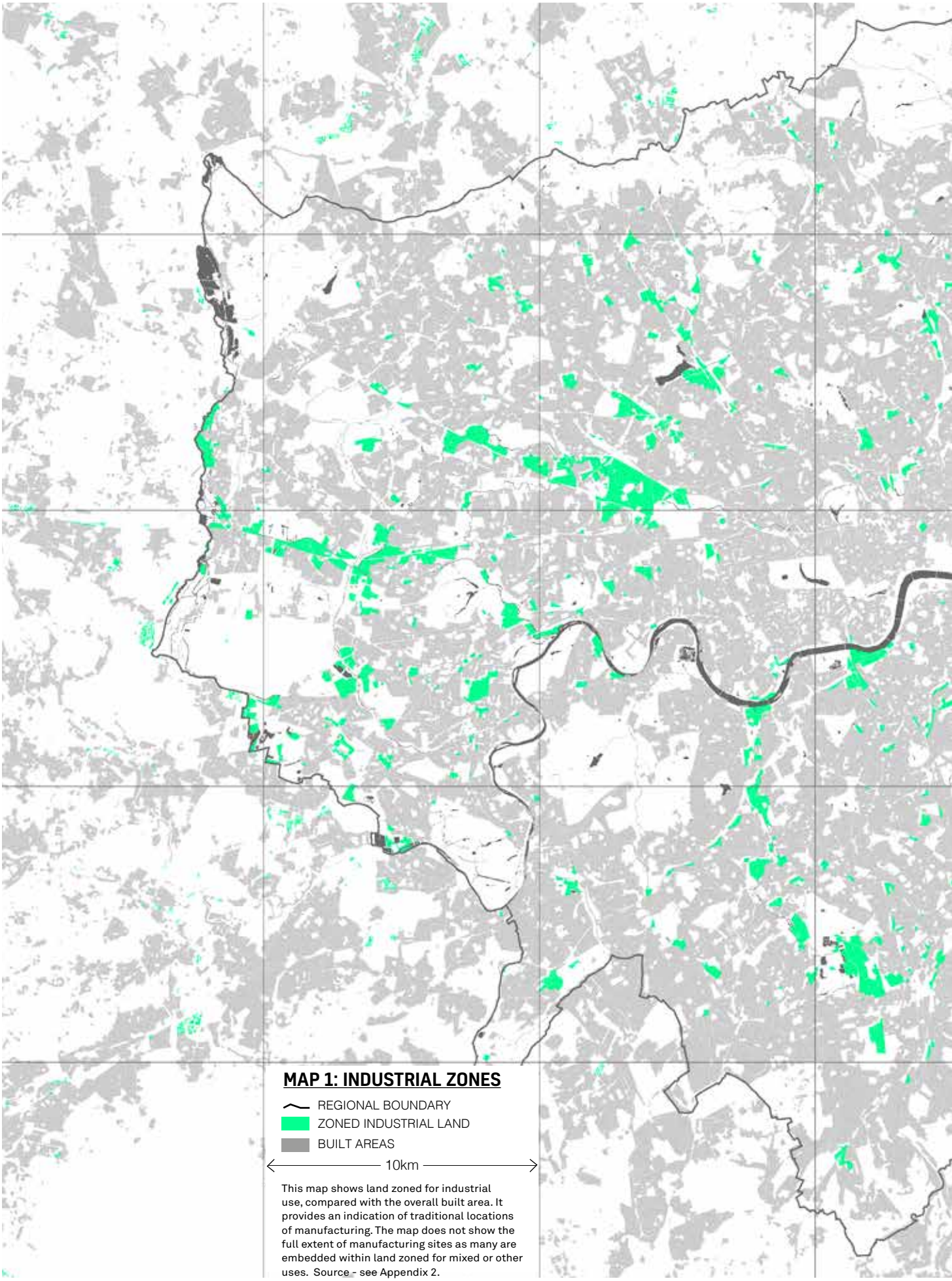
London's manufacturing base has declined significantly over the last 50 years. Its role has shifted as both the city and the country as a whole have developed post-industrial economies. However, while the city is clearly no longer geared towards manufacturing, it is still an important component of London's vast and diverse economy. London should not be written off too quickly as a city that makes.

In London today the manufacturing sector accounts for 2.2 percent of total employment[22] and a similar share of GVA[23]. Whilst this is a small proportion, the city still plays an important role in the nation's manufacturing sector: more people are employed in manufacturing in London (114,000) than in other UK city regions such as Greater Manchester (108,000) and West Yorkshire (99,000); places more often perceived as manufacturing strongholds. Its output is significant too; at £8.5bn, London's total GVA from manufacturing is close to that of the sector across all of Wales[24]. Looking at output per hour as a measure of productivity, London is in line with the UK average for the sector[25]. Whilst the city's manufacturing employment figures have reduced over time, these seem to have reached a plateau since the end of the financial crisis (see Figure 1).

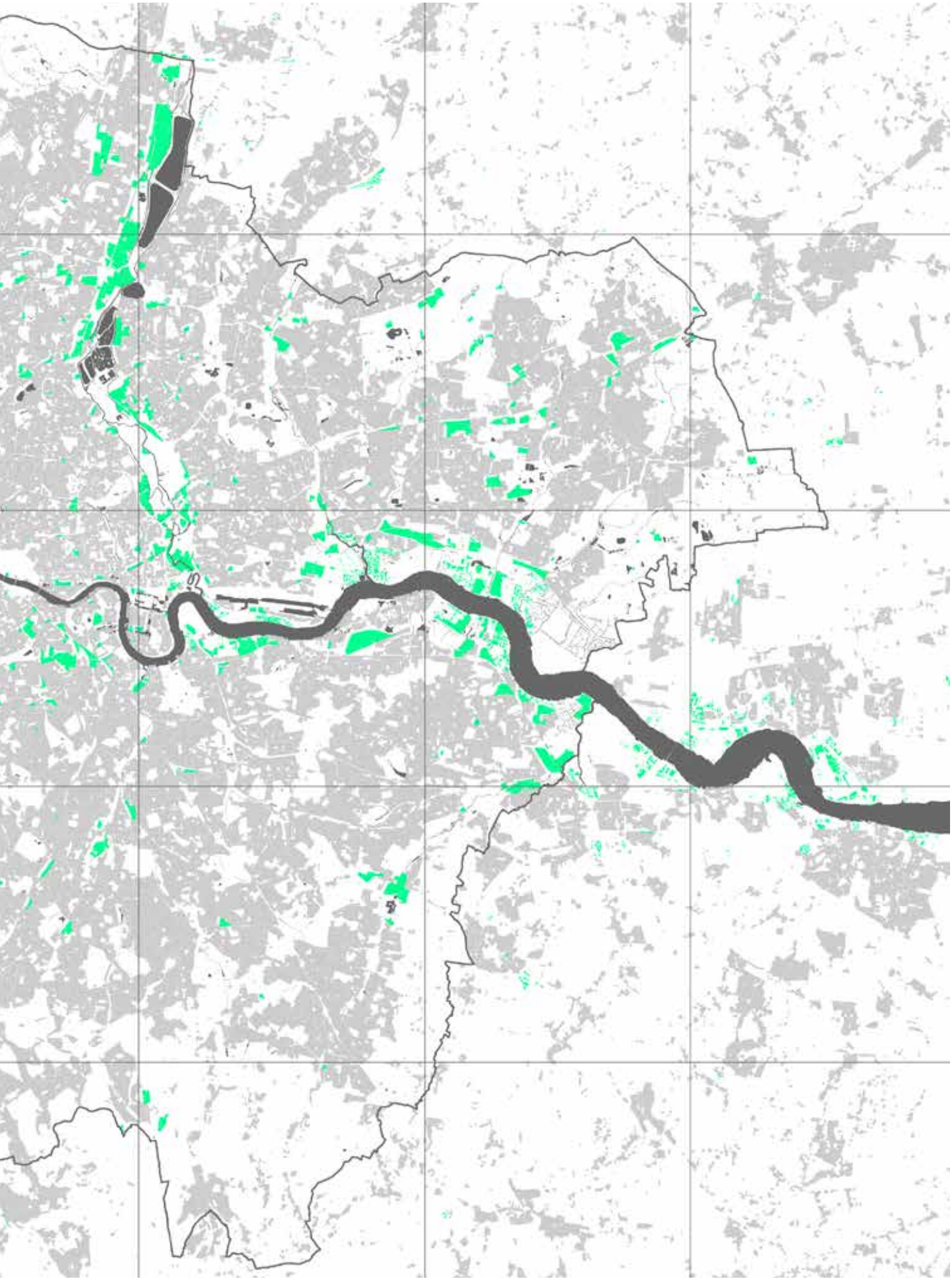
As the sector has developed over time, its needs have also changed. A study of Park Royal (London's largest industrial site) describes a trend that has seen some of the larger businesses on the site relocate or close, to be replaced by smaller businesses today[26]. Trends like this one, along with the enormous growth of the services sector relative to manufacturing, make the picture in London more complicated than one of simple decline. It would be a mistake to think that London's manufacturing sector is destined to shrink further or that it is not relevant for the city simply because it makes up a small part of its economy.

The rest of this chapter will explore London's manufacturing activities in more detail.

Sugru is made in London
/ © Sugru



This map shows land zoned for industrial use, compared with the overall built area. It provides an indication of traditional locations of manufacturing. The map does not show the full extent of manufacturing sites as many are embedded within land zoned for mixed or other uses. Source - see Appendix 2.



3.2 Manufacturing sectors and trends

London is home to diverse manufacturing activities, from baking to bike making. These productive business are found across the city, providing employment and supporting the city's other activities.

MADE IN LONDON

As has been the case historically, manufacturing in London is comprised of many different activities, the majority of which are situated towards the end of the production chain (see Figure 2). Many provide just-in-time products and services that support London's wider population of residents and businesses.

In terms of employment, food manufacturing is the largest sector. Its 24,000 workers account for more than 20 percent of London's manufacturing workforce. Employment is also concentrated in the following industry divisions: manufacture of fabricated metal products, printing and reproduction of recorded material and manufacture of wearing apparel. These four industries collectively make up almost half of all manufacturing that takes place in London[27].

Repair and installation of machinery is also a major employer with 12,500 workers[28]. This industry provides services that support the wider functioning of the sector. It includes activities relating to the maintenance of machinery used in industrial processes, such as bread making or welding, but also commercial equipment used in other sectors[29].

London's car making heritage should not be forgotten; GVA output highlights that transport equipment is still a significant part of London's manufacturing economy, contributing more than £1bn[30]. Ford's engine factory in Dagenham is the largest single manufacturing site in London, with over 1,800 employees[31]. Transport equipment figures also include the value added by Brompton Bicycles Ltd. A great success story of London's contemporary manufacturing scene, Brompton make foldable commuter bicycles, over 45,000 units a year. They recently expanded, moving across London to a new site in Greenford, Ealing and now employee over 300 workers[32].

