London's industrial land: Cause for concern?

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Jessica Ferm (j.ferm@ucl.ac.uk)

Edward Jones (e.jones.12@ucl.ac.uk)

Bartlett School of Planning, University College London, Central House, 14 Upper Woburn Place, London WC1H 0NN

ABSTRACT

Housing required to meet the projected population growth is rapidly swallowing up London's industrial land. London Plan projections suggest that manufacturing and industry is in decline, so industrial land will soon not be of much use to the city and can be gradually developed in a process of 'managed release'. But it may be that the destruction of London's infrastructure of employment land will have a detrimental and unpredictable impact on London's present status as a world-leading business hub and have unexpected negative implications for Londoners who live and work in the city.

The paper draws on a review of existing literature and research, as well as evidence presented from grassroots organisations in response to the Further Alterations to the London Plan. It argues that manufacturing is changing, but it is not dead. Smaller manufacturers whose work cannot easily be replicated overseas are flourishing and the UK remains the 6th largest exporter on the planet. Industrial land also accommodates diverse industrial activities and infrastructure aside from manufacturing, as well as small creative and service sector businesses, voluntary and community organisations, who benefit from the relative affordability and flexibility of premises on industrial land, which are increasingly difficult to find elsewhere given London's rampant property market. Together these activities provide vital support to London's economy and residents, and contribute to London's diversity, vibrancy and overall status as a World City – as London continues to grow, it will need more (not less) of these goods and services.

The evidence presented demonstrates that on-going loss of industrial land is being driven largely by real estate speculation rather than deindustrialisation. However, evidence for the actual state of industrial land - who does business there, how those businesses are linked together and embedded in the places they occupy - is thin on the ground. This lack of information means the impact of this loss of industrial land is a worrying mystery; the current move away from separating industrial land towards mixed use in London's built environment – both on ideological grounds and in response to housing need – needs to be much better understood. There is an urgency to this. The UK Government has proposed to further deregulate the planning system to facilitate conversion of industrial land to housing without the need for planning permission. Concern is particularly acute in London where differences between industrial and residential land values are likely to drive redevelopment if Permitted Development Rights are extended. We may be blindly heading towards a situation where London becomes a densely packed, high value residential dormitory, instead of a vibrant global city.

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1. INTRODUCTION

London is facing a difficult challenge. Following decades of declining population and slow growth, its population is now rising quickly and projected to reach 10 million by 2030 (GLA, 2014a: 12). However, with England's planning system still geared towards containing urban sprawl and protecting 'green belt' (Cheshire, 2004; Gallent et al, 2006; DCLG, 2012), and Londoners' majority opposition to high-rise living (Architects Journal, 2014), the challenge presented to the Mayor is to accommodate "growth within the capital's boundaries and without intruding strategically on its protected green and open spaces" (GLA, 2014a: 15). Currently, the Mayor's preferred solution is to release some of London's industrial land for housing, particularly in designated Opportunity Areas, and around transport nodes. This strategy of 'managed release' of industrial land has been followed in various iterations of the London Plan. The evidence supporting such an approach comes from predictions produced by the Greater London Authority (GLA Intelligence, 2013) of continued loss of manufacturing jobs and jobs in other industries occupying industrial land. The predictions are that there will be an 88% loss of manufacturing jobs from 129,000 in 2011 to just 15,500 in 2050 and substantial loss of other jobs in industry, utilities, transport and warehousing. This is contrasted with the equally dramatic increase in jobs in the Professional, Real Estate, Scientific and Technical sectors - a 107% increase from 670,000 in 2011 to nearly 1.4 million in 2050. This explains the emphasis we see in the London Plan on growth of central London at the expense of other sectors and alternative economies (Taylor, 2013), and on the loss of industrial land to housing.

However, there is emerging criticism of the approach that the GLA is taking, and the methodology used to justify ongoing release of industrial land. There is also criticism of the broader approach that the UK Government is currently promoting to further deregulate the planning system to facilitate conversion of industrial land to housing. Concern is particularly acute in London where land value differentials between industrial and residential use are likely to drive redevelopment if Permitted Development Rights are extended[1]. There is also a strong alternative discourse developing, from the local to the international level, which starts to paint a rather different picture of what the future could hold. The aim of this paper is to capture these arguments in order to fundamentally challenge three myths. The first is that manufacturing in London is dying and therefore we can lose industrial land to housing with little impact. The second (slightly less extreme but rather prevalent myth) is that we do not need manufacturing and industry in a world city such as London and therefore they can simply be moved 'elsewhere'. The third is that protecting and retaining industrial land is incompatible with a desired transition to a more compact, mixed use, 'smart' city.

In order to begin to counteract these myths, we need to start from a much better understanding of London's industrial land, what goes on there, and what role planning and development has in all this. There are thus four key objectives guiding the research:

[1] Permitted Development Rights allowing the conversion of office buildings to residential were introduced in 2012 and the Government has recently consulted on proposals to extend these rights to allow conversion from

1. To establish what is driving the loss of industrial land in London. Is there any evidence (beyond the mere extrapolation of historic employment data) that jobs in manufacturing and other industry in London is continuing (and will continue) to decline? What other factors are driving the loss?
2. To understand - from a qualitative perspective - what is going on within London's industrial estates. From the evidence available, what do we know about the businesses located there, what they actually do, and the premises they occupy?
3. To establish how sensitive (or not) these businesses are to relocation either within London or outside London. How important are they for the functioning of London and its economy? How tied are they to local place? Could they easily be relocated elsewhere?
4. To consider the potential consequences of losing designated industrial land and moving further towards a mixed use urban environment, which does not separate land uses.

In order to challenge the ongoing 'managed release' of industrial land, which is based on quantitative data on manufacturing and industrial jobs, this paper draws on more nuanced and qualitative research and evidence to understand what is going on in London's industrial areas. As expressed by architects, Gort Scott (2013: 4):

> Industrial areas in London are not well-understood. Most people have no idea what is made and assembled in their borough, because industrial areas are unwelcoming and do not have a public face.

The Greater London Authority's Regeneration team is recognising the importance of more qualitative work and is progressing comprehensive surveys of strategic industrial land (SIL) sites, starting with the largest industrial area in London, Park Royal (GLA, 2014b). This paper draws on this work, and considers it alongside other evidence, to get further under the skin of London's industrial land.

Both authors are members of Just Space Economy and Planning (JSEP)[2] , a London-wide network of voluntary and community groups with an interest in influencing strategic decisions around London's economy and planning. During the course of preparing this paper, the group has convened seminars and conferences on London's economy, where it has become evident that the issue of London's industrial land is of real concern to members. These events, the email forum for the group, as well as some of the written evidence compiled by members in response to the Further Alterations to the London Plan (GLA, 2014a), have helped to frame the research questions, contribute to the evidence base and provide leads to other studies and data. The contributions of the group have been invaluable to the production of the paper, but equally it is envisaged that the paper will provide a springboard for further research activity in the group.

[2] JSEP is part of the broader organisation, Just Space, which is a London-wide network of voluntary and community groups working together to influence planning policy at the regional, borough and neighbourhood levels. It grew from sharing information, research and resources on the Further Alterations to the London Plan in 2007 (www.justspace.org.uk). JSEP formed in 2013 in response to demand from some members for a focused forum to progress common interests around the theme of the Economy and Planning.

The review includes a range of academic studies, think tank and consultants' reports, employment land reviews, business surveys and evidence emerging from the work of Just Space Economy and Planning members, which together start to tell a different story and argue that:

a) The nature of manufacturing and industry is changing, but is still thriving and important for London's future growth – its loss in London in recent years has primarily been due to real estate speculation rather than deindustrialisation.
b) Aside from manufacturing and core industrial uses, a range of other activities and businesses occupy premises on industrial land, benefiting from its relative affordability and lack of proximity to housing.
c) Together these activities provide vital support to London's economy and residents, and contribute to London's diversity, vibrancy and overall status as a World City - as London continues to grow, it will need more (not less) of these goods and services.
d) Businesses occupying premises on industrial land are locally dependent and part of a delicate local industrial ecology, where suppliers, customers and employees rely on a network of interdependent relationships. Disrupting this can have far reaching consequences.
e) The move away from separating industrial land towards mixed use in London's built environment - both on ideological grounds and in response to housing need - will have negative consequences, both for the well-being of Londoners, and for London's sustainability.

The key message is that London's industrial areas are changing, but they are not dead, and they continue to play an important role for London's economy and the well-being of Londoners.

2. CONTEXT: INDUSTRY IN LONDON AND THE ROLE OF PLANNING

> "the capital was clearly the most important single seat of manufacturing industry in the country, accounting for between one and six and one in seven of all manufacturing workers in 1861, over one in six in 1921, and over one in five in 1951. Manufacturing occupied nearly one in three of all workers in London in 1861 and one in three in 1951" (Hall, 1961: 23)

This optimistic picture, described by Peter Hall in the Industries of London since 1861, stands in stark contrast to that painted by the Mayor of London in his most recent predictions (GLA, 2013), where the impression is that manufacturing in London is well and truly on its way out. Understanding the dynamics of the current situation first require an investigation into how we got here. A comprehensive treatment of the history or the detail of changes in industrial structure is not possible here, but an attempt will be made to at least set the discussion in its historical context. As such, we start with a brief review of the nature, structure and location of industry in London, how the state has historically intervened in industrial location, why zoning for industrial land is the key planning policy tool today, and the arguments for and against the ongoing use of industrial zoning. Of course, the legislative context in the UK is different to that in the US (and many other countries where zoning is embedded in planning law). In the UK, planners can identify areas where industrial uses are protected (designated as strategic or locally important industrial land in local plans). However, this is not akin to zoning in the US as it is not bound by law. The UK's discretionary

planning system means that developers can submit a planning application for a change of use on such land, and each case is considered on its merits against relevant planning policy and 'material considerations'. These differences are worth keeping in mind as much of the literature considered here originates from the US. For ease, throughout the rest of this paper, we refer to industrial 'zoning' as a generic term used to describe both mechanisms (statutory and non-statutory), but acknowledge that there is technically no 'zoning' in the UK.

1861-1951: Diversification and expansion

"The failure of nineteenth-century observers to appreciate the importance of London manufacturing" (Hall, 1961: 25) was one of the driving forces influencing Peter Hall's original PhD thesis, later published as a book. This led to an in-depth investigation of the structure of London's industry from 1861 to 1951. Part of the reason for this lack of appreciation, explains Hall, is the fact that London has never had a significant concentration of 'primary' industry - agriculture, fishing, mining and quarrying - nor was it known for any one industry. For example, whereas Lancashire came to be identified with 'cotton', London was not known for any one product. Rather it was home to a diverse set of industries, traditionally including clothing, printing, furniture and precision trades (jewellry and watchmaking) concentrated in central and inner London; and later including electrical engineering, engineering and car manufacturing. Industries that thrived in London were the ones that were closer to the end of the production chain: clothing manufacturing rather than textiles; furniture, rather than woodworking; printing rather than paper production; and jewellry and watchmaking rather than metal manufacture. For these industries, their location was driven by proximity to the market (in London the large pool of potential customers and their relative wealth was an attraction - as well as access to the national and international markets). The other driving force for their location was the availability of access to either specialist and skilled or cheap, unskilled labour, both of which were plentiful in London. These two factors and the balance between them explains the concentrations of the clothing manufacture industries in the West End (closest to the luxury end of the market), and the East End around Whitechapel (closest to the pool of cheap, immigrant labour, who in turn were initially in the East End due to proximity to the Docks where they first arrived). The fact that these industries were vertically disintegrated i.e. separated into many specialist processes, using subcontracting and homeworkers for different aspects of the production process, meant that they were hugely dependent on each other and benefited from external or agglomeration economies, as famously described by Weber and Marshall.

During the industrial revolution, it was assumed that industries located where they could obtain the maximum return for their investment and there was little government interference. For example, Hall describes how the concentration of manufacturing activity spread from the traditional Victorian manufacturing belt concentrated in central and inner London, to extend north up the Lea Valley, eastwards over the Lea marshes to Dagenham, and north-west extending towards Harrow, Wembley and Uxbridge. This expansion of manufacturing in London post-1914 was in part due to the movement of some traditional industries (such as furniture) to the outer ring due to expansion, but mostly it was due to a growth of newer industries in engineering, electrical engineering and car manufacturing starting their operations in London's outer ring. Thus relocation from other parts of the country was an insignificant factor. To these newer industries, access to the market and labour were similarly important factors (although these were less locally specific than for the previous industries, and focused on the London market more broadly). Their specific location within London

was often due to the availability of suitable factory buildings for rent; by that time many were vacated by wartime industries such as arms manufacturing.

