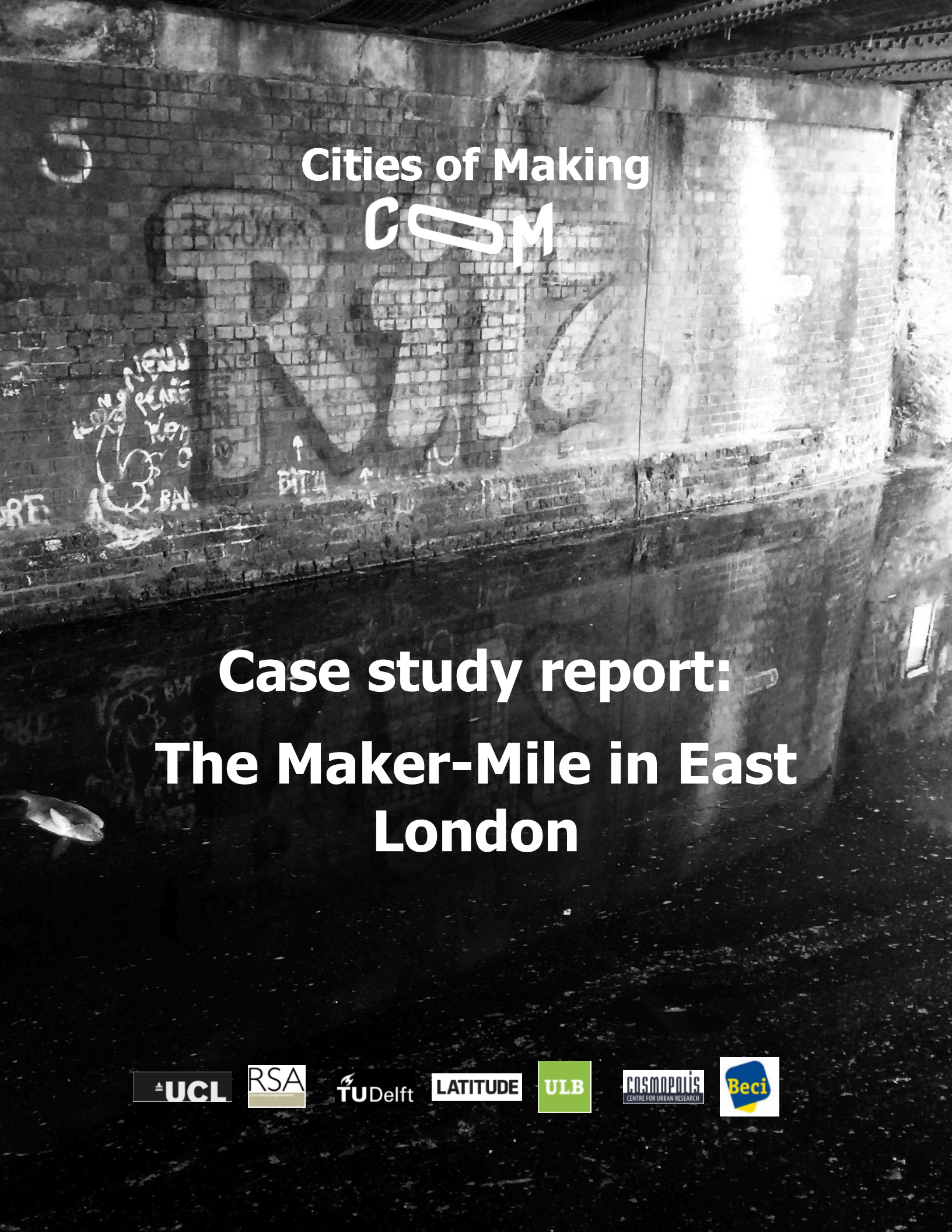

Cities of Making

Case study report:

The Maker-Mile in East London

UCL RSA TU Delft LATITUDE ULB COSMOPOLIS CENTRE FOR URBAN RESEARCH Beci

Cities of Making Report

Case study: London Borough of Hackney

Sustainable Urban Manufacturing report

Cities of Making (CoM) explores the future of urban based manufacturing in European cities in terms of technology, resources, place, and application. CoM uses a combination of strategic and action research resulting in concrete projects. Our ambition is to identify what works in supporting a resilient and innovative industrial base and to test those solutions in a real-world setting.

The team: The project brings together a dynamic, multidisciplinary team from Brussels (BECI, Latitude, ULB and the VUB), London (UCL and the RSA) and Rotterdam (TU Delft) – which gather a breadth of competencies in resource and technology, industrial ecology, circular economy, urban planning, governance, strategy, social dynamics and more.

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London, UK, June 2020

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1. Overview of the research area

1.1 Summary and rationale for choice of case study

This case study focuses on making and manufacturing in the London inner city area of Hackney and Tower Hamlets, known as the 'Maker-Mile'. It illustrates how manufacturing and making has historically and dynamically become embedded into a mainly residential-commercial part of London, with makers being distributed across the area as opposed to being isolated in industrial estates. Manufacturing and making has evolved substantially in the area over the decades from distinct pockets of manufacturing to more mixed-use spaces where manufacturing, residential and commercial activity concur in the same space. Currently, manufacturing generally work well with residential uses in the area, partly because most processes are non-polluting and relatively quiet.

This part of London is a buzzing creative centre, benefiting from both networks of local artists, and spill overs from the Shoreditch tech sector. The area also attracts relatively well-off residents and visitors, who have high levels of purchasing power – meaning that firms can access an attractive local consumer market, both for their products, and for off-shoots such as training and leisure activities. As a result, local manufacturers have diversified into a number of different

activities, where the boundaries of manufacturing dilute into commercial, design and training. The informal networking that the area supports appears to be helping to promote innovation and collaboration. Local 'maker spaces' – such as Machines Room - have also provided opportunities for the sharing of both technology and ideas.

However, the area also presents a number of important challenges to its makers – not least rising property prices and business rents. In recent years this is causing many makers and manufacturers to close down and leave– and indeed maker spaces are also under threat and having to contract in size. In addition, it was notable that manufacturers in the area were having to source suppliers at an international scale, highlighting the hollowing out of the UK and London supply chain in many sectors. There was also a lack of knowledge as to the nature of waste flows, and the possibilities represented by the circular economy. While local policy makers and networks are aware of these challenges, more resources are needed to support a more comprehensive mapping of the manufacturing sector in this area. Local planning systems could also do more to ensure that basic and affordable industrial premises are protected.

1.2 The boundary of the area

The study area for the Vyner Street case study has its epicentre at the intersection of Mare Street and the Regent's Canal. This point marks the centre of the 'Maker-Mile', a one square mile district of creative businesses related to making and design[1]. This initiative was founded by Thomas Emarcora - an architect, urbanist and technologist - following the idea that all urban dwellers need to become 'city makers' to promote urban sustainability. The 'Maker-Mile' has been included for several years in the "London Design Festival' as a Design Route, essentially a cluster of design-related activities concentrated within walking distance[2].