Other industries where there is noteworthy activity include the manufacture of rubber and plastic products, furniture, and computers, electronic and optical products. Roli, for example, a music technology

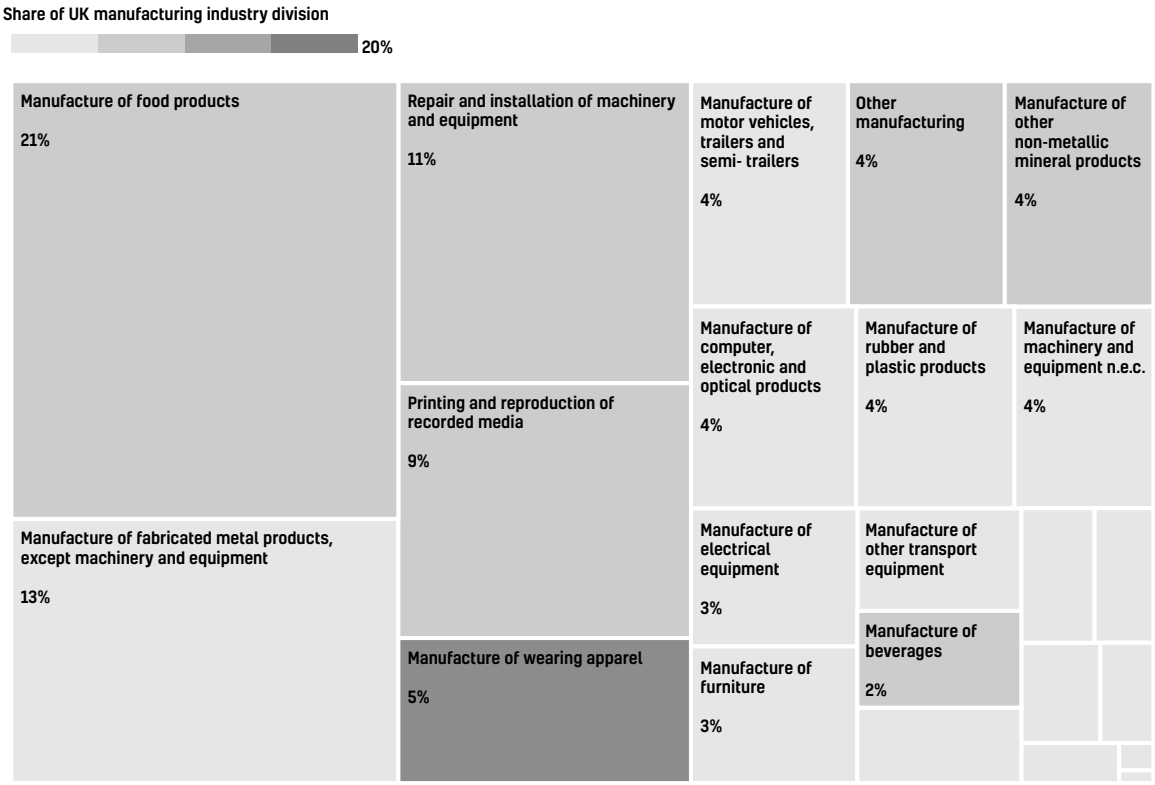
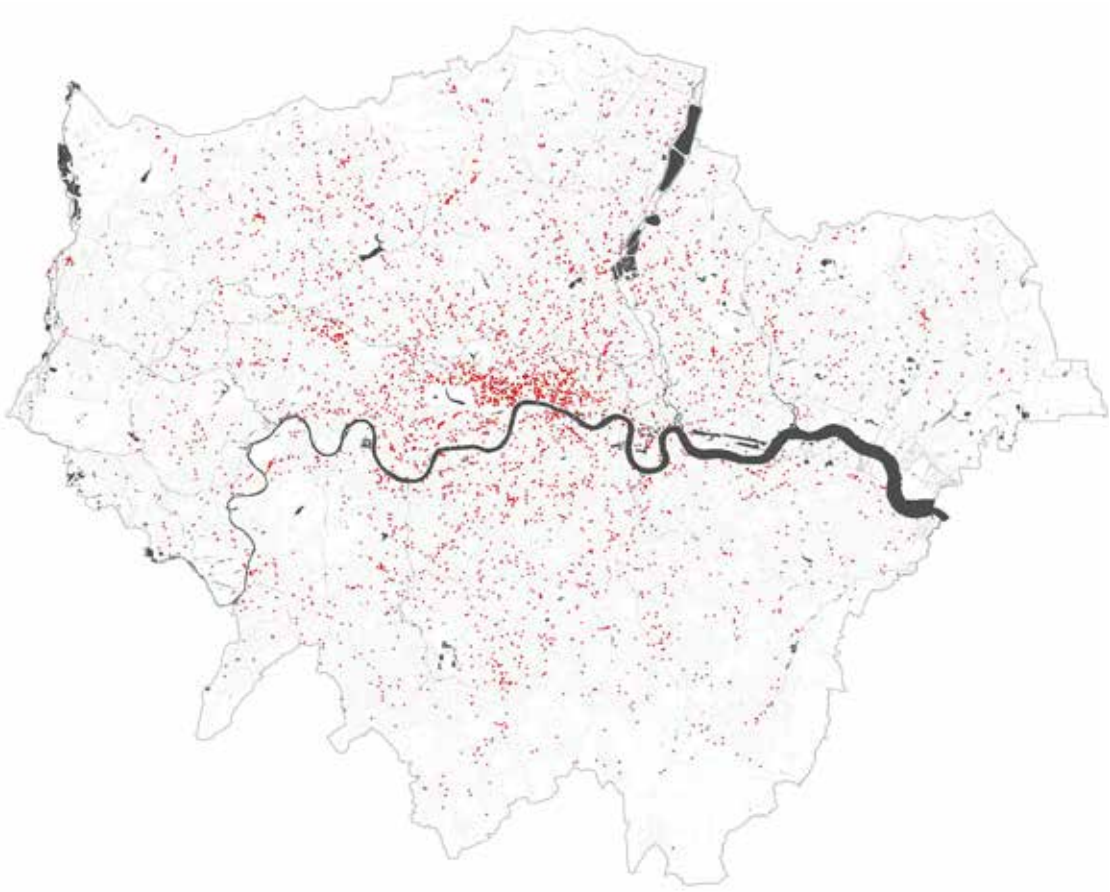


Figure 2: Employment in London's manufacturing economy by industry division

Source: RSA analysis of Business Register and Employment Survey (2016)

start-up, assemble high-tech music instruments in a railway arch in East London[33].

Manufacturing has evolved over the centuries in London. Much of it has gone from the city, either because it is no longer considered compatible for environmental reasons (consider the chemical works which once existed in East London[34]) or because it became more cost effective to produce elsewhere (as was the case for Vauxhall cars, whose early life started in South London). So why have the remaining businesses stayed in London? A closer look shows that these businesses, many of which are small and light industrial operations, are plugged into the city. The manufacturing that has remained is that which either fulfils the needs of the city's residents and businesses, that which derives value from being situated in London's unique business climate (whether their products are consumed by locals or exported), or that which benefits from being close to its niche, and diverse, consumer markets (see Box 5).



Map 2: Business locations - Food and drink products.

Source: see Appendix 2

MAIN SECTORS

Food products

Food and drink manufacturing collectively contributes over £2bn to London's economy[35]. This includes the labour of the 2,000 workers involved in the manufacture of alcoholic and soft drink beverages. Map 2 shows locations of businesses in this sub-sector.

More than 15,000 workers are involved in the production of bread, biscuits, ready meals and other just-in-time foods such as sandwiches[36]. Greencore Group plc[37] is one example of this type of manufacturer. Greencore is a leading international manufacturer of convenience foods, with multiple sites across the city. While you are unlikely to see their branding on products, they make many of the sandwiches, sushi and prepared salads found at major supermarkets and high street chains. Another more familiar example might be the bread and baked goods manufacturer Warburtons, who have a base in Enfield[38]. Both these businesses work around the clock to provide the city with the foodstuffs its residents consume daily.

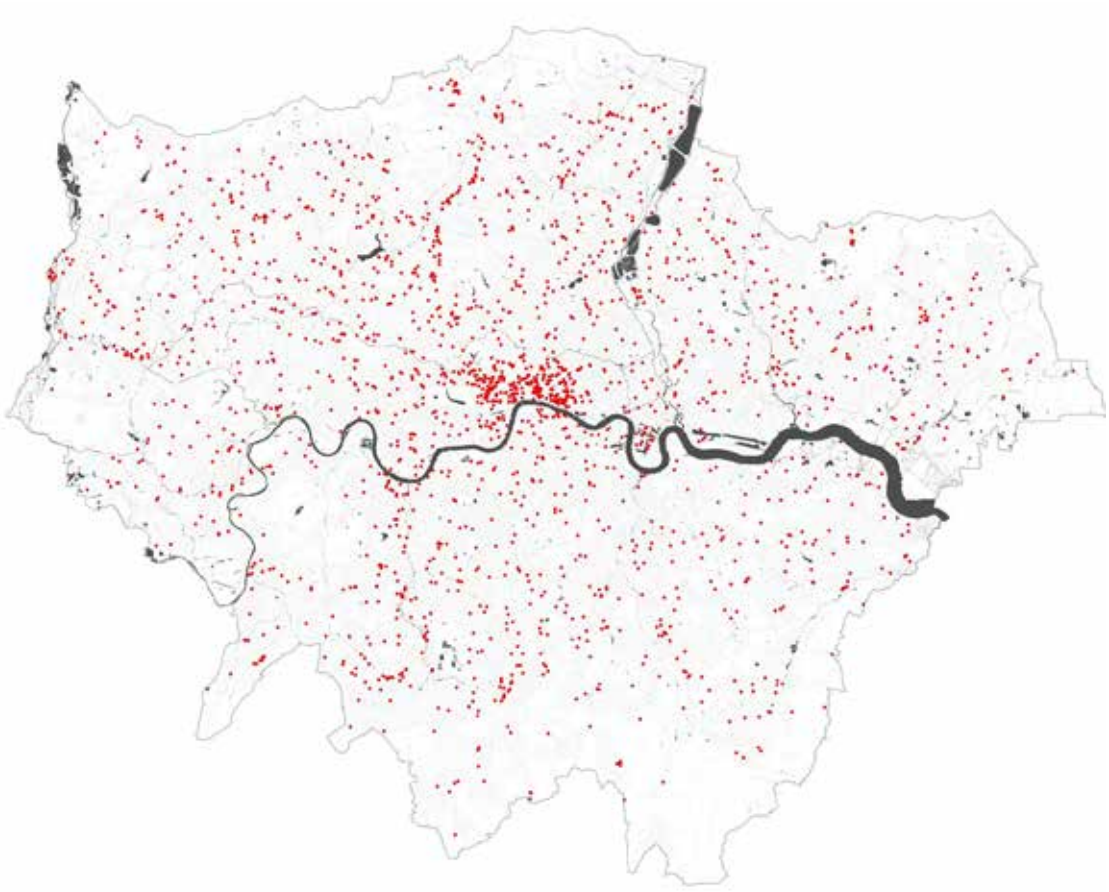
London also has a noteworthy contingent of artisan food producers, for example: La Latteria produce a range of handmade fresh British cow's milk mozzarella in a North Acton warehouse[39]; while Bermondsey Street Bees make award winning honey with a little help from hives on a South East London rooftop[40]; and Secret Smokehouse cure salmon and kippers just off London Fields[41].

