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Logistical Gazes:
spaces, labour and struggles in global capitalism

edited by Carlotta Benvegnù, Niccolò Cuppini, Mattia Frapporti, Floriano Milesi and Maurilio Pirone

About this journal

The globalisation of world trade in combination with the use of information and communication technologies is bringing into being a new international division of labour, not just in manufacturing industry, as in the past, but also in work involving the processing of information.

Organisational restructuring shatters the unity of the traditional workplace, both contractually and spatially, dispersing work across the globe in evermore attenuated value chains.

A new 'cybertariat' is in the making, sharing common labour processes, but working in remote offices and call centres which may be continents apart and occupying very different cultural and economic places in local economies.

The implications of this are far-reaching, both for policy and for scholarship. The dynamics of this new global division of labour cannot be captured adequately within the framework of any single academic discipline. On the contrary they can only be understood in the light of a combination of insights from fields including political economy, the sociology of work, organisational theory, economic geography, development studies, industrial relations, comparative social policy, communications studies, technology policy and gender studies.

Work organisation, labour and globalisation aims to:

- bring together insights from all of these fields to create a single authoritative source of information on the new global division of labour, combining theoretical analysis with the results of empirical research in a way that is accessible both to the research community and to policy makers;
- provide a single home for articles which specifically address issues relating to the changing international division of labour and the restructuring of work in a global knowledge-based economy;
- bring together the results of empirical research, both qualitative and quantitative, with theoretical analyses in order to inform the development of new interdisciplinary approaches to the study of the restructuring of work, organisation and labour in a global context;
- be global in scope, with a particular emphasis on attracting contributions from developing countries as well as from Europe, North America and other developed regions;
- encourage a dialogue between university-based researchers and their counterparts in international and national government agencies, independent research institutes, trade unions and civil society as well as policy makers. Subject to the requirements of scholarly peer review, it is open to submissions from contributors working outside the academic sphere and encourages an accessible style of writing in order to facilitate this goal;
- complement, rather than compete with existing discipline-based journals;
- bring to the attention of English-speaking readers relevant articles originally published in other languages.

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introduction to a special issue of *Work Organisation, Labour and Globalisation*

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ABSTRACT

This article introduces this special issue of *Work Organisation, Labour and Globalisation* on logistics. First of all, it furnishes a brief genealogy of logistics in the modern era. Then, it frames some of the main issues in current critical debates on logistics. Finally, it presents the contents of the special issue in detail, connecting them with more general attempts to develop a 'logistical gaze' as a methodological perspective on the different and multiple transformations of contemporary capitalism.

KEY WORDS
logistics, mobility, labour, counter-logistics, spatialities

Logistics is currently emerging, with increasing intensity, as a key disruptive paradigm for interpreting the changes that distinguish contemporary capitalism. Despite its apparent modernity, logistics has a long-term historical trajectory, deeply interwoven with the affirmation of the 'Modern Era'. From the genealogical point of view, logistics was initially framed as a combination of knowledges and techniques related to the development of the armies of the state and the creation of global markets (both to

sustain military operations on a European and colonial scale and to support the new intercontinental trade routes – not least the Atlantic slave trade). Over time, it progressed from being the art, technique and science of moving people, commodities and military mobility to become a broad and interconnected system that imposed itself as an overall logic of governmentality (Cowen, 2014).

Within this long history, we focus on two specific breaking points for recent developments. The first is usually labelled the 'logistics revolution' of the 1950s and 1960s when – thanks to the large-scale introduction of shipping containers – it became a benchmark of capitalist production and reproduction (Allen, 1997). From this point on, the logistical perspective progressively established itself as the fundamental tool for the re-organisation of productive forms and political spaces, contributing to the development of the overall infrastructure of multiple interconnections that characterises contemporary world society. Put differently, globalisation could be read as a world vision where the spatial dimension is simultaneously both expanded and constricted (Harvey, 2001). This revolution – that can be conceived as integrating circulation into the time of production – presented logistics as unexplored territory for businesses and management: 'the last dark continent', as the management guru Peter Drucker imaginatively said: 'We know little more about distribution today than Napoleon's contemporaries know about the interior of Africa. We know it is there, and we know it is big; and that's about all' (quoted in Cowen, 2014:50). Moreover, we could consider this not simply as a technical and efficiency-driven revolution for a better productive capitalist organisation, but a capitalist transformation that produces new subjectivities and power relations in response to labour resistances and struggles in the Fordist factory.

The second key breaking point we highlight here relates to the progressive application of Information and Communication Technologies (ICT) in production, which has led over time to a massive use of digital applications and devices for organising and controlling labour in diffused and connected spaces (Scholz, 2012; Srnicek, 2017). This tendency assumes different patterns and narratives according to how and where it is adopted, leading to varied geographies of impact. For example, the so-called Fourth Industrial Revolution particularly affects manufacture and the movement of goods from Germany, whereas the 'Platform Revolution' has a particularly strong impact on the investment in and provision of services emanating from Silicon Valley in the USA. This turning point can be conceptualised as a shift from the direct discipline of labour in enclosed spaces to algorithmic management across multiple spaces.

Now, in the second decade of the twenty-first century, logistics is acting as a leading vector for the decomposition and restructuring of transnational value chains, allowing an undefined expansion of global production networks and configuring a giant wall-less global factory articulated on different scales, from transnational supply chains to urban platforms. A real 'logistics-driven capitalist mode of production' can be identified, bound to deep political transformations. Logistics is no longer an unexplored continent for management but has become instead an obscure and dark logic hidden among the flows, largely invisible both to those who work within these flows and for analysts of capitalism who still try to make sense of its dynamics using

only traditional categories such as states, regions and borders. As Deborah Cowen (2014:51) notes, 'the work of logistics is concerned precisely with the production of space beyond territory'. In other words, logistics is now not only a matter of the circulation of commodities but also produces its own spatiality, contributing to the transformation of geographies and influencing a wide range of different fields: from the planning of urban spaces to the mobility regimes governing migration, passing through multiple transnational assemblages of workers.

Until recently, engineering and management were the only disciplines entitled to study logistics. One of the emblems of such technical approaches is the 'black box' that safeguards from indiscreet eyes the rationality of labour organisation and commodity flows. Such black boxes surround us everywhere: from state governance to digital devices, from platforms to urban planning. This supposed technicality of logistics – as a mere matter of the organisation of flows, distribution of spaces and cost-effectiveness – leads to non-neutral consequences, for example by reducing the roles and conditions of the labour force to algorithmic variables and the efficiency of tasks.

However, in the last decade, a flourishing and varied field of new innovative and critical approaches to this issue (Toscano, 2011) has emerged, stimulated by disruptive events, including radical strikes and warehouse blockades by logistics workers. Since the 2000s, the research interest in logistics has spread beyond its traditional home in technical and managerial fields into a range of bordering disciplines, from geography to anthropology, from history to political philosophy. Step by step, the study of logistics has surged to become a centrally important perspective in critical studies across a range of disciplines.

Critical geographers – as well as scholars of political geography and spatial concepts – represent the core of references in this emerging field. In it, we can include authors who did not address logistics directly as an object of investigation but have nevertheless posed some problems and adopted approaches that could be useful for logistics studies. For instance, the way in which Henri Lefebvre (1974) analysed the production of space remains interesting for the study of logistics as well as the role and the relevance of the metropolis in the global world. Lefebvre is also interesting for his use of spatiality in the analysis of such modern political concepts as that of state, conceiving the role of logistics in the construction of state space as connected with the development of industrial regions outside urban spaces (with the effect of dismantling city borders through flows). Another 'traditional' author whose work can be readapted and used to grasp some related contemporary phenomena is Manuel Castells (1996), who was among the first to study the impact of ICT on society and urban spaces – proposing a distinction between the spaces of places and the spaces of flows. Finally, we can mention the work of Sergio Bologna (1972; 2010) who, as early as the 1970s, shifted his attention from factory workers to dockers and the role of circulation in capitalist organisation.

A few of the scholars who have more recently crossed their researches with an interest in logistics include Neil Brenner (2004; 2014) who has studied the implosion and explosion of spaces, Saskia Sassen (2001) in relation to her analysis of global cities and overflowing territories, and Sandro Mezzadra and Brett Neilson (2013) who examine its role in the context of their political critique of borders.

To conclude this brief and fragmentary review of scholars who have contributed to the creation of a logistical gaze on capitalism's contemporary operations, we can also include some authors who have focused on logistics, such as Keller Easterling (2014) with her focus on the governance of extra-state infrastructures, Deborah Cowen (2014) in her analysis of the production of space in the context of security and resistance, and Anna Tsing's (2009) conceptualisation of the human condition in supply chains.

This special issue of *Work Organisation, Labour and Globalisation* aims to contribute to the further development of critical studies on logistics. It has not been edited by a group of researchers or a research group but as part of a wider path of collective and multidisciplinary research on the issues of spaces, logistics and labour, in an initiative named *Into the Black Box*.[1]

The essays that make up the special issue have been thought of as different perspectives feeding into a dialogue with this collective research project. Each contribution furnishes tangible case studies of what we have labelled a 'logistical gaze' (Into the Black Box, 2018), that is, a particular methodological and theoretical approach to understanding the global and variegated dimensions of contemporary transnational value chains, migration flows, platforms and digital spaces – to name just a few.

What do we mean by a logistical gaze? In brief, it can be summarised as a picture of logistics as *ars combinatoria*, that is, first of all, a capacity for articulation and governance. A logistical gaze thus looks to flows, mobility regimes, points of condensation and different distributions of power and roles to analyse phenomena. At the same time, it focuses on knots, bottlenecks, resistances and the production of a counter-logistics. To achieve this, it has to integrate and modify the 'traditional' categories of critical theory with new concepts such as assemblages, hubs, corridors, connections, infrastructures, interruptions, resilience and strategies that could be useful for breaking the opacity of black boxes and penetrating their logic. In other words, a logistical gaze considers logistics not only as a mere matter of circulation, a neutral technique of management or a simple device to organise mobility in the most efficient way but rather as a more all-encompassing bio-political apparatus that produces spaces as well as subjectivities, norms and relations (Cuppini, Frapporti & Pirone, 2015).