This growth in the newer industries far outweighed any closures or layoffs in the traditional industries: As noted by the Royal Commission on the Distribution of the Industrial Population (the Barlow Commission) in 1940, growth in industrial employment during the interwar period was growing in London at about twice the national rate. However, the regional disparities across the UK created spatial inequalities in employment, exacerbated during the depression of 1928-32, leaving the so-called 'depressed areas' of the UK experiencing up to double the rate of unemployment than the national average (Goss, 1962).

State intervention post 1945

This high unemployment in many of the regions, coupled with the rapid growth and concentration in London was considered by the Commission to be a problem worthy of state intervention. Detailed accounts of the way in which the UK government has historically intervened in the spatial distribution of business are provided elsewhere (see Balchin et al, 1995; Buck et al, 1986; Goss, 1962; Hall, 1961; Ward, 1990); however, a summary here is important for contextual purposes.

In 1940, the Barlow Commission recommended a centrally imposed policy of decentralization or dispersal of industries [3] from the 'congested' urban areas to benefit the regions, with London highlighted as a particular problem due to social, economic and strategic disadvantages. This was followed by the Greater London Plan of 1944, which planned for the decentralization of over a million people and a quarter of a million jobs out of the so-called congested districts of inner London, mostly into New Towns outside the Greater London conurbation. In order to bring these proposals to fruition, in 1945, the Government passed the Distribution of Industry Act, which allowed the location of industry to be controlled through Industrial Development Certificates (IDCs) and gave the government powers to (a) assist firms to establish factories in the depressed areas, and (b) prevent the construction of factories in areas of over-concentration. The aim was to bring industry to the workers. The policy enjoyed some success, although the extent to which this reduction in unemployment was due to policy rather than improved economic circumstances and market-led relocation of industries to cheaper locations has been questioned. A further and more ambitious policy was facilitated by the New Towns Act of 1946, which relocated both industry and workers to designated New Towns. The policy to constrain growth in London and promote decentralisation continued for the next two decades.

Market-led decentralisation

Towards the end of The Industries of London, Peter Hall considers the impact that the post-1945 state intervention policies had on industrial location in the UK. Through considering comparative data between 1952 and 1958, he showed that manufacturing industry in London grew at half the national rate and overall employment grew at a lower rate than any other region, except the North West. This was clearly a change from the previous period considered in the bulk of the thesis. Hall speculates that this could have been in part due to decentralisation policies, but the analysis is

[3] In this context, 'industry' refers to all business - what we would separately refer to today as office and industrial uses.

inconclusive. What we do know is that in the years following the publication of his book, the downward trends that were observed by Hall in the 1950s accelerated (see Hutton, 2008; Thornley, 1992) and have since been largely explained in terms of market-led forces, with little attention placed on the role of the state.

The theory underpinning industrial decentralization in the post-war period is explored in some depth by Scott (1982). He argues strongly against an interpretation of the trend simply as a series of 'push' and 'pull' factors, as identified in a diverse range of studies based on questionnaire surveys on the locational decisions of business managers. These studies point to, for example: high land and labour costs in central areas, lack of space for expansion (push factors); and development of road-based transport, a decentralized working population, the development of horizontal plant-layouts and cheaper land (pull factors). These studies, argues Scott, are static snapshots and do not take into account the dynamism of the sector or seek to explain long-term trends. For this, he argues, we need to understand processes of incubation, product cycle and hierarchical filtering:

- **Incubation**: new and innovative firms tend to seek out the mutually supportive environment provided by a concentration of other similar firms, with similar needs. This environment tends to be naturally found in the centre of cities, which provide various positive 'agglomeration' effects, such as availability of labour, ability to share equipment and premises, proximity to other businesses in supply and co-production chains. As firms grow and expand, they become more self-sufficient and less dependent on other firms or the availability of such externalities, and can take advantage of lower land costs in more peripheral locations.
- Linked to this is the evolution of the **product cycle**. At the early stages of evolution of a product, firms tend to be small and depend on specialized, skilled labour. As the product develops and matures, the production process becomes more standardized (and mechanized), is more 'land hungry' and less dependent on skilled labour. Thus the firm becomes less dependent on the positive agglomeration benefits of the central city.
- **Filtering**: As large industrial processes develop and mature, they may develop branches of their operations away from the larger metropolitan areas, thereby filtering down through the urban hierarchy. As they grow, they may also split their functions, so that more office-based functions requiring more face-to-face activity with clients are based more centrally, whereas production is decentralized.

Even this, argues Scott, does not provide a satisfactory explanation. It explains why there is a trend towards decentralization as companies mature. However, it does not provide an adequate explanation for the rather substantial shift at a particular point in time. For this, we need to look at the role of technology and the difference between labour-intensive and capital-intensive businesses. Throughout history, there has been a tendency for labour-intensive firms to seek central locations (with access to the greatest 'pool' of labour), and for capital-intensive firms (those who depend more on larger premises or machinery) to seek peripheral locations, where land is cheaper. With improvements in technology, we have seen over the course of history, a displacement of labour (people) by capital (machinery) in manufacturing. Thus, over time, we have increasingly seen firms disperse or decentralize. Although Scott's (1982) article was concerned with explaining the decentralization of industry to the suburbs, the same argument could be extended to understand

the movement of industry to developing nations; an extension of the same logic, expanded by the forces of globalization.

Policy U-turn and protectionist policies

In the late 1970s, policy took a U-turn, as concerns were expressed about the flight of both industries and wealthier residents from cities and the resulting inner city urban decline. The 1977

White Paper, Policy for the Inner Cities, advocated a strategy to preserve what was left of the manufacturing base, improve the physical environment and social conditions, and curtail the decentralization of population and employment from inner areas. It also proposed funding through the Urban Programme, new partnership arrangements between central and local government, and a new remit for the Location of Offices Bureau to promote office employment in inner urban areas. The White Paper placed responsibility for delivery firmly on local authorities as the "natural agencies to tackle inner city problems" (Para 31.) The Inner Urban Areas Act of 1978 then empowered local authorities to declare Industrial Improvement Areas and offer loans and grants to industry for the improvement of buildings and occupation of premises. The incoming Conservative government in 1979 cut regional aid and abolished Industrial Development Certificates (and the later Office Development Permits), thus confirming the shift in policy from one of promoting the revival of the depressed regions to regenerating the inner cities.

The passing of the Town and Country Planning Act in 1947 had enabled local planning authorities to regulate land use, but the policies of decentralisation of industry pursued in the post-war period meant that these powers were not initially used to protect industrial land in London. However, as policy shifted away from decentralisation towards the revival of the inner cities, and there was less support internationally for costly state intervention in the form of subsidies and incentives (which were increasingly deemed to be ineffective), attention turned to land use instruments and planning interventions through zoning, which were cheaper and locally implemented (Heikkila and Hutton, 1996). Whereas traditional, so-called 'Euclidian', zoning had been used in the past to prevent heavy manufacturing from locating in residential areas in order to protect residents from the noise and grime associated with those industries (Hills & Schleicher, 2010), a new type of 'exclusionary' zoning started to be used, which also served to prevent other higher-value land uses (including residential) from locating in an area zoned for industrial use. This acted primarily to suppress and stabilize land values in these areas, discourage speculation and thereby encourage new investment in manufacturing and industry.

Regeneration through industry? The GLC and the London Industrial Strategy

> 'London is a city laid bare by deindustrialisation and economic collapse. It has the greatest concentration of unemployment in the developed world. The contrast between unmet needs and vast human and financial waste is stark. The Greater London Council's London Industrial Strategy is about using wasted resources to meet needs, by modernising and restructuring London's industrial core.' (GLC, 1984: 638).

Responding to the decline of longstanding industries, rising unmployment and population loss, the Greater London Council (GLC) in the 1980s pursued an activist industrial strategy which sought to improve the fortunes of Londoners by increasing and safeguarding employment in a wide range of

sectors of London's economy. The strategy was based on a detailed analysis of 23 key sectors of the London economy, setting out major trends affecting each sector and offering considered proposals for action. The approach appears novel to contemporary eyes, setting out a vision for the economic renewal of London based on an equitable approach to entrepreneurship and innovation and a greater degree of employee and consumer participation in the planning and management of the economy. Encompassing the cultural industries and domestic work as well as printing and vehicle manufacturing, the strategy was based on a holistic understanding of the London economy and the prospects of rebuilding a viable industrial base through an interventionist sectoral strategy. With the abolition of the GLC in 1986 the strategy ceased to be implemented and very different visions of London's economic future became dominant.

The urban renaissance in London

In the early 1990s, National Planning Policy Guidance for 'Industrial, commercial development and small firms' (DoE, 1992) stressed that there should be "sufficient land available which is readily capable of development and well served by infrastructure" (para 6), as suitable sites were a "scarce and important resource for … industry." (para 8). However this quickly changed during the course of the 1990s, which saw a revival of interest in city living and housing started to be seen as a potential catalyst for the regeneration or renaissance of the inner city (Tallon, 2010). The influential publication of Cities for a Small Planet, led by the prominent architect Richard Rogers, characterised London as "rudderless and polluted" whose "industries have departed … (and) many of its neighbourhoods have collapsed. " It went onto argue that "Housing is one of the keys to consolidate the neighbourhoods of our city. The way to meet the huge demand and to strengthen our existing communities is to redevelop derelict and brown land to produce dense, compact and mixed developments." (Rogers and Gumuchdjian, 1997: 106, 112, 118). This narrative portrays employment sites as vacant, derelict or brownfield, ripe for regeneration into well-designed, sustainable, mixed-use developments.

Rogers' ideas on sustainable development and urban regeneration were further expounded in Towards an urban renaissance, the report of the Urban Task Force (UTF) chaired by Rogers. The report sought to improve the quality of urban areas in a manner which would also facilitate the provision of housing to accommodate the anticipated growth in the number of households (UTF, 1999: 7). A key means by which these objectives would be realised would be development on brownfield land and the recycling of existing buildings to accommodate new uses (Ibid: 11). Employment land, protected by local planning authorities, was viewed as a resource which could in many cases be better used for mixed use and residential development. An important 'driver of change' identified was the structural shift to a knowledge-based economy, leaving "large tracts of wasteland" (Ibid: 27). Cities were characterised as accommodating "old and less productive manufacturing plants" (Ibid: 33), while in London there was a "shortage of space to accommodate all the people who wish to live there." (Ibid: 34). As a solution, the report proposed the government "adopt a sequential approach to the release of land and buildings for housing, so that previously developed land and buildings get used first." (Ibid: 12). Nationally, this approach was reflected in policy in Planning Policy Guidance note 1, 'General policy and principles' (1997) and the subsequent Planning Policy Statement 1, 'Delivering sustainable development' (2005), as well as Planning Policy Guidance note 3, 'Housing' (2000).

These shifts were consolidated in the early 2000s with the publication of an ODPM report on 'Planning for economic development' (Ecotech and Roger Tym, 2004). The report emphasised the need to balance the need to plan for employment sites against other objectives, and to assess the allocation of employment land against the 'principal considerations' of sustainability and market realism (Ecotech and Roger Tym, 2004: 15). Employment land safeguarding in policy "should not be used as means to hoard employment land" and sites allocated as employment land should be allowed to change to other uses "if there is no reasonable chance of the site coming forward in the medium term." (Ibid). The language used in the document suggests a more permissive and reactive approach should be followed by planning authorities, withdrawing protection of employment sites where there is no clear market demand for certain kinds of employment space.

These considerations lay at the heart of the ODPM's 'Employment land reviews guidance note' (2004) which emphasised the need to define "sensible criteria in terms of sustainable development and market realism." (ODPM, 2004: 5). It is telling that planning authorities were advised to conduct employment land reviews at the same time as housing capacity studies. A key task identified for individual planning authorities was to identify the 'best' employment sites and a range of potential sites to be released (Ibid, 25). Government guidance from this era charts the introduction of a 'managed decline' approach to employment sites in policy. 'Sustainable development' could be interpreted to imply a housing-led regeneration along the lines of a compact city/ urban renaissance model. 'Market realism' could recognise the high cost of inner urban locations for industrial/ manufacturing uses when compared with peripheral or exurban sites, and the rising value of residential sites. These considerations, along with the brownfield imperative for residential development set up a policy basis for the loss of sites suitable for industrial and manufacturing uses in places of declining industrial employment and rising demand for housing.