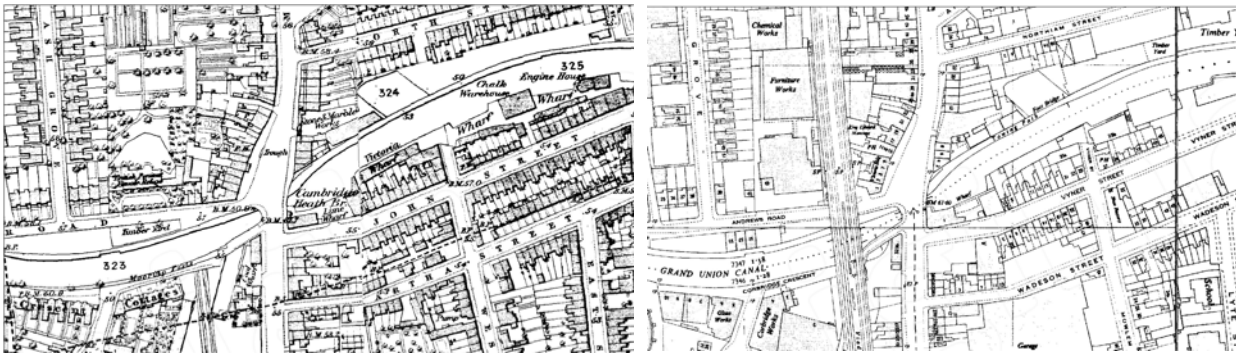
To define the study area, instead of adopting any sort of administrative or geographical boundary, we demarcated a one-square-mile area circle. However, the boundaries of the study have then been relaxed to include other relevant activities happening in the area beyond the one mile radius, which contribute to explain the nature of manufacturing activities represented in the area. During the site survey and interviews, we later discovered that some of the businesses in the directory had a vague idea of the 'Maker-Mile' and that the 'self-imposed' label was not reflecting the rich manufacturing history of the area, which partly explain current innovation dynamics. Also, it is worth noting that although the 'Maker-Mile' spans across the Hackney and Tower Hamlets local authority boundaries, the 'design capacity' of the area was earlier documented by 'Designed in Hackney' in 2012[3] by Dezeen, a popular worldwide online design magazine. The data we collected and analysed was circumscribed to this study area boundary in Fig 1.

[1] See page 98 in the Cities of Making 'Cities Report'
[2] See: https://www.londondesignfestival.com/mare-street-maker-mile
[3] See: http://www.designedinhackney.com/

Fig. 1 The study area in East London has a mixture of building typologies and open green areas that are spatially organized around the Regent's Canal and Mare Street/Cambridge Heath Road.

Historically, the 'Maker Mile' area appears to have been a primarily residential neighbourhood, with industrial uses being found cheek-by-jowl with terraced housing. However, in the first half of the 20th century, parts of the area were redeveloped providing space for larger scale warehouses and factories[4] (see the map below showing the Vyner Street area).

[4] https://vynerstreet.wordpress.com/about/



Note: at this point Vyner Street was called John Street.

Fig. 2&3 Vyner Street area transformation from a residential to industrial area. Source: Edina Digimap: County Series, 1:2500 First edition 1877 and National Grid 1:2500 for 1955. Landmark Information Group Ltd and Crown Copyright 2020.

The 'Maker-Mile' now includes a wide range of types of manufacturing including hardware start-ups, artist and design studios and food businesses. Until recently, Vyner Street was the site of a buzzing art and gallery scene – similar to the area of Hackney Wick elsewhere in East London. The industrial buildings in the area were converted into hip artist production and show spaces. The scene has now died down, but a few galleries remain. On the other side of Mare Street, South of Regents Canal, there is an area known as the Oval Space, which hosts a wide diversity of different types of commercial space, with the creative sector being particularly strong. There are also a number of sites where containers have been piled high and used as commercial units, hosting both makers and designers and other types of use.

Fig. 4 'Containerville', a building of containers offers a new typology of industrial units

To the north of Vyner Street is London Fields, and the Broadway Market, which attracts in many people at the weekends, and has been associated with a 'hipster' community in recent years. The Broadway Market street is well-connected into the surrounding neighbourhood, generating a buzzy flow of makers, consumers and local residents moving around the area. In the map below, Space Syntax analysis is used to show the streets that are particularly likely to have pedestrian movement and interaction (with the streets most likely to support through movement of pedestrians and movement in red, going down to dark blue for relatively isolated streets).

Fig. 5 Map showing likely through movement ('choice') in the area at the 2km radius identified through space syntax analysis - source Space Syntax Ltd's Openmap. Source: https://spacesyntax.com/openmapping/

Taking into account the 2011 Area Classification[5] generated using census data, the study area is characterized by 6 groups (see Table 1, Annex). According to the classification, these groups and 'the descriptions of them are intended to be illustrative of the characteristics of areas in terms of their demographic structure, household composition, housing, socio-economic characteristics and employment patterns'.

[5] See details: http://webarchive.nationalarchives.gov.uk/20160110080540/http://www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/ns-area-classifications/ns-2011-area-classifications/index.html

Fig. 6 The range of groups profiles reflects the mixture and diversity of the area, although these groups tend to be mostly segregated.

The map reveals that there is a prevalence of the 'Aspirational techies' and 'Endeavouring Ethnic Mix', with the first group mainly being employed in information and communication industries, which corresponds well with cluster of industries found within neighbouring Shoreditch. It is also interesting to note the presence of the 'Aspiring and affluent' and 'Inner city students' groups which might be associated with the liveliness of the area. According to these group illustrations, the households in the area are most likely live in flats, semi-detached or terraced, socially and privately rented housing units.

At street level, the area shows a concentration of retail activities along Mare Street/Cambridge Heath Road. The density of retail activities is also high in Broadway Market street, which has a variety of small and independent businesses on a street stretch of fewer than 300 meters. Office activities are less prevalent in the study area but there are some spots of concentration in Vyner Street, which has a concentration of architecture offices. As in other parts of London, we observed the recent arrival of flexible office space businesses for freelancers like WeWork and Second Home, being the last one a workspace with a nursery attached. The OpenStreetMap survey shows

that industrial land predominantly groups near both sides of the Regent's Canal. Within these, the 'Bethnal Green Gasworks', 'Ash Grove Bus Garage' and 'Best Ways' stand out.

Fig. 7 Ground level relevant activities in the study area. Analysis by the authors with data collected from OpenStreetMap

1.3 Hackney as a brand

We noticed that this high concentration and mixture of activities has its roots and overall design, artistic and manufacturing tradition dating back many years in the area. In 1994, Hackney was considered the borough with the higher concentration of residing artists in Europe[6]. It could be argued that this situation constituted the base of what was later identified as an 'incredible diversity of design talent' by the Designed in Hackney Festival. Today, products that are 'made in Hackney' take advantage of the creative tradition of the area and local manufacturers use this as a branding strategy with pride.

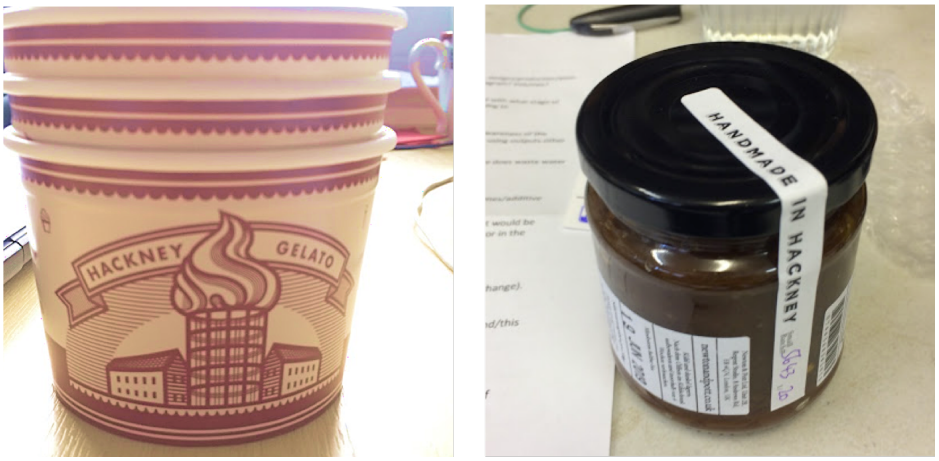


Fig. 8 Ice cream tub by artisan gelato makers 'Hackney Gelato' showing the Gasometer as a landmark, and the 'HANDMADE IN HACKNEY' label signalling the added value of every jar produced by the preserve-makers 'Newton and Pott'

[6] See https://www.independent.co.uk/life-style/hackneys-divine-holograms-1414539.html

This year, Hackney also hosted a large maker festival – the Make More Festival for Doers and Makers, helping to build business-to-business relationships, which one interviewee had benefited from (although another interviewee felt that there were less maker fairs in London than in other global cities).