This makes it necessary to look at logistics as 'a site of power and struggle' (Neilson, 2012) among constantly changing ways to adapt life forms to different environmental and productive conditions. In other words, logistics flattens out spaces, models bodies and produces subjectivities and norms as flexible as the adaptation to the conditions of circulation requires. Labour force struggles and organisation reveal themselves as central view points for the understanding of this logistics-driven capitalist mode of production and distribution, based on new global infrastructures, regional systems and new rationalities of production. Or, to put it differently, subjectivities are erupting from algorithmic management and logistics networks as irreducible elements (Dyer-Witheford, 2015).

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1   See www.intotheblackbox.com.

Five intriguing fields of research can be identified for a logistical gaze on contemporary capitalism: first, the politics of logistics and new global geographies (such as China's 'New Silk Road' or the many pipelines currently being constructed worldwide); second, work and conflicts in logistics sites (particularly, in harbours and warehouses, for example, in Germany and Italy); third, the logistical mode of urban production (e.g. in the development of smart city policies); fourth, the logistical logic of platform capitalism (e.g. Amazon or Uber) and the counter-logistics of protests (e.g. strikes of food delivery riders); and finally, the processes and outcomes of the emergent systems of labour measurement and performance management regimes (KPIs). These five fields formed the starting point for assembling the investigations that make up this special issue.

The essays that have been brought together in this shared agenda furnish a variety of multidisciplinary logistical gazes on the current global situation, in a mutually enriching range of into-the-black-box perspectives. The issue is divided into three sections: the logistical production of spaces; logistics and labour; and struggles and counter-logistics.

The first section, *the logistics production of spaces*, brings together a group of essays that analyse the continuous articulation of territorialisation and de-territorialisation processes produced by logistics. Brett Neilson and Tanya Notley look at the data centre industry in Singapore and its impact on labour relations and processes. The contribution by Clément Barbier, Cécile Cuny and Nicolas Raimbault focuses on the production of logistics spaces at a metropolitan and a local scale in relation to local authorities and global firms, comparing the Greater Paris Region in France and the regions of Frankfurt Rhein-Main and Kassel in Germany. Alessandro Peregalli investigates the strong articulation of finance, extraction and logistics in Latin America by studying the creation of new infrastructural corridors. Moha Ennaji and Filippo Bignami explore the role of digital devices in producing new migration routes and spatialities for migrants.

The second section, *logistics and labour*, groups essays reflecting on the production of new labour regimes resulting from managerial strategies including competition, the exploitation of racial differences and the use of digital technologies. Kim Moody presents logistics as a field of contradiction between multi-dimensional cross-currents of competition and workers' organisation. Jake Alimahomed-Wilson focuses on the role of racialisation in amplifying the erosion of labour conditions for logistics. Moritz Altenried investigates the forms of digital technology that enable the management and surveillance of labour in the last mile.

The third and final section, *struggles and counter-logistics*, showcases essays that explore the role of the, often unexpected, subjectivities that configure logistics as a site of struggles and a conflictual field. Andrea Bottalico presents a literature review on the dynamics of dock labour in European ports, with a particular focus on the labour issues that have emerged in recent years. Daniela Leonardi, Annalisa Murgia, Marco Briziarelli and Emiliana Armano turn their attention to a specific group of logistics workers, food delivery riders, and their attempts to organise and struggles against digital platforms. Sabrina Apicella and Helmut Hildebrandt compare the workers' attitudes to strike action at Amazon warehouses in two contrasting locations in

Germany. Evelina Gambino reflects on the development of the New Silk Road project in Georgia, proposing to reposition workers into a visible central position in narratives around the expansion of logistics.

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Data centres as logistical facilities:
Singapore and the emergence of production topologies

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ABSTRACT
Data centres mobilise server–client architectures to disperse and draw in labour from across industries and nations. In doing so, they provide an infrastructural fix for capitalist actors seeking to bypass traditional labour actions, by designing logistical routes around which to redirect production processes. In this article, we build on research that investigates the data centre industry in Singapore to consider how these facilities drive processes of global circulation and establish new kinds of labour relations and processes. We point to limits in conceptualising these relations according to dominant models of the supply chain or the production network. We argue that understanding the client footprint enabled by data centres as a form of territory allows us to approach these facilities as political institutions that influence the operations of power across wide geographical vistas.

KEY WORDS
data centres, logistics, labour, territory, Singapore, supply chains, production networks, revenue farms, extraction, social cooperation

From distribution centres to data centres

Recent critical studies have approached logistics as a mode of power active in the production of space and subjectivity. Emphasising the historical origins of logistics in military activities and the late twentieth-century 'logistics revolution' that made distribution a constitutive part of productive processes, this work has mapped the

expanding frontiers of logistics well beyond the spheres of transport and communication. Nonetheless, the iconic materiality of the shipping container has exerted an influence on these studies. In its empirical moments, critical research on logistics has frequently been conducted in sites such as shipping ports or distribution centres. Despite a strong discussion of how data information systems coordinate logistical movements, the focus has been on the storage and transport of goods and not the storage, transmission and processing of data. This article reverses this situation by investigating the role of the data centre as a key infrastructural site of logistical coordination. Drawing on research conducted in Singapore as part of a project examining the relation between data centres, labour and territory in Asia, the aim is to understand how data centres drive contemporary processes of global circulation and create relations between labour forces that might otherwise seem disconnected.

The role of data centres in logistical processes can be illustrated by considering the operations of a company like Walmart. In *The Rule of Logistics*, Jesse LeCavalier (2016) describes how Walmart runs both data centres and distribution centres. The latter are large warehouses where the company receives, stores and dispatches the merchandise sold in its stores. Given the firm's commitment to efficient inventory management and thin operating margins, a large proportion of goods are not deposited in these facilities but directly cross-docked from truck to truck. A system of conveyors, rollers, shelves, struts, sensors and actuators processes the company's merchandise. Voice-directed software instructs workers known as pickers to select, scan, sort and consolidate the goods. As LeCavalier explains, 'the goods in transit through these buildings must be physically moved and are inherently material' but 'Walmart manages merchandise as if it is immaterial – as if it is only information' (157).

Data centres are discrete facilities that house the computing hardware that performs this information management. Highly securitised and located to minimise land and energy costs, these installations 'provide the "intelligence" for the company's logistical operations' (90). Examining Walmart's facility in McDonald County, Missouri, LeCavalier explains that the 'building acts as an information pathway because, even though it houses Walmart's collection of servers, it also stores and transmits the company's constant stream of proprietary data' (93–94). In this sense, the data centre 'is not a building full of computers but rather a computer with architectural qualities' (96).

Numerous retail and logistics companies follow this model of dual ownership of distribution and data centres. However, such a combination of facilities is by no means a standard, for these firms and data centres have many other uses besides the coordination of merchandising activities. Amazon, for instance, maintains both distribution and data centres, but the latter in this case house not only the hardware that stores and processes data for the company's retailing activities and other service platforms but also physical computers and virtualised servers that are hired out by Amazon Web Services – the world's largest cloud provider. Large tech companies like Google and Microsoft also own and operate data centres. These facilities host the machines that run the many service platforms operated by these firms as well as making public cloud services available on a paid subscription basis. By contrast, firms like Equinix run multi-user data centres that not only offer public cloud services but also hire out space in which clients can locate their own equipment to benefit from

economies of scale related to energy costs and other variables, as well as peering arrangements that allow direct exchange of information between machines. Facilities of this latter kind provide the focus of our research in Singapore.

Clients of multi-user data centres range from governments to firms and individuals. These facilities support a wide array of activities, including financial services, enterprise resource planning, telecommunications, social media networking, big data analytics, smart city operations, machine learning and artificial intelligence, just to name some of today's most prominent business propositions. Among these, the coordination of the physical movement of goods and people is only one field of action, even if it makes use of many of the techniques and technologies listed above. Logistics firms, in other words, are a limited subset of data centre clients. Nonetheless, data centres can be characterised as logistical facilities because they enable the coordination of business and governmental activities across space and time. Take finance, which, in its immediate operations, appears more concerned with the manipulation of highly abstract qualities than the circulation of materials or information. Recent technologies of high-frequency trading, however, rely on rapid data transmission to take advantage of arbitrage opportunities between financial markets. Logistical considerations such as the placement of cables, servers and data centres take priority. When trafficked through data centres, finance becomes a logistical game. A similar point can be made about social media networking, smart city initiatives, and many other contemporary business operations. Data centres reckon with the logistical dimensions of a whole range of commercial, governmental and industrial activities.

With these considerations in mind, the present article explores how data centres in Singapore coordinate the work of labour forces across and beyond the South East Asian region. Unlike distribution centres, which are also highly automated environments, these facilities are largely emptied of human workers. The labour forces that interact with (and are in many cases controlled by) the computers housed in data centres are rather located on the client end of these installations. In the case of Singapore, which has become a data centre hub that hosts approximately 50% of the servers in South East Asia (BroadGroup, 2016), these labour forces are distributed across an array of national spaces. How do data centre operations generate economic territories, and what are the significance of these spatial and technical arrangements for capital's interactions with regimes of labour and life across regional terrains? This article argues that such interactions cannot be easily conceptualised according to the dominant models of the supply chain or the production network. By paying analytical attention to the forms of political power produced and sustained by data centre operations, we seek to extend the debate concerning the rising importance of logistical power and its implications for labour forces, workers and political struggle.

Singapore as a data centre hub

In his historical account of the continuities between Singapore's colonial past and prosperous present, Carl A. Trocki (2005) highlights the relation between opium revenue farming and the emergence of capitalist enterprises in South East Asia. Although Thomas Stamford Raffles claimed that the establishment of Singapore as a British colony on behalf of the East India Company in 1819 offered a *tabula rasa* on which to

experiment with free trade, large 'prefabricated components of Indian Ocean *entrepôt* culture already existed and were ready to slide into place when Raffles cut the ribbon' (70). Precisely because Singapore was a free port where duties could not be imposed, the colonial administration came to rely on revenue farms to support its financial operations. Prevalent throughout South East Asia, this system involved colonial governments delegating or 'farming' out the right to collect tax to a private entity. Run by Chinese business elites, revenue farms also maintained private security forces and through auctions and monthly rent payments, acquired monopoly rights over the distribution and sale of excisable goods. As Trocki (2002:297) explains, there 'were many different types of farms in nineteenth-century South East Asia, including farms for liquor, pork, prostitution, gambling, markets, tolls, capitation taxes and others'. But opium generated the highest level of cash flow, creating large pools of capital that were linked to racialised forms of labour control and commodity production.