In order to service their market, these food manufacturers need to be close to their consumers, and demand for their products is likely to increase from both population growth and consumer trends. If predictions are right, the UK 'food-to-go' market is set to increase by over 8 percent between 2017 and 2022[42], and a greater interest in high-quality food from small producers is already seeing SME food producer profits grow[43].

Tate & Lyle factory © Les Chatfield

Fabricated metal products

While Sheffield may be more famous for its steel production, London has its share of metal workers, often providing highly specialised products and services. This industrial sector



Map 3: Business locations - Fabricated metal products.

Source: see Appendix 2

Metal worker ©Brompton Bicycle Ltd.

includes the manufacture of locks and hinges, tools, cutlery and other metal products with a variety of household and commercial uses[44]. Map 3 shows locations of businesses in this sub-sector. Kaymet is a manufacturer of luxury trays, trolleys and electric table hotplates. Based in Peckham, this small manufacturer has been making anodised aluminium ware since 1947. Today they have 7 employees. Their products are stocked worldwide, including in London's most famous department store, Harrods[45].

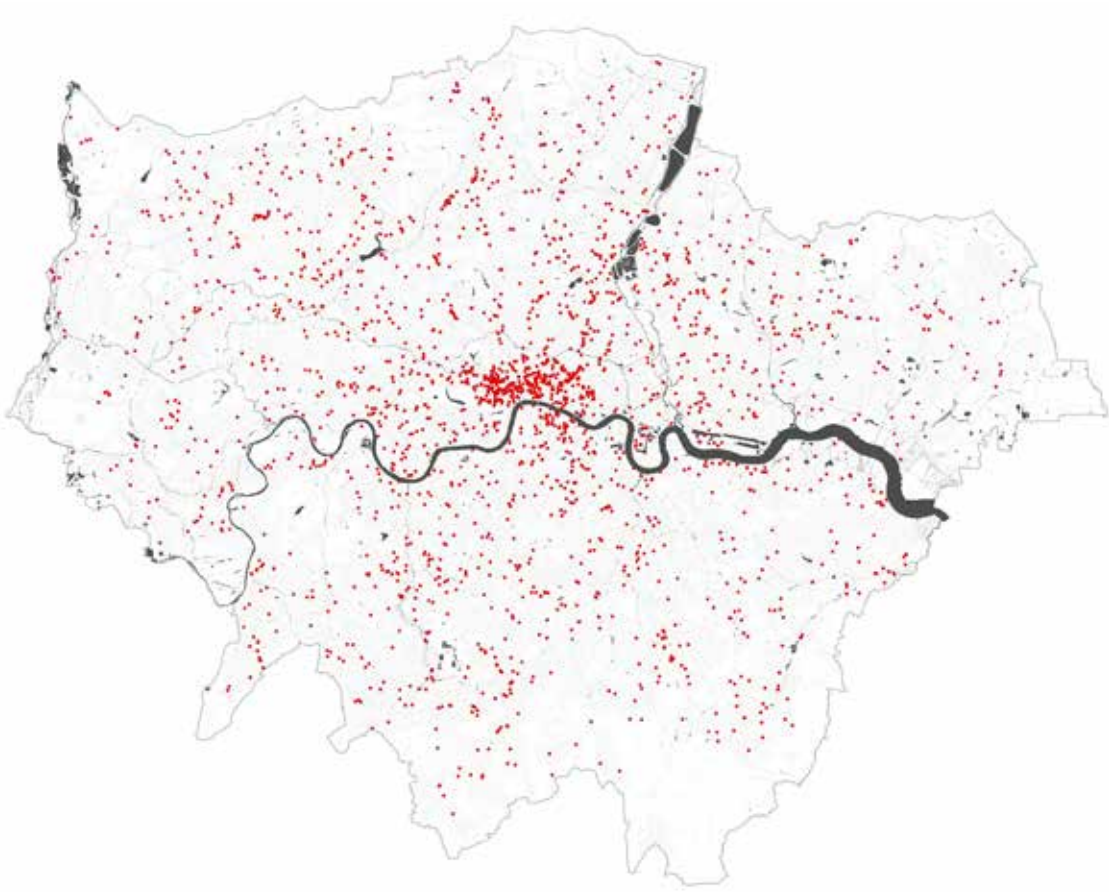
An estimated 5,000 of these metal workers are employed in machining, which involves industrial processes such as milling, polishing and welding[46]. Today, these processes are often aided by computer numerical control (CNC), in which computer software is used to more precisely control the operation of machinery. Some of them supply products and services to London's leading cultural institutions. Factory Settings, for example – based in Leyton – design, fabricate and install exhibitions, theatre sets and experiential environments for the likes of the Barbican and Natural History Museum[47].

Nearly 4,500 are employed in the manufacture of metal doors, windows or other metal structures, supplying London's renowned architects and interior designers[48]. Metal Works in Brixton is one of these manufacturers, supplying high-quality staircases, gates and balconies[49].

Printing and reproduction of recorded material

Traditionally, printing has involved techniques such as lithography, whereby images are transferred from a plate or screen, but today they are often transferred digitally from computer files.

Despite being home to most of the UK's newspapers, printing these publications now accounts for fewer than 100 jobs in London. But print lives on in different guises. The majority of employment in this industry is in other forms



Map 4: Business locations - Printing and reproduction of recorded material.

Source: see Appendix 2

of printing, including books and magazines, brochures, personalised stationery, and posters[50]. Printing therefore supports the activities of a wide range of other businesses in the city, from professional services firms to restaurants.

Many also offer specialised services, including graphic design. Based in Bethnal Green, Calverts is a printers that specialises in publications and sustainable print, but also provides design services such as branding and web design[51]. Calverts is a workers' co-operative, meaning profits and decision making are shared amongst their employees. And printing does not always rely on paper; businesses such as BAF Graphics in Wandsworth print signage straight onto glass, plastic and other materials[52]. Map 4 shows locations of businesses in this sub-sector.

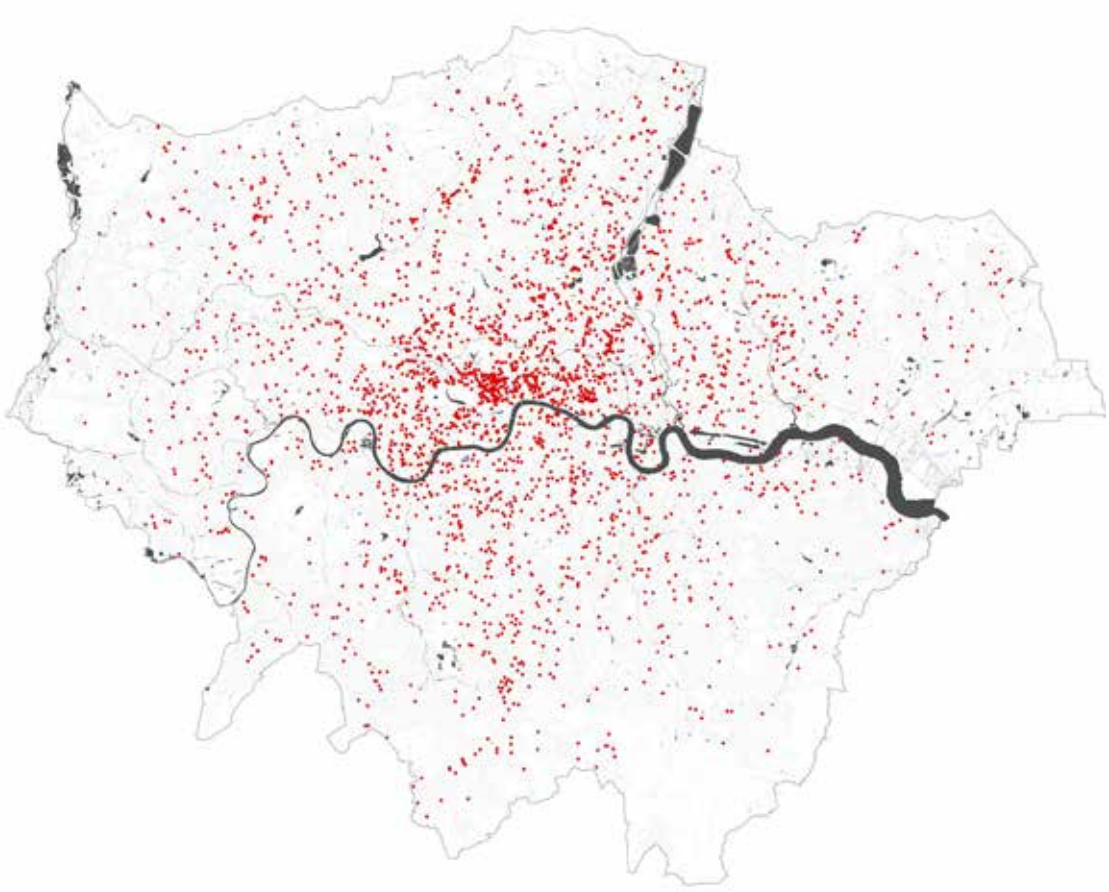
Calverts printers

Wearing apparel

Wearing apparel is a traditional sector for the city. Whilst it is not London's largest manufacturing sub-sector, it is certainly important for the rest of the country as 20 percent of jobs related to the manufacturing of wearing apparel in the UK can be found in London[53]. It also adds £800m to London's GVA output[54].

Supplying clothing for as diverse uses as the Changing of the Guard to London Fashion Week, these garment producers range from the traditional to the contemporary. Most workers (4,500) in this sector are involved in the production of outerwear, both in sample and batch production of garments[55].

Savile Row has a reputation for some of the best tailors in the world. Norton & Sons, established in 1821, gained eminence for making suits for the likes of the young Winston Churchill and have cut cloth for the royal households of many European countries[56]. The making of a single suit can involve up to eleven craftsmen and 60 hours of work. Kashket & Partners, based in Tottenham, cut a different cloth. Their bespoke tailors and artisans produce and service ceremonial military uniforms for regiments in the



Map 5:
Business locations -
Wearing apparel.

Source:
see Appendix 2

British Army, including the Household Cavalry[57].

But modern apparel manufacturers are also thriving, for example the company Fashion Enter, which supplies e-commerce giant ASOS with womenswear from their factory in Haringey. Their 40 strong contingent of machinists produce up to 7,500 units a week. This social enterprise also offers a range of learning and development opportunities for would be designers and makers, including apprenticeships and mentoring[58].

Just down the road are The Albion Knitting Co. Established in 2014, they are the first industrial scale flat knitting factory to open in London in the last sixty years[59]. Their parent company, Alphatex, is a Beijing based manufacturer whose owner moved from the UK to China two decades ago when most of the knit industry relocated there. He and his co-founder opened Albion in order to be close to their clients in Europe's luxury fashion houses, including Alexander McQueen and Givenchy[60].