More recently, PPS4 'Planning for sustainable growth' (2008) and the National Planning Policy Framework (DCLG, 2012) stress that employment sites should not be protected unless there is the 'reasonable prospect' of use. (PPS4 policy EC2, NPPF paragraph 22). This implies that local authorities should be responsive to markets rather than attempting to lead and shape real estate markets through (for example) the use of planning policies allied with a regeneration strategy to encourage the development of certain industrial/ manufacturing sectors of the economy. The requirement to undertake regular reviews of employment land, mindful of 'market realism', places power in the hands of organisations who are experts in real estate markets and possess a high degree of technical knowledge. Employment land reviews, more often than not prepared by private consultancies, play an important role in informing the formulation of planning policies and thus planning decision making. The technical nature of these reports means that it is difficult for lay people to dispute the assumptions and findings of these reports, in the absence of specialist training and resources. Employment Land Reviews help shape spatial development, yet the assumptions of these studies seem to lie outside the ambit of democratic debate and contestation.

Industrial zoning and protection: contemporary approach and debates

In the contemporary context, the London Plan (Policies 2.17 and 4.4; GLA, 2011) identifies three different types of industrial sites, which allow sites to be protected and managed to varying degrees:

- Strategic Industrial Locations (SILs) – designated in the London Plan and representing London's main reservoir of industrial capacity, but subject to periodic review to reconcile demand and supply. Development proposals for alternative uses should be refused "unless they are part of a strategically co-ordinated process of SIL consolidation through an opportunity area planning framework or borough development plan document" (Policy 2.17);
- Locally Significant Industrial Sites (LSIS) - identified by the boroughs in Development Plan Documents (DPD) on the basis of robust evidence, protection of which needs to be reviewed regularly and justified in assessments of supply and demand for industrial land; and
- Other industrial sites - to be identified by boroughs and distinguished from the locally-significant sites identified above. Many sites falling into this category continue to have a local and strategic role for industry (GLA, 2012) and are particularly susceptible to change.

There is much debate about the advantages and disadvantages of separating industrial from other land uses. The arguments against zoning are generally made on either economic or ideological grounds. The economic argument (summarised in Heikkila and Hutton, 1986) is that the market should be left to its own devices to determine the most efficient allocation of scarce land resources; zoning inhibits efficiency and limits the ability of land to be put to productive use, leaving vacant tracts of land or premises if there is insufficient demand in any given 'zoned' location. According to this perspective, the act of zoning only serves to prolong industrial decline, delaying the inevitable and giving the wrong signals to employers and investors that industry has a more secure place in the city than it actually does. All the work around industrial agglomeration suggests that businesses are best left to their own devices when choosing an optimum location, and manipulating business location through policy only undermines the potential benefits to be achieved through allowing businesses to cluster using market signals. Hills & Schleicher (2010) argue that the external benefits of allowing manufacturing to stay in the city are not high enough to warrant effectively subsidising manufacturing through zoning (making land cheaper). Building on previous arguments on the efficiency of land allocation through the market, they argue a direct subsidy to manufacturers (paid for through land receipts on developing land for higher value uses) would be better. Non-compatibility with residential uses could also be dealt with differently, they say (for example by stipulating zones where manufacturing uses are allowed and introducing a legal restriction on residents (through contracts) moving into that area preventing them from essentially suing the manufacturers. However, this argument (especially the provision of direct subsidies to business), assumes that it is fine for businesses occupying premises on industrial land to simply 'go elsewhere'.

The ideological argument against zoning and separating industrial from other land uses suggests that zoning is an outdated, now irrelevant way of managing cities, which does not support compact, diverse and vibrant mixed-use city environments, and is therefore unsustainable. The loss of manufacturing in industrial cities of north America and Europe has prompted many to question the logic behind the continued physical separation of employment land from other city uses and housing, the assumption being that businesses in the knowledge economy no longer seek traditional employment locations, but are more attracted to the mixed-use environments typical of city centres. Promoting more 'mixed-use' also allows employment land to accommodate housing development, and meet the pressure for housing growth. Aside from the practical considerations, 'mixed-use' environments - whereby a range of different commercial, residential, leisure and community land

uses are accommodated together within a building, site or district – support the environmental sustainability agenda of compact cities and have been promoted, following the traditional European model, by the European Commission in the 1990s (CEC, 1990), and the UK Labour Government in the early 2000s (DETR, 2000) as part of its drive for an Urban Renaissance. In many places, it is now the norm rather than the exception (Foord, 2010). The trend towards mixed-use and urban renaissance has its parallels in the 'new urbanism' and 'smart growth' movement in the US. Building on the success of the traditional European model, smart growth enthusiasts perceive sustainable land use and economic development as promoting non-industrial activities over industrial activities; on the basis that it promotes compact development, increased jobs, attracting residents to the city centre and increasing local tax revenues.

On the other hand, the benefits of protecting industry through planning policy are accepted in most policy circles. In a review of industrial land studies in 20 US cities, Dempwolf (2010) found that all cities recognized the vital role of industrial land in the urban system. In rapidly growing cities, the rapid loss of primary industrial land to residential and mixed-use development challenged planners and city officials and attempts were being made to strengthen protection.

This complements the work of Leigh & Hoelzel (2012) reviewing industrial land policy in 13 cities in the US, where it was revealed that all the cities expressed concern about loss of productive industrial land to other uses and subsequent ramifications for local economic development – fearing they might miss out on new economic development opportunities from advanced and sustainable manufacturing. In the UK context, an industrial land study commissioned by the

Mayor of London (Roger Tym & Partners, 2011b:5-7) sets out two clear arguments for the protection of industrial land:

1. On the basis of **economic efficiency**: In real life there are market failures, and planning is required to correct these. For example, there is reason to doubt that land use allocations based on the price signal alone would result in the most efficient land use allocation taking into consideration potentially incompatible land uses (e.g. housing), negative externalities such as pollution or C02 emissions arising from relocation further from London, or long term time horizons of thirty years of more.

2. On the basis of promoting **social equity**: Even if markets work perfectly and so produce the highest possible wealth in total, there is no reason why they should produce a fair distribution of that wealth, or the costs of generating it. There is a strong rationale for maintaining industrial land in London to achieve equity objectives, as the evidence suggests there is a close fit between the immediate catchment area of industrial estates and the areas of London experiencing the highest levels of deprivation[4].

Other academic studies have elaborated on some of the economic arguments. Heikkila and Hutton (1986) summarise the range of arguments in support of industrial zoning, which include the fact that it promotes a diversification of the economic and employment base, helping to ensure a range of different types of businesses can thrive and a range of different types of jobs are provided for the

[4] See Figure 2.1 p.7, Roger Tym & Partners (2011b).

workforce. In particular, it supports the location of small, new firms in central locations, important in the 'incubation' phase, when firms rely on the agglomeration benefits of the inner city. It also makes the provision of public services and infrastructure required by similar types of businesses more efficient and less costly.

More recently, Chapple (2014) has argued that the availability of industrially-zoned land contributes to the regional economy by providing flexibility, specifically offering a reserve of relatively large sites that can accommodate a range of businesses. Whereas startups (in their very initial phases, as low-overhead home-based businesses) can locate in residential areas, firms that expand – whether in production, distribution, and repair or information-based services – benefit from the ability to spill into available space in large buildings. Industrial zones seem to facilitate this slightly more effectively than commercial zones, perhaps because they have more of the 'flex' space that allows firms to grow and shrink readily.

Despite ongoing broad-level support for policies protecting industry in London, the dominant narrative is that protectionist policies have been able to have little impact in the face of larger structural trends in the economy, namely the shift from a largely manufacturing based economy to a predominantly service based one:

> Structural change in the London economy over recent decades has led to a shift in employment away from traditional manufacturing industries and into the service sector. Over the past three decades, London's employment in manufacturing has declined from over 1 million in 1971 to just 131,000 in 2010 and accounts for under 3 per cent of London's total employment (GLA, 2012: 6)

Given this trend, and the continued downward projections in manufacturing jobs, it has been increasingly difficult for local (and regional) government to continue justifying the protection of industrial land, particularly in the face of market demand for alternative uses and a need to deliver more housing. However, some important clarifications of terminology are useful here. This broad structural shift in advanced economies is often referred to as deindustrialisation or industrial decline. In addition to the transition from labour-based to capital-based production (and the resultant loss of jobs), there has also been a major shift in the locus of manufacturing activity, which means that manufacturing is no longer a large employer in these economies. However, arguably, it is just an extension of the theory of decentralisation, as previously discussed. In other words, industry and production is an ongoing important function of the global economy, but the issue is where it takes place. The use of the terms 'deindustrialisation' and 'industrial decline' suggest in the popular imagination that manufacturing is dead. However, if we understand the location of manufacturing and production as a necessarily dynamic process, then this allows for a more fluid interpretation of the future of manufacturing and where it might suitably take place.

3. DEINDUSTRIALISATION OR REAL ESTATE SPECULATION?

When faced with the rather alarming future projections of loss of employment in manufacturing and industry, one question immediately springs to mind (aside from the questionable methodology of extrapolating historic trends): Is this decline in jobs inevitable and due to structural economic change outside our control, or have our actions facilitated the decline?

Certainly there is a problem. The so-called managed release of industrial land in London is happening at a rate far greater than that planned for. Between 2001 and 2006, 90 ha per annum of industrial land were lost to other uses, approximately double the proposed benchmark in the GLA's 2003 Draft Industrial Capacity Supplementary Planning Guidance (URS, 2007: 9, 82). For the period 2006-16, the benchmark remained roughly the same at 48 ha per annum (GLA, 2008: 7), while in reality 86.75 ha per annum of industrial land was released between 2006 and 2010 (GLA, 2012: 8). Substantial losses of industrial land, over and above the quantitative benchmarks set out in policy, has led to lower land release benchmarks for the 2011-2031 period (36.7 ha per annum, Ibid), but has not led the GLA to revise its overall approach. Setting quantitative benchmarks is clearly not working, and is also partially explained by findings that planners demonstrate "very little understanding of strategic employment land issues" in managing development, and have "no familiarity with the benchmarks or with the GLA evidence base in general" (Roger Tym & Partners, 2011b: 19).

From a developer's perspective, if it can be argued that industrial land is derelict or underused, then it can be considered 'brownfield' land, in other words developing it for housing would be more sustainable than developing on a greenfield site, and therefore likely to be viewed positively in planning decisions. Given the gap between residential and industrial land values – particularly large in London – there is huge development pressure for a change of use to residential or 'mixed use' on industrial sites.

The dominant narrative of deindustrialisation also does not take into account the role of such real estate speculation or the impact of planning policy, which could negatively impact on manufacturing and lead to a spiral of decline. There is plenty of evidence in developed economies of the industrialised world that industrial decline is only a limited part of the story of the loss of manufacturing and that changes in urban structure are influenced by (a) the inability of manufacturing businesses to compete with sectors that are willing to pay higher land costs for central locations (Buck et al, 2002), (b) political motivations and alliances between politicians and different sectors of the urban community (Rast, 2001), (c) the real estate and financial sectors and the mass media (Indergaard, 2009; Zukin, 1988), and (d) the absence of public and political support for industrial uses in the city (Curran, 2004). This implies that the movement of light manufacturing and small low-value businesses out of cities is not wholly due to their decline, rather there are other powerful forces of economic structuring at play.

In the New York context, Sharon Zukin (1988) first questioned the assumption that artists who started the trend of loft-living were merely finding innovative uses for empty spaces vacated by a declining industrial sector, in other words that it was the supply of lofts that created the demand for loft living. She argued that the transformation of loft-living from something marginal, acted out by 'powerless' artists, into something 'chic' and appropriated by high-class users suggests that there is a bigger story over and above that of simple supply and demand – a story involving the mass media, selective disinvestment by banks and selective re-zoning by city government, all of which weakened industry's hold on the city centre. This is not to say that industry was not in decline and that many buildings had not been lying vacant, but it appears to only tell part of the story.

In Williamsburg, Brooklyn, which was until recently a thriving industrial district, Curran (2004, 2007) later documented the phenomenon of industrial displacement by gentrification and loft-living that

was inferred by Zukin in Manhattan. Curran argues that rising land values, particularly for residential land, have led to a gentrification dynamic where longstanding manufacturing activities are displaced by residential development, and incoming residents battle remaining businesses over noise and traffic. Curran argues that if more land is rezoned for housing in Williamsburg (one of the largest concentrations of manufacturing land in the city) 'it will severely constrain the ability of manufacturing firms to locate in the city, and therefore affect the ability of thousands of blue collar workers to earn a living.' (2004: 1247). Although there has been large-scale decline of manufacturing in New York due to global competition, Curran claims that the city is still home to a "vibrant and varied manufacturing sector that serves important urban niche markets and provides employment for a less educated and largely immigrant and minority workforce" (Curran, 2007: 1428). The majority of remaining firms are planning to either invest or expand, and those that remain are flexible, resourceful and able to respond quickly to consumer markets. However, industrial space in certain urban areas provides an illustration of the rent-gap; the actual rents paid by industrial users are far below the potential rents of converted residential space. This leads to inflated prices for industrial premises intended to facilitate conversion to residential, and certain practices, such as the refusal of landlords to renew leases for thriving businesses. Thus, argues Curran, the loss of industry from Williamsburg is not only the result of global competition or increasing labour costs (i.e. of deindustrialisation), but of real estate speculation for residential conversion, actively promoted and reinforced by developers, city planners, policy makers, landlords and individual gentrifiers.