1.3.1 Presence of 'incubator' buildings

Hackney is also home to a number of higher-rise buildings which offer smaller workshop spaces for manufacturing firms, potentially helping to incubate new businesses and provide networking opportunities. One of these is Regents Studios, which was home to Hackney Gelato, while another is Netil Studios where another of the interviewed firms started out. Regents Studios was originally designed as a set of industrial units as part of a vertical tower block more usually associated with residential.

1.4 Planning and public policy

The Maker-Mile area straddles two London Council boundaries – Tower Hamlets and Hackney. These two Councils have their own economic development policies and planning restrictions. For the purposes of this study, a meeting was held with Tower Hamlets Council to find out more about their policies towards manufacturing firms. It is interesting to note that Tower Hamlets council has put restrictions on conversion from commercial to residential uses along Regent's Canal[7].

Fig. 9 Excerpt from Tower Hamlet's online Environment & Planning summary map. Source : http://towerhamlets.maps.arcgis.com/apps/webappviewer/index.html?id=b0448c3d9f254bf683e200174fc3f729

[7] More information about planning guidance on industrial land in Tower Hamlets council can be found here: https://www.towerhamlets.gov.uk/Documents/Planning-and-building-control/Strategic-Planning/Local-Plan/Evidence-base/Existing-research/LDF-Industrial-Land-Study-sub.pdf

Some of the makers and manufacturing firms in the area are part of the East End Trades Guild, which is an alliance of 250 small independent businesses, that has been lobbying, for example, for more affordable commercial spaces as part of an Affordable Workspaces Manifesto.

There are also several sectoral networks within manufacturing e.g. the Maker-Mile network itself (which e.g. shares a Makers books collection), in addition to international networks such as the Hardware Club (which supports Hardware start-ups).

2. Study Methodology

2.1 Data collection method

The dataset of economic activities used in the study was created by gathering information from the following sources and filtering criteria:

Data source description	Source	Filtering criteria and stages all	Subtotal number of records
European Classification of Economic Activities. NACE.Rev.2	FAME database (Financial Management Made Easy). Data collection published by Bureau van Dijk (Other activities classification/All NACE Rev. 2 codes/ Display first value only)	Selection of codes groups according to the perceived impact of the economic activities in the study area (81 codes, including e.g. Media) Second iteration excluding service-related economic activities (e.g. tourism, restaurants, publishing - 59 codes)	517
Maker Mile and Web research	Maker Mile website http://makermile.cc/ (location and contact information) www.londondesignfestival.com/maker-mile-monday (Maker Mile design route description)	Selection of activities that involved the material production of something. For example, making 3D objects (design firms and showrooms were excluded).	29
Field observations	Mainly on-site building directories	Selection of firms in the manufacturing business (manual online content analysis of firms' websites).	16

The categorization of the manufacturing activities of the area was achieved through an analysis of prevalent types. The FAME dataset contains a trade description attribute that was used to classify the observations. We took these as a base to classify the remaining activities collected

from web research and field observations. The following table summarizes the manufacturing activities of the area with illustrative examples for each of the 11 categories.

Manufacturing category	Trade Description (name of business)
Computer, Software and Hardware	Computer kits manufacturers for educational purposes (Pi-Top, Kano); Wireless electronic kits for coding (SAM Labs); Computer consultancy activities (Studio Ponto Ltd)
Design and Artistic	Design studio working on interior, landscape, lighting & furniture (Taylor Hawkes); Specialised design activities (Studio Parallel Ltd, Hyphen Design Ltd)
Media and Production	Motion picture production activities (Systir Productions Ltd, Alchemy Films Limited); Other photographic activities (Millennium Images Limited)
Clothing, textiles and accessories	Manufacture of other wearing apparel and accessories (James Ince & Sons (Umbrellas) Limited, The Costume Workshop Ltd); Manufacture of men's outerwear (Trimtex Clothing Company Limited, Tweed Addict Limited)
Food and beverages	Manufacture of bread; manufacture of fresh pastry goods and cakes (E5 Bakehouse Ltd., The Bread Station Limited); Handmade preserves, makers and wholesalers (Newton and Pott)
Other manufacturing	Neon and other sign makers (Vinyl Projects); Spoon carving related, shop and courses (Barn the Spoon); Manufacture of musical instruments (Mander Organs Limited)
Waste, recycling, repair and renting	Collection of non-hazardous waste (Great Eastern Waste Limited, Waste Oil Recycling Ltd); Repair of consumer electronics (The Macsmiths (Of Hackney) Limited, C4goods Limited)
Printing	Printing (Dmt Design Web And Print Limited, Hato Press Ltd); A boutique London print studio - in-house litho, foiling, letterpress and hand-finishing (Avenue Litho)
Furniture	Manufacture of office and shop furniture (Produce The Goods Limited, Fabbed Limited); Manufacture of other furniture (Rhmb Limited, Seccaroni Joinery Limited)
Transport and cargo	Cargo handling (Vintage Cargo Company Limited, Sym Logistics Co Ltd)
Metal working	Traditional foundry (James Hoyle & Son); Manufacture of other fabricated metal products n.e.c.(Fagring International Ltd)

2.1.1 Interviews

After the initial mapping of manufacturing activities, these were grouped by sector of activity and a representative sample was selected across different sectors, business sizes and locations. The sample also included relevant stakeholders such as local council representatives and informal conversation with other relevant collectives which promote manufacturing activities in the area. A total of 9 formal interviews and site visits and 3 informal brief discussions were undertaken, as summarised in table below.

Company name	Sector of activity	Date
Bare Conductive	Manufacture of electronic kits	29/06/2018
Newton & Pott	Manufacture of food products	11/07/2018
Hackney gelatos	Manufacture of food products	02/07/2018
Chelache Knitwear	Clothing	01/08/2018
Earl of East	Artisanal	11/07/2018
Taylor Hawkes Design	Furniture	09/07/2018
Ince Umbrellas	Accessories	04/07/2018
East End Trades Guild	Trades association	10/08/2018
Tower Hamlets Council	Government	14/08/2018
MacSmith*	Computer and software	07/08/2018
Fab.pub*	Computer and software	07/08/2018
B3 studio*	Computer and software	07/08/2018

3. The nature of manufacturing in the area

The mapping exercise identified 562 manufacturing activities, as defined above. The bar chart below shows the breakdown of the 562 manufacturing-related activities according to manufacturing category.