Manufacturing's relationship with the creative industries

London's manufacturing businesses service activities across London's economy. An important relationship exists with the creative industry. London has a world leading creative sector, from theatres to architectural firms. These businesses represent a significant part of the capital's economy. In 2015, they contributed an estimated £42 billion, accounting for around 11 percent of London's total GVA, and just under half that of the UK creative industry's total contribution. The wider creative economy is a growing sector for employment. There were 882,900 jobs in London's creative economy in 2016, up by almost a quarter since 2012[61].

Manufacturing in the capital underpins this sector in ways seldom appreciated; the theatres need props and costumes, while the fashion designers need garments sampled and small batches produced. A short film, 'London Made', created for the Seoul Biennale of Architecture and Urbanism in 2017, explored some of these connections by tracking the supply chains from one of the city's most distinctive cultural centres, the Barbican[62]. Its case studies highlight the importance of local links and demonstrate the need for the creative industry to be close to a network of local manufacturing businesses.

LONDON'S MANUFACTURING GEOGRAPHY

Manufacturing employment in London is concentrated in the outer boroughs where there tends to be more industrial space (see Figure 3). Ealing has the largest share of London's manufacturing employment (11 percent) with 13,000 workers employed in the sector[63], many of whom can be found in Park Royal, often claimed to be Europe's largest industrial site[64]. Park Royal is located on the border of three London boroughs: Ealing, Brent, and Hammersmith and Fulham. The birthplace of London's Routemaster bus, Park Royal is home to household names such as McVities, who have been making biscuits here for over 100 years and today have more than 700 employees[65]. A range of different sized manufacturers are located here. Sunbeam Group, who have 35 employees, design and install shop fittings for the likes of Selfridges, while two person start-up Botanic Lab, who make deluxe organic juices, have recently relocated to the site from East London[66]. Nearby in Chiswick is Fullers' Griffin Brewery, London's oldest brewery, who have been providing the city with fine ale since 1845[67]. Together with neighbouring boroughs, Hillingdon and Hounslow, this part of North West London accounts for nearly a third of total manufacturing employment[68].

Many of London's manufacturing workers can also be found alongside the River Thames in East London. Industrial sites on either side of the river span the boroughs of Greenwich, Newham, Bexley, Havering and Barking and Dagenham. Charlton Riverside is one example of a key location in this area, as is the aforementioned Ford plant in Dagenham Dock. "Out of the strong, came forth sweetness" goes the slogan of UK heritage brand Tate & Lyle, which has not one but two sites on the Silvertown area in Newham[69]. Their Thames Refinery site is the largest sugar refinery in the EU. One mile away, their Plaistow Wharf site ships out more than a million tins of golden syrup every month[70].

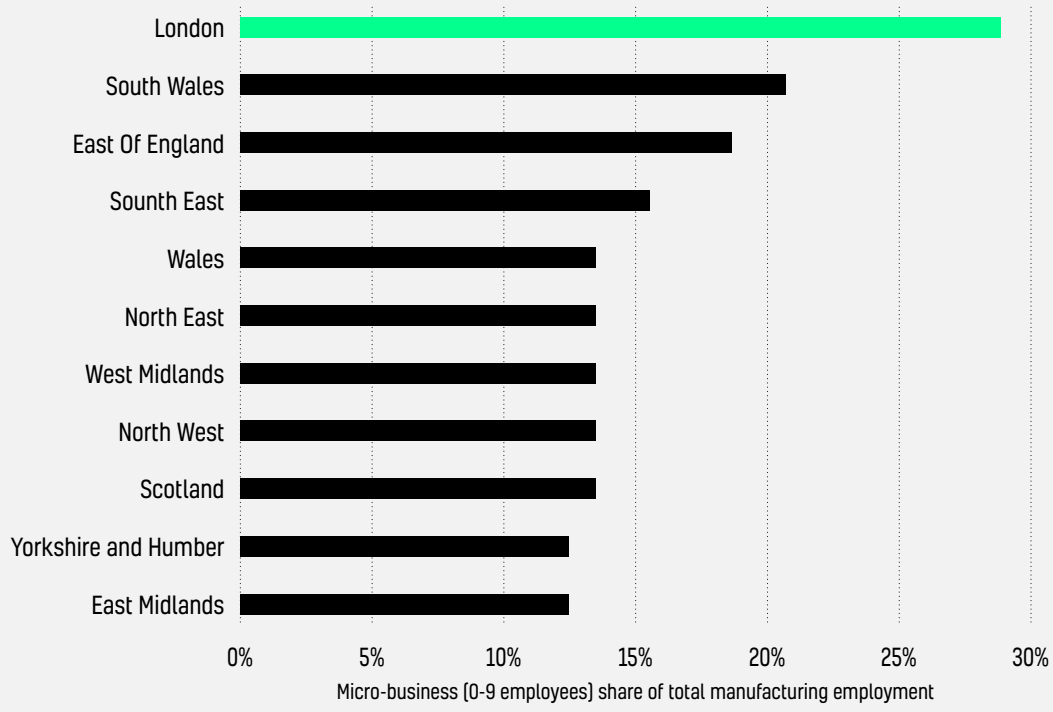
One of the largest industrial corridors in London, the Upper Lea Valley spans the boroughs of Enfield, Haringey, Waltham Forest and Hackney. Once famous for gun and motorcycle production, this borough acts as a gateway to and from London due to its proximity to the North Circular ring road (rather than the river and canal which once were the highways of the area). Coca Cola has been bottling drinks here for over 40 years and, more recently, Greggs Bakers opened up a distribution centre of excellence[71].

Additionally, smaller scale manufacturing can be found across the city. East London is home to the 'Maker Mile', a creative cluster of more than 80 fabricators, studios and workshops[72]. A one-mile radius from Mare Street, this area spans the boroughs of Hackney and Tower Hamlets. Machines Room is a makerspace based here which enables businesses and members of the public to access workspace and machinery, including laser cutters, 3D printers and CNC machines[73].

With an extensive rail transport network, railway arches criss-cross London, and many are home to smaller scale manufacturers. Be it craft beer makers Brixton Brewery[74], Sourdough bakers E5[75], or one of London's many metal works. These sites beneath railway lines are ideal for this kind of activity. They are inexpensive because they are incidental to main purpose of carrying trains, and noise of these trains means other business noise is also tolerated. London has a particularly large number of these. In fact, the brick viaducts that extend from London Bridge and Blackfriars through South East London are among the largest built structures in the world[76].

Manufacturing activity takes place all across London. The spatial distribution of these activities today is in large part driven by the history of the city; industrial space and businesses are found where previous generations of makers set up shop. But the city is constantly evolving and the space available for making is shifting too, shaped

Figure 4: Regional share of micro-businesses in manufacturing



Source: RSA analysis of Department of Business, Energy and Industrial Strategy (2017) Business Population Estimates

by political decisions as much as business ones. London needs to consider how manufacturing fits into its future geography - see Map 1 showing industrial zoned land.

EMPLOYMENT IN MANUFACTURING

This section explores three different aspects of work experience in manufacturing in London, namely business size, job types, and job quality.

Business size

As of 2017, there were almost 14,000 manufacturing businesses based in London, the vast majority of which are micro-businesses; 11,700 or 87 percent have fewer than 10 employees. The largest number of these businesses can be found in printing (1,800), fabricated metal products (1,500), wearing apparel (1,100) and 'other manufacturing' (1,200), which includes crafts such as jewellery making[77]. Hatton Garden may be the most famous example here, with businesses such as Just Castings offering casting, plating and finishing services to London's designers[78]. One person businesses can be found in shared workshops across the city, such as Made By Ore, a silversmithing workshop in Walthamstow, which houses 7 independent makers[79].

Self-employment and micro-businesses account for a high share of London's manufacturing employment compared with other regions (see Figure 4). Almost a third (29 percent) of London's manufacturers work in these kinds of enterprises, a figure more than twice that of many other UK regions[80].

Larger businesses are mostly found in the food and drink industry. There are an estimated 25 businesses in these sectors with over 250 employees, accounting for half of all industry that takes place at this scale. In the food industry, 855 companies are micro-businesses, indicating the extent of artisan production in this sector. There are also a handful of large businesses in printing, the manufacture of rubber and plastic products, the manufacture of machinery and equipment, and the

repair and installation of machinery[81].

Larger businesses also account for a significant share of London's manufacturing employment, providing 38 percent of all jobs, a figure slightly below the UK average of 42 percent. London's manufacturing workers are also less likely to be employed in medium sized enterprises (50-249 employees), which account for only 15 percent of jobs, compared to 23 percent across the UK[82]. This suggests that there may be barriers to expansion.

One such barrier may be a shortage of available, affordable and appropriate industrial space. An analysis of Valuation Office Agency (VOA) data shows that London has more property units per m^2 of industrial floorspace than other English regions[83]. The cost of this space (per square metre) is also more than twice as expensive as other parts of the UK and available industrial floorspace declined by 20 percent between 2000 and 2012 (see Figure 5). This may be posing challenges for business expansion and new business creation. Challenges presented by a lack of space for making are further discussed in Chapter 3.3.

The ability for smaller scale manufacturing businesses to grow is important for both London and other parts of the country. London could act as an incubator for some manufacturing businesses, enabling them to develop before relocating outside of the capital. For other businesses, remaining in the city will continue to be necessary

London's manufacturing occupations

Manufacturing is made up of a diverse range of occupations, from skilled tradespeople such as garment makers or metal workers to engineering professionals, warehouse managers, forklift operators, and accountants[84].

Skilled trades account for approximately one in five manufacturing jobs in London (18 percent) (see Appendix 3). Many

Figure 5: Regional cost of industrial floorspace

Region	Rateable value £/m²	Industrial floorspace £/m²	Hereditiments Units/m²	Change in industrial floorspace (%) 2000-2012
London	68	21,115	2,1	-19%
South East	50	35,627	1,7	2%
East	42	33,299	1,5	4%
South West	37	26,575	1,8	1%
West Midlands	33	44,375	1,2	-6%
East Midlands	32	37,787	1,1	5%
North West	30	49,411	1,2	-9%
Yorkshire and Humber	29	40,919	1,2	0%
North East	25	15,744	1,2	-2%

Source: RSA analysis of Valuation Office Agency (2012)

Commercial and Industrial Floorspace Rateable Value Statistics Used here, hereditiments refers to property units

of London's makers providing bespoke or artisanal services will fit this bill.

Workers employed in manufacturing in London are much less likely to be employed as process plant and machine operatives, with just 11 percent found in these jobs compared to 20 percent across the whole UK. These are the job types that are typically found on the floor of large factories and involve the routine operation of heavy machinery.

Instead, London's manufacturing workers are more likely to be employed in associate professional occupations or as managers and directors[85]. Both job types are linked to business support and administration, and include roles like marketing professionals and functional managers responsible for corporate strategy. Many of these jobs are those that that one would expect to find in manufacturing firms whose head office is located in the city. This includes businesses such as drinks manufacturers Diageo who don't make any products in London but develop advertising campaigns here[86].