In Singapore, where opium farming provided the largest single source of government revenue from about 1824 to 1910, revenue farms were central to the system of colonial extraction. The syndicates that ran these organisations purchased opium on the open market and sold it to Chinese migrant workers known as coolies, who provided labour for the plantations and other businesses that these syndicates ran. Proceeds from sales allowed recapture and recycling of labour costs. Although the colonial government eventually closed the revenue farms, these organisations enabled Singapore's emergence as a regional trade centre. Not only were they a source of capital for other ventures, but they also made the island a crucial labour exchange point. Revenue farms are usually understood as transitional institutions between pre-market Asian mercantile practices and the corporate systems of the twentieth century. But, as Trocki (2002:314) comments, it is necessary to ask 'what elements of these economic structures actually survive in present-day or at least subsequent institutional structures'. Logistically speaking, there are affinities between revenue farms and Singapore's present-day data centres, at least insofar as the control of a key commodity and the establishment of regional labour networks are concerned. However, understanding how Singapore has become a data centre hub also means exploring the infrastructural conditions and present policy settings that have facilitated the industry's expansion.

An important factor leading to the expansion of the data centre industry in Singapore is the presence of undersea cable landings. In 1871, Singapore was connected to London (via Madras) and Hong Kong by telegraph cables, laid by the British Indian Submarine Extension Company and the China Submarine Telegraph Company respectively. Part of what Nicole Starosielski (2015:31) calls 'copper cable colonialism', telegraph cables augmented colonial state formation and the centralisation of imperial command. This recasting of state and imperial power not only altered the institutional structures of colonialism but also established routes of infrastructural connection with path dependence effects. Telegraph lines followed existing trade routes and set paths for future cable rollouts, including the coaxial cable that dominated in the Cold War period and the fibre optic cable that carries most of today's digital messages. Telegraphy also introduced new ways of doing business. Prior to its arrival most transactions required in-person negotiations. Following the telegraph these acts were depersonalised since buying and selling could be carried out anonymously and *en masse* (Carey, 2009).

Today Singapore hosts three clusters of fibre optic cable landings: Changi North, Tanah Merah and Tuas. Singtel, a public listed company (through Temasek Holdings) with majority ownership by the Singapore government, listed in 2015 that it part owned 33 cables, including 11 of the 18 cables that land in Singapore.[1] In this way, the Singapore government plays a role in building and maintaining the undersea cables that support the island's digital economy. Having so many cables land in Singapore (more than any other country in South East Asia), means that the country's data industries have a distinct advantage in terms of current and future capacity to move and receive data to and from the rest of the world. As Starosielski (2015:1) writes, 'Cables drive international business: they facilitate the expansion of multinational corporations, enable the outsourcing of operations, and transmit the high-speed financial transactions that connect the world's economies'.

Singapore's emergence as a data centre hub also needs to be understood in the context of its post-independence development. With separation from Malaysia in 1965, a focus on building an industrial base allowed Singapore to free itself from its dependence on its hinterland, evident in its role as an exporter of rubber and tin produced in Malaysia and Indonesia. The unbroken rule of the People's Action Party (PAP) was established on 'its ability to use the economy as a vehicle to gain a much higher level of control over the state and society' (Trocki, 2005:162). By making an alliance with international capital, the PAP boosted direct foreign investment and eliminated the need to share power with local capitalists. It also influenced how foreign capital was invested, directing funds towards manufacturing in the first instance and then towards oil industries in the 1970s. A focus on the technology sector emerged in the mid-1980s. The Intelligent Island plan of 1992 fast tracked the building of a high-speed fibre optic network on which future technology and data industries could rest. Liberalisation of the financial and telecommunications sectors followed, reaching a peak after the 1997 Asian financial crisis. However, Singapore's government-linked corporations (GLCs) remained an important part of the economy, reinforcing the tight relations between the country's business elites and the ruling party.

Current efforts aim to create a regional industry hub focused on extracting value from the creation, processing, movement and storage of data. Singapore has advanced data infrastructure, attractive tax rates, flexible labour laws (for skilled migrants), start-up and lucrative R and D incentives have allowed the data industries to flourish. There are 70 to 75 very large data centres in the country: these are estimated to constitute about 50% of South East Asia's data centre capacity (BroadGroup, 2016). Inside these data centres the world's largest cloud service operators keep and run their servers including Amazon Web Services (AWS), Alibaba, Microsoft Azure, Digital Ocean, Google, GoDaddy and Linode. Many of the world's largest global technology companies and platforms have a regional headquarters in Singapore including Twitter, Microsoft, LinkedIn, Microsoft, Apple and Hewlett Packard, as do regional leaders like

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1   This information derives from the following map created by Singtel in 2015: http://info.singtel.com/ coverage/googlemaps/. Accessed 19 January 2019. Since this time, Singtel has become co-owner of at least two additional cables (Indigogo and Se-Me-WE-5). We can thus conclude that Singtel is currently part owner of 35 cables, including 13 of the 20 that land in Singapore.

Garena, Grab, Lazada and Razer. In 2018, Facebook, which at this time had its regional headquarters and 1,000 employees located in Singapore, announced it would build its first data centre in the country: an eleven-storey 170,000-square-meter building (Cheok, 2018). Terence Lee (2016) argues that these global tech companies threaten to displace Singapore's GLCs as they can offer services in areas such as retail, transport and logistics where the GLCs have traditionally dominated. But the government also has a stake in assuring the efficiency and competitiveness of the data industries. Temasek Holdings, the government's investment arm, has close to one quarter (23%) of its total investment in the telecommunications, media and technology sector. In the future, it plans to move into artificial intelligence and biotechnology (Temasek, 2017): two fronts of technological expansion that require storage and processing of large amounts of data.

Ironically, the proliferation of data centres in Singapore has produced geographical and socio-economic combinations similar to those that gave birth to its nineteenth-century economy. While the country has always been a logistical switch point and has since the 1980s tried to position itself as an intermediary with expanding businesses in China, the initial approach of the post-independence era emphasised the establishment of an industrial base that would allow the fledging nation to stand free from regional trading networks based on the production and export of goods such as rubber. But the fact that data centres in Singapore serve clients and labour forces across South East Asia means that the island remains a point of regional commodity and labour exchange. What is transacted these days is not only physical goods or bodies but also data that travel at fast speed across national borders. Data farming, to recall an industry term that describes the production, collection and manipulation of data to generate valuable information, has replaced revenue farming as Singapore's main front of extractive capitalism, although the government still 'farms out' business by exercising considerable control over tenders and setting the rules of play for corporate activities. Yet, to understand the relevance of the contemporary data industries from a logistical point of view, it is necessary to stress the discontinuities as well as the continuities with the extractive activities of the colonial past.

The fungibility of territory

The server–client relationship underlies the network architectures established between data centres and their remote users. In a server–client architecture, all computers connected to a network are either servers or clients. The former runs programs or applications that share their resources with clients. The latter do not share resources but request content or service functions from servers. Because data centres concentrate servers under one roof, and allow the establishment of peering connections between servers, they become powerful sites of content storage and service delivery. Clients are distributed around these facilities, although not necessarily in spatial proximity. Data centres store, process and transmit data from clients spread across diverse spaces and scales and this enables them (or in the case of multi-user installations, the companies that place servers in them) to engage in economies of extraction that aggregate, analyse and sell such data. In the case of data centres quartered in Singapore, clients are predominantly interested in the location of Singapore as an efficient and secure

'gateway' to data sources and digital services operating within the South East Asian region (BroadGroup, 2016). The presence of a company like Telin (Telkom Indonesia), which runs three data centres in Singapore under a local subsidiary, means that much of the data generated by the firm's clients is stored and routed through facilities in Singapore. Not only do Telin's Singapore data centres offer a launch pad for companies seeking to market digital products and services to the expanding ranks of Internet users in Indonesia but they also provide service capacities for Indonesian companies and institutions that connect to Telin's national ICT networks. In this way, data centres generate a client footprint, or territory, which follows patterns of networked distribution and cuts across the exclusivity and contiguity of state territories. Yet because data centres obscure relations between clients and can only pass information through the mediation of servers, such patterns of territorial networking remain invisible to all but the logistical gaze.

Data centres clearly market their territorial reach to prospective clients, giving territory a fungible quality – by which we mean that the conceptualisation of territory by data centre operators and users is characterised as much by openness and receptivity to patterns of economic exchange as it is to the political sovereignty of any particular state. Telin Singapore (2017), for instance, seeks to attract business by highlighting its extensive network across the Indonesian archipelago. Yet, given the centrality of digital networking to contemporary forms of governance and rule, the commercial imperative of providing territorial reach to data centre clients also has wider political implications. To understand the client footprint of data centres as a form of territory is to treat these facilities not only as digital infrastructures but also as political institutions that influence how power is wielded across wide geographical vistas. This approach is consistent with critical work that argues that infrastructures 'exist as forms separate from their purely technical functioning' and show 'how the political can be constituted by different means' (Larkin, 2013:329). Keller Easterling (2014) introduces the term 'extrastatecraft' to describe the making of polity through infrastructural and technical systems that operate in parallel, rivalry or partnership with the state. Saskia Sassen (2018:7) discusses how 'operational spaces' that 'include networked digital structures' integrate 'only parts of national spaces' and 'cross multiple interstate borders with great ease'. Noting how such networked structures cannot 'survive without some very material infrastructures, and, often massive conglomerations of buildings', she describes them as '*situated* territorial spaces' or 'new cross-border geographies of centrality'. Although Sassen does not deal directly with data centres, her understanding of these 'largely extractive and infrastructural spaces' (8) registers the way in which data centres produce 'bordering dynamics' that are 'partly formalised, partly emergent, and partly not necessarily meant to be formalised nor to be particularly visible' (7). The capacity of data centres to generate operational spaces that function within but also partly beyond existing law and jurisdictional relations is an important territorial feature of their client footprints.