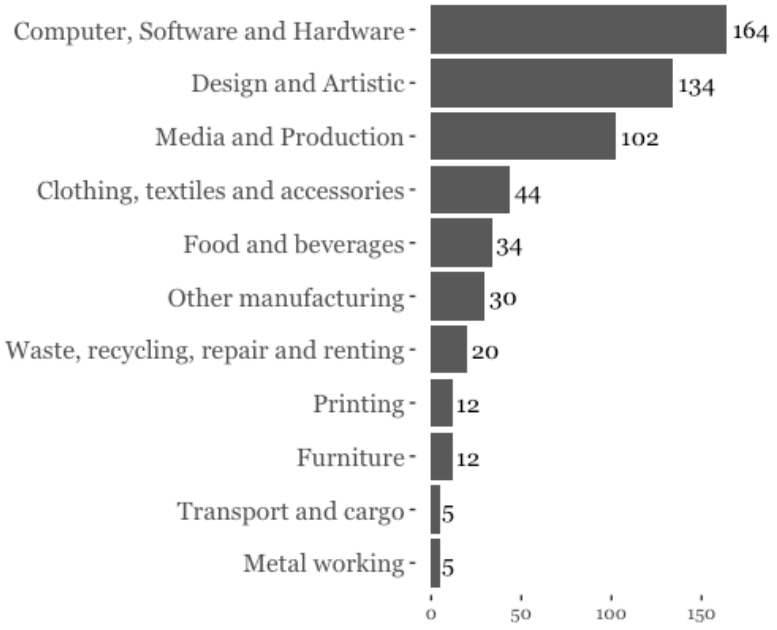


Fig. 10 Summary of the nature of manufacturing in the study area

The area is clearly dominated by the top 3 categories which account for more than half of the firms in the area (400 out of 562). Although, some these might not be strictly associated with the manufacture of things, they fall under the broader class of creative productions and specialized industries and they rely on associated manufacturing activities and production spaces, many of which are located in the area. It could be argued that this dominance not only gives shape to the creative capacity of the area but can also be considered as creating potential market base for local manufacturers (e.g. film makers as customers for costume makers[8]) that unveils the close links between manufacturing, design, innovation and creative activities. The next group of 3 categories (108 firms in total) can be associated with more traditional type of manufacturing related to textiles and food. Also, in this group is 'Other manufacturing' that includes less conventional approaches to manufacturing such as digital fabrication and bespoke manufacturing. Finally, the last group of 4 categories, with 54 firms, includes manufacturing activities closely related to the build environment sector, which may in some case involve heavier equipment, movement of goods and processing activities with associated environmental effects that need to be monitored to ensure compatibility and coexisting with other uses within the urban environment. The scale of these activities tends to be small and therefore potential nuisances relatively small. Also, in these cases, separation of activities in space shows organic forms of evolution of activity clustering.

The analysis of the spatial distribution of the categories shows that the activities, in general, spread evenly across the study area, which evidences the coexistence of manufacturing activities with residential uses. However, a closer look shows some clustering of activities in certain locations. For example, the density of 'Clothing, textiles and accessories' activities is higher in Regent Studios. Similarly, 'Media and Production', tends to group around the Vyner Street area, and 'Design and Artistic' is dominant in the adjacency of Netil Market. On the other hand, 'Metal working' and 'Printing' show a more linear spatial pattern along the railway and Hackney Road respectively, in line with more historical evolution of manufacturing along main logistic routes.

[8] See part 3 of 'Regent Radio' radio show by Carl Turner Architects for the London Festival of Architecture 2018 https://www.mixcloud.com/199Radio/playlists/regent-radio/

Fig. 11 Spatial distribution by manufacturing categories in the study area

3.1 Makers or manufacturers?

The boundary between a maker, a new spin of urban based small-scale technology savvy manufacturers, and more traditional manufacturers is possibly an artificial one. The sample of interviewees selected could be placed on a continuum along more traditional to more innovative forms of manufacturing, with most of them sharing some core of opportunities and challenges of being based on urban areas. Some firms defined themselves as makers rather than manufacturers, although the definition of what constituted 'a maker' varied. For example, one firm thought that they were makers because they were small-scale, and they varied their production according to the season. Another classified themselves as makers because they were more involved in designing and prototyping – people who come up with the ideas, develop solutions, connect the dots; as opposed to manufacturers who physically make and sell things. One company felt that they had set up a 'laboratory' or a testing ground – to produce in larger batches they would have to up production significantly and cannot afford the space e.g. A large retailer might want to make orders of 6 pallets of preserves at a time, but just 1 pallet takes 6 weeks to make).

3.1.1 The power of making

The interviews showed that manufacturers are not only motivated by direct commercial sales from their products. Making is also a way of thinking, inventing and innovating. To borrow an idea from a V&A exhibition about the role of making in our time[9], making in this broader sense, '*is the most powerful way that we solve problems, express ideas and shape our world*'. It can be useful for more knowledge-based services and hi-tech firms to also include an element of 'making' in their activities in support of their overall creativity. For 'Bare Conductive', making prototypes was a way of thinking and developing new products and applications of their electrically conductive paint, which was considered even more crucial to the business than its core product itself. Selling products commercially can also be a useful side-line for artists wishing to support their broader work.

It was also interesting to observe that while firms were adopting new digital technologies, they were also combining these with more traditional techniques as a means of opening up new creative directions. The preserve-producers Newton and Pott declared that they were "*following very old ancient techniques and I think that's a beauty of what I'm doing and why it is valued*". The furniture designers Taylor Hawkes digitally fabricate furniture while also revisiting ancient Japanese joinery techniques.

3.1.2 Diversification

The businesses in the area appear to be diversifying into a number of areas – not only manufacture but also retail/wholesale and training. In particular, the cultural appeal of making to local residents was being exploited through complementary training activities, with firms teaching local residents how to make certain products (e.g. food preserving techniques by Newton and Pott, wood carving by another local firm called Barn the spoon, and bread making by the E5 Bakehouse). This helps local firms to stay in the area and expand (e.g. through writing and selling books about preserving alongside manufacture). In one case a manufacturer (Earl of East) was using their ground floor space to sell their own products (candles), but also other locally manufactured products (ceramics, local crafts) while also offering training in candle making on their premises. Another interviewee noted however that it can be risky providing training, as it might risk giving away production secrets.

3.1.3 High local turn over?

There is evidence of a relatively high turn-over of some firms. While one company was over 200 years old (Ince Umbrellas, originally established in 1805), many were relative newcomers e.g. Hackney Gelato was 4 years old while Newton & Pott was 5 years old. The traditional industries have been pushed away by rapid transformation of the area but also some of the characteristics

[9] See http://www.vam.ac.uk/content/articles/p/powerofmaking/

of the area which its uncommon combination design skills, traditional manufacturing base, artists and software-hardware spin offs from Old Street tech hub have favoured the emergence of new innovative businesses in different sectors from tech to food or fashion.

3.1.4 Who is employed/what skills are used?

The companies interviewed were mainly small, employing between 1 and 12 staff, with others being employed on a flexible basis (see below). The managers of the companies came from a variety of backgrounds – artists, engineering, advertising, product design, chefs. A considerable number were artists (e.g. Taylor Hawkes Design, Bare Conductive, Chelache, including from the Royal College of Arts Product Design programme which supports 'creativity for purpose').

When looking for staff, local makers do not necessarily seek people with formal qualifications – often firms are looking for people who are able to operate machines and do routine work. Generally, recruitment was seen to be difficult, as staff with technical skills were difficult to secure (see below). For example, there were particular concerns amongst textile-related firms as to a lack of basic machinists in London. There seemed to be discrepancies between skill sets available and required. In fashion sector, applicants tend to be overqualified in other ways but lacking in basic machine skills. It was identified as being easier to recruit people with such skills from overseas (particularly Eastern Europe). Part of the issue may be that local people find repetitive work to be unappealing or that the progressive lost of industry have led to important knowledge gaps in technical skills. This may have implications in future innovation capabilities in key sectors.

3.1.5 Flexible working

Manufacturing is often done as a second job in Hackney. One firm was run by two people who also worked in advertising. In another case, a manager was happy that his staff generally had other jobs because it meant that he could offer flexible work contracts without worrying that this would lead to instability for the workers.