More broadly, many of London's manufacturers benefit from having access to a diverse pool of talent that comes with London being a global commercial centre. Be it a business like Tate & Lyle who make and market their products in London, or smaller start-ups looking to develop their brand.

Job quality in London manufacturing

The ability of a sector to provide jobs is an important factor in its role within the economy. The recent Taylor Review asserted that, as a whole, the challenge faced by the UK is not with the number of jobs, but with their quality, and highlighted issues with the markers of pay, progression and security[87].

Manufacturing jobs are often perceived as higher quality than those in low skilled service sectors such as retail and hospitality, where huge swathes of the workforce are poorly paid. This is true to an extent. In London the typical weekly wage for a full-time employee in manufacturing is £624, compared to £516 for retail and £386 for hospitality workers[88].

However, manufacturing consists of a diverse range of industrial divisions and these vary significantly in the skills they require. This is reflected in workers' pay packets. Workers in low tech manufacturing sectors earn considerably less than their high tech counterparts. With a median hourly wage of £25, workers involved in the production of motor vehicles typically earn more than twice that of those working in food (£10.50) and wearing apparel sectors (£12.50). Workers involved in the production of computers, electronic and optical products command a similarly high salary of £22 per hour[89].

Sadly, low pay is a problem for parts of London's manufacturing sector: 21 percent of these jobs pay less than the London Living Wage (set by the Living Wage Foundation at £9.75 per hour for 2016[90]). Food manufacturing may be especially guilty here as 43 percent of workers earn less than this living wage, a figure no different from retail[91].

Manufacturing jobs in London are not, however, associated with insecure forms of employment, such as zero hours' contracts. Less than 2 percent of workers in manufacturing have these contracts, whereas in low skilled service sectors, such as hospitality, this figure is as high as 8 percent[92].

STRONG SIGNALS: FUTURE MANUFACTURING TODAY

Alongside the established manufacturing that takes place within the city, there are pockets of activity that signal future directions for London manufacturing.

The circular economy

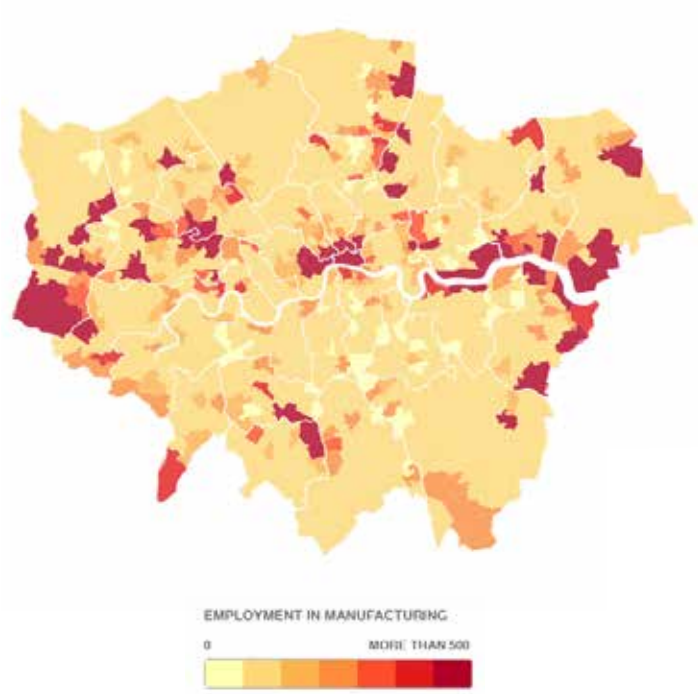
The Mayor of London has ambitious targets for improving the environmental sustainability of the capital, including the aim to become a zero waste city and to move to a more circular economy[93]. These

ambitions are discussed further in Chapter 3.3.

Achieving these goals will require a fundamental shift in the way products and materials are produced, consumed and cared for in the city. Already there are new initiatives and businesses showing the potential that exists. These sit alongside the sectors of industry critical to delivering a circular economy, such as the waste and recycling sectors.

Part of London's booming food manufacturing sector, companies like Rubies in the Rubble[94] and Snact[95] are capturing old or misshapen fruit and vegetables before they go to waste, and turning them into business opportunities. In the garment sector, Worn Again, based in East London, are developing a chemical textile-to-textile recycling technology that will enable clothes and textiles to be collected, processed and made back into new yarn again and again[96]. Helping to take care of London's offices are Premier Sustain who remanufacture desks, chairs and other office furniture at their Renew Centre in North London[97]. This furniture remodelling and refurbishment helps minimise waste and extends the lifecycle of these ubiquitous products. Sugru, originally invented and now made in London, is the world's first mouldable glue, which enables people to repair, modify and create items. It is available worldwide, with fourteen million mini packs reaching people across the globe, helping them to fix and customise their products[98]. Other home-grown businesses similarly offer Londoners the opportunity to repair their goods. The Restart Project is a social enterprise that helps people to fix their electronic items and to learn the skills involved at 'parties' hosted across the city[99].

Figure 3: London's manufacturing clusters; employment in manufacturing by Middle Layer Super Output Area (MSOA)



Re-distributed manufacturing and local production

Re-distributed manufacturing is one of a number of terms (others being 'distributed manufacturing' or 'decentralised manufacturing') referring to changes in the economics and organisation of the sector that shift production sites closer to consumption[100]. This is a contrast to previous trends in manufacturing, which centralised the production of goods. The phenomenon is driven by new production technologies that enable smaller volume and bespoke production to be viable, including additive technologies like 3D printing, and technology which changes communication across value chains, such as cloud computing. These activities are anticipated to significantly change the way goods are produced, and enthusiasm is building across sectors, from healthcare to construction, for the opportunities this could bring, for example in reducing transport emissions and costs, and enabling bespoke production.

Within London, pockets of re-distributed manufacturing are emerging. Several of the city's leading universities provide research on new manufacturing technologies and support the development of

young engineers and designers. University College London's Institute of Making[101] and the Royal College of Art's work on the role of makerspaces in the circular economy are two examples[102].

There are independent institutions too, such as HSSMI based in the Olympic Park who support the research and delivery of digital technologies for manufacturing[103]. Across the city, the wealth of expertise in these institutions is a source of, and draw for, entrepreneurs. They could be key to positioning the city to make the most of these new technologies.

Opendesk, a company based in East London, capitalise on this technology. Their online platform hosts digital furniture designs and helps customers connect with local manufacturers in order to have them produced[104]. Whilst they are not manufacturers themselves, the service they provide enables re-distributed production across the world.

The city has other opportunities for local production in its makerspaces and other open workshops, offering London's businesses and residents' access to new technologies[105]. A 2015 study by Nesta suggests that London has many more of these makerspaces than other parts of the country: an estimated 20, compared to only 3 in other major UK cities[106]. And this number is growing. The Open Workshop Network – London's network of open-access workshops – now boasts more than 40 spaces as members[107]. One of them, Building Bloqs, is a not-for-profit open workshop near the river Lea in Tottenham. It is a home for over 350 makers and small business, providing them with access to workshop space and equipment for metal and woodwork, textiles, and digital fabrication. These makers support Made at Bloqs, a service for the design, fabrication and installation of products, serving private and business clients across the city[108]. These spaces are indicative of the pervasive entrepreneurial spirit that draws capital and talent to the city, earmarking London as a great potential place for innovative manufacturing businesses to start up.

3.3 Governance and Decision Making in London

The manufacturing sector in London is shaped not only by business decisions, and market trends, but also technocratic decisions made by both national and local government. Support for manufacturing from these authority bodies has fluctuated over time as political and economic ideals have changed.

Before exploring these changes and their impact in more detail, it is important to note that London's governance arrangement in the UK is unusual, with the Greater London Authority having a distinctive structure and set of powers. This has been the case for the last two decades, and the model provides London with greater local power than other regions in the UK including, importantly, the ability to integrate economic and spatial planning across the city region. Appendix 1 briefly describes the main actors and their roles.

INDUSTRIAL POLICY

TO INTERVENE OR NOT TO INTERVENE: CHANGES IN NATIONAL INDUSTRIAL POLICY

Whilst manufacturing remained core to the UK's economy well into the twentieth century, the story of manufacturing policy latterly became one of neglect. Manufacturing, and industry more broadly, has suffered from a lack of strategic direction, lack of investment and lack of continuity[109].

The post-war period saw the attempt to redistribute industrial growth from successful city hubs, such as London and Birmingham, to areas of the country suffering from industrial decline. This followed the logic of 'bringing work to workers' rather than defining policy based on the needs of industry. The 1945 Distribution of Industry Act introduced Industrial Development Certificates which enabled the government to direct the location of industrial growth through preventing factory development in some developed areas and assisting development in depressed regions. The success it had in boosting these regions is unclear and somewhat contested. But it does seem likely that it served to damage industry

View to Canary Wharf
© Bex Walton

within previously successful cities through discouraging business growth[110]. During the 1950s, London's manufacturing sector grew at half the national rate[111].

Attempts to 'pick winners' through industrial intervention policies in the 1960s and 70s were a response to de-industrialisation and its economic and social impacts. However, failures such as the unsuccessful bids to save automotive company British Leyland resulted in political disenchantment with industrial strategy[112]. By the 1980s the government's position had shifted to trusting in the free market over state intervention[113].

Policy at the London level broadly mirrored this changing national context. A notable difference, however, came in the mid-1980s, when the then regional authority, the Greater London Council, produced a London Industrial Strategy. This interventionist-style document, produced by the Labour led Council, was at odds with central government policy[114]. The detailed document set out actions to support key industries, including the automotive sector. The government dismantled the GLC shortly afterwards which curtailed the strategy's implementation. Since then, London's economy has shifted dramatically from manufacturing and industry towards services, particularly in the finance sector. In comparison with other de-industrialised cities in the UK, London has flourished. Capitalising on the booming financial and knowledge sectors, the city's economic development policy has focused on supporting services.

Set within this context of London's economic restructuring, manufacturing has recently received little attention from the city's policy makers. While recent strategies have not explicitly disincentivised the sector there has been an assump-

tion that the decline in manufacturing will continue. This has resulted in little focus on it as a distinct sector. Policies designed to protect industrial space are not working well enough.This has had significant impact and is explored later in this chapter. There has been little attention given to the sector outside of the planning policy domain and the links between the capital's manufacturing base and the rest of its economy are underdeveloped.

Take, for example, the draft Economic Development Strategy released by the Mayor in late 2017[115]. This document lays out ambitions to make the capital's economy fairer and more inclusive, and to create the conditions for businesses to start and grow. It lays out seven sectors which the Mayor believes are key to creating this, including 'cultural and creative industries', 'tech and digital', and 'low carbon and environmental goods and services'. It contains nods to the role of manufacturing, most notably in recognition of the importance of having industrial space within the city. But it lacks a vision for enabling London's manufacturing base to drive and support the Mayor's overall ambitions; a role that it could potentially fulfil given its fundamental links to the key sectors identified.