The real estate market in London has many similarities to New York, largely due to its concentration of financial services and 'world city' status (Sassen, 1991, 2001). In London, there is also evidence that it is not only the decline of manufacturing that is leading to the loss of industrial space. In South Shoreditch (on the fringe of the City of London), it was primarily the commercial boom of the 1980s that raised commercial property values and rents in the City of London and its fringe, and put pressure on small manufacturers to either close down or leave the area (Renaisi, 2003). In other words, it was due to competition from higher value land uses - in this case commercial property. This was facilitated by changes to the planning system through the introduction of the Town and Country Planning (Use Classes) Order (1987), which allowed the conversion of buildings from manufacturing to office use, without the need for planning permission (Hamnett and Whitelegg, 2007).

In Camden, a local authority covering central and inner London, studies conducted in 2008 and 2011 (Roger Tym & Partners, 2008; 2011a) showed a shortfall of supply of industrial land relative to demand. In 2011, the study revealed a very low vacancy rate of around 2.3%, whereas a balanced healthy market would expect vacancy rates between 5-10% (Ibid: 12). Sites that were unoccupied could be characterised as those which were 'compromised' by proximity to residential uses (fear of complaints around noise created by deliveries and production processes and smells) and those which were being marketed were being so at inflated rents because of the 'hope value' of redevelopment for housing (Ibid: 13). There was evidence in both studies of planned reductions in supply (through existing planning permissions) and predictions of continuing loss due to a shift from low to high value uses, whereas demand was not predicted to drop significantly over the next 10-15 years. Thus, despite these pressures and evidence of continued demand for industrial locations, sites are lost through redevelopment for other uses; even though Camden is identified in the London Plan as a borough where 'restricted' transfer of industrial land should take place (see Map 4.1, GLA, 2011). The problem is acknowledged by the local authority in its Core Strategy:

> The Camden employment land review 2008 found that the cost of industrial locations in Camden is high, indicating that supply does not meet demand. However, there has been pressure to redevelop the borough's stock of land used for employment purposes, particularly manufacturing and industry, for higher value uses, principally housing. Once employment land in the borough has been developed for an alternative use it is very unlikely it will ever be returned to industrial use. There has been virtually no new provision of such premises in the borough for many years. (LB Camden, 2010)

Similarly, in Islington, strong demand for light industrial space is reported by agents across the borough, where it is stated that "industrial activities are being displaced to other locations particularly as new housing development is reducing the compatibility of industrial activities and associated traffic generation close to residential areas" (Atkins, 2008: 68). Despite this acknowledgment, the study forecasts a decline in demand for light industrial premises in all three of the scenarios outlined, on the basis that employment in this sector is forecast (using GLA predictions) to decline. In Tower Hamlets, a 2008 employment land survey found that all employment land was being actively used for employment uses, with a vacancy rate of zero; the vacant land identified in a previous study having been developed for employment uses or lost to residential development (URS, 2009: 114, 123). Again, despite this clear evidence of an appetite for employment land and premises, demand for industrial premises is forecast to fall (Ibid: 110, 113). These studies do not explore the apparent contradictions here, specifically the role that market-led redevelopment of industrial sites for housing, facilitated by planning policies and decisions, could play in the continued decline of manufacturing jobs. There is plenty of evidence in London, corroborating Curran's findings in Brooklyn, New York, that the continued deindustrialisation of the city is being fuelled by real estate speculation for conversion to higher value uses, rather than a lack of demand. The way in which different levels of planning policy and documents produced by local authorities can serve to fuel such conversion has been documented in detail for the London Borough of Haringey (Lima, 2014). This study revealed that, of the 54 sites identified for redevelopment to accommodate housing in the Council's site allocations document, five were Locally SIgnificant Industrial Sites and six were other industrial sites. Haringey is identified in the London Plan for "limited" transfer of industrial land (Map 4.1, GLA, 2011).

There is a need to further understand the impacts of such real estate speculation, beyond the more obvious effects of direct displacement. An employment land study of an outer London borough, Waltham Forest (Gort Scott, 2013), employed a more qualitative methodology and found that many businesses in industrial areas spoke of continuous rumours and speculation around the threat of major mixed-use redevelopment on or in the vicinity of the sites where their businesses are located. These rumours gain currency among firms partly because many of the companies had themselves been previously displaced from sites around London redeveloped for other uses. The authors conclude that this uncertainty reduces the willingness of firms to invest in or commit to the area, and progressively breaks down confidence. (Ibid: 60-61). There is also evidence from a diverse set of locations (Hackney Wick, Kings Cross hinterlands, Charlton Riverside Greenwich) that, in anticipation of the potential for redevelopment, landlords on industrial sites are offering increasingly short and insecure leases (Acme & Capital Studios, 2006; muf architecture, 2009; Just Space Economy & Planning, 2014). This means that companies needing a secure base, or wishing to invest in particular fit-outs or machinery, are unlikely to settle and invest in a location when there is the danger that they would have to move on in the short or medium term. This leads to vacancies and a high

turnover of firms, strengthening the case for redevelopment to higher value land uses. Imrie et al (1995) argue that small businesses are particularly vulnerable to 'urban renewal' as they tend to occupy valuable sites and do not have the financial or temporal resources to establish the networks or political contacts necessary to resist such change.

The evidence that the loss of manufacturing in London in recent years has primarily been due to real estate speculation rather than deindustrialisation suggests we could envisage a very different future for London, one that is productive as well as consumptive, where we could address the challenges of deprivation, foster a diverse economy and meet the needs of all Londoners, as set out in the London Plan. In support of such an approach, there is a very strong alternative narrative emerging internationally, which provides a much more optimistic picture on the role for manufacturing in developed economies.

Before the recession of the late 2000s, there were reports in numerous US cities of strong blue-collar growth following public authorities' emphasis on workforce education, technical skills and building on the city's natural strengths (Kotkin, 2008). In London, a report by PwC (2009) argued that, contrary to the popular assumption that UK manufacturing is in terminal decline, the output of British manufacturing was at an all-time high in 2007 and the UK remains the world's 6th largest manufacturer. It was predicted that UK manufacturing would survive the recession and could even emerge as a 'thriving' sector of the economy, as the line between manufacturing and services becomes increasingly blurred. This has been confirmed by industry surveys showing that UK manufacturing is now showing consistent growth since the recession[5] and is once again showing strong signs of growth, over and above economists' predictions (The Guardian, 2014). Recent data from the Office of National Statistics has shown that despite the fall in number of manufacturing jobs since the late 1970s, manufacturing output has - in fact - been steadily rising overall (despite suffering during the recessions)[6]. In London, the manufacturing sector is strong in terms of productivity, and there is potential for manufacturing output to compete strongly with other cities, as the "pattern of rapidly-developing economies overtaking developed economies in terms of manufacturing, only to be overhauled again once they become more developed, has been seen in the recent past" (Europe Economics, 2008: 47). The importance of manufacturing and exports for the financial recovery since the recession of 2008-9 is acknowledged internationally. It has been a key driver of Obama's National Network for Manufacturing Innovation, and the European Commission's publication, For a European Industrial Renaissance (2014). The UK Government has also explicitly acknowledged its importance for recovery and growth and London is acknowledged as an important export hub (Theseira, 2014).

A number of academic studies also argue that the post-industrial economy provides new possibilities for small urban manufacturers who are well placed to develop more niche specialisations to serve the needs of a gentrifying population in global cities (Curran, 2007; Hardt and Negri, 2000; Sassen,

[5] Financial Times, "Strong PMI data fuel manufacturing optimism", Emily Cadman, 3 November 2014.

[6] 'Not the sick man of Europe anymore: How UK manufacturing output has increased since the 1970s despite 60% fewer workers', 22 October 2014, by Ben Salisbury, accessed: http://www.thisismoney.co.uk/money/news/article-2803400/UK-manufacturing-output-increased-1978-ONS-fig ures-show.html

1991, 2001). This is confirmed by planners in London, who indicate that there is a growing sector of small-scale manufacturers in places like Whitechapel and Hackney [7], for example firms such as 'Lost Values' in inner east London, who design and manufacture products that merge craft with high technology. This optimism is also shared by the Deputy Mayor for Business and Enterprise, who recently argued that "manufacturing is now slowly coming back to life, especially niche, small manufacturers" [8].

This evidence suggests that projections of ongoing manufacturing decline that are based on an assumption that past trends (i.e. rates of decline) will continue are not justified in that they ignore the impact of real estate speculation and planning policy on manufacturing (and employment land more generally). It also ignores more optimistic evidence about new and emerging manufacturing niches and the impact of the changing nature of manufacturing. In addition to a more optimistic picture emerging around the future of manufacturing, when discussing employment land, we need to understand more about the other activities occupying land there; still very little is known about London's industrial estates; in particular, what goes on there, what type of space businesses occupy, how they work and their importance to London and Londoners. The next section turns to the first of these questions.

4. THE NATURE AND PURPOSE OF BUSINESS ON LONDON'S INDUSTRIAL ESTATES

The previous section has served to paint a much more optimistic picture of manufacturing in London than that suggested by the GLA's employment projections. However, in making an argument for the ongoing importance of industrial land in London, it is important to acknowledge that manufacturing is not the dominant activity on industrial land. An industrial land demand and release study prepared for the GLA (Roger Tym & Partners, 2011b: 44) indicated that only one third of jobs on land designated for industrial uses in London were in manufacturing. Similarly, the GLA's Land for Industry and Transport SPG (GLA, 2012: 6) states that although London's employment in manufacturing is only 3%, London's industrial areas accommodate 11% of London's total employment. Both studies suggest that there is lots of other economic activity taking place in industrial areas, apart from manufacturing, and it is important that we understand the nature and purpose of all this activity and its importance to London.

This section argues for the ongoing importance of industrial land in London, from two perspectives. Firstly, the nature of manufacturing itself is changing and we need a proactive strategy, which includes availability of suitable and affordable premises, if we are to capitalise on this as a potential growth area. Secondly, there are lots of other types of businesses and uses - both industrial and non-industrial - occupying premises on industrial land. We need to understand the nature of these and why they are located on industrial land if we are to understand the impact of future loss of such land.

Diversity and complexity

First a note on the changing nature of manufacturing itself. The narrative of the continuing decline of manufacturing does not take account of more nuanced changes to the structure of the sector.

[7] Interviews conducted by one of the authors with planning officers, Spring 2014.
[8] Presentation at the launch of the Park Royal Atlas at the GLA Briefing to Park Royal Business Group, 23 May 2014.

For example, as described in the GLA's own Park Royal Atlas (GLA, 2014b), although "by the 1970s Park Royal was facing large scale industrial restructuring, as well general industrial decline" and many of "the multinational firms, the area's largest employers, chose to relocate"… today "many of the large factories that produced everything from beans and beer to bombers and buses have been replaced by or subdivided into smaller industrial units" and are "being used by many smaller businesses today" (p.13). In Park Royal, 75% of the workplaces are occupied by micro enterprises (fewer than 10 employees), with only 1% occupied by large businesses of over 250 employees. The loss of large factories, plants or breweries tend to make the headlines but are in many documented cases easily compensated for by the growth in jobs in smaller, emerging firms. For example, as shown by recent CASS research, the loss of Nestle looks to be easily compensated by the rapid growth of over two dozen small coffee roasters (Brearley, 2014).

Research is only starting to uncover the diversity and complexity of many of the smaller occupiers on London's industrial estates. For example, the researchers in Park Royal highlighted a potential weakness of the survey, which is that "In some cases, particularly where buildings had been subdivided into multiple premises, buildings were not accessible and it was difficult to establish the exact number of units or how many of these were occupied. In these cases it was also more difficult to estimate the proportion of the building footprint area used by individual workplaces" (GLA, 2014b: 21). This view was reinforced in a study of Waltham Forest's industrial land (Gort Scott, 2013) where the researchers found the hardest part of the survey process was mapping all the unit subdivisions of the units, and the possibility that 'hidden' subdivided units could not be captured - potentially revealing a complexity of interconnecting activities behind a single facade. Similarly, the numbers of units found is not likely to reflect the range and scale of activities as a

number of units are used as shared workspaces, where several small producers would rent a single unit and split the cost of rent and machinery. Premises were found to be very adaptable; the industrial areas were conceived at a time when manufacturing was dominated by fewer, larger firms, yet the same built stock now accommodates a wide range of smaller firms. Similar premises requirements from a range of firms means that "a company designing and making architectural metalwork could easily occupy the same type of premises as a waste recycling company or a handbag manufacturer" (Ibid: 59).