These complex territorial dynamics do not mean that data centres are generic spaces whose geographical location is inconsequential. Although they may have weak social, as opposed to infrastructural, ties to the urban or national contexts in which they exist, these facilities tend to cluster in formally constituted territories that offer a safe harbour for data storage and favourable business environments. Singapore attracts

data centres not only because of its advanced digital infrastructures but also because of its geographical location, skilled workforces, access to reliable supplies of electricity and water, regulatory environment and the political stability offered by the continuous PAP rule. But this pre-eminence is under threat as the industry grows in neighbouring countries such as Thailand, Vietnam and Malaysia. In the case of the latter, an explicit attempt is being made to piggyback on Singapore's industry position by establishing a data centre park at Sedenak in the country's southern Iskandar province (Sedenak Iskandar Data Hub, 2018). Able to offer cheaper prices for labour, electricity, land and water with very little attenuation in network speed in comparison to Singapore, such initiatives could potentially unsettle Singapore's market dominance. Nation-states also legislate data sovereignty measures that require certain types of data, for example, citizens' health data, to be stored on national territory. Arguably as much of a trade as a security measure (Selby, 2017), given that security in cloud computing involves mirroring and distribution of information, such 'data nationalism' (Chander & Le, 2015) limits the tendency for companies and institutions based in surrounding countries to store data in hubs like Singapore. The relation of data centres to territory is thus complex and crosshatched: on one hand, they establish their own discontinuous and distributed territories; on the other, they remain subject to standard geopolitical, trade and territorial arrangements.

How are we to understand the importance of these territorial networks for work organisation and globalisation? A first step means expanding our understanding of work beyond paid labour, although this certainly remains a consideration when firms outsource their information technology needs to external data centre providers that promise to provide secure data storage and processing on terms more economically favourable than can be organised locally. In this case, workforces that use digital equipment, whether under direct employment arrangements or under various kinds of indirect, labour hire or piecework arrangements, occupy the client end of network architectures that provide infrastructures, platforms or software as a service. Under these conditions, workforces in different nation-states or under different labour regimes might share resources provided from the same data centre or even the same server, as much as the latter is possible to identify in a computing environment where all machines have been virtualised. For instance, a directly employed but precarious data entry workforce in Indonesia might upload data to be stored in the same Singapore data centre that serves a ride share platform for gig economy workers in the Philippines. This is a hypothetical example, as the server–client architecture that pertains in data centres does not reveal such connections in an evidentiary way. But the plausibility of such arrangements raises the question of how relations between such workforces are to be understood and theorised.

To this, we must add another question about the role of unpaid workforces. Consider the new ranks of Internet users in Indonesia that digital service providers attempt to reach by placing their servers in Telin's Singapore data centres. Like their counterparts in other parts of the world, many of these users sign up to digital services that generate value by aggregating, analysing and selling on data produced by users, whether from Internet searches, social media use or other activities such as news browsing and online shopping. Data centres are essential to this extractive economy

because they provide the infrastructural base that allows aggregation, analysis and selling on of data to take place. That user activity creates data that enable extraction and value generation suggests that this activity should be conceptualised as labour. This does not mean that the extraction implicit in contemporary data economies is equivalent to the extraction performed on the colonial revenue farm or the 'extraction of surplus labour' inherent in classical wage exploitation as conceived by Marx (1977:141). What distinguishes the labour of the data generation from that accomplished on the revenue farm or under the wage contract is the way it mobilises social cooperation as a productive force.

In the case of the revenue farm, relations of debt and addiction tie workers to syndicates that become important vehicles for commodity production and capital accumulation. As in the relation of 'formal subsumption' described by Marx (1977:1019), previously existing productive processes are appropriated by capital and synchronised with dynamics of valorisation from an external position. Under the wage contract, by contrast, capital directly organises social cooperation within the spatial and temporal parameters of the working day. Marx (1024) characterises this situation as 'real subsumption', by which he means that the 'entire development of the productive forces of *socialised labour* . . . takes the form of the *productive power of capital*'. The extraction of value from data generated by users' digital activity extends this logic at the same time as it explodes its spatial and temporal continuity. Social cooperation performed and organised through online participation produces data that are then aggregated, analysed and sold to create value. The moment of extraction applies to neither residual productive activities, such as the cultivation of pepper and gambier that took place on Singapore's revenue farms, nor those organised directly by capital, such as those that occur in the industrial factory. Instead, capital draws externally upon emergent forms of digital sociality, with which users engage for purposes such as consumption, work, play and communication. To understand this engagement as labour is to emphasise the subjective element of this sociality. From this flows a raft of questions, including the critical issues of how subjects who perform such labour make a living or fit into patterns of class identification and struggle (Huws, 2014:173–81). For now, we want to emphasise how the labour of data generation extends across and increasingly defines the contours and qualities of social life rather than being confined to the workplace or tethered by relations of dependence and indenture. Recognition of this subjective condition is no longer confined to advocates of the 'social factory' thesis (Tronti, 1966; Terranova, 2000). An understanding of data as labour has also gained traction among proponents of so-called radical markets (Posner & Weyl, 2018) who argue that payment of subjects who produce data would contribute to technological development and economic growth.

In any case, an understanding of data supply as labour thickens and complicates arguments about the relevance of the territorial networks generated by data centres for work organisation. As compared to a view that accounts only for directly or indirectly employed workers, this perspective integrates an awareness of the business models of digital providers that generate profit by extracting data from users and selling them or using information derived from their analysis to design services that can then be sold or rented. Such an analysis needs to account for the likelihood that tech firms like

Google and Facebook will move away from advertising-based revenue models towards the marketing of services that deploy artificial intelligence and machine learning (Morosov, 2018). But the point remains the same. Data centres mobilise server–client architectures to disperse and draw in the labour of many diverse and heterogeneously located subjects, spanning different kinds and experiences of labour. Although these subjects may work in different sectors, enterprises or occupations, be paid or unpaid, employed or unemployed, or occupy positions in discrete supply chains, they are placed in infrastructural relation to each other by virtue of their connections, known or unknown, to data centres. How are we to conceive of this relation and the diagram of power it establishes in the context of network topologies, jurisdictional boundaries and existing means of conceptualising the relation between different kinds of working subjects and industrial units? The next section of this article takes up this question by assessing the logistical organisation of labour accomplished by data centres in the light of current conceptions of supply chains and production networks.

Production topologies

In Singapore, revenue farms provided the financial and logistical backbone to the economic system of colonial extraction for more than 100 years. Since the free movement of goods through the ports were so critical to the global success of the colonial administration, duties could not be imposed as a key way to extract value and revenue. Thus, the colonial administration developed and relied on revenue farms to finance its operations. By benefiting from revenue farms, at a distance and without direct involvement, the colonial administration was able to benefit from labour, industries and practices that they otherwise could not have accessed, whether because of a limited physical presence, a lack of other infrastructure in place or because doing so would have been questionable legally or morally. As Lisa Lowe (2015:74) explains, 'ideas of "free trade"' were intrinsic *both* to liberal political and economic freedom in England, *and* to the improvisation of new forms of sovereignty in the empire, as Britain moved away from strict mercantilism to expanded worldwide trade, and from colonial practices of slavery and territorial conquest to new forms of governance linked to the production of value through the movement of goods and people'.

We point to resonances between the way revenue farming established Singapore as a switch point for regional networks of labour and commodity trade and the current role of the country's data centres in organising labour relations and data flows across regional borders. Exploring these affinities does not mean we draw an easy parallel between colonial forms of administration and the governance strategies of Singapore's current ruling party. Nor do we seek to update the trite and misleading media analogy 'data is the new oil' by suggesting that 'data is the new opium'. We recognise the historical, legal and economic differences surrounding the production, circulation and consumption of these two commodities. We also acknowledge that the post-independence governance approach of the PAP has had very different implications for land holding and state monitoring of the Singaporean economy than those that pertained in the colonial era. Under PAP rule, state land ownership increased from around 30% in 1960 (Chan & Shanmugaratnam, 2015) to around 90% in 2017, while the size of the country increased by almost a quarter by filling-in swamps and

expanding the coastline (Subramanian, 2017), At the same time the PAP focused on growing Singapore's two sovereign wealth funds – both of which now consistently rank in the world's 10 wealthiest (Sovereign Wealth Fund Institute, 2018). These changes provided the pre-conditions for the state to orchestrate the shift from manufacturing to oil and then data industries that has characterised Singapore's economic trajectory. Yet, just as Trocki (2008) argues that revenue farms were crucial to establishing national borders and territories in South East Asia, we suggest that data centres play a prominent role in shaping territorial arrangements that influence the current traffic of labour, goods and information in the region and beyond. To understand more fully this intersection between data centres, labour and territory, we need to situate our argument with respect to recent theoretical and empirical accounts of transforming patterns of global production and work organisation.

Over the past decades, there has been a proliferation of chain and network metaphors in studies of globalisation, international political economy, development, business management and labour processes. Ursula Huws (2014:88–89) provides a schematic typology of the three main ways of thinking about relations between firms and workforces in these fields. The chain paradigm focuses on relations between firms involved in the production and distribution of a given product. Developed mainly for understanding the globalisation of manufacturing industries, this approach enables us 'to understand not only the spatial distribution of the tasks that contribute to producing the final product and the value contributed in each step but also the power relationships between the different actors along the chain' (88). The *filière* approach allows visualisation of 'how a product like electricity or water is distributed across a single economy' (89). Less useful for understanding international flows or power relationships, it provides a means for tracking flows within discrete economies and a way of modelling inputs and outputs between sectors. The network paradigm offers the potential to map interactions between actors both within and between economies. According to Huws, it is less effective in accounting for the direction of flows or the drivers of change. Huws suggests that a model that understands economies as composed of modular 'business functions' composed of interchangeable tasks can overcome the weaknesses and strengths of these approaches. Other important recent contributions stress the mobilisation of labour within the constitutive diversity of 'supply chain capitalism', focusing on factors of gender, ethnicity, nationality, religion and citizenship status (Tsing, 2009). The literature on 'global production networks' also points to the role of diversity in production processes, moving beyond state-centric approaches by investigating the 'nexus of interconnected functions and operations through which goods and services are produced, distributed and consumed' (Henderson et al., 2002:445).

All of these approaches have something to contribute to an analysis of how data centres contribute to contemporary extractive economies by linking firms and workforces across diverse territories. But because the concepts of chain, flow and network are metaphors that seek to describe complex material relations, they have limited applicability in studying the different kinds of connectivity enabled by data centres and related infrastructures. Interrogating the global production network paradigm, for instance, Christopher Foster and Mark Graham (2017:76) note that 'the

digital is rarely problematised as a changing, dynamic and active element' but instead 'either treated as a background element or ignored'. Foster and Graham call for an analysis that examines which actors gain from the digital, explore the processes by which digital networks come into being, and emphasise how the digital operates in 'constant interplay between networks and territories' (85). Such an approach clearly needs empirical inputs, for instance as regards the codes, standards and algorithms that mediate action within digitally enabled production networks. For the current study, the question of how data centres create their own territorial networks is paramount. Research on this issue cannot be content with the mobilisation of standard chain, flow or network metaphors. The chain metaphor, for instance, does not register how relations of peering between firms in data centres create new forms of comparative advantage. The flow metaphor cannot account for packet switching technologies that transmit data in bursts (Sprenger, 2015:73–104). And the network metaphor cannot explain how the physical wiring of data centres generates distinct topologies that determine how different clients, users and labour forces interact (or don't) in digitalised production environments.