Reignited interest in manufacturing: a new industrial strategy

The financial crash in 2007-8 spread ripples of concern about London's reliance on its financial sector, and led the national government to reprioritise the need to rebalance the economy geographically and reduce the widening gap between UK regions. Despite the then-Chancellor George Osborne's call in 2011 for Britain's economy to be fuelled by the 'march of the makers'[116], the North-South divide is still growing, with London and the South East faring better than the rest of the country[117].

Although in practice relatively little change has been achieved, this interest is a marked shift in the national government's approach to industry. Last year's publication of the UK Industrial Strategy set out a long-term vision for ensuring that all areas of the UK benefit from a strong and prosperous economy, with industry at its heart. It takes two approaches, firstly it identifies Five Foundations for boosting productivity across business: ideas, people, infrastructure, business environment, and place, and lays out actions to support these. Secondly it calls for significant innovation within industry. It identifies four Grand Challenges set to transform the way people live and that, the government believe, the UK has the opportunity to play a leading global role in developing. These are AI & the Data Economy, Future of Mobility, Clean Growth, and Ageing Society. The strategy stresses the importance of manufacturing to the country and places particular emphasis on developing high-value manufacturing sectors and on enabling SMEs, including manufacturers, to grow[118].

The document also calls for the development of Local Industrial Strategies. The Mayor of London has said that a city-focused Industrial Strategy for London is key because being 'closer to the ground' than national government, the city is able to identify locally relevant initiatives[119]. How this national strategy is translated to the local London level will be of significance to the city's makers.

SPATIAL PLANNING POLICY

Amongst the policies that affect manufacturing are those governing spatial planning. This section gives an overview of the key aspects of planning policy affecting London's manufacturing base. In order to set the context, this section starts with a brief description of the UK planning system.

UK planning: a hierarchical system

The UK spatial planning system is a hierarchical stacked structure starting with national policy and cascading out to local areas. The overall guidance for planning policy within the UK comes from the National Planning Policy Framework (NPPF). This legislation was introduced in 2012 in order to reduce and streamline planning policy across the UK, and the policy seeks to contribute to the sustain-

able development of the UK, marrying the social, economic and environmental roles of places and spaces'[120]. All regional and local planning policy must conform to this central framework.

Within London, responsibility for planning falls to the Mayor, who must produce up to date spatial development strategies. This is known as The London Plan and is 'the overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London'[121]. In December 2017 a new Draft London Plan was published. This document will be in consultation and examination during 2018 and will plan for London's development until 2041[122]. Beneath the London Plan sit Local Plans produced by each London borough. These Local Plans must be 'in general conformity' with the London Plan[123]. London boroughs determine the outcome of planning applications, though boroughs can refer certain applications for the Mayor to determine, and the Mayor can 'call-in' certain applications, superseding the jurisdiction of boroughs. These criteria for referral and call-in relate to large housing proposals, tall buildings or the use of land protected as Green Belt or open space.[124]

In the Draft London Plan, the Mayor sets out his ambitions for London's spatial and economic development to deliver 'good growth' that improves health, reduces inequality and sets a sustainable future for Londoners[125]. In order to achieve this the document outlines a number of priorities for London's places and spaces:

- **Intensification**
  The Plan seeks to intensify land use in order to increase efficiency, accommodate the city's growing population and provide more living and working space.
- **Housing**
  It is estimated that 66,000 homes need to be built every year over the next few decades in order to meet demand for housing in the city. The Plan specifies that smaller plots of land, as well as larger sites, need to be developed in order to meet this.
- **Resilience and efficiency**
  In order to provide a safe future for Londoners the city needs to improve resilience in the face of climate change and reduce its environmental impact, including through its infrastructure and built environment.

London planning policy position on industrial land

Manufacturing jostles for position amongst the many spatial demands on the city. As has already been described, manufacturing has not been a core strategic focus for London's economic development in recent years and land policy has reflected this.

Over the last two decades the London Plan has allowed for the managed release of industrial land (see Box 2) for transfer to

Box 1 Industrial land classification

The land and buildings governed by the planning system are categorised into 'use classes', following legislation laid out by the Town and Country Planning (Use Classes) Order 1987[126]. These 'use classes' determine the type of activities that may be carried out on a particular site. Industrial uses, including manufacturing activities, are categorized under use class B. Manufacturing encompasses a wide range of activities each of which fall into different sub classes, such as B1 (business and some light industrial use), B2 (general industrial use) or B4 (certain types of metal work). It is possible for land and buildings to be reclassified in order to allow for a different activity to take place, like converting an office building into residential accommodation. Change of use usually requires planning permission to be granted by the local planning authority in charge of deciding whether the proposal is in line with both regional and local planning policy.

other use classes. Between 2001 and 2015 over 1,300 hectares (approximately 1,800 football pitches) of industrial land was released. This figure is well in excess of the benchmark figure that had been set out[127]. The London Plan (2015) does provide some protection for industrial space, which is outlined in Box 3.

This policy approach sought to rebalance land use from a sector that had declined, and was predicted to decline further, releasing land for housing development and other uses. In 2013 GLA employment projections calculated that manufacturing would continue to shed jobs and leave only 15,500 workers in the sector in 2050[128]. However, predictions of terminal decline are underpinned by the belief that the past employment trends of deindustrialisation will continue, a view which may not be fully considering the role of the sector as a whole. Critics point to recent small increases in manufacturing employment and note that the decline in manufacturing contribution is relative rather than absolute, meaning that its economic share has reduced overall because of the rapid growth of the service economy. The productivity of the sector is important as well as the employment figures. Indeed, the rise of the former may lead to a reduction of the latter, but does not negate the contribution of the sector to London's economy, nor the requirement for appropriate space within the urban economy[129].

Further critiques of the policy argue that this rapid loss of industrial space has largely been fuelled by financial speculation rather than simply being a result of low demand from industry or pressure from other uses. London's residential property market has boomed in recent years, with growth far outstripping other UK regions[130]. In this heated market it is claimed that owners of industrial space have grasped opportunities to transfer their sites to uses that offer higher financial returns, such as residential buildings and offices[131].

The approach to managing industrial land has had significant impacts on industry. The redevelopment of such sites has resulted in many firms needing to move, either because their site is being transferred to a non-industrial use, or as the result of rent increases driven by high demand or raised land value. These factors are also reportedly affecting tenancy contract lengths, with some landlords unwilling to enter into long-term agreements that would prevent redevelopment or rent increases.

With land being squeezed across the city, businesses that find themselves needing to relocate face the difficult challenge of finding a suitable new site. In many cases, these sites are not available. Several businesses interviewed by the RSA explained that they had carried out a search, by way of risk assessing their current situation, and could find nothing to adequately meet their needs[132]. A wood workshop in South London said that despite only relocating from North East London last year (they could find no other suitable space nearer their previous home) they were already feeling under threat from potential future redevelopment of their new premises[133]. The costs to the business of moving once were high, moving twice could prove to be prohibitively so.

These concerns affect the ability of businesses to secure their long-term future. A lack of space hampers a business's ability to grow and thrive. James Morgan, Chief Executive of Truman's Breweries, gave an example of this, explaining that his company has been seeking a site for a second brewery since they built their first, but in the past five years they have had no success. Their business is growing rapidly and they have plans to expand production and employment, but the lack of space is the biggest challenge they face[134].

These significant challenges inevitably lead firms to question whether or not to remain in the capital. Brompton, for example, found themselves having to invest large sums in a move to a new site when their previous site would not allow them

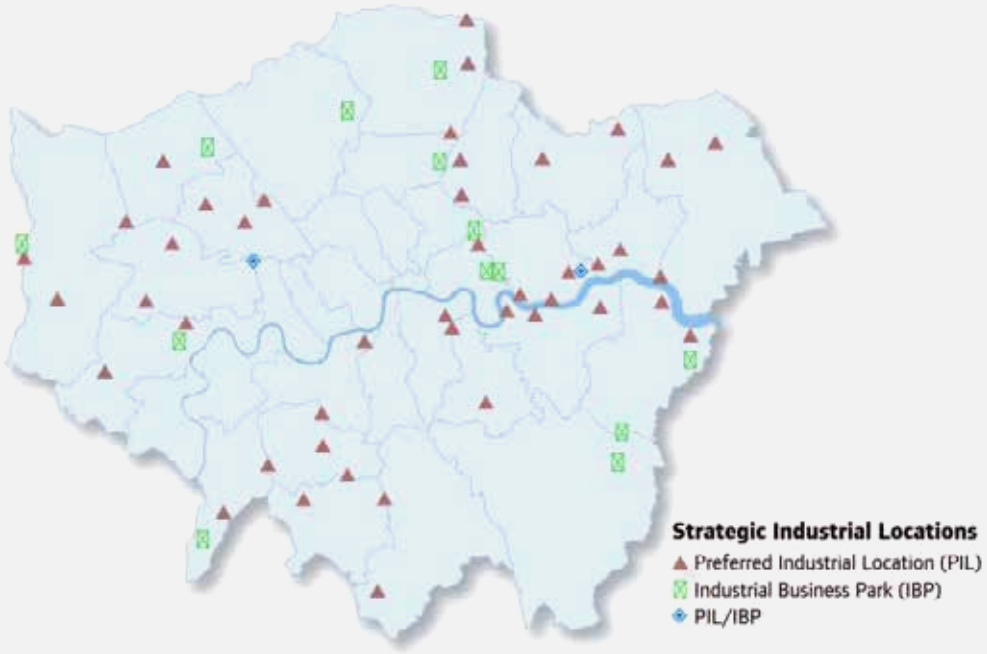


Figure 6: Strategic Industrial Locations

Source: GLA © Crown Copyright.

Box 3

Protection for industrial space[136]

The London Plan (2015) contains provisions for the protection of some industrial space through the creation of two categories of site: Strategic Industrial Locations (SILs) and Local Significant Industrial Sites (LSISs). Both categories incur additional planning guidance and restrictions to protect their industrial use, over and above the protections provided in the NPPF, namely the need for planning permission to be sought for change of use.

Strategic Industrial Locations (SILs) - see Figure 6

These are designated sites identified by the GLA as the main reservoirs of industrial land. There are 59 SILs, and together these sites account for more than 50 percent of London's industrial land supply. Most employment clusters are located in SIL areas.

SILs are subject to additional planning policy criteria, designed to discourage or prevent change of land use. These sites are important because their homogenous nature means they offer space for activities that may be incompatible with other use classes.

There are two categories of SILs, designed to meet different occupier criteria:

- Preferred Industrial Locations (PIL), which are suitable for general industrial use. There are 44 of these sites.
- Industrial Business Parks (IBP), which are suitable for activities requiring higher quality surroundings, such as research and development. There are approximately 16 of these sites.

These sites are subject to periodic review within the London Plan.

Locally Significant Industrial Sites (LSIS)

These sites are identified by Boroughs as having significance for the industry of the local area, and are given protection through policies contained in Local Plans. Their significance must be robustly evidenced, and whilst protection is advised, these Local Plan policies tend to be given less weight in the quasi-judicial planning system, than policies for SILs set by the London Plan.