However, we know that manufacturing is not the dominant activity on industrial land. A lot of this other activity is very visible, such as the presence of utility companies, land for transport, distribution and warehousing, and retail. However, it is also increasingly evident that our standard surveys and land use classifications[9] are failing to capture the diversity of types of activity on industrial land. For example, two recent reports (Harris, 2013; Ramidus Consulting, 2012) have revealed that companies are adapting industrial premises to suit their various needs, which are often hybrid, requiring some space that is 'client facing', including areas for office use, and other space suitable for production and goods handling. Such adaptations can include the installation of mezzanines, subdivision of space and enhanced specification. Such hybrid office/industrial activities are increasingly important to the functioning of London as a global city (Ramidus Consulting, 2012), but the characterisation of 'industrial' sheds 'belies a far richer mix of uses and activities' (Harris,

[9] Most industrial land surveys tend to be quantitative in nature and based on the Standard Industrial Classification system, first introduced in 1948.

2013:1). For example, in the Liddell Road Industrial Workshops, they found companies specialising in film production, high tech printing, interior design, mail management, musical instrument hire, packaging and photography. Many industrial premises have also been converted by workspace providers for use by a variety of small businesses on a flexible, short-lease basis. For example, London's largest commercial workspace provider, Workspace Group, has grown from 400 tenants in the 1980s to over 4,000 in London alone, across more than 100 estates (The Wall Street Transcript, 2005; Workspace Group, 2014).

There is an inference here that the way we have traditionally sought to survey, classify and understand activities on industrial land is increasingly proving inadequate in capturing the diversity of types of businesses on London's industrial land today and understanding their continuing importance to London's economy and Londoners. The remainder of this section therefore seeks to address this gap, drawing on a range of different types of studies that have utilised more qualitative methodologies, to paint a picture of the contemporary nature and purpose of activities on London's industrial estates. In London, this has always been a complex task due to the sheer diversity of activities in a range of locations across the city. Importantly, the limited scope of this study means that this section is not able to provide either a comprehensive review of the types of business activity on London's industrial estates; nor can it provide an analysis of the location or concentration of different industrial activities across London. Rather, we focus instead on the various different sectors or business activities that are likely to be in greater demand as the city grows and, for example, its population and businesses make ever increasing demands for niche, bespoke and 'just-in-time' products and services. In particular, we reveal the importance of the 'food and drink' sector, a revival of artisanal manufacturing, distribution and warehousing associated with e-retailing, 'just-in-time' services, construction and property, waste and recycling. We also argue that a wide range of businesses and organisations are occupying space on industrial land as it provides a source of affordable and flexible workspace; these include the cultural and creative sector, voluntary, charity and faith organisations.

Servicing the City

> Over the past few decades, Park Royal has supplied, fed and fitted out London, without Londoners really noticing[10]
>
> Just consider the diversity of services and products consumed by the average office building: catering; cleaning; furniture; maintenance and fit out; office equipment and supplies; print and copy; security; waste disposal and many others…Much of this support activity is located away from the central area, often clustered around the central area and in outer London… Often the activity is "low key", but is vital to the efficient functioning of the city and in supporting its global role[11]

The importance of activities on industrial land as a support function for London's businesses and residents seems obvious but is often overlooked.

[10] Presentation at the launch of the Park Royal Atlas at the GLA Briefing to Park Royal Business Group, 23 May 2014

[11] see Harris (2013:1).

Some of these relationships are documented in a study on the City of London's supply chains (CEBR, 2008), which reveals that 39% of City firms buy goods and services from the City fringe, yet this varies by sector and almost half of the firms surveyed in the professional, scientific and technical sector did so. The research found that businesses "who purchased in the City fringes stated that the reasons for purchasing from those particular firms is due to their sale of specialist products which are needed for their business, as well as for convenience.' (p. 15). Other research has emphasised the importance of a City fringe location for the printing industry, as such a location offers fast access to clients, the availability of skilled specialist labour, and the proximity of suppliers and ancillary services. For printers and publishers, 'proximity to the City gave firms in the area an edge that could not easily be imitated.' (CEBR, 2008: 11).

It may be that policymakers understand this, but they do not consider proximity to be of any particular importance. However, a recent Business Premises Study for Camden (Roger Tym and Partners, 2011a) identifies the main driver of industrial demand in the borough as firms who provide central London customers with services or goods with a short 'shelf life' (p.10). A Camden location offers ready access to both the City and West End, important as many of these firms are required to guarantee timed deliveries to customers or their own retail outlets. Examples include:

- Go Flowers: florists with several retail outlets in central London in rail stations with little or no storage, therefore they rely on servicing these shops from a centrally located warehouse.
- Wasabi: Fast food Asian restaurant that does not have on-site kitchens, rather they achieve efficiency by having a central kitchen and delivering fresh food to their outlets throughout London. Previously in East London, Wasabi's headquarters moved to Camden in order to serve a wider geographical location more efficiently.
- Addison Lee: major taxi company requiring a central administration and vehicle garaging centre, enabling quick dispatch of vehicles to respond to market demand. Heavily used by both personal and business customers across London.

The demand for a wide array of just-in-time goods and services is only increasing as London's residential and business population becomes increasingly wealthy, lifestyles are changing and the internet facilitates the delivery of such services at the touch of an app button.

In many cases, the manufacturing and service elements of the business are intertwined and it is this symbiosis that is critical to the success of the business. For example, on Charlton Riverside in southeast London[12] , there is a collection of complementary companies working in lift manufacturing and repair. Here, lift manufacturers and repairers are located next to specialist steel stockholders and electrical fitting suppliers. Working in close symbiosis, these firms can offer a rapid lift repair service to firms in the City and Canary Wharf, as well as to local residential high rise blocks.

The construction industry, which of course has supported London's property boom, depends almost entirely upon space available on London's industrial land: particularly the manufacture and supply of construction materials, but also related services such as plumbers' merchants, scaffolders, trade wholesalers etc.

[12] Provided as evidence in Just Space Economy and Planning's submission to the FALP (JSEP, 2014)

Here we have suggested that there are a range of production and service companies who provide critical support services to London's residents and businesses, many of which are time-sensitive, and this latter category is growing. Below we go on to consider a range of different sectors and how demographic, technical, and economic change, together with changing consumer preferences, are likely to lead to increased, not decreased demand for such activities.

Expanding manufacturing sectors

Although it is not what necessarily springs to mind when we think 'manufacturing', the food and drink sector is today one of London's most important industries and changes within it reflect some of the more widespread trends that are driving the changes in industry across London more broadly. Park Royal in northwest London is known as 'London's Kitchen', and therefore unsurprisingly employment in this sector is larger than in any other sector occupying premises on the estate ('food manufacturing' represents 11% of overall manufacturing floorspace). However, food and drink businesses have also been documented to represent the largest number of businesses in Waltham Forest's industrial areas (Gort Scott, 2013), and there is a significant presence in Charlton Riverside (Just Space and UCL, 2013). The sector includes manufacturing, food preparation, wholesaling, and cash & carry retail operations. There is also an increasing presence of 'public-facing' food and drink outlets. For example, in Hackney Wick and Fish Island, there are a range of cafes, coffee shops, and smaller food shops; beyond what one would expect if they were only designed to serve workers in the area (muf architecture, 2009). In Park Royal, a middle-eastern bakery/sweets wholesaler - Patchi - has an attached cafe which is open 24-hours a day in the month of Ramadan, serving a wide customer base; clearly attracted to the location because of the flexibility of opening hours.

Changes in this sector firstly reveal the observed trend from larger to smaller manufacturers. For example, although Park Royal is still home to McVities biscuit factory employing 735 people, it is also home to many food and drink start-ups, such as Botanic Lab, a 2 person start-up recently relocated from east London and specializing in organic juice production, and micro firms such as specialist bakeries and sushi preparation. The growth in bakeries and sushi roll producers reflect both an increasing demand for 'just-in-time' production of fresh food, and luxury international foods. As noted by CASS research, bakeries provide an example where both high volume bakers such as Warburtons, Hovis and Allied are all expanding their London facilities, and at the same time, "with blossoming demand for craft baked bread, the number of smaller wholesale bakeries has been fast increasing, to about 120 currently. Now brands such as Paul's, Ladurée, Konditor & Cook, Delice de France and Blackbird Bakery have all become significant producers in London". Similarly, whereas the closure of InBev's Stag Brewery in Mortlake led to 180 job losses, leaving only Fullers Brewery in Chiswick, "since then over 30 new [micro]breweries have emerged, with a handful (such as Meantime) already up-scaling". (Brearley, 2014). The growth in number of microbreweries in London has also been interpreted as a consequence of gentrification (Dunn, 2014), confirming Curran's (2010) observations in Brooklyn, New York.

Many of the businesses reveal the inadequacy of the rather arbitrary distinctions between manufacturing and services in many standard industrial land reviews based on Standard Industrial Categories (SIC). For example, in Park Royal, the food-based business, Sweetlands, employs 10 people, making Mediterranean baklava pastry on site, which is simultaneously available to buy in their adjacent shop. Another sushi production company also runs a sushi chef training school.

In Charlton, there are a large number of ethnic minority food wholesalers and retailers, particularly noteable are

> 'the Chinese and Viet Namese food suppliers, which have developed since the resettlement in the area of Viet Namese refugees in the early 1980s…The larger operations offer retail services whilst most of the smaller ones are wholesale only. This has permitted the development of a range of new Viet Namese retailers, in local town centres, together with a larger number of restaurants offering varieties of South East Asian food. An African food cash and carry is also operating in the area, and there are several operations serving the longer standing Indian community'. (JSEP, 2014:33)

London has a global reputation as a place where you can eat food from all over the world. This is an important component of its attraction as a World City, but these wholesalers, retailers and restaurants also serve the local ethnic communities of their food origin. As emphasised by Patria Roman, a researcher on London's Latin American communities:

> 'Migrant and ethnic economies are an important asset for London's status as a global city and their contribution to the UK economy and to community cohesion cannot be ignored. More needs to be done to support ethnic and migrant economies so that their place in the global city is not lost as a result of regeneration.'[13]

Based on an extrapolation of current trends, we can only speculate that the food and drink sector will continue to grow in London as the capital's reputation as a centre for world cuisine is consolidated and with the growth in fresh fast food outlets (such as Wasabi, Itsu) ready-made food offer in supermarkets, airlines, and take-away delivery companies.

In addition to the growth of the food and drink sector, there has also been a revival of traditional craft-based or artisanal manufacturing, which had been on the decline since its heyday in Victorian London. This includes bespoke furniture makers, 'Made in London' handbags and clothing, wood carvings, luxury and bespoke fashion. In Hackney Wick & Fish Island, nine furniture makers were documented just before the Olympics (muf architecture, 2009). This reflects a London wide trend whereby new growth is being witnessed following decades of decline in these sectors, argues Mark Brearley (2014). For example, Brearley's research has revealed that there are now approximately 130 small-scale furniture makers, and 30 luxury bespoke tailors in the city - the latter is the world's greatest concentration. Production in luxury leather goods is also seeing a revival, with at least 15 new producers coming on the market recently such as Tallowin, Bill Amberg, Anya Sushko, Frank Horn and Thomas Lyte, joining the traditional surviving brands of Dunhill, Hanson and Tanner Krolle. Brearley argues that 'these trends are magnified by the city's increasing prosperity and the burgeoning of interest in local origin'.

Although some of the expansion in manufacturing is to directly serve the needs of London's businesses and residents, this rather ignores the role of London as a capital city and the fact that the

[13] Patria Roman, invited speaker at the JSEP conference 14 July 2014 'London for All: Opening up debate on London's Economy', Bromley by Bow Centre, London. Summary available at: http://justspace.org.uk/category/economy-and-planning/

'market' in London is complex and bigger than its own population and business base. In 1940, the Barlow Commission explained it in the following terms, which are still highly relevant today:

> The importance of London as a market is not fully measured by its population. It has those advantages that are associated with a capital city - probably in greater measure than any other capital city. For some new industries London is the first market in point of time; it provides a sort of initial goodwill and is the first which the industrialist seeks to capture. It contains a large body of wealthy potential consumers and attracts any others from the provinces; these constitute the first approach to the national market. Further, many industrialists wish to be near the pooling centre of experience and initiative and the centre of discussion and communication. Finally, the raw material of some industries is imported into London from overseas. (Royal Commission of Distribution of Industrial Population Report, 24 (1940) quoted in Hall, 1961: 165).