3.2 Why do manufacturing firms choose this location?

London was seen as a positive location for manufacturing businesses due to access to staff, access to other business, and access to markets. Being accessible to staff was a particularly important concern for a number of businesses. Being close to other businesses brought opportunities for both custom and collaboration. London was also seen as offering an important market for niche UK products. However, businesses also discussed the challenges associated with being based in a city with rising property prices and business rates. Ince umbrellas identified that businesses '*have to be bloody efficient to survive in London*'.

3.2.1 Staffing

Staffing was cited by one of the interviewed firms as the most important factor in their decision to remain in the city. They identified that*: 'We will die if we have to move outside London – seriously, because our staff won't come with us*'. Their staff live locally and are reluctant to travel too far. Firms such as this are reluctant to lose skilled people that they cannot easily recruit and train.

Another company pointed out that this is an attractive place for people to come and work – '*being central, or in an area like this it's easier to attract talent effectively, people enjoy when they come to work, the access to other pieces of information that keep people engaged and excited*'. Managers living close is also a key issue (e.g. in the case of Hackney Gelato). Another firm (Newton and Pott) has recruited all Hackney people out of the local 'food community' although the manager had to train them in preserving techniques: '*There's a great food community at the moment in Hackney, it's almost like a revolution of good food*.

3.2.2 Business-business collaboration

Being in London is an asset for firms who rely on a large local customer base of other businesses, particularly where these businesses rely on same day delivery. Here firms are also close to designers and decision makers. "[Suppliers] *can pop around with their samples, and this fabric or that fabric, or this idea or that idea*" (Ince Umbrellas). Designers come and ask '*can we print our design on your umbrellas*'? The proximity to many other businesses increased the possibility of people 'popping in' to try new products, bring design ideas.

Local networking in London Fields has led to collaboration on product development in a number of cases. Taylor Hawkes Design identify that 80% of their jobs have been from local people meeting him on the street or walking in. "*It really is that, kind of, localised design".* They work with Surface Matter who are next door. They are also designing and making new tables for a jazz club two minutes away on Broadway Market – Kansas Smitty's. To do this they are using material from Surface Matter – bamboo sandwiched in between Richlite – their signature material. They also made some bespoke desks and designed sofas for local firms based around Broadway Market. Hackney Gelato also said that their business customers (restaurants) are close enough just to pop around for a chat and do a tasting. They have also co-produced products, for example a peanut butter-flavoured ice-cream together with a peanut butter manufacturer on Hackney Road.

3.2.3 Markets

In terms of non-business customers, London was seen as offering a particularly good market compared with the rest of the UK for specialized niche goods such as high-quality umbrellas, electric paints, while also offering large and diverse high-quality department stores (Harrods,

Harvey Nichols, Selfridges). One firm picked Regents Studios because of its closeness to Broadway Market where they sell their product.

Earl of East found that being based in London Fields had helped them to access international markets because of the number of creative and entrepreneurial international people visiting the area. However, most of the firms interviewed were also selling directly via the internet.

3.2.4 Local services and assets

It was reported by several interviewees that maker spaces like Machines Room generate a creative environment for collective learning and experimentation. We also observed how 'Machines Room' operated as space for designing and prototyping products with a global reach. Through the crowdfunding platform 'Kickstarter' a group of technologist and designers based at 'Machines Room' developed 'Smartibot' --- the world's first A.I. enabled cardboard robot. This is now backed and sold internationally.

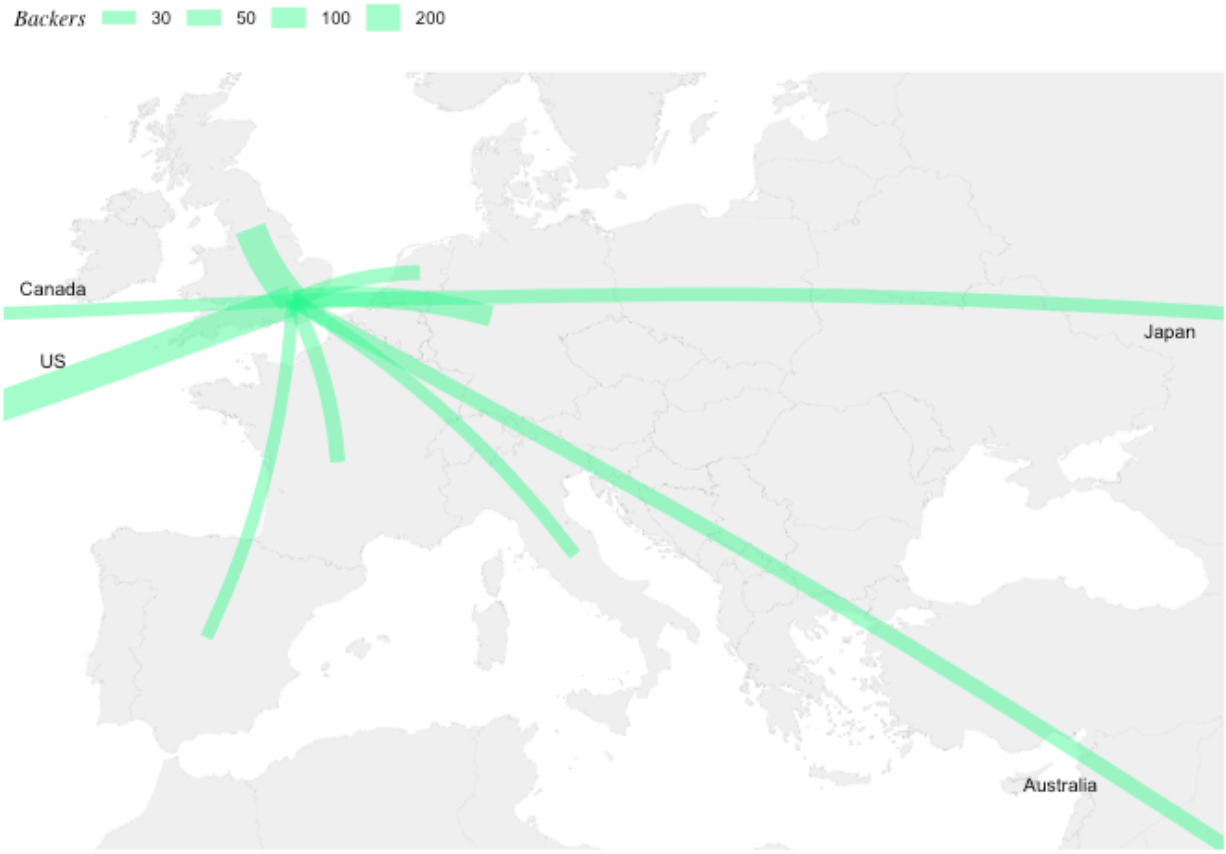


Fig. 12 Market of the designed in Hackney 'Smartibot'

3.2.5 Are buildings in the area fit for purpose?

Manufacturers had been able to find buildings that were more or less fit for purpose, with businesses prioritising: size, adaptability, 'messiness' and closeness to other businesses in

particular. The major challenge, however, was in having enough space to expand as businesses grow, with a lack of cheap space in the area making it difficult for businesses to 'scale-up'.

Businesses valued being in purpose-made historic industrial spaces. For example, Earl of East had converted an old industrial building near London Fields station which they felt was a "*jewel in the neighbourhood*". They were proud to be able to open up the interior space to local people through their candle-making workshop and shop/café.

As noted above, the area also benefits from the existence of small start-up spaces e.g. Hackney Gelato started in a tiny site in Oval Space, experimenting with making their products. One business started locally in their bedroom before acquiring a small production unit in Regents Studios.