In this regard, it is important to note that not all data centres (or indeed digital networks) are alike. We have already pointed to the difference between data centres run by single firms for their own operations and multi-user data centres that bring servers utilised by different firms, users and workforces under a single roof. But data centres also have different network configurations, depending on their purposes. With names such as closed-tree, Clos, fat-tree, Dcell, BCube, c-Through, Helois, PortLand and Hedera, these network topologies determine how physical machines are materially connected to each other (directly or via switches) in data centres. Different topologies imply different trade-offs between network qualities such as speed, redundancy, path diversity, energy conservation and scalability. A data centre that attracts business from high-frequency financial traders, for instance, is likely to have a Clos topology, since this architecture reduces buffering and favours low latency transmission that provides information from stock markets with minimal delay. By contrast, a large commercial multi-user centre might prefer a fat-tree topology that modularises the servers used by different firms and connects them to each other via electronic switches that lead to a 'meet-me' (peering) room. When such a centre supplies software, platforms or infrastructure as a service, however, a more flexible architecture that utilises optical switches to reconfigure during runtime is an attractive option (Liu et al., 2013).

The design of network topologies is now a crucial part of the data centre business. Different topologies can be combined in a single data centre, for instance, creating hybrid networks that seek to balance and optimise operations. On top of the physical infrastructure of network topology, a software layer controls the viritualisation process by distributing load and virtual machines across physical machines. With names like Sunbird, Nlyte and Tuangru, data centre infrastructure management software packages bridge information across organisational domains to configure workflows, power use and the like. Technically this means the operations of any single client might be distributed across different physical machines or even across physical machines in different data centres. The possibilities are multiple and, due to processing speeds, highly variable in time. It is also true that network topologies extend outside data

centres into cabling systems and that the various architectures available have their own infrastructural histories; for instance, the widely used Clos topology has its origins in 1950s telephone exchanges. But because virtualisation means that east–west traffic (between servers in the same facility) increasingly outweighs north–south traffic (between servers and clients located outside of data centres), it is important to understand the relevance of data centre topologies for production processes. We need to account for these network architectures if we are to supplement political economic analyses that rest on chain, flow and network metaphors with relevant knowledge concerning the infrastructural conditions that shape relations between firms, workforces and users in digital economies.

We are well aware that the physical production of material commodities continues to expand at the global scale and that digital labour cannot be considered in separation from a wider analysis of changing divisions of labour. However, as we noted earlier in writing about the production of data, information networks have been crucial to the social expansion of labour beyond the factory walls. Informatisation also reorients other modes of production, from peasant economies altered by the introduction of genetically modified crops to manufacturing industries challenged by new fronts of automation based in artificial intelligence and machine learning. Indeed, as a recent International Labour Organization report (Chang, Rynhart & Hunyh, 2016) details, these latter developments are putting manufacturing jobs in South East Asia at risk, marking an end to the trend that moved these jobs to this region across past decades. Artificial intelligence and machine learning also contribute to the service economies that are beginning to eclipse the advertising-based business models of large tech firms. Significantly, these technologies require the storage and processing of large amounts of data in data centres, confirming the centrality of these facilities to contemporary operations of capital. If we understand data supply as labour, however, what this situation confirms is that the real engine of these developments is living knowledge, intelligence and subjectivity. Even though data centres are highly automated environments that employ few workers (usually male managers, technicians and security staff), the flashing lights and buzzing fans inside these installations materially register the presence of distant labour forces, which are connected and organised into patterns of social cooperation by the network topologies we have discussed.

To speak of production topologies is to augment the discussion of production networks with knowledge of the network architectures that structure operations within and between data centres. Celia Lury, Luciana Parisi and Tiziana Terranova (2012:5) have discussed how topology provides a way of describing how 'a distributed, dynamic configuration of practices is organising the forms of social life'. In their conception, topology is 'emergent in the practices of ordering, modelling, networking, and mapping that co-constitute culture, technology and science'. We seek to extend this perspective by bringing a discussion of how data centre networks open to a high degree of variability contribute to relations between firms, users and workforces in contemporary production networks. While the existing literature on global production networks stresses the '*social processes* involved in producing goods and services and reproducing knowledge, capital and labour power' (Henderson et al., 2002:444), it places emphasis on the '"architecture", durability and stability' (453) of network relations as opposed to their variance.

Knowledge of data centre topologies and processes of virtualisation places these relations in a more dynamic context. Doubtless, production still sometimes occurs through linear chains and fixed networks; but without an appreciation of the more complex and distributed production relations introduced by data centre topologies, it will be difficult to identify critical points in production processes where workers might effectively apply their agency. This is because data centres provide an infrastructural fix for capitalist actors to skirt traditional labour actions, by designing logistical routes around which to redirect production processes, for instance, or by furnishing technologies of fault tolerance and mirroring that absorb such disturbances in ways that minimise their effects. Assisting workers to see and understand how data centre production topologies connect them across different countries, employment statuses, and occupational and social identities is a first step to imagining new forms of organisation and solidarity adequate to challenge the extractive operations of contemporary capital.

In terms of the debate on logistics and the forms of power it generates, a focus on data centres and their topologies allows us to intervene in discussions about how logistical power interacts with other forms of power. In particular, the question of how data centres generate networked territories that discontinuously cross state spaces is crucial for assessing how logistical power meets sovereign power and the governmentalisation of power in and beyond the state. We reserve fuller discussion of this matter for another occasion (although see Neilson, 2012; 2018). For now, it is sufficient to note that the position of Singapore as a data centre hub with regional network capabilities provides a strategic focus for research seeking to understand transformations in labour relations and processes at the regional scale. This article has made preparatory steps in that direction. Unpacking the historical, territorial and topological relations that position labour forces in relation to data centres may seem a complicated task, but it remains one worth completing if we are to devise new means of collective action to forge a life beyond capitalism.

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The production of logistics places in France and Germany:
a comparison between Paris, Frankfurt-am-Main and Kassel

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ABSTRACT
Logistics is now a key concept for the analysis of the transformations of global capitalism and a central perspective for understanding the changing power relations within global production networks. Furthermore, the development of logistics relies on the construction of thousands of warehouses and terminals that are essential nodes in the circulation of goods. The production of these logistics zones entails negotiations and coalitions between local authorities and different local and global firms, and structures the everyday life of logistics workers. The aim of this article, therefore, is to analyse the production of logistics areas at metropolitan and local scale, through a comparison between Paris (France) and Frankfurt-am-Main and Kassel (Germany). Based on an interdisciplinary approach combining urban sociology, urban geography and political science, it reveals that the production of logistics places is primarily the outcome of local negotiations and legitimisation processes in which the logistics real estate investments of globalised financial markets are embedded.

Introduction

Logistics is now a key concept in the analysis of the transformations of global capitalism and a central perspective for understanding the changing power relations within global production networks (Cowen, 2014; Bernes, 2013; Mezzadra & Neilson, 2013, 2015; Neilson, Rossiter & Zehle, 2010; Rossiter, 2012). From a material point of view, the development of logistics activities and flows entails the construction of thousands of warehouses and terminals that are essential nodes in the circulation of goods (Dablanc & Frémont, 2015; Cidell, 2015). These multiple logistics sites are mainly understood as the physical infrastructures that make current globalisation processes possible: the emergence of a 'wall-less global factory' (Cowen, 2014), the diversion of capital into the built environment, and thus the expansion of the geographical frontiers of the accumulation process (Danyluk, 2018). In contrast with these approaches that identify logistics as something new, the result of a 'logistics revolution' (Bonacich & Wilson, 2008), research on logistics workers highlights the continuities between logistics activities and the manufacturing world (Benvegnù & Gaborieau, 2017).

However, global scale production is only one dimension of the space-making practices of logistics. This article deals with warehouses and terminals that are concentrated in urban regions. They raise many political issues in terms of the production of urban and metropolitan space, which have been addressed by current debates on 'City Logistics' (Taniguchi et al., 2001) and the 'Logistics City' (Cowen, 2014). As argued by Cowen, research on 'City Logistics' highlights the problems of the coordination of flows at urban and metropolitan or regional levels but hardly considers workers' working conditions and the normative orders according to which logistics organisations reshape cities (Cowen, 2014:180–84). With the concept of 'Logistics City' Cowen thus defends a critical approach to the relationships between logistics and urban development, showing that logistics produce specific urban forms that are not conceived for people but for goods, according to an order derived from their military origins. Consequently, these spaces are standardised, privatised, fragmented, unsafe for workers and lacking in any democratic control by citizens. Nonetheless, the concept of 'Logistics City' tends to generalise specific cases of former military zones recently converted into logistics international hubs (the main examples are Basra Logistics City in Iraq, the Global Gateway Logistics City in the Philippines and Dubai Logistics City), without considering more 'common' logistics places, which are embedded in traditional industrial urban areas or in new economic development projects. These are precisely the logistics spaces we aim to study in this article that analyses the production of logistics spaces at metropolitan and local scale with the aim of complementing approaches that explore the global scale dynamics of logistics (e.g. Cowen, 2014, Danyluk, 2018). Rooted between urban sociology, urban geography (Storper, 2013) and policy analysis (Lascoumes & Le Galès, 2012), this holistic perspective on the modes of

production of logistics spaces compares Paris (France) with Frankfurt-am-Main and Kassel (Germany) using a set of qualitative methods. The production of urban space encompasses the design, construction, exploitation and use of the urban built environment. Our analysis of this process focuses on the governance of urban places (e.g. Logan & Molotch, 1987; Fainstein, 2001; Lorrain, 2002), shedding light on the private and public actors involved in these local and metropolitan policies, on the decision processes and the discourses (Williams, 1999) as well as on the policy tools (Hood, 1983), which contribute to the production and governance of warehouses and terminals in the three urban regions. By doing this, it focuses on public land developers and real estate actors in their relationship to the retail industry and private investors (Raimbault, 2016).