For industrialists today, the London market might constitute the first approach to the international, as well as (or perhaps even more than) the national market. However, there is little research that we are aware of that seeks to understand the continued importance of London as a location for manufacturers seeking to tap into this broader national and international market. A recent report by the Centre for London (Theseira, 2014) on London's Exports reveals that London's goods exports are valued at around £30 billion, represent about 13% of the national goods exports and have remained steady in recent years. Areas of growth in recent years have included medicines, food, beverages, clothing and telecommunications equipment. Although awareness about the importance of the UK's manufacturing sector is rising, particularly since the financial crisis, and there is acknowledgment in some spheres about the UK's continued importance as an exporter of goods, there seems to be a mismatch between the Government's aspirations to support manufacturing and grow the export market, and the policy direction of regional government. If we are to achieve growth in this sector, we need a clear strategy based on a solid understanding of the types of manufacturing businesses that require access to the London market and to the broader market through London; and how best these businesses can be supported.

London's strategic infrastructure

In addition to activities which belong to the supply chain of products and services provided to London's residents and businesses; there are a wide range of activities which are part of the strategic infrastructure of London and are critical to the functioning of its economy, e.g. waste, utilities, transport, storage and distribution. These activities typically take up a lot of land, are not particularly attractive and are the least popular uses to retain within a city environment. They may appear at first glance the least location-sensitive. However, think for a moment what might be the implications of relocating an Addison Lee depot outside London, or an Amazon distribution centre. For both businesses, their competitive edge lies in being able to quickly reach their business and resident customers. They are both crucially dependent upon road transport; therefore very sensitive to traffic and delays. The growth in internet retailing will only mean

increased space requirements for this sector; and the trend for retailers is to deliver in record time to retain their competitive edge; Amazon has just launched its same day delivery service. In all these cases there are sustainability arguments to be made, but it is particularly pertinent when considering

land for transport, storage and distribution; where relocation further from the customer base simply adds to time and fuel spent on the road.

Although land for waste, recycling and repair has always been a necessary feature of the London economy - part of the infrastructure necessary to support it - this is an area that looks set to expand as requirements to meet sustainability targets increase, and the potential for the 'green economy' to deliver jobs is exploited. London's low carbon and environmental goods and services sector has grown in recent years, despite the economic downturn, to £25.4bn, employing 163,500 people (kMatrix, 2013). Facilities for the production of renewable energy generation equipment, insulation and municipal recycling tend to be located in purpose built estates in outer London. Powderday building waste recycling centre occupies a site in Park Royal, and makes use of rail and canal infrastructure to transport waste thus reducing lorry movements. (GLA, 2014b: 72).

Although large, edge of London, facilities will still be required, there is a growing trend - exemplified by the CASS research - to localise energy production, and use waste for the production of recyclates. Brearley (2014) argues that recyclate production is increasing in London, becoming a significant type of manufacturing. For example, the Dagenham gasification plant will turn 180,000 tonnes of waste each year into 19MW of energy, while producing metal, aggregate and glass recyclates. Newer businesses, such as Closed Loop who produce food-grade plastic recyclate out of plastic bottles, wanted to be in London because of its stream of waste. The large scale potential of such an approach has been identified by the New Economics Foundation (NEF, 2014), where they called for the closure of City airport in London as part of a regeneration approach for the Royal Docks, based on a new business economy "designed on cradle-to-cradle principles which treat waste as a valuable asset, and where products are made to be reused" (p.7).

As we move further towards renewable energy solutions, we start to see an environmental interdependency between different co-located firms, so that for example waste products from one can be used as an input to another. Chertow (2007, 2000) characterises industrial symbiosis as engaging traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water, and by-products. The keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographic proximity. Since the 1990s, the symbiotic organisation of a power plant, industry and domestic heating in Kalundborg, Denmark have inspired the organisation of spatially proximate uses in a manner which reduces energy use, transport costs, external inputs and waste. In Kalundborg, a power station is used to provide steam and heat to a pharmaceutical firms, oil refinery, municipal district heating network and wastewater treatment plant; the range of interconnections between uses is illustrated below.

On a smaller scale there are a range of enterprises throughout London who focus on recycling and repair which represents part of a broader revived interest in making, mending and 'upcycling'; exemplified in Simms & Potts (2012) 'New Materialism' manifesto, which highlights the benefits of a green economy "characterized by less passive consumerism and more active production, making, adapting, mending, sharing." (p.9). They call for a 'producer society' where skills are developed and people engage in a different relationship with the material world than merely passively consuming goods.

The potential for job creation in the Reuse, Recycling and Remanufacturing (3Rs) industry is big but still in its infancy, argues Leigh (2011). She cautions, however, that it is essential that we have "sufficient industrial land and infrastructure for firms to have local operations" (p.20). This is not an insignificant point, she adds, given the amount of industrial land that has been rezoned for housing and mixed use redevelopment (Leigh & Hoelzel, 2012). In the US, this latter study suggests this is of real concern to cities, who fear that the loss of productive industrial land to other uses might mean that they miss out on new economic development opportunities from advanced and sustainable manufacturing.

A range of other uses that provide critical infrastructure or support for London are accommodated in the rural-urban fringe. Such uses are often pushed out from inner areas by rising land values or problems with the 'neighbourliness' of particular uses. Uses deemed unacceptable in denser areas include car breakers' yards and utilities such as electricity substations and sewage works; uses which require cheaper land include out of town shopping or open car storage (Gallent et al, 2006: 465). Many of these are important service functions for the metropolis (Ibid: 459). The Enfield Experiment, a novel approach to local economic development currently underway in London's northernmost borough, seeks to capitalise on the preponderance of underused land on the rural-urban fringe. An initiative led by the local authority as part of the scheme seeks to revive market gardening on the edge of London (Johal and Williams, 2013: 6), increasing employment and exploiting the commercial possibilities offered by the proximity of food processing operations, restaurants and markets in London.

Cultural and creative industries

The next two categories refer to a wide range of businesses and activities that are utilising space on industrial land in London as it is more affordable and flexible than that available elsewhere. These include the cultural and creative industries, but also a wide range of other diverse activities.

In terms of the first of these, there has been substantial Interest in the last two decades in the contribution of a range of businesses to promoting or producing culture and creativity. It is an extraordinarily difficult category to define and research (see Pratt, 1997), precisely because it includes businesses involved in creating knowledge and generating new designs, as well as businesses involved in the production of things, the production of ideas or cultural outputs (art, music). Pratt (2008) argues there is a "need to focus on the cultural industries as a process that links production and consumption, manufacturing and service" (p. 108). The purpose of discussing it under a separate heading here, is to explore these different types of creative businesses and demonstrate that industrial land is important in supporting not only those involved in production of designed things, but also those involved in the creation of ideas and production of ideas and creative outputs. This latter category might traditionally have sought a less industrial and more 'inner city' location. However, premises on industrial land are increasingly being chosen because of their relative affordability and flexibility. In addition, not all industrial land falls within what we might conventionally think of as 'industrial estates'. Many industrial premises are within the more conventional inner city and town centre landscape, albeit in the backlands or tucked away in less visible locations. More recent employment studies such as Gort Scott's (2013) study of Waltham Forest's employment land, identified 'design/creative' as a separate category in their quantitative

analyses (as well as identifying the sub-category 'artisanal/skilled maker' as part of the manufacturing catogory).

The relatively low cost of industrial premises has contributed to the long running trend of artists in London taking up work and live space in factories and warehouses. Large floorplates, high ceilings and natural light mean that these premises are well suited to artistic production. The specialist accommodation provider Acme Studios has been active in London for over 40 years in acquiring premises. However, most of Acme's buildings are on short-leases and therefore threatened by redevelopment (Acme Studios, 2008a), and they have lost a large number of studios to redevelopment over the years, most significantly during the 2012 Olympics, where they lost 150 studios at Carpenters Road (Acme Studios, 2008b). Although artists have come into favour in recent years, often actively sought out to contribute to regeneration schemes (see Ferm, 2014), the increasing policy focus on incubators, accelerators and coworking spaces (URS, 2014), which deliver higher employment densities than artists, has led to a fear amongst some artist studio providers that they are increasingly going to be sidelined in new mixed use development schemes[14], where there has hitherto been some opportunity to secure affordable studio space (Ferm, 2014). The implications of this are that industrial buildings are likely to continue to be an important source of studio space for artists in the future. Currently a concentration of such artist studios exists in Hackney Wick and Fish Island, and was the focus for the report, Creative Potential (muf architecture, 2009), which sought to develop a strong narrative for the area as a place of great creative potential, in the hope that many of these uses might be protected through redevelopment associated with the 2012 Olympics and legacy proposals.

Peckham Vision, a consortium of individuals who live, work or run a business in Peckham, has drawn attention to the role that industrial land plays in emerging creative industries[15]. They found that the imaginative reuse of industrial floorspace in Peckham has fostered the organic growth of one of London's most dynamic creative and industrial hubs. As a result, they argue that Network Rail's proposed release of industrial land around public transport nodes should be subject to a full assessment of the impact of such releases on local economies. Peckham Vision's activities highlight the importance of the presence of affordable and adaptable old buildings to startups and small enterprises which create a 'self-regenerating' dynamic that benefits the local economy and can serve as an attraction to visitors from elsewhere in London. Peckham is a good example of where the creative industries often occupy space in a manner which breaks down traditional boundaries between production and consumption. Places of artistic production, whilst ostensibly being studios or workshops, can also serve as exhibition space, performance space and residential accommodation.

Peckham is an example where the concentration of creative industries in this location is already developing its reputation as a creative hub. However, some of the more traditional industrial estates, less obviously tied to cultural consumption, are hosting creative industries alongside some more mundane industrial businesses. For example, the Cedar Way industrial estate off Camley Street to the north of Kings Cross includes businesses specialising in fish processing, laundering, salt and gravel storage, as well as photographers and architectural model makers. This is made possible by

[14] Expressed at the GLA's Open Workspace Providers network event, 15 September 2014.
[15] See Peckham Vision's consultation response to the FALP (Peckham Vision, 2014)

the flexible typology of space on the estate, which allows for vehicular access to warehousing units below and a mezzanine floor with its own terraced access to more hybrid office/industrial space above[16] .

The Park Royal Atlas has also identified a cluster of music and film production businesses at Park Royal (such as ARY TV broadcaster, Flash Film Studios and Soundhouse Studios). Shepperton, Pinewood and Twickenham studios are located nearby, meaning that firms such as RDW scenery only have to transport sets and props relatively short distances to these customers. Music production facilities are often sited in former manufacturing premises as they are adaptable and suitable for cost-effective soundproofing. Anecdotally, industrial units and even self-storage spaces are used for informal music rehearsal, as the lack of nearby residential occupiers limits potential noise disturbance problems. Space for the music and film production sector is in high demand but can be relatively hard to come by. For example, a representative from the West London Film Office reported that temporary space for film production (usually up to a year) is being actively sought in the Park Royal area, but demand is not currently being satisfied[17].

There has also been a growth of informal and temporary uses in commercial premises. A trend has gathered pace in recent years for the staging of artistic, cultural and entertainment events in industrial and commercial premises. These spaces are important for the kind of immersive and participatory performances intended by the organisers. For example, Punchdrunk Theatre held a performance in a former postal sorting office in Paddington[18], while a warehouse in Tower Hill and the former electricity board building in Bethnal Green have been used for these types of performances in the past. Similarly, Secret Cinema film screenings have been held at a range of locations in London, including manufacturing and transport infrastructure sites.

Other diverse occupiers

The complexity of London's economy and diversity of its population mean that a huge diversity of businesses are necessarily required to support it. A report by Ramidus Consulting (Harris, 2013) surveyed a small industrial estate of only 17 businesses and found a huge variety of businesses occupying space there (see Figure 1).

Such diversity is not uncommon on London's industrial estates. A number of these might require an industrial location because they require easy vehicular access for deliveries. Alternatively, they might be attracted to the flexibility (and/or affordability) of space available: there was evidence in the report that many of these businesses are adapting the basic shed to meet their needs.