Flexible space is important for small manufacturing firms. Ince Umbrellas described, for example, how they would have liked their industrial building to be more adaptable. They also emphasized the need for space which accommodates messy and noisy activities. Bare Conductive identified that "*We needed kind of like..messy space*", particularly early in their development because they were mixing paints as part of prototyping. But it can be important that such messy spaces can be found in conjunction with office/computer space.

Regents Studios and Netil House both appear to act as incubators as they bring many small businesses under the same roof. However, their rents have been increasing, particularly for newcomers, forcing makers out and higher value companies (architects, advertisers, wholesalers) in. One of the interviewed firms identified that they had started out in Netil House but had ended up back producing at home when the costs of renting there became too high.

Some manufacturers do not feel that they have the space to be able to *scale up* as they would like. eg. Chelache Knitwear, Ince Umbrellas – with some planning to move out of the area because of this (eg Hackney Gelato). Often the need to find additional storage space is particularly important – particularly for those firms that are selling direct to customers. Production space is also an issue – one firm has had to put off producing some runs of product to consecutive days. Options being considered by companies included shared warehouse space. Having a separate warehouse elsewhere was considered an option (but not outside a 2-mile radius, said one firm). For others the cost of rent is just too high for their current level of production – one company said, "*The rent sucks all the money*" – meaning that the company owner has had to forgo their own salary to keep the business running. Others thought that it was fair enough that the rents were set at market value, but that it was unfair to require small firms to pay such high (and rising) business rates.

Some companies work over several sites e.g. Taylor Hawkes Design makes the furniture in Greenwich and Peckham, while using their Hackney base now for prototyping and training (and they may start retailing there at the weekends to coincide with Broadway Market) – they found that their Hackney premises were not suitable for 'messy forms of production'. Another firm also produces in Exeter and in Wales while keeping a base in Hackney because rent is cheaper there.

3.2.6 Manufacturing is distributed

it is also obvious that manufacturing is in many cases distributed i.e. not carried out in one firm alone. For example, Bare Conductive outsource many small tasks to 5-6 suppliers which could be part of their own production chain (e.g. mixing paints, putting them into containers, processing orders, packing and shipping). They paid one supplier to alter their machine in order to be able to work with their product. It is often cheaper (and more flexible) to work with a supplier who has a machine, as opposed to buying a machine - at least in the short term.

4. Mapping of resources and materials

Most of the firm located in the Hackney area are relatively small and the scale of production of physical goods is generally small e.g. 3000 products a week. There was a seasonality to some forms of 'craft-based' production – for example rising during Christmas time, or those linked to seasonal goods (e.g. ice-cream). This translates into requirements of flexibility in terms of space and organization of production.

The research has also highlighted that city manufacturers are especially bound to changes to production lead times. Many markets have experienced important speeding of their processes from design to final delivery. This translates into markets becoming more 'rapid' - in the textiles sectors, one company was suffering from the decline of the old 'seasonal' planning calendars– with manufacturers planning for the Winter Season during the Spring. Now they are required to respond to new demand much more quickly. This requires a lot of coordination and rapid responses between processes, logistics, design and manufacturing.

4.1 Identification of supply chain and its scale (local, regional, national, international)

Critical in this context is a good coordination along the supply chain. Urban manufacturers are required to work very closely with the supply chain in just in time processes as space for production and storage is very limited. This has been challenging for some companies where local and regional supply chains have been substantially altered in recent years. Following the hollowing out of the UK manufacturing supply chain, many local companies are having to exploit complex international linkages to source materials for their manufacture. China and the Far East

were frequently mentioned as sources of supplies. For example, several textiles and accessory firms identified that they had found it difficult to source products such as threads and materials locally, and are therefore bringing in such products from Italy, Germany, Japan and China. One company had a procurement specialist working for them in China. In terms of transport, products come in by air and container with road delivery being used in-land. However, it should be noted that in many cases supply chains are driven by quality rather than price and where transparency and accountability of processes remains important.

The table below identifies some of the material flows at the regional, national and international scale that relate to production and manufacturing in the case study area. While some of the manufacturing firms have local or London-based suppliers (e.g. New Spitalfield market as a source of supplies for food producers), others were reliant on more regional suppliers (e.g. East of London for the furniture and textiles industry, due to shipping routes and historic manufacturing development in this part of the country).

4.1.1 Geographical scope of the supply chain

Country	Region	Material
UK	London	Fruit and vegetables (e.g. Old Spitalfield market)
		Plastic (for 3D Printing)
		Ribbons, tapes, trimmings, Velcro
		Labels
	South East	Wood
		Jars and lids
	South West	Milk (Somerset)
		Ice cream cones
		Cardboard boxes and containers
		Electric paint
	North	Springs
	Scotland	Candle wicks
	Wales	Packaging
	Elsewhere	Cardboard boxes and containers
		Product testing in universities
Baltic region – Latvia and Lithuania		Wood (via merchants in Essex)
Brazil		Jars
China and Far East		Metal frames
		Labels

		Electronic chips
Germany		Threads Yarns Wood
Greece		Cotton
Italy		Wooden handles Fabrics Food ingredients (milk powder, sugar, pistachios and hazelnuts)
Japan		Fabrics
Patagonia		Sheep's wool
Turkey		Buttons
United States		Eco soya wax
Other international		

The figures below maps a few of the international material flows coming in to manufacturers within the Maker-Mile area – both within the European continent and beyond.