Maker in Opendesk network
© Opendesk

to grow. Despite wanting to remain in the same borough, no site was available. The company was, however, determined to stay in London, in part because of the significant investments they had made in staff[135].

Concerns like this have been growing in recent years. Business leaders, industry bodies, academics and campaigners have all called for this tide of loss to be stemmed. There are now signs that the GLA is listening. The new Draft London Plan (2017) marks a change in policy for industrial land and requires that there be no net loss of industrial space in London. It mandates how this will be applied across each borough, requiring that they either maintain industrial capacity, increase it, or in a few situations that they may transfer a proportion of industrial land to other uses. Whilst this recognition is welcomed, it is unclear if these measures will be sufficient to protect industry in future, these issues are further explored in chapter 3.5.

RESILIENCE AND EFFICIENCY

A core strand of the London Plan is dedicated to ensuring that the city is resilient in the face of disruptions from climate change and, in order not to contribute to further environmental damage, that its activities become more resource efficient. In support of this, the GLA have recently strengthened their commitment to the application of circular economy principles in the city. This is reflected in recent high-level strategic policy and planning documents, including the drafts of the Environment Strategy[137] and London Plan.

The Mayor's draft Environment Strategy pledges to move to a more circular economy and combines a host of approaches to improving the capital's environment, including a commitment to become zero carbon by 2050, targets for a sustainable transport system, commitments for improving air quality and plans to mitigate climate change impacts. By 2026 no biodegradable or recyclable waste will be sent to landfill and, by 2030, 65 percent of London's municipal waste will be recycled.

The London Plan also sets a 95 percent recycling target for construction and demolition waste and a commitment to generate low carbon energy from waste from remaining suitable waste flows138. The Plan also stresses the important role of infrastructure for waste treatment and valorisation , and the need to safeguard existing waste management sites. In terms of space, it identifies suitable locations for managing waste and secondary materials, with a reference to Strategic Industrial Locations (SILs) and other sites, such as wharves. This may create trade-offs between the space for valorising waste and space for making, unless a better understanding of the untapped potential to link valorisation and manufacturing can be generated through, for example, the identification of opportunities to substitute primary materials for secondary ones in the manufacturing sector.

Meeting these targets, and doing so in a way which does not simply offload the problem to other areas of the country or the globe, will require a fundamental shift in the way the city produces, consumes and cares for the products and materials within it.

3.4 Ongoing projects and Activity

Recent development on London's manufacturing sites have focused on consolidation and more efficient use of space. Numerous industrial sites are considered prime locations for the burgeoning housing market while there is pressure for industrial activities to be re-accommodated rather than being erased. Tensions are emerging in finding the right mix of housing, working, making and leisure that can host existing manufacturing, high-tech and the creative industry.

OPDC

The Old Oak and Park Royal Development Corporation (OPDC) are redeveloping a very large site in North West London: Old Oak Common and Park Royal. Two new rail projects are coming through the site, High Speed 2 and the Elizabeth Line. This infrastructure investment is initiating the redevelopment, which is intended to increase economic activity in the area and provide new homes.

The Mayor formed the OPDC to manage the development. They are only the second corporation of this kind in London, the first being the London Legacy Development Corporation, which managing the transformation of the former Olympic site in East London. The OPDC are a local planning authority, meaning that they develop a Local Plan for the area and manage planning decisions based on that policy.

Park Royal is one of Europe's largest industrial estates, if not the largest[139]. It has been home to household names such as McVities and Heinz, and it is thriving today with over 30,000 people working there in over 2,000 businesses. The site has very low vacancy rates and demand for space is high. As a key industrial site, Park Royal is one of the city's Strategic Industrial Locations, and the OPDC plans to retain and improve the area's industrial capacity.

An employment study of the area in 2014, the Park Royal Atlas, is one of the most comprehensive studies of industrial space in London. The study provides an insight into the diversity of activity taking place there, and the desire the residents have for it to remain a core part of the city's industrial infrastructure[140].

OLD KENT ROAD

The Old Kent Road, in the south east of central London, is a designated Opportunity Area (OA) in the London Plan. OAs are identified as being brownfield sites which offer significant development opportunity to create new jobs, homes or transport infrastructure[141]. The proposed plans for the Old Kent Road area will see all three.

These plans, however, are concerning to the area's industrial businesses and many SMEs (including many manufacturers), who fear that proposed developments are tantamount to a sweeping away of industrial space. Local businesses are calling on the local council to ensure that they develop plans in collaboration with them, and not only with larger stakeholders and developers[142].

FUTURE DEVELOPMENT: THAMES ESTUARY PRODUCTION CORRIDOR

A collaboration between the GLA and South East Local Enterprise Partnership is setting the vision for a new 'Production Corridor' in the Thames Estuary area to the east of London. Long the heart of industry in the capital, this plan imagines a new future for the area in supporting London's creative economy with production facilities and space, along with a large number of new homes and other developments. The vision document explains that in order to grow London's successful creative industries, space must be provided for production: 'World class pieces for the Fourth Plinth [in Trafalgar Square]', the document cites, 'often have to be built elsewhere in Europe, because more space [in London] is given to consuming products and not enough to making them'[143]. The plans it proposes would provide high-quality space for the production of large works, TV and film production, and other creative industry activities.

These initial proposals are currently being developed into larger plans, but point to a recognition of a need for space to make, and in the need for 'making' to support the creative industries of which London is so proud. How these plans develop, and how this interplays with industrial capacity across the rest of London remains to be seen.

Hackney Wick
© Adrian Hill

3.5 The Future of Making in London

London's manufacturing base plays an important role in the city. Supporting this and unlocking its potential further requires a number of challenges to be addressed. For manufacturing to flourish in London a number of themes have been identified including the provision of suitable space, a greater focus on sustainability, industry voice in policy making and a more coherent vision for London's manufacturing sector.

1. PROVIDING SPACE FOR MAKING

A bustling city like London must accommodate a range of commercial, domestic and civic activities. Spatial planning and architectural decisions made today will shape the future of the city. This is as true for the future of manufacturing as it is for the future of residential and civic spaces. Proper provision for these activities is crucial to the future success of the city's manufacturers.

The Draft London Plan shows ambition to address the provision of industrial space. It seeks to prevent further net loss and to ameliorate the available space through the intensification of existing industrial spaces and through provision of new mixed use developments, which bring industrial and other uses together[144]. This step demonstrates the GLA's recognition of the importance of protecting industrial capacity within the city and is very much welcomed.

However, it is unlikely that this alone goes far enough in mitigating the threat of insufficient space. Whilst the policy goal is that there will be no net loss there will be loss in some areas as land is consolidated and shifted within boroughs. These movements will continue to be felt by businesses across the city. The largest concern is that in protecting industrial land boroughs are likely to focus on SILs and LSISs. It is right that these segregated spaces are duly protected, but it is important to also recognise the impact that the loss of undesignated[145] industrial space has. These sites, at the backs of high streets for example, provide important and distinctive space for business and play a role in the vibrancy of high streets and town centres across the city. Calverts, for example, are situated on this kind of site, as are the units in 'Maker Mile' just around the corner.

Machines Room, a new space accessible space for making.

Design and proving concept

The Draft Plan places emphasis on intensifying current industrial land, and on creating more mixed use developments, where industrial, residential and/or other employment uses are co-located. Both of these routes offer potential for tackling the constraints of space in the city, but bring their own challenges in design and execution.

Intensification involves increasing the efficiency of the existing stock of industrial buildings. Some examples of this exist in the city, like Segro's multi storey warehouse in Heathrow that houses industrial units on multiple levels. The company are planning another of these at a development in Meridian Water in North London[146]. Examples similar to this exist in other countries. However, it will be important to understand which activities these developments are providing for, and specifically how manufacturing space can be made available, not only space for warehousing and logistics.

The second route brings together industry and residential or other employment space in 'mixed use' developments. This is increasingly appealing as space in the city becomes ever more in demand. However, there are significant challenges in doing this, indeed the existing land use classifications were implemented in order to prevent mixed activities being unhappy neighbours. Industry can be noisier or smellier than residential activity and there is often a need for industry to operate around the clock or to receive early deliveries. On a segregated industrial estate this causes little concern, but when residential developments are nearby or co-located with industry, issues can arise. Where this occurs it is more likely that the industrial occupiers are required to compromise their activities. Whilst these are valid concerns, it should also be remembered that industry and residential buildings already exist together all across the city, and that these concerns can be overcome and managed through good design and governance.

Employing high-quality design will be critical to making these ambitions for mixed use and intensification work. Business requirements like yard space and access must be taken into account, as must residents' need for tranquillity. The challenges to success may not lie solely in design however, but also in financing. The real barrier may come in proving the financial viability of such schemes and attract-

Brompton production line. © Brompton

ing developers[147]. Because these require new models, and because industrial space commands lower prices than residential, developers are likely to be reluctant. Investment and support from both the GLA and local borough authorities may therefore be needed to develop proof of concept examples in the city.

Increasing demand for industrial space

Vacancy rates on many industrial sites across the city are low or very low. In the case of the popular Park Royal estate, vacancy rates have fallen to as low as 2 percent[148]. This is due in part to the loss of industrial land across the city, but also as a result of new demand from the growing 'just-in-time' economy, whose need for warehousing and logistics space is contributing to an already stretched capacity. London is also experiencing an increasing demand for industrial space from e-tail and e-commerce companies who need it to provide next day (or even next hour) delivery to residents and businesses across the city. Even within industrial sites, the manufacturing sector is competing for the available space with a host of other industrial uses. Demand for warehousing and logistics is likely to grow so it will become increasingly important that industrial space is able to cater for the wide range of sectors for which it is vital. Manufacturing must have a voice in that discussion.

2. GIVING MAKERS A VOICE AND MAKING THEM VISIBLE

Despite employing over 110,000 people within London, the manufacturing sector lacks visibility. Its activities are found across the city, however they often take place in locations that are out of sight to Londoners, in industrial parks or behind unlabelled doors. Most residents have no idea what is made in their borough[149] and many Londoners' perceptions of manufacturing may be anachronistic and not reflect the true nature of industry today. There is a danger that manufacturing could suffer because it is unfamiliar. A lack of interaction may lead to misconceptions about what manufacturing is and does, which could have negative impacts on skills development and retention within the city.

This perception can be powerful and it is not only residents who are unaware of the activities taking place. The same challenge faces local and regional authorities. At a recent GLA Planning Committee hearing, concerns were raised about planning officers' lack of understanding of the sector and its requirements[150]. This is particularly concerning as they take important decisions which affect the future of manufacture in London.

Precise, centralised and accessible data about numbers of firms and where and what they are making is lacking. There have been a number of in-depth studies carried out on particular industrial estates, such as the Park Royal Atlas[151], and these provide fascinating and useful insights into the detail of the activities taking place. However, these studies are concerned with a small proportion of London's industrial activities, and given that manufacturing is but one activity taking place on industrial sites, there is even less information specifically about manufacturing. The data from these reports is generally to be found within pdf reports and case studies rather than in more easily searchable formats. This limits their ability to be searched or aggregated by local authorities, researchers or other organisations seeking to understand the sector.