[16] Guided site visit to Cedar Way Industrial Estate led by Elena Besussi of the Camley Street Neighbourhood Forum and Christian Spencer-Davies of A Models Ltd, Bartlett Access to Planning Summer School, 18-21 August 2014.
[17] Launch event for the Park Royal Atlas, Park Royal Business Group, 23 May 2014.
[18] http://www.telegraph.co.uk/culture/theatre/theatre-features/10127892/Punchdrunk-plunge-into-a-world-of-extraordinary-theatre.html

Audio-visual equipment	Recording equipment repair
Cash and carry	Maintenance contractor
Design and manufacture of art	Sweets manufacturer
E-trading	Oriental food supplier
Event catering	Short-run digital printing
Freight forwarding	Specialist gift wrapping
Graphic design	Wine importer

Figure 1 Sample of shed occupiers (Source: Harris, 2013)

Due to the growth of buildings managed by workspace providers and occupied by a collection of small businesses, the diversity of occupiers is not immediately obvious. However, a quick review of buildings occupied by Workspace Group would reveal such diversity. For example, in the Hatton Square Business Centre off Hatton Garden in Clerkenwell, there are businesses connected to Hatton Garden's jewellry industry, occupying the same space as marketing companies, small manufacturers, charities, graphic designers and communications companies. The workspace provider sector itself is also differentiated (see Ferm, 2014 for a fuller discussion). The occupants in Workspace Group's premises differ significantly depending on location, the types of premises (more industrial or more office/studio based) and their location (high value vs low value, within an existing cluster or not). In addition, workspace providers can be commercial organisations (such as Workspace Group), social enterprises or charities. Some charities are more focused on supporting particular businesses; for example Hackney Cooperative Developments (HCD) gives priority to startups and black and minority ethnic businesses and voluntary sector organisations. Therefore, premises on industrial land that lend themselves to multi-occupancy, provide a vital 'perch' to start-ups and a diverse range of enterprises priced out of other types of property in an increasingly expensive real estate market.

A survey of businesses in Charlton Riverside industrial estates by UCL students found that though industrial and manufacturing uses predominate, a range of other activities are also present including cafes and a pub, retail businesses, a climbing wall, and a veterinary practice.

The CAG report for GLA Responding to the needs of faith communities: places of worship (2008) demonstrates that competition from higher value land uses means that faith uses take up space in employment premises. Rapidly expanding faith groups encounter problems in accommodating growing congregations and users of their facilities, and the size and configuration of industrial premises allows relatively large numbers of people to be accommodated whilst avoiding the costs of hiring large halls.

This is supported by quantitative studies. For example, in the Waltham Forest survey, Gort Scott identify two distinct sub-categories of social work/charity and educational/medical/religious within a larger category of Community Providers, which include 17 and 29 businesses respectively (of a total of 365 businesses).

This section has demonstrated that the nature of manufacturing and activities on London's industrial land is changing but it is certainly not dead. In fact, with the growth of London's population, prosperity, ever-increasing preferences for luxury, bespoke and locally-made products, and increasing demands for same-day services and fresh, fast food, these qualitative trends suggest we will need more - not less - of the goods and services currently emanating from London's industrial land. The nature of activities on London's industrial land has been changing – manufacturing itself has seen a shift away from large to small manufacturers, but it remains only a proportion of the total, diverse activity that takes place and contributes to London's diversity and overall status as a world city.

5. INTERDEPENDENCIES IN LONDON'S ECONOMY: A DELICATE ECOLOGY

Assumptions tend to be made by those governing redevelopment and regeneration schemes that small, low-value businesses can simply move 'elsewhere', or worse, that they are old-fashioned and uncompetitive and therefore their decline is inevitable anyway (Imrie et al, 1995; Raco & Tunney, 2010). The previous section summarised evidence on the very vibrant and varied commercial activities going on within industrial estates in London, and revealed the importance of some of these businesses who provide goods and services to London's businesses and residents. This section develops this to argue that businesses occupying industrial premises in London are often part of a very place-specific, local network of mutual dependence, between customers, suppliers, employees and other businesses – in nearby town centres and the City of London. This delicate ecology means that even small losses of industrial land and limited direct displacement can have widespread impacts, leading to indirect displacement of other businesses.

The importance of locality for a manufacturing firm is normally discussed in terms of access to the market, labour pool and transport infrastructure. However, focusing only on drivers behind business location could give us the misleading impression that businesses are footloose and easily relocated if needed. The evidence suggests otherwise, particularly for small firms. Manufacturing firms are often dependent on place-specific supporting infrastructure of other businesses and organisations, customers/clients, social ties and local employees in order to operate, and these networks are not easily reproducible elsewhere. Cox and Mair (1988) argue that a firm's local dependence may result from its relationships – built over time - between buyers and sellers, where the "development of predictability, trust, brand loyalties and unique local knowledge all encourage stable relations with particular customers and suppliers in particular places" (p.309). Industrial SMEs tend to be particularly locally dependent for a number of reasons. First, as small enterprises, they cannot adopt a strategy of acquiring multiple locations in order to spread risk. Second, they rely on a local labour force, who might not have the capacity to move with the company under circumstances of relocation. These workers may have specific skills needed by firms, leading to personnel problems if a firm is forced to relocate. They are also more vulnerable because, unlike their larger counterparts, they may not have the capacity to participate in local business coalitions in order to influence the local economic development process.

Drawing on her empirical work in Williamsburg, New York, Curran (2010) extends this argument on local dependence to emphasise the importance of location to manufacturing firms: "these businesses, and the markets they serve, are highly place specific" (p.873). She argues that urban, inner city neighbourhoods remain good places to do business, and for some firms the very urbanity

of their location are what makes business possible and successful - the historical development of place-specific supporting infrastructure of business, cultural and social networks are critical to the firms' operations and mean that they benefit from the proximity of very place-specific suppliers, customers and a local workforce. To illustrate the importance of a locally-based skilled workforce as a prerequisite for the operation of certain kinds of firm, Curran uses the example of a high-end clothing manufacturer, who stated they needed to stay in their current location because:

> If you look at our employees where they live, it's like a circle around this place. So to move out from the middle of the circle, we'd cause problems for ourselves. It's like a craftsmanship job that we do here, and it's good to have those skilled people to do it. It's not so easy. Certain types of industry, you get rid of these people, and you get other people. And you start someplace else. It's like nothing. Our business is different than that.
>
> (Clothing manufacturer in Williamsburg, quoted in Curran: 2010: 879).

These findings hold true in London, and in industrial locations outside the inner city context. Surveys and interviews of businesses in Charlton, south London (Just Space and UCL, 2013) and on the Olympics site prior to the Games in East London (Raco and Tunney, 2010) also underline the importance of local linkages (suppliers, customers, employees) for small industrial firms and reveal the interdependent relationships that co-evolve between firms and the places within which they operate. In the East London context, these relationships were made evident through businesses' comments on their experiences of negotiating with authorities on imminent displacement. Raco and Tunney found that smaller businesses are particularly vulnerable in the face of redevelopment. All the companies who faced liquidation as a result of the forced relocation to make way for the 2012 Olympic Games, had a turnover of less than £500,000 and less than 50 employees. In other words 'the burden of change fell disproportionately on those least able to adapt' (Ibid: 2079). The biggest problem facing firms displaced by the Olympics was the costs associated with forced relocation – the fact that they could not find similarly priced accommodation and that the compensation they received was inadequate to cover other costs such as staff retention and recruitment, purchase of equipment. Alongside this, the other key problem identified was the inability to replicate customer, buyer and supplier bases elsewhere. Businesses were faced with the difficult choice of accepting significantly more expensive (and frequently inferior) premises in the vicinity, or relocating to somewhere considered affordable but facing the loss of customers/clients and employees, both of which would be costly. The findings also confirmed the very negative impact that uncertainty over a business's future can have on both the investment decisions of business owners, and staff morale, which inevitably impacts on productivity. The fact that the majority of businesses employed local people meant not only that it caused difficulties for the business upon relocation, if they lost staff as part of that process, but also the impact on employees themselves needs to be considered. As this study revealed, the fact that these businesses tend not to pay high wages precludes employees from being able to sustain the high costs of travel if they are forced to commute. In short, there is 'little acknowledgement of the peopled nature of SMEs or the relationships of trust and reciprocity that build up between social actors over time. Disrupting such networks has a potentially devastating effect on a firm's competitiveness and the lives of those who work for it' (Ibid: 2082).

The interdependency of businesses and their locales, and the relationships with local employees, suggests that the loss of industrial land and businesses has a far-reaching impact on other businesses

and the broader economy, but there will also be other, far reaching social impacts. As explained in Camden's Core Strategy (LB Camden, 2010: para 8.12)

> Premises suitable for industrial, manufacturing and warehousing businesses provide jobs for people who would otherwise be at high risk of being unemployed or workless. The Camden employment land review 2008, using data from the National Employer Survey 2003 and the Annual Business Inquiry 2006, found that the skills required for these sectors are fundamentally different from other sectors with similar qualification level requirements, such as retail, leisure and hospitality. Therefore, it is unlikely that the retail or hospitality sectors will provide straightforward alternative job opportunities for people losing industrial/warehousing jobs in the borough.

In addition to linkages between suppliers, customers and employees, we also need to consider those between interdependent firms. In certain London industries it appears that subcontracting is used extensively in the production process. Research by Evans and Smith (2006) in London indicates that the loss of an individual firm is also likely to have repercussions outside the employees of that firm and their families. 87% of clothing firms surveyed by Evans and Smith engaged in subcontracting arrangements mainly with other London firms, so the closure of one clothing firm has a negative impact on firms they contract work out to and firms for whom they provide services. The decline of the clothing industry has led to a decline in the demand for home-workers, further impacting the communities for whom piece work provided an important contribution to household finances.

There are also intricate relationships between industrial areas and London's suburban town centres. This supports ongoing UCL research project on Adaptable Suburbs[19] , which argues that the delicate balance of uses in town centres - including industrial uses - has made them adaptable over decades. The presence of workers (and therefore daytime trade) is critical for the ongoing vitality and viability of London's town centres . The research reveals that town centres have always been about more than retail, and function as complex networked ecologies of movement rather than as simply retail attractors. Manufacturing uses have played, and continue to play, an important economic role as part of the diverse range of uses which are characteristic of many parts of London.

There are some ethnographic based studies of urban environments that are starting to 'get under the skin' of what might be going on behind the scenes. For example, although not focused on industrial sites, Suzanne Hall's recent work on Walworth Road in Elephant & Castle (Hall, 2012) and on Rye Lane in Peckham (Hall, 2013), provides some fascinating insights into how standard land use classifications (such as 'shops' or A1 units) are inadequate in capturing the diversity and interdependence of uses which take place behind a single shop front. She found that many shops have a number of interior subdivisions, allowing much smaller spaces to be 'sub-let' to traders, who sometimes occupy as little as a desk from which to sell their merchandise. Many of these traders have mutually beneficial reciprocal relationships, which serve to enhance their operations. These 'mutualisms' are based around an economic (as well as cultural) imperative, where shop proprietors can collect rental income to supplement that of their retail sales, and small entrepreneurs can afford to try out businesses in very small spaces with little financial outlay. (Hall, 2013: 22). Hall's work powerfully underlines issues around visibility and valuing the activities which go on in a place and she makes a strong case for the value of ethnographic research in making activities visible and

[19] see http://www.ucl.ac.uk/adaptablesuburbs and Vaughan and Griffiths (2013).

appreciating the impacts of diverse local economic activities. The delicate ecology of uses in Rye Lane may indeed be replicated in the relationships found amongst manufacturing firms and their interdependence with other firms and wider town centres and communities. This is a potentially fruitful area for further qualitative research which could reveal some very interesting and complex relationships amongst businesses in industrial areas, and between these businesses and the city or their surrounding town centres.

6. THE FUTURE OF LONDON'S BUILT ENVIRONMENT: A RETURN TO THE 19th CENTURY?

If the arguments developed here resonate, and there is an acknowledgement that we need to provide better support for industry in London, then the question remains how best to do it and we come back to the issue of the merits of protecting industrial land. In London today, there are divergent views. One school of thought focuses on how we can accommodate remaining industry within a mixed-use context (Cotter, 2012, Urban Design Group, 2014). This resonates with the views of the Deputy Mayor for Business and Enterprise, who has suggested that we are going to have to find ways to integrate housing into industrial areas and intensify the built environment: "The idea of an industrial park is really a modern phenomenon" and "what we will return to is a 19th Century model, where industry is mixed around housing"[20]. Although one could argue that this agenda is largely driven by the urgent need to find more sites for housing in London, it is also supported by design-led work by the Urban Design Group that promotes a concept of the "industrious city", which supports bringing more industrious activities into cities, as well as re-appropriating our business parks[21]. This is driven by a desire to support and celebrate manufacturing activity in cities:

> There is an opportunity to move away from the rooted practice to design these sectors out of our towns and cities. Let's make them visible again and stop housing them in anonymous sheds. Let's re-appropriate industrial estates and districts through raising the quality of their design and maintenance. As a result, local communities could have a better understanding of how their local economy is formed and develop a sense of ownership. Let's celebrate manufacturing industry again. (Urban Design Group, 2014: 2).