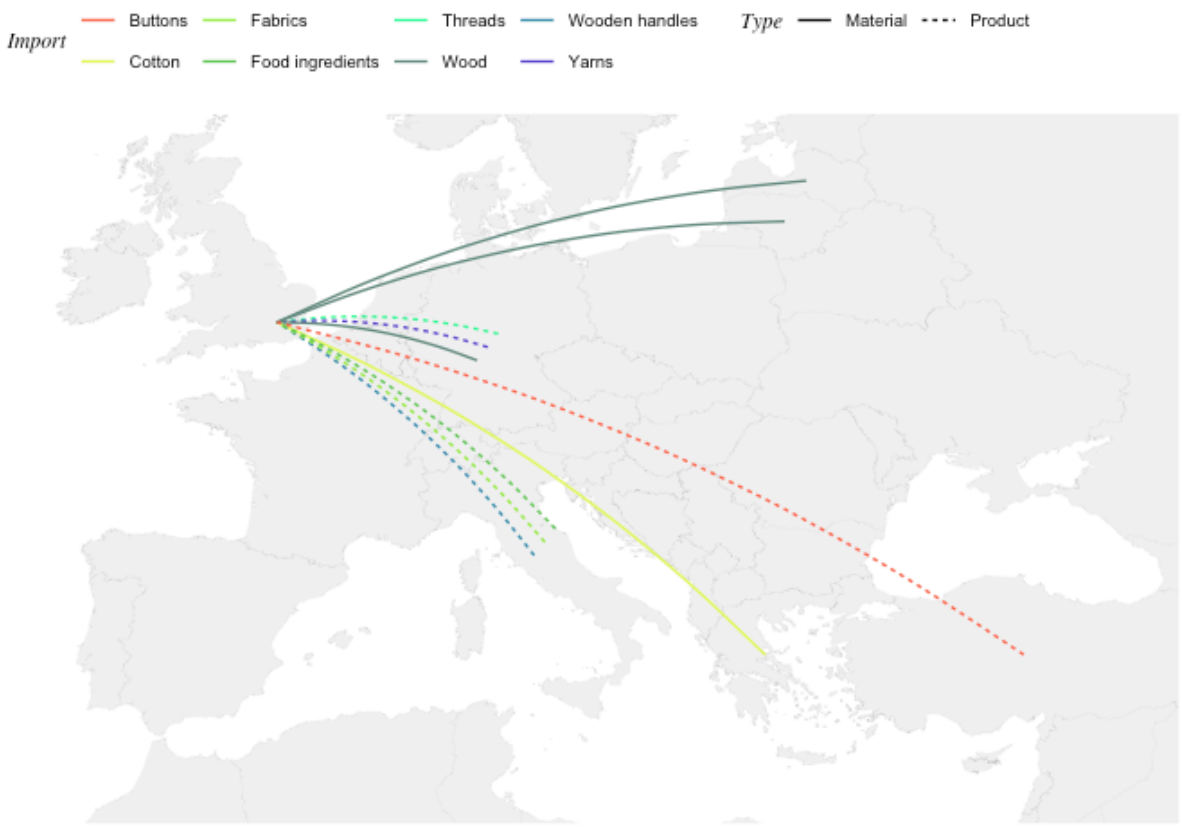


Fig. 13 Continental supply of material and products

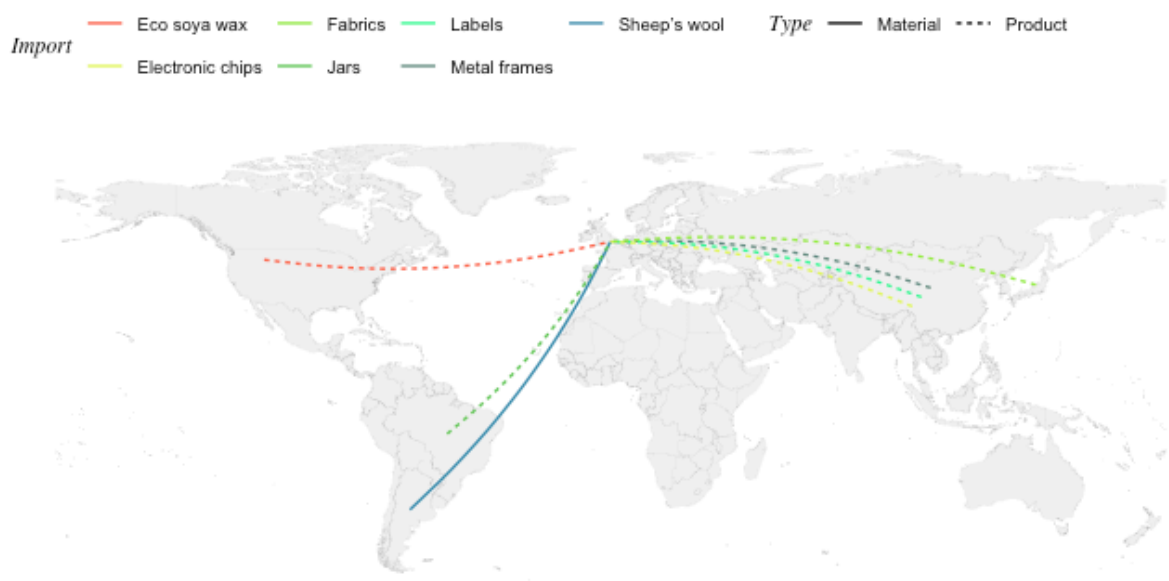


Fig. 14 International supply of material and products

Clearly, many of the products made locally had international markets – a few of these are identified below.

Markets

Country	Product
Australia	Knitted garments
Germany	Candles
US	Candles
	Umbrellas

4.1.2 Outsourcing of processes

It is also interesting to note the geographical organisation of some of the outsourcing processes (see the table below). Many of the urban manufacturers had fabrication, storage and other complementary activities distributed across the territory generally within local or regional reach, although some activities had also built supply chain integration with activities located in other countries with specific set of skills or networks.

Country		Process
UK	London	Digital printing
	South East	Putting paint in tubes
		Printed circuit boards
		Merchants for wood imports

	Midlands	Order dispatching
		Laser cutting (textiles)
	North	Sewing machine repairs
	Elsewhere	Assemblage
Germany		Spinning wool into yarns

5. Sustainability and industrial recycling

It was clear that local manufacturers in Hackney are putting in place sustainable practices in order to limit their environmental impact and reduce waste. Being located in the city makes potential negative impacts of manufacturing more exposed and also most of the urban manufacturers visible and transparent manufacturing and sustainability as integral part of the ethos and value as brand. Sustainability practices, their scope and relative impact reduction depends by sector and type of activity. The research indicates that while not all the interviewed companies have a formal sustainability policy, most of them engage in different ways with diverse aspects of the companies' key environmental aspects.

The opportunity to recycle varies by sector – e.g. there is often less waste in textiles manufacture, particularly in knitting which does not produce off-cuts. While plastics are used in prototyping for some local companies it was felt that this was justifiable as it meant less wasteful errors further down the line. In some cases, local firms were recycling containers and jars, asking customers to bring these back after use. It was identified however that there are a number of challenges to increasing sustainability:

Legal barriers:

- There are legal barriers to recycling/reusing some things e.g. ice cream tubs, preserve lids, due to hygiene concerns.

Lack of sustainable products:

- ***Packaging***: Packaging companies do not appear to be quick enough in offering biodegradable products, even though manufacturers would like these – e.g. for ice-cream containers or for bags to sell umbrellas in.
- ***Lack of eco-friendly textiles coatings***: one firm was concerned that the coated textiles they use are not bio-degradable and are trying to find new eco-friendly__coatings.

Poor Traceability

- It is difficult to really find out how sustainable the supply chain is due to a lack of traceability. While companies were aware of who was directly supplying them with a product, it was often difficult to find out where it originally came from. In the wood trade,

'FSC' certification can help. However otherwise it can be difficult sourcing this information. For example, one company asked their Italian suppliers the source of their materials, but this was seen as somehow insulting given that the Italian system is based on trust and mutual assurances. Another company sourced jars from Brazil but thought the original supplier was probably in China.

Lack of local products:

- ***Lack of choice and quality in UK supply chain***: A majority of businesses said that they would prefer to source locally but could not**.** A recurring theme was that the products were better from other countries, with more choice (eg choice of threads for umbrellas, quality of yarns of knitting, quality of ingredients for ice-cream), and in some cases cheaper.

Lack of international labelling:

- ***What is this material?*** Many products, particularly plastics, arrive at manufacturers doors with no labelling as to their materials. This is particularly the case for overseas materials due to the lack of an international labelling system. This means that it is difficult to know what can be recycled, so materials end up going into landfill.

Lack of time:

- ***No time to search***: People not having the time to research new ways of doing things, new ways of recycling their waste: Newton and Pott: "*Small business people are busy people*". Companies such as Ince Umbrellas identified that they would love to have more support and help in sourcing supplies locally, particularly sustainable supplies.

Lack of knowledge:

- ***Lack of knowledge about waste flows***: A number of the interviewees were not aware of what happened to their waste. Further, it was not clear to producers how their waste products might be useful inputs to other industries. There was evidence of companies focusing on sustainability of core product/production processes but then not thinking about packaging (e.g. use of bubble wrap).

Lack of infrastructure:

- In order to properly scale up industrial recycling, it was felt that new infrastructure might be required (e.g. material recovery facilities)

6. Technology

6.1 Identification of main sectoral technological innovation and absorption capacity of new technologies

It was also noticeable that some manufacturing firms in the area were operating with relatively out of date machines. It is clear that there are a number of barriers to the adoption of advanced and emerging technologies - the cost of machines being a big issue, with several companies using old (some very old) machines because it would be too big a capital investment to buy a new one. One company said: "*we invested it in a robocop (automatic vegetable chopper) which cut vegetables in cubes, which costs more than my car*". One of the challenges of using older machines, however, is finding specialist repairers locally and sourcing parts. Alternatively, firms may decide to outsource that part of production.

Fig. 15 Machinery for the fabrication of umbrellas.