It is important that policy makers hear the voices and concerns of the sector. However, given that London's manufacturing base is made up of many small organisations it can be challenging for these diverse organisations to be heard. The size of these firms means it is likely that they are focused on their own daily activities and may lack the resources or connections to engage with policy makers or developers. Organisations and bodies to provide platforms for the collective voice of manufacturers are therefore particularly import-

ant. This includes sector organisations like EEF[152] and Soloman, and place-specific organisations, like East End Trades Guild[153], or Industrial Business Improvement Districts. This collective voice is particularly important when it comes to the spatial planning arena where large, often multinational, stakeholders dominate the field and technical language can make it difficult for non-experts to engage in discussion[154]. There is a significant power imbalance between these groups and it is important that the concerns of London's manufacturers are heard, whatever their size. East End Trades Guild, for example, are calling on prospective local councillors to support their Affordable Workspace Manifesto, which lays out ambitions for a London Working Rent for workspace[155].

3. BUILDING CONNECTIONS AND CAPACITY FOR INNOVATION

Lack of visibility also affects manufacturers' ability to connect with one another or with potential clients. Interviewees frequently cited concerns about the lack of connectivity and capacity in London's manufacturing base. These issues both have potentially significant implications for the future prosperity of the sector and of the wider economy as they threaten to dampen opportunity for new business and innovation.

London has enormous potential for fostering innovation. The UK and London develop excellent designers, but these designers must also be able to take products to market. Creating strong relationships with industry, which has the technical knowledge, is vital for enabling this[156]. The purpose of the Central Research Laboratory (CRL) in Hayes, who run an accelerator programme for start-ups, is to prove that the supply of talent and skills in London are such that you can run an investable and sustainable hardware business. They are working on innovations from science education kits to cleantech[157]. When it comes to manufacturing however, these businesses, and others, go outside of London and the UK, often to China. One interviewee likened manufacturing in China to going to the supermarket "we know we can find everything and everyone we need". They likened the same process in the UK to "making your way to a farm and being told 'there might be some carrots in the field'" - neither the infrastructure nor the work is easy to navigate[158]. This was not to criticise the local firms, rather to highlight a lack of support over time resulting in manufacturing infrastructure that is feared to be too fragile to deal with the potential that exists in the city. Things are ticking along, but there is a lack of dynamism. Others share similar concerns, believing that this fragility leads to defensive behaviours; people are reluctant to share their manufacturing connections in the city for fear that they themselves might lose out on capacity[159]. Potential for growth and innovation are slipping through the gaps. Given the ambitions set out both in the Industrial Strategy and in the London Plan, improving the situation is an opportunity that should not be missed.

Support to broker relationships could help to address this. An example of this from outside the capital is Make Works. Beginning in Scotland, but now rolled out across a number of cities, the organisation facilitates connections between manufacturers and designers, with the aim of igniting new working collaborations[160]. London's makerspaces could also play an important role through opening up routes to making. However, they themselves face challenges in developing sustainable business models and securing workspace[161]. It is worth exploring how London can support these spaces. Barcelona's Fab City approach is an interesting model for this as it brings together the city council, private business and makers to explore how local production can support the city's future[162].

Education and skills are also critical, and whilst better accounts exist of the need for improving the supply of skills for the manufacturing sector as a

whole, suffice to say this applies equally to London's workforce and education system. And whilst London can be an attractive place for a business, it is an expensive place to live for its staff. Despite its success, Brompton has found it challenging to compete for skilled engineers against other parts of the country where the cost of living is lower[163]. The city needs to find ways to grow, maintain and attract skilled workers for its manufacturing sector.

An investigation of the links within industry was not the main focus of this work. Nonetheless it hints at a challenge facing the sector and one that may significantly hinder its future. More investigation is needed into the interconnections within London's manufacturing base.

4. MAKING IT SUSTAINABLE

Policy makers, residents and businesses are recognising London's urgent need to become more sustainable across all of its many activities. Manufacturing has a key role to play in this future and needs to be involved more in these discussions.

Practical investigations into developing and implementing a more circular economy within London are underway. In 2017, The London Waste and Recycling Board (LWARB) released a route map proposing five focus areas for circular economy opportunities: food, built environment, electricals, textiles and plastics. By 2036, it is predicted that circular economy developments in these sectors could provide London with net benefits of at least £7bn every year, as well as 12,000 net new jobs in the areas of re-use, remanufacturing and materials innovation[164]. As part of this work LWARB and partners are working to provide business support, develop sector knowledge bases and encourage collaboration between stakeholders. Practical investigations of this kind are key to better understanding the networks involved and the support needed to unlock the potential in the city.

Policy makers need to continuously engage with this developing knowledge in order that policy can accurately reflect the needs identified. The current policy picture is not yet comprehensive. Whilst the high-level policies described in chapter 3.3 acknowledge the relationship between the circular economy and business competitiveness through improved resource efficiency, they demonstrate little understanding of how that potential can be unleashed through links with the manufacturing sector in the city. There is, for example, limited discussion about how recycled and secondary materials will be incorporated back into local productive cycles in the city, or of the economic potential of those resources. The London Plan explicitly encourages exemplar case studies of circular economy practices, such as extending product lifetimes, the production of secondary materials, and repair, refurbishment and remanufacturing activities, but provides no indication of how these activities may compete with other uses in the city. Given the current spatial challenges for industry in London, this needs to be given due consideration.

If London is to meet its sustainability ambitions it needs to look at its current manufacturing sectors and ask if it has the skills and technologies required to transition to a more circular economy. Both existing and new manufacturers can be supported in developing products and services that support this. Mobilising around this challenge would provide an exciting opportunity to develop skills and harness technology within the city.

5. CREATING A VISION FOR MANUFACTURING

London's manufacturing sector will continue to evolve, shaped by new technological developments, consumer demands and political choices. A new wave of technological change is on the horizon and London should take the opportunity to consider what role it wants its manufacturing sector to play in the city's future,

as well as what policies and initiatives are needed to facilitate this. Perhaps not all manufacturing that could be based in London, should be based in the city. Space is limited and the Industrial Strategy is seeking to rebalance economic growth across the country. Within its own vision for manufacturing, London needs to consider its relationship with other parts of the UK.

However, there are activities that need to remain. The city's residents and businesses need goods and services that enable them to go about their lives and activities. There will always be a need for the local manufacturing businesses that provide produce perishable and time-sensitive goods, or specialised methods of production. As the city grows, this demand is likely to increase. Take the large food sector in the city, or the printers and set makers.

In addition to this local demand, London's ability to draw entrepreneurs, investors, and a creative and educated workforce provides a huge opportunity for innovative manufacturing businesses to start. These businesses are attracted to London's unique business climate and the city should recognise the value that they bring in both employment and innovation. The draw is illustrated in the decision by The Albion Knitting Co. to set up in London. Despite there being more traditional locations in the UK for knitwear, Albion chose London to be close to both its clients and to a dynamic workforce[165]. London should consider its opportunity for incubating new manufacturing businesses. Some, such as Brompton, may then continue to stay in the city as they grow. Others may choose to move elsewhere.

London's vision for manufacturing in the city should be based upon a sound understanding of its value and an appreciation of its economic and social connections. London's manufacturing community should be involved in shaping this vision.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APPENDIX 1: DESCRIPTION OF RELEVANT BODIES IN THE LONDON GOVERNANCE STRUCTURE

Greater London Authority (GLA)
The administrative body for the Greater London region. It consists of an elected Assembly of 25 elected members and a directly elected Mayor. It is a strategic regional authority with powers over policing, transport, economic development and planning. This structure enables it to take a strategic approach to supporting the economy through an integration of economic development, planning, transport and housing strategies. It is unique in the UK in its structure and powers, and was established in 2000 to replace a series of more local boards.

Mayor of London
Along with the members of the London Assembly, the Mayor is accountable for the governance of Greater London. The Mayor serves a four-year term.

London Assembly Committees
Made up of cross-party members of the London Assembly, these committees discuss key issues for the capital. Pertinent to manufacturing, there are currently committees looking at planning, housing, economy and regeneration.

Local authorities
There are 33 local authority districts within London, 32 are London boroughs and one is the City of London. Each is governed by an elected borough council (or in the case of the City of London, the City of London Corporation). These borough councils oversee the provision of many of the public services in the capital, from schools to social care, although councils work together on delivery. London-wide services are delivered by the GLA, other key public service include health providers accountable to national orgnisations (eg NHS).

London Waste and Recycling Board (LWARB)
This board, set up by the GLA, works on, promotes and encourages waste reduction, pushing for an increase in the proportion of waste that is re-used or recycled and the use of methods of collection, treatment and disposal of waste which are more beneficial to the environment in London. It has a fund from central government (DEFRA) with which to carry out these goals

APPENDIX 2: MAPPING DATA

Separate Industry Maps
Each dot represents an individual business registered with the NACE code related to the described industry
Source: ORBIS database [web]

Manufacturing Maps Urban Regions
The maps give an overview over industrial land use in each urban region.
Source: Urban Atlas – Copernicus Land Monitoring Service [web] accessed April 2018.
All locations of registered business in the metropolitan area from ORBIS database NACE sector C Manufacturing. [web]

APPENDIX 3: ADDITIONAL DATA TABLES

Table 1: London's manufacturing occupations

Source: RSA analysis of Labour Force Survey (2016).

Major occupational group	Proportion of UK manufacturing employment	Proportion of London manufacturing employment	Difference in proportion
Managers, Directors And Senior Officials	12.2%	18.5%	6.3%
Professional Occupations	12.9%	12.8%	-0.1%
Associate Professional And Technical Occupations	13.7%	21.2%	7.5%
Administrative And Secretarial Occupations	6.7%	6.7%	0.0%
Skilled Trades Occupations	22.6%	17.8%	-4.8%
Caring, Leisure And Other Service Occupations	0.3%	0.0%	-0.3%
Sales And Customer Service Occupations	2.9%	2.8%	-0.1%
Process, Plant And Machine Operatives	20.0%	10.6%	-9.4%
Elementary Occupations	8.6%	9.5%	0.9%

Table 2: Median hourly earnings across London's manufacturing industry divisions

Source: RSA analysis of Office for National Statistics (2016) Annual Survey of Hours and Earnings

Manufacturing Industry Division	Median hourly wage (£), London, all employees
Motor vehicles	25.1 £
Computer, electronic and optical products	21.9 £
Other transport equipment	19.7 £
Repair and installation of machinery	18.8 £
Chemicals and chemical products	17.7 £
Machinery and equipment n.e.c	16.1 £
Rubber and plastic products	15.8 £
Furniture	13.8 £
Printing and reproduction of recorded media	13.8 £
Fabricated metal products	13.0 £
Other manufacturing	12.6 £
Wearing apparel	12.5 £
Food products	10.5 £
Wood and of products of wood and cork, except furniture	10.5 £
Other non-metallic mineral products	10.3 £

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