Such ideas have been put into practice in the Blackhorse Lane draft Urban Design Framework (LB Waltham Forest, 2011). Building on Gort Scott's survey of the industrial land and businesses on the estate, the Urban Design Framework presents design proposals that incorporate and integrate existing businesses and buildings into a development plan that could be commercially viable. The approach is to "support and retain the social/cultural equity of the neighbourhood along with proposals that creatively adapt and re-use buildings". It seeks "to retain and build upon the pre-existing diversity of uses within the area by enabling local businesses and industries to remain in-situ wherever possible. If it is demonstrated that a business cannot be retained within the existing premises, it is proposed to temporarily relocate it within the site, whilst new premises are built. Extinguishment of businesses is to be avoided at all costs." (p.40).

[20] Kit Malthouse, Deputy Mayor for Business and Enterprise, speaking at the GLA Briefing for the Park Royal Business Group, 23 May 2014.

[21] Presentation by the Urban Design Group on forthcoming report Designed for business: creating the industrious city. 18th March 2014, Urban Design Group, 70 Cowcross Street. (see www.udg.org.uk/events/designed-business-creating-industrious-city)

These ideas chime with the messages emerging from this report, on the need to support and build on our existing industrial business base, nurturing the future of these businesses in their current locations. However, there are also strong counter-arguments to this approach. A report on Camden's business premises (Roger Tym & Partners, 2011a) makes a strong case against the integration of industrial premises and residential uses, particularly what they term 'vertical separation', where business uses are accommodated on the ground floor, with residential uses above. Based on their experience of the industrial property market and demand for different types of premises, they argue that although occupiers are generally prepared to compromise on the quality of the building stock and price, they generally do not compromise on key locational features such as proximity to customers, unencumbered access and sufficient distance from residential neighbours to enable 24 hour operation without complaints. Therefore, because "Camden's main strength is its location, most occupiers will compromise in all aspects of their space requirements and pay a premium to secure a location close to central London" (Ibid: 14). They report many new mixed use developments with industrial space on the ground floor that remain un-let and argue that developers tend to pay little attention to the design and specification of the industrial part of the development, treating it as a 'loss-leader' and may even have in mind a future change of use to residential.

Furthermore, mixed use environments are not without their problems (see Foord, 2010) and presumptions about the benefits need to be balanced with the important function of employment land being to protect lower-value commercial uses from the rising land values of the inner city and competition from higher value land uses, in particular housing. To date, there is no effective mechanism in the UK context to protect employment land values within a mixed-use area. Rather, there are likely to be knock-on effects of the loss of employment land to mixed-use. First, the price of remaining employment premises (the old stock) would increase, according to laws of supply and demand, and new employment floorspace created within mixed-use redevelopment schemes would be let at significantly higher prices than the employment floorspace it replaces (Ferm, 2014). Second, the expectation by developers that mixed-use redevelopment can be achieved raises land values across the industrial area and means that new commercial development is less viable (Roger Tym & Partners, 2011a: 13).

As discussed in section 2, when we set out the arguments for and against industrial zoning and protection, arguments against planning control and interference are often made on the basis that this interferes with the market-led mechanisms that promote agglomeration. However, due to the susceptibility of industrial uses to displacement by higher-value land uses, a counter argument to this is that we need to protect industrial land if we are to create the conditions for industrial agglomeration to occur at all.

> A successful industrial district requires a critical mass of business, and the existence of that critical mass depends on the availability of industrial land. Rezoning not only shrinks the amount of available land legally available for industry; it drives up prices in broad areas where industrial businesses are located, produces uncertainty about long-term capital investments in industrial operations, and invites conflict with nearby residential and retail uses...If urban industry is to survive, not to say thrive, it needs protection from market forces… treating industry as a relic justifies the conversion of industrial land to other uses,

> thereby further weakening the possibility of industrial revitalization. And like farmland, once lost, industrial land is gone forever. (Bronstein 2009: 30)

Critics of the smart growth agenda (Bronstein, 2009; Leigh & Hoelzel, 2012) also argue that protecting industrial land is wrongly seen as undermining sustainable land use. On the contrary, sustaining urban industry "fends off urban sprawl" (Bronstein, 2009: 28) caused by outward movement of industry. It also promotes more sustainable transportation between businesses occupying industrial land and the other businesses they serve and interact with.

Reconciling these different viewpoints is not straightforward and there are no doubt merits on both sides of the argument. There may be benefits of further integration between some businesses occupying premises on industrial land and residential uses. However, we need to be very careful that we do not negatively impact on or risk displacement (either direct or indirect) of existing businesses. In order to ensure we fully understand the potential impacts of any proposed policy in this area, we suggest that there are four areas of fruitful research to be pursued. First, we need to better understand the workings of industrial areas and their businesses, through utilising more qualitative and ethnographic methodologies, drawing inspiration from the work of Suzi Hall, Laura Vaughan, Gort Scott and others. Second, we need a better grasp of the impacts on land values of introducing residential land use into industrial areas. Third, a finer-grain understanding of the types of activities and uses that can co-locate with residential uses is required. This could be effectively informed by international examples, for example in San Francisco and Los Angeles, there are said to be effective models of co-location of residential and high-tech manufacturing. Finally, we need to do further research on how to protect land values within a mixed use context, with a view to reforming the planning system to facilitate this.

7. CONCLUSION

The introduction to this paper set out a conundrum for London's politicians and policymakers; namely where to accommodate new housing in London, which is required to meet the projected population growth. Given parallel projections for jobs in manufacturing and industry produced by the Mayor's office, it is evident that the policy choice has, in many ways, been simple. The figures seem to suggest that London's industrial land, although once important, will not be of much use to us in the near future. Therefore releasing industrial land over time to housing and mixed use development, will allow us to accommodate growth and promote a transition to a more compact city. However, if you speak to businesses occupying industrial land, community groups and interested academics, a rather different picture starts to emerge. This paper therefore sought to capture and present this evidence and alternative narrative, which paints a different picture and strongly suggests that there is, in fact, substantial cause for concern.

The first concern is that the ongoing loss of industrial land in London today is not being driven primarily by deindustrialization, but by real estate speculation. Such speculation is fuelled by any indication in planning policy that industrial land might, in fact, be up for grabs. This tension is not sufficiently acknowledged either in emerging planning policy or in studies that assess demand and supply of industrial land. Predictions of future employment in manufacturing and industry importantly do not take into account the role that development pressure and planning policy have played in past loss and therefore predictions based on historic trends are invalid. These findings have clear implications for planning at the London level and the way in which boroughs work with

the Mayor's policies on managed release of industrial land at the local level. Importantly, the Government's proposed extension of Permitted Development Rights to facilitate the conversion of industrial premises to housing without the need for planning permission (DCLG, 2014) will exacerbate the problem and make it even more difficult for local authority planners to make effective decisions on proposals that would result in a loss of industrial land or premises.

In contrast to what the downward spiraling projections suggest, evidence on the ground indicates that manufacturing is changing, but it is not dead. We are seeing an ongoing transition towards smaller manufacturers in general with a revival in artisanal manufacturing, and a growth in smaller food and drink manufacturers, which is more than compensating for any losses of larger manufacturers. The evidence from London supports Curran's observation in Brooklyn, New York: "those businesses that could, left the city long ago; those that remain are the ones that need to be there or have a business advantage because of their urban location" (Curran, 2007:1429). Outside the sphere of planning, there are many more positive discussions, studies and statements being made about the future of manufacturing in advanced economies. However, such optimism is not reflected in the London Plan or its alterations, which suggest that the managed release of industrial land in London is unproblematic.

The analysis here has also revealed the extent to which London's industrial land is accommodating a wide range of other businesses and activities, aside from manufacturing. Alongside (and in many cases closely linked to) the manufacturing businesses, a variety of service-oriented businesses occupy industrial land in London and together they play a vital role in supporting London's businesses and residents; providing the vital support that London needs to thrive as a global city. Large parts of industrial land also accommodate the infrastructure required for London to function at a basic level. The fundamental importance of these businesses and activities for London is necessary to reiterate. However, the study also revealed an often-overlooked role for industrial land, particularly in a high value city with overheated property prices such as London. This is that industrial land – through its separation from higher value land uses, such as housing – is naturally more affordable. Coupled with the flexibility of many industrial premises, which can be easily adapted, this has meant that a whole range of businesses and activities are occupying industrial premises, because they cannot be easily accommodated elsewhere. These include artists and creative industries, faith uses, diverse businesses that require hybrid office/industrial premises, charities, educational and community providers. Many workspace providers are, in fact, capitalising on demand from such a diverse group of occupiers, and this is fundamental to their business model, which relies on acquiring premises or land for development in industrial areas. The importance of many of these uses for London's reputation as a world city is known, but the fact that many are threatened through loss of industrial land is perhaps less so.

The fact that many of the smaller businesses and activities on London's industrial land are hidden and difficult to research means that we are a long way from being able to assess the potential impact of loss of industrial land. In addition, the analysis has revealed that businesses on industrial land tend to be part of a delicate local ecology, relying on close-knit networks of customers, suppliers and employees. This suggests another cause for concern, which is that the relocation of these diverse, small businesses - as part of redevelopment schemes - is much more problematic than often appreciated. Recent ethnographic studies conducted in smaller retail areas and on industrial land show a promising way forward to getting 'under the skin' of what is going on in order to

evaluate the importance of many hidden activities and assess potential impacts of relocation. Such an approach will be vital to understanding the broader impact on surrounding communities; the loss of valuable jobs, services and community facilities.

There is a potentially broader impact hitherto not explored fully. This is that industrial areas in London are often surrounded by areas of lower-value housing, naturally more affordable to people on low and middle incomes. For example, the residential areas adjacent to the proposed Mayoral Development Corporation for Old Oak Common (within the London Borough of Hammersmith and Fulham)[22] have higher proportions of social housing, higher numbers of housing benefit and council tax benefit claimants than other parts of the borough. Redevelopment of industrial land will have a knock-on impact on surrounding land values, creating the trigger for regeneration in many areas of London that have been hitherto cushioned from its impacts. Residents in areas due to be affected by major redevelopment of industrial land are concerned about (a) the impact on land values over time and that existing residents (and employees) will be displaced from the area through rising rents and property prices; and (b) that new jobs provided in any future redevelopment will not provide suitable jobs for local people; either they will not directly benefit, or the jobs provided will be low-value jobs in retail and hospitality[23].

This paper has grappled with the divisive question of whether or not the continued separation of industrial land is desirable. We have asked, whether it is possible, through clever urban design, to accommodate businesses currently occupying industrial land within a higher density mixed use context? Such optimism is prevalent but ultimately does not address the fundamental problem, which is that there is currently no effective mechanism within the UK legislative and planning system to manipulate land values within a mixed-use context. Even if one could address – through design or legislation - the concerns of industrial occupiers regarding the proximity of housing and the resulting restrictions on their operations, how could one prevent the ongoing loss and displacement of the lower-value industrial land uses within such a mixed-use context? To date, employment-led mixed use has been notoriously difficult to achieve and negotiate. Rather than try and redevelop the whole of London into new mixed-use quarters, we need to acknowledge the importance of industrial land as a vital component of a compact, smart city, not a barrier to achieving it (Bronstein, 2009; Leigh & Hoelzel, 2012). Therefore, although we have sympathy with the position of many urbanists and economists who deride the concept of land use separation in the modern urban context, we feel that - in London at least - the imbalance of land values and the strength of the residential property market means that we now have little alternative.

This review has helped to reveal and make visible the businesses on London's industrial land and their importance for the future of London's economy and Londoners' well being. However, it represents only a first step towards a more comprehensive understanding of contemporary London's industrial land. This analysis has not been able to paint a comprehensive picture of

[22] Hammersmith & Fulham Borough Profile 2014 accessed 18 November 2014 at: http://www.lbhf.gov.uk/Images/14_62ds_71424_councillors-induction_10borough_profile_rev5_tcm21-188745.pdf

[23] Grand Union Alliance Conference (Local Employment workshop), 15 November 2014, Tavistock Halls, Harlsden Methodist Church.

London's industry, the geographical location of different niches across London, or provide a comprehensive account of the activities on it. However, it has served to challenge some myths. One important gap in our knowledge – which has not been addressed by any known contemporary or historical study to date - is that we do not adequately understand the nature of the relationship between different industrial areas across space and time. For example, one of the interviews conducted through the Park Royal Atlas revealed that the business had located to Park Royal after having been displaced from another industrial site in East London; and the survey revealed that most businesses in Park Royal were established businesses, rather than start-ups; in other words Park Royal was a destination that they moved onto. This suggests that there are other industrial areas in London that are better serving startups, but we know little about how businesses might move around from one to another, and what the impact of such moves are. It suggests that there are implicit functional relationships between different industrial sites in London, and that businesses have different needs at different stages of their lifecycle. This is just one of the potential avenues for future research if we are really get under the skin of the role of London's industrial land.

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