Our contribution is thus twofold. First, we show that the standardisation, privatisation and fragmentation of space and the lack of democratic control, which characterise logistics places, also result from the way they are governed and produced at the metropolitan and local scales. The establishment of these logistics sites entails negotiations, discussions and coalitions between metropolitan and local authorities and a range of local and global firms. These regional and local contexts shape the everyday life of logistics workers and contribute to the reproduction of social relations of domination (De Lara, 2013).

Second, although the production of logistics space is influenced by metropolitan discourses and strategies, it is primarily the outcomes of local negotiations in which legitimisation processes are embedded (Raimbault, 2017), and which, in particular, incorporate the logistics real estate investments of globalised financial markets. The governance of logistics zones cannot thus be understood purely in terms of the 'neoliberalisation of urban policies', considered as a global ideological transition towards urban policies aimed at stimulating urban growth and capital accumulation processes by developing new markets. These approaches tend to subsume different processes of liberalisation, financialisation and the fostering of new forms of competition that must still be analysed separately (Pinson & Journel, 2017; Le Galès, 2016) or might even be a misleading interpretation of historical dynamics and of the role of ideas in urban change (Barbier, 2018). Our comparative approach assumes the diversity of local modes of governance understood as stabilised systems of political, economic and social coordination (Le Galès, 2004) in urban regions (Raimbault & Reigner, 2018). More precisely, such a comparison confirms the existence of different local modes of logistics zone governance corresponding to distinct modes of production already highlighted in the case of Paris (Raimbault, 2017; Raimbault, Heitz & Dablanc, 2018).

After a brief discussion of our methodology, in the next section, this article shows how local and metropolitan authorities, experts and private firms establish a discursive hierarchy, which distinguishes between the 'high, smart and clean' logistics that contribute to the international competitiveness of cities, and the 'dirty, noisy and polluting' logistics characteristic of most logistics zones. Although these discourses emanate from practical policy instruments, such as research clusters and environmental labels, they help to eclipse the material and social issues relating to the spatial layout of logistics sites and the working conditions within the warehouses.

The following section then tackles the processes whereby logistics zones are produced, processes primarily governed by a powerful logistics real estate industry in negotiation with local governments. Because logistics activities and spaces are rarely the target of serious public intervention in urban regions (Le Galès & Vitale, 2013), this mode of space production remains outside the scope of metropolitan rhetoric. Although this leads to a strong tendency towards standardisation in urban form, our analysis reveals that the historical and institutional context, the scarcity of land, the financialisation of the real estate industry and local social movements are key elements for understanding how current logistics zones are produced and governed.

Methodology: a comparative and interdisciplinary approach to the analysis of logistics places in urban regions

This collaborative research is empirically based on a PhD thesis on the Paris Region (Raimbault, 2014) and on the preliminary phase of the ANR WORKLOG research project in Germany.[1]

The Île-de-France Region (population: 12.2 million),[2] which corresponds to the Paris metropolitan area and comprises 1,276 municipalities, claims 240,000 logistics jobs. About 45% of these are blue-collar jobs in warehouses and terminals (handlers, pickers, forklift drivers and dockers) while 30% are blue-collar jobs in distribution and delivery activities (drivers and couriers) and the remaining 25% correspond to managers, engineers, technicians, salesmen and office clerks.[3] These workplaces are mainly located in the outer or inner suburbs, especially in the former industrial belt (Omont, Graille & Saugnac, 2015). Île-de-France also plays a role as the French economy's international gateway, with Roissy-Charles de Gaulle Airport, Europe's leading freight airport.[4]

The Frankfurt metropolitan region, which comprises 112 towns and communities around Frankfurt (population: 2.2 million), accounts for 103,500 logistics jobs.[5] Because of its denser urban structure and, as we will show, different spatial planning rules, logistics markets in Germany are mainly regional. In France, the logistics market is unified at a national level, especially around Paris. Nevertheless, like Paris, Frankfurt has its own airport, which makes it an international gateway.[6]

Logistics centres develop not only in metropolitan regions but also around middle-sized cities like Kassel. This city and its surrounding district (population: 430,000) is home to 17,400 logistics jobs,[7] the same proportion of the working population as in the Frankfurt metropolis (9%). Whereas the attractiveness of this city for logistics is usually

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1 'Workers' socio-cultural worlds in retail logistics. A visual and transnational ethnography backstage in the world's cities', University of Paris-Est Marne-la-Vallée, ANR-16-CE41-0003-01, http://worklog.hypotheses.org, accessed 21 January 2019.
2 The Île-de-France Region is home to 19% of the French population.
3 INSEE, 2014, authors' calculation.
4 2.3 million tonnes in 2017.
5 Beschäftigungsstatistik based on the 2010 employment classification, Bundesagentur für Arbeit, Land Hessen, 2016.
6 2.2 million tonnes in 2017.
7 Beschäftigungsstatistik based on the 2010 employment classification, Bundesagentur für Arbeit, Land Hessen, 2016.

explained by its location at the barycentre of Germany's road networks,[8] we intend to show that these spatial properties are the result of political decisions and power relations.

In each city, our empirical study of the modes of production of logistics spaces is based on one or two logistics zones, which were chosen according to their importance at the metropolitan level in terms of the numbers of logistics firms and jobs, and according to their strategic meaning for urban and economic development at the local level. For each zone, the investigations drew on expert and semi-structured interviews with logistics real estate developers (19), members of local public administrations (21) and employees of para-public urban development companies (14), as well as on the analysis of the public relations documents of these institutions.

The quest for 'strategic logistics': the symbolic upgrading of logistics in metropolitan discourses

Paris, Frankfurt-am-Main and Kassel have all experienced significant development in logistics over recent decades. In this context, much public discourse on logistics development in the three cities has emphasised the exponential rise in the international movement of goods, promoted regional planning for the key global logistics nodes and highlighted local forms of public–private partnership for specific 'innovations' in this sector. This section seeks to understand the basis of this discourse and its impact on the symbolic value of the different logistics activities.

The most frequent advocacy in favour of logistics as a dynamic and innovative economic sector is to be found at the metropolitan level in the institutions responsible for the economic development of the three cities: the French government and the Île-de-France Region in Paris, the metropolitan planning authority in Frankfurt (Regionalverband Frankfurt-Rhein-Main) and Nord-Hessen Regional Management and the city economic development agency in Kassel. On one hand, this rhetoric stresses the importance of logistics for the economic competitiveness of cities. On the other hand, the metropolitan discourses promote 'innovations' through the running of public–private research clusters. In so doing, some of the actors in metropolitan government are seeking to raise the symbolic status of specific logistics activities and thereby contribute to the establishment of an internal hierarchy within the sector as a whole.

Metropolitan discourses: logistics and economic competitiveness

Some logistics activities and spaces are framed as fulfilling a strategic metropolitan function by supporting international competitiveness. In Île-de-France, the logistics strategy defined by the French government and the regional authorities since 2009 has focused on the development of specific transport infrastructures such as ports and airports. By strengthening institutional integration and transport connections between Paris and its nearest seaport (Le Havre), these authorities have aimed to make Paris a global hub for international flows.[9] They have therefore built a unified institutional

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8   Starting from this location, a truck can reach many different points in Germany within the same distance/time ratio.

9   Interview with the deputy head of strategy and innovation, Haropa Ports, 2 January 2013.

structure incorporating all the ports on the River Seine and developed new rail and river facilities (Brennetot, Bussi & Guermond, 2013; Raimbault, 2014; Magnan, 2016).

In parallel, the regional strategic planning policy initiated by the French government during the same period, defined 14 'clusters of excellence' in specific economic sectors and locations. Two clusters in particular are dedicated to 'logistics innovations': at Roissy-Charles de Gaulle Airport and in the new town of Sénart,[10] which is the region's main suburban logistics pole. Logistics is thus included in the broader metropolitan policy implemented within the Île-de-France Region.

However, the majority of logistics activities remain outside the scope of this strategy. In Frankfurt-am-Main, logistics are also seen as essential to the city's international competitiveness, but, in contrast with the Paris Region, logistics growth is seen as just one of several aspects of an industrial strategy. From this perspective, development of the logistics infrastructures appears quite problematic, as it is in competition with manufacturing industry for space. Because of this competition, there is a scarcity of land for logistics, because it remains an ancillary function in comparison with industry. To solve the problem, much hope is invested in technologies that will reduce the space requirements of logistics functions through rationalisation (Beirat Industrie der Stadt Frankfurt-am-Main, 2015:20).

Although the Frankfurt-Rhein-Main metropolitan planning authority considers Kassel, which is located approximately 200 km north of Frankfurt, as a 'periphery'[11] that specialises in land-consuming logistics with a low-skilled workforce, the city of Kassel's logistics actors and land-use planners see things very differently. According to the head of Kassel's economic development agency, logistics developed around Kassel during the 1990s as a consequence of industrial development and the site's historical specialisation in the automotive industry.[12] He then explained that Kassel also faces the problem of land scarcity for logistics, which could have been solved through economic cooperation at local and regional level to concentrate 'land consuming logistics' 100 km further away, in the North-East of the region, around the city of Bad Hersfeld.[13]

The symbolic upgrading of 'strategic logistics'

Apart from these rhetorical strategies, some logistics activities and locations have been symbolically upgraded by practical institutions, policy instruments and technological innovations that are publicised in international logistics journals and fairs. These policies on technical innovation, public–private research clusters or sustainability labelling have resulted in the reimaging of a so-called 'high, smart and clean' logistics.

Several institutions promote and finance 'technical innovations' applied to logistics. The emphasis on technical progress, such as increased automation, is often linked with the idea that these upgraded activities will need more skilled employees. Local decision

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10   New Towns were planned by the French government in the 1970s in order to regulate the urbanisation of the Paris region.
11   Interview with the Director of the Regional Development Department, Regionalverband FrankfurtRheinMain, 5 April 2016.
12   Volkswagen's spare parts centre plays a central role in all scientific and political discussion of Kassel's economic development over the last twenty years (Schröder, 2016).
13   Interview with the Director of the Economic Development Department, City of Kassel, 11 August 2017.

makers, professional organisations and logistics training institutions therefore emphasise figures such as supply-chain managers or researchers in robotics or logistics solutions,[14] although they represent a very small part of the workforce (2% in Germany and 7% in France).[15]

In addition, the public–private research cluster acts as a strong symbol of economic excellence, which contributes to the reimaging of the logistics sector. In Germany, the 'triple-helix coalitions' established as models of academic–public–private-partnership for innovation (Fromholdt-Eisebith, 2012) play a central role in this discourse, with notions like 'Industry 4.0.' and the 'Smart City', and the participation of institutions like the *Frauenhofer Institute* or, in Frankfurt-am-Main, the 'House of Logistics and Mobility'. In the Paris Region, though less closely tied to the logistics firms, there are comparable government-led initiatives such as the 'logistics innovation' cluster in Sénart new town.