At the same time, there was evidence of the use of new types of technology such as 3D printers (being used by Taylor Hawkes Design). Chelache Knitwear has participated in a Kickstarter crowdsourcing campaign in order to raise funds for a new form of knitting machine which includes digital 3D-'printing' technology called Kniterate. The benefit of this technology is that it is small and relatively affordable for small-scale makers. There was also evidence of digital technologies being used effectively by relatively traditional manufacturers e.g. digital printing being carried out by traditional umbrella makers.

7. Opportunities and challenges for urban manufacturing: the role of policy

While there is evidence of manufacturing coexisting relatively easily with residential uses in the Hackney case study area, it is clear that there are a number of challenges that make it hard for small manufacturers to expand and develop. This issue was discussed, among other things, with policymakers from Tower Hamlets Council as part of this study. The Council would like manufacturing and production to play a bigger role in their economy in the future - in particular as a source of manual, 'middle-skills' level employment that can provide a living wage, given the broader polarisation of London's economy into high and low skilled jobs. They are also aware of the importance of supporting SMEs - 20% of future growth in the borough is expected to come from micro and small-medium enterprises. The Council is concerned, however, that as a borough they have lost a disproportionate amount of factory and warehouse spaces in recent years, compared to the rest of London (see the figure below).

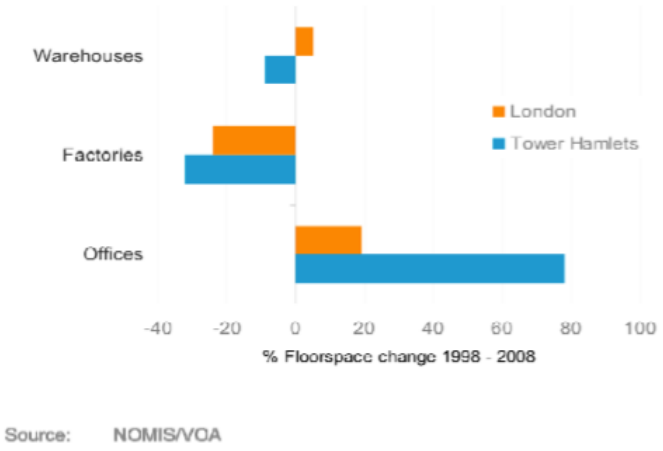


Fig. 16 Floorspace variation according to industrial category in Tower Hamlets between years 1998 -2008. Source: Tower Hamlets Enterprise Strategy, 2012

Local policymakers recognise that, given the rising cost of land in the borough, it is difficult for manufacturers to find spaces where production can occur at scale. They also recognise that care needs to be taken to steer planning processes (such as planning gain and Section 106 agreements) so that they produce commercial spaces that are appropriate for industry, as opposed to ground floor retail spaces which tend to predominate and which can end up empty for long periods.

It was identified that property developers need to be more aware of the spatial requirements of industry – for example acoustic protection and double-height ceilings, and shared industrial spaces (where small makers can share ideas and provide mutual support) as opposed to isolated

ground floor spaces. The importance of such requirements was also reiterated in the company interviews – one company had been turned down for a 'maker space' in the new Here East development due to the noise and vibration involved in their production processes. There are also reports of some landlords 'sitting on' commercial property with the hope that it will be eventually reclassified as residential, increasing their rental yields. In the process, rental values can go up in anticipation ('hope' values). This means that we are losing the parameters for what would be a fair rent for an industrial commercial space in London.

In some parts of the borough (e.g. Brick Lane), Tower Hamlets Council are working with landlords to ensure that first floor commercial properties are quickly brought to the market and available for use. The borough also has a policy of encouraging 'meanwhile use' industrial lettings.

7.1 Rising Business Rents

A number of the businesses interviewed identified business rates as being a problem. One issue is that very different uses can be made in the same planning use class, pushing up 'comparable rents' and making it difficult to find appropriate comparators for basic industrial uses.

7.2 Sustainability

Tower Hamlets Council have recently launched a Waste Strategy. However, they recognise that more could be done to support industrial waste recycling (with it being reported that under 2% of local business waste is recycled locally as opposed to 19% household). Council officers thought that there was space for thinking more innovatively about the potential uses of waste products– e.g. saw dust can be produced from wood offcuts - this is already being used by a shoe manufacturer to make heels. The Council itself is also focusing on recycling waste oil – e.g. for export, to fuel a private taxi fleet. One problem is limited places for waste disposal – they would like to ear mark space for waste consolidation/sorting/containers, including in service yards in Housing estates. The Closed Loop site in Barking was cited as good practice (https://www.packaging-gateway.com/projects/closedloop/).

7.3 Opportunities for future investment to support manufacturing

Opportunities for policy makers to better support the manufacturing sector in the area included:

- **Making sure that affordable industrial space remains available in the borough.** This could partly be achieved through ensuring that the planning system preserves basic industrial space. Subsidising business rates for small start-ups employing local people is a further option;

- **Subsidising maker-spaces.** It is not only local manufacturers that face challenges in maintaining operation in the face of high rents - this is also a problem faced by maker spaces. For example, Machines Room was forced to scale down its operation and move to smaller premises at the time of this case study. Maker spaces are particularly valuable given that they not only allow people to access and share technology, but also provide an opportunity for knowledge sharing and mutual learning. More could potentially be done to link these technology hubs with local schools and colleges, to encourage children and young people to experiment with making and explore manufacturing as a potential future career prospect. It was also felt that universities could do more to share their tools and machinery with local firms;

- **Supporting more sustainable production and more local material flows**: it is clear that policymakers could do more to support sustainable practices in the case study area. This could include providing incentives for waste collection and better linking up local firms so that more sustainable and productive material flows can be supported locally.

8. Annex

Appendix 1. Table 1:

Group	Description
Inner city students	The age profile of this group shows a high proportion of schoolchildren, full-time students, and people aged 25 to 44, though a lower proportion married or divorced. Households are more likely to live in flats, to live in private rented accommodation, and to have overcrowded conditions. A lower proportion of people provide unpaid care, and a higher proportion work in accommodation or food service activities industries.
Aspiring and affluent	The proportion of people age 0 to 14 is higher than for the parent supergroup. A higher proportion of people are married. There is a higher proportion of people who are of mixed ethnicity. A lower proportion of households have full-time students. Compared with the supergroup a higher proportion of households live in semi-detached or terraced properties. People are more likely to work in the information and communication, and financial related industries, and use public transport to get to work.
Ethnic family life	When compared with the parent supergroup, this group has a higher level of all non-White ethnic groups. There is a lower proportion of people born in the old EU but a higher proportion were born in the new EU. There is a higher proportion of people whose main language is not English or Welsh. Households are more likely to live in detached, semi-detached or terraced properties
Endeavouring Ethnic Mix	This group has a higher proportion of people who belong to the Bangladeshi ethnic group than the parent supergroup but a lower proportion of those in Pakistani and Indian ethnic groups. There is a higher proportion of people who were born in the old EU countries. Households are more likely to live in flats and to socially rent than for the supergroup. Overcrowding is also more prevalent, and public transport more commonly used to get to work.
Aspirational techies	With the exception of the Indian and mixed ethnic group, this group has a lower representation of all non-White ethnic groups than in the parent supergroup. There is a higher proportion of people born in the old EU but a lower proportion whose main language is not English or Welsh. Households are more likely to live in semi-detached or terraced properties, and to live in privately rented accommodation. Workers are more likely to be employed in the information and communication industries, and to travel to work using public transport.
Rented family living	This group has a higher representation of White and mixed ethnicity residents than the supergroup and a lower proportion of people whose main language is not English or Welsh. Households are more likely to live in terraced properties or flats, and to socially rent their property.