Another form of symbolic upgrading of logistics activities is supported – often in a more pragmatic way – by local actors responsible for the production of logistics zones. Responding to protests in Germany led by environmentalist movements and green politicians since the 1990s,[16] and to complaints over smells, noise and visual pollution since the early 2000s in France,[17] local decision makers claim to be rigorously selective in their preference for 'clean(er) logistics'.[18] These claims rely on the introduction of various kinds of environmental protection instrument. Pollution indicators, sustainability standards and labels certifying low energy consumption by warehouse buildings – such as BREEAM certification – are among the different assessment and benchmarking systems that have been developed since 1990 and have been supported by professional organisations and real estate actors (Raimbault, 2016). In addition to this, specific transport infrastructures, such as multimodal terminals that connect rail, road and river transport, are touted as reducing the unit environmental cost of transport. Finally, offset schemes have been implemented to encourage public developers to buy wetland and biotope reserves for each new area urbanised through logistics development.

Ultimately, measures intended to symbolically enhance the status of logistics have led to the development of an internal hierarchy within the sector as a whole. The reimaging of logistics in fact relies on the targeted stigmatisation of specific logistics activities. In Frankfurt-am-Main, in particular, the public actors responsible for economic development policies present themselves as rejecting 'dirty, noisy and

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14   For examples, see the website of the *Fraunhofer-Institute für Materialfluss und Logistik* (www.iml. fraunhofer.de, accessed 21 January 2019).
15   Zensus, 2011; Enquête Emploi, INSEE, 2012.
16   This was the case of the protests against the airport enlargement project in Frankfurt in the mid-2000s.
17   The 'Seine-et-Marne Nature Conservation Association' (A.S.M.S.N), 'Nature Environnement 77' in association with 'France Nature Environnement', the R.E.N.A.R.D. in Roissy and the ADIR in Sénart, are examples of social movements that directly criticised logistics development in the eastern part of the Paris metropolis (see section 2).
18   For example, this happened in 2006 concerning the development of the 'Parisud 6' logistics zone in Sénart or more recently in the development of the 'Mönchhof' industrial park in the cities of Kelsterbach and Raunheim, next to Frankfurt Airport.

polluting' logistics, that is, the logistics of standard warehouses moving standard goods. Similarly, metropolitan actors in the Paris Region differentiate between strategic and non-strategic logistics activities, framing as strategic only a small part of the region's logistics activities: the main transport infrastructures, logistics activities linked to the international seaports and the 'logistics innovation clusters'. As a result, a large proportion of logistics activities and spaces in the three cities remains outside the scope of metropolitan rhetoric or is framed as non-strategic or even 'dirty'.

The production of logistics spaces: development policies for local logistics zones, financialisation and silent privatisation

The way the majority of logistics activities are located in space remains largely outside the scope of metropolitan discourse and intervention. In fact, logistics zones are in the main developed by the logistics real estate industry, which leads to a strong dynamic of spatial standardisation. Nevertheless, the analysis of the logistics zones in each city reveals that the local and regional historical and institutional contexts are key determinants of the way current logistics sites are built and governed (Raimbault, Heitz & Dablanc, 2018).

More precisely, on the basis of several case studies in the three regions, this section shows the co-existence of different local modes of logistics zone governance. These modes of governance correspond to different phases of logistics development. To explain these variations, we identified four main and interconnected mechanisms. First, demands for logistics space differ according to the structure of the regional logistics markets. Second, features of the local land and real estate markets (from the availability of land in existing industrial zones to the degree of financialisation of the real estate industry) largely determine these modes of governance. Third, the regulation of these markets mainly relies on the public and political institutional architecture of the urban region, that is to say on the level of political autonomy of municipalities and on the effectiveness of regional planning regulations. Finally, local development projects are also influenced by social movements in the neighbourhoods in their immediate environment.

In this way, changes in the modes of production of logistics sites significantly structure the changing geography of workplaces, local services in the logistics zones and their connection with the places where logistics workers live.

The incremental and silent conversion of industrial zones into logistics zones

The first mode of governance corresponds to the development of logistics in industrial zones from the 1970s to the early 1990s. During this period, logistics providers and shippers were looking for land in major urban regions, in order to build the warehouses they needed to expand their logistics networks.

They first found suitable spaces in the large existing industrial zones. They built on plots that became available when the demand for new manufacturing sites started to decline. This led to a silent conversion of industrial zones into logistics zones. The

production of this generation of logistics sites did not rely on complex political arrangements, or specific real estate or land development operations. The land, usually developed by public land developers, was available for any kind of industrial purpose, whether manufacturing or logistics. Municipal authorities were asked to give their formal agreement by signing the building permits. Their political involvement and public regulation were limited to urban planning. The shift to logistics on these former industrial sites was therefore almost invisible, without explicit public discussion or negotiation between public and private actors. There were only few social movements against it.

In the Paris Region, the historical industrial suburbs, known as the 'red belt' because of their strong communist history, became the focus of most of the logistics sites over this period (Raimbault, 2014). The shift to logistics was consistent with development trends in the industrial world. Relying on 'low-skilled' jobs, logistics activities could find the necessary labour force among local jobless workers, who may previously have been employed in more skilled positions in the local manufacturing firms. At the same time, they paid local taxes that enabled the municipalities to continue implementing social redistribution policies.

In the Frankfurt-Rhein-Main metropolitan region, the development of logistics in the town of Dietzenbach followed the same model.[19] In 1973, the State of Hessen wanted to expand urban growth in this town in order to meet the huge demand for housing in the city of Frankfurt. For this purpose, the State of Hessen used the so-called 'Städtebauliche Entwicklungsmaßnahme' planning instrument, which enabled the city authorities (which at that time were in favour of urbanisation) to buy land from landowners through compulsory purchase at the price of non-constructible land, and then to sell it to public or private investors at the price of construction. Two German retail groups bought large parcels of land (between 1 ha and 6 ha) in this period in order to build their national distribution centres. Their warehouses rubbed shoulders with other industrial activities in a mixed economic landscape.

In the 1990s, the local authorities began to prohibit logistics activities in land-use plans in response to criticisms by local green party or citizen groups, which objected to the environmental pollution caused by warehouses. Since 2000, logistics real estate developers have taken advantage of industrial brownfield sites to develop new logistics parks, but this development remains restricted by land-use plans, political decisions and adjacent activities (when the available plots are smaller than 1 ha). Specialist logistics real estate developers have emerged recently, in relation to the other governance modes we will describe in the next sections. This example shows that these new governance modes are dependent on the local institutional and spatial path as well as being shaped by local social movements.

The production of logistics spaces in historically industrial areas has not followed a specific path vis-à-vis the dynamics of industrial zones. In the Paris region, logistics development represents a continuation of the municipal policies of the 'red belt'. In Frankfurt-Rhein-Main, the regional authorities planned industrial zones that were

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19   A town of around 30,000 people located 15 km south-east of Frankfurt.

attractive for logistics development. However, the development of logistics in these industrial areas has been met with objections from environmentalists that have significantly hindered the process.

The emergence of local policies on the development of logistics zones

The increasing demand for logistics spaces led to a second mode of governance. Many local governments or authorities took advantage of this demand to develop new business zones dedicated to logistics activities.

In the Paris Region, this strategy of economic development was adopted in particular by several new towns such as Evry, Marne-la-Vallée and, most of all, Sénart. These new towns were entirely designed and planned by public land developers – 'Établissement Public d'Aménagement' (EPA) – directly accountable to central government and, conversely, independent of municipalities and local politics. Since the 1990s, logistics have been seen by these public corporations as an easy way to attract businesses in a so-called 'post-industrial context'.[20]

The case of Sénart is particularly emblematic. The EPA designed a development programme for several logistics zones connected to the area's main motorway nodes. It established strong links with domestic property developers, which built warehouses for rent on the different sites. In this way, Sénart became one of the region's main logistics poles with some 7,000 logistics jobs (20% of local jobs) and 2 million square metres of warehouses.

Although a public land developer was responsible for this policy, working conditions in the logistics zones, together with housing and public transport for those working there, were not considered to be relevant issues for the public authorities. The goal of the EPA was to increase the number of jobs according to the population growth they had planned in the new town. The policy was supported by the municipalities[21] insofar as it brought in substantial tax revenues.[22]

From the 2000s, a social movement influenced the development of the most recent logistics zone planned by the EPA. The plan for the zone was first challenged by a group of residents directly affected by this land development and with strong connections to their local municipal council. The municipality itself did not have the power to stop the development planned by the EPA. However, as a result of these objections, the municipal council could legitimately seek several changes to the project in the sense of making it a greener logistics zone, as well as introducing a number of planning gain measures, with the result that the EPA agreed to finance local facilities such as local roads and cycling lanes.[23]

The development of a logistics zone with a container terminal to the south-east of Kassel reflects a similar strategy of local economic development. In the 1990s, a new

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20 Interview with the head of economic development, EPA Sénart, 18 August 2011.
21 Sénart new town is made up of 10 municipalities.
22 Interview with the mayor of Lieusaint and vice-president of Sénart intermunicipal organisation, 31 May 2011.
23 Interview with the mayor of Réau, 1 September 2011.

container terminal had been planned and financed by the city of Kassel and two neighbouring municipalities (Lohfelden and Fuldabrück). The context of this first decision remains unclear: on one hand, the three cities were supported financially by the German Federal State, so that the costs of this infrastructure were reduced; on the other hand, the forecasts for its short- and medium-term profitability were controversial. The director of the public company which now manages this infrastructure thus presents this project as the result of a 'successful gamble' on further regional development and as a political compromise, which today restricts further development of the logistics park.[24] A 75-ha logistics zone was developed by an international real estate developer during the 2000s, in order to take advantage of the proximity of the container terminal.

In the absence of strong regional planning policies or metropolitan discourses on 'international competitiveness', local governments have implemented economic development policies based on logistics zones and terminals. These local public strategies are a response to the growing demand for logistics spaces. In both cities, this has resulted in logistics zones spreading towards suburban and outer-suburban areas, generally in zones of lower housing density. The urban sprawl resulting from logistics development (Dablanc & Ross, 2012) appears even bigger in the case of the urban area of Paris where legal restrictions on land use are weaker than in the German cases. A significant number of municipal authorities in the outer suburbs of Paris lack political, financial and technical resources. They often rely on external bodies in order to implement new logistics zones. In new towns, the planning function belongs to the EPA. Furthermore, some municipalities are tempted into authorising real estate firms to lead these development projects, which are directly related to a third mode of logistics spaces production.

Logistics sprawl, financialisation and privatisation

Since the 1990s, logistics firms (shippers and logistics services providers) have tended to opt for flexible real estate solutions and thus to look for warehouses to rent rather than building and managing their own facilities. This has contributed to the emergence of a market in logistics real estate (Hesse, 2004; 2008; Raimbault, 2016). This new process in the production of logistics spaces is tied to a third mode of governance in the three cities.

In connection with the general dynamic of the financialisation of business property (Halbert & Attuyer, 2016), the logistics real estate market is dominated by international firms which specialise in logistics and manage global investment funds.[25] These companies take charge of the development of the warehouses they buy as investment fund managers. In order to lessen their dependence on negotiations with local public authorities, they also tend to be the developers of the logistics zones in which they invest.[26] In other words, instead of building warehouses scattered around different

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24   In order to respond to the actual demands, the terminal would need a second crane, but no land has been set aside for this purpose. Interview from 11 August 2017.

25   The market leaders are Prologis (USA), Global Logistic Properties (GLP, Singapore), Goodman (Australia) and Segro (United Kingdom).

26   Interview with the director of development, Prologis Europe, 14 September 2011.

business zones, the industry leaders develop private logistics zones containing several warehouses. These 'logistics parks' are entirely owned and operated by the same investment fund managers who are also responsible for property management. They are fenced and protected by private security companies. Property management firms also provide services for the companies that rent the warehouses and their employees, such as canteens, creches or even transport services.

This business model leads to the privatisation of the governance of logistics spaces (Raimbault, 2017). To the extent that logistics parks are entirely private, real estate firms become the *de facto* owners and managers of the streets and green spaces that constitute the public spaces in the logistics parks. Moreover, this model also enables real estate companies to decide on local economic development issues, insofar as they select the firms that settle in the municipality, which considerably affects the specialisation and prospects of the local economy.

However, local governments retain control of every legal resource. Indeed, logistics parks must be authorised and supported by local governments, which are responsible for issuing spatial planning documents and building permits. The production of logistics parks therefore implies that the local authorities concerned accept this dynamic of privatisation. Case studies conducted in the Paris region and the Frankfurt-Rhein-Main Region reveal two different political mechanisms that explain why local governments accept privatisation.

First, some local authorities in the outer suburbs, because of a lack of financial, technical and even political resources, are looking for private investors able to establish private business zones. For example, between 2002 and 2009, Val Bréon undertook a project for a large, dedicated, 200 ha logistics park.[27] However, the local authority lacked the administrative, technical or financial resources to lead it.[28] It therefore welcomed the proposal for a joint venture between the developer PRD (Percier Réalis et Développement) and the investor Amundi (a subsidiary of the Crédit Agricole bank) to build a private logistics park. The joint venture company would be responsible for financing the total operation, developing the site and the buildings and finding the firms that would rent the warehouses, as well as for the long-term management of the site. Moreover, the private firm was also tasked with the global steering of the project, even in its political dimension. With regard to land development, the main challenge was to resolve a legal conflict with an environmental group, which objected to the impact of the development project on local wetlands. The local authority asked the private land developer to negotiate with the association and to find a solution. The developer proposed involving the group in discussions on the design of the zone and selling the wetlands to it for one euro for protection. The local authority also asked the firm to extensively rewrite the local master plan in order to adapt it to the logistics park project.[29] In this way, the real estate company undertook many of the activities usually

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27 Val Bréon is an intermunicipal district of 15,000 inhabitants and 10 municipalities about 50 km east of Paris.
28 Interviews with the president (26 November 2011) and the vice-president of Val Bréon (24 May 2011).
29 Interview with the deputy director of PRD, 14 October 2011.

carried out by local governments within the framework of their policies for urban and economic development.

Second, some outer-suburban municipalities argue that the private logistics park model is superior to traditional publicly developed business zones. This explains how Prologis, the global leader in logistics real estate, chose Sénart to develop its principal logistics park in France. In the early 2000s, Prologis bought a large agricultural plot in Moissy-Cramayel, one of the communities that are part of the new town. They immediately negotiated with the municipality the possibility of building a logistics park, which required a change to the local master plan. Although the mayor initially rejected the project out of hand, three arguments regarding the differences between the logistics park and the logistics zones developed by EPA Sénart, convinced him to change his mind.[30] First, the general design of the park and the fact that it was fenced and secure seemed to be an improvement. Second, as both development and management were totally private, it made no demands on the public purse. Third, the property manager Prologis would be solely responsible for the entire park, and would negotiate directly with the mayor over any request. This gave the mayor a greater sense of control over his territory compared with the situation with the logistics zones developed by the EPA.[31] Indeed, the latter did not need the mayor's authorisation to develop a logistics zone, and would not subsequently control the long-term management of the zones (since the plots would be owned by different investors). In the end, however, Prologis and the municipality were opposed by a social movement, 'ADIR-Sénart', a Sénart residents' group, supported by an environmental organisation (France Nature Environnement), which protested against what they called 'logistics XXL'. Their goal was to prevent Prologis agreeing to store dangerous goods in its park. The campaign gained a quick political response, promising a slowdown in logistics development in Sénart.

Although this way of developing logistics sites seems to be less common in Germany, we found a quite similar example in the city of Rodgau, a municipality of 43,000 people located 28 kilometres south-east of Frankfurt. As in the case of the neighbouring municipality of Dietzenbach presented above, logistics developed in line with industrial development trends from the 1970s to the 1990s. The project for a new logistics park emerged at a time when the municipal government was seeking to acquire better control of the direction of economic development on its territory. Even though logistics development had been locally and regionally politicised by the environmentalist parties since the 1990s, the local government could not develop its own planning policy during the 2000s, because, in contrast to Dietzenbach, where land property had been in public hands since 1973, it had remained in private hands in Rodgau, even at the time when the first industrial zones were planned. Up to the end of the 2000s, logistics providers continued to settle in former industrial zones by simply buying brownfield sites from their private owners, a process difficult for local

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30   Interview with the mayor of Moissy-Cramayel and president of Sénart intermunicipal organisation, 17 July 2011.
31   Interview with the mayor of Moissy-Cramayel and president of Sénart intermunicipal organisation, 17 July 2011.

government to control through the traditional instruments of building permits and land-use plans. At the end of the 2000s, it therefore cooperated with a Czech real estate developer, which wanted to 'conquer' the German market, for the development of a new logistics zone of around 12 ha on former agricultural land. The local authorities contributed to the project by working with the private landowners to negotiate the land price with the developer and by requiring it to provide environmental compensation and to fund development spending. On the basis of these 'requirements', the local authority was able to claim that it actually managed the development and the potential objections to it. Thanks to the 'requirements' negotiated with the real estate developer, the local mayor gained the support of city councillors belonging to the local green party.[32] In contrast to the case of Dietzenbach, where we could see how the spatial and institutional legacy of the first governance mode constrained the local financialisation of the production of new logistics zones, the case of Rodgau shows how this financialisation can be used by local governments as a resource to intervene in logistics development and actively get out of the first governance mode.

The consequences of this last mode of governance, dominated by the logistics real estate industry, are twofold. At the local scale, within these coalitions, local governments negotiate only with property developers and investors. They rarely meet the users of the warehouses, the workers or even the logistics firms themselves. Managing the relations with the firms that rent the warehouses becomes the task of the property manager alone. Social movements focus exclusively on land development issues, approaching them from an environmental or quality-of-life perspective. At the regional scale, the financialisation of the production of logistics zones directly challenges planning policies. As this real estate product is particularly attractive for outer-suburban areas, where local authorities do not have the resources or the desire to develop logistics zones alone, the financialisation of logistics real estate has contributed considerably to urban sprawl since the 1990s. Financialisation therefore intensifies the spatial mismatch between the workplace and the home faced by logistics workers.

The comparison shows that, in the two German cities, regional planning regulations have restricted the space available for logistics and reinforced the regionalisation and, thus, the fragmentation of the logistics real estate markets. By contrast, the case of the Paris region highlights how the weakness of regional planning regulations has led to the development of huge logistics parks and zones in the outer suburbs (Raimbault, Heitz & Dablanc, 2018), which rely on a national logistics market. Nonetheless, the same three different modes of logistics zone governance co-exist in both France and Germany. The availability of land for logistics in existing industrial zones first keeps logistics development largely outside the scope of local politics (the first of the three modes of governance described above). The production of new logistics zones contributes to politicising the process within the framework of local development policies (the second mode of governance). The opposition of

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32   Interview with the heads of the urban and economic development departments, city of Rodgau,
28 April 2016.

environmentalists or residents' associations can influence these policies. Our investigations show how environmental objections have generally gained the attention of municipal councils in the German cities whereas the connections of social movements to city authorities appeared to be much weaker in the French cases. The financialisation of the logistics real estate industry and the subsequent production of logistics parks have contributed to the privatisation of these policies and to limitations on local political agendas. However, this makes logistics highly visible at the local level and thus makes it easier for social movements to object to the construction of new logistics sites. Finally, the degree of development of logistics parks still depends on local and regional historical and institutional conditions, as is highlighted by the German case studies. The lack of financial, technical and even political resources in many local authorities in the outer suburbs of Paris explains the success of the logistics parks developed by the real estate industry (the third mode of governance).

Conclusion

This analysis of logistics development in Paris, Frankfurt-am-Main and Kassel highlights the different modes of regulation and legitimation of the production of logistics space. Discourses on metropolitan attractiveness, together with image policies that seek to raise the symbolic status of logistics activities by marketing a kind of logistics that is supposed to be 'strategic, smart and clean', are emerging evermore frequently from a growing number of research institutions, public–private partnerships and groups of experts. These coalitions act to promote scientific, economic and environmental innovations, whether for the purpose of reducing the negative externalities of logistics or of fostering the development of high-tech logistics activities that draw on a highly skilled workforce.

However, our inquiry has shown that the core of the economic and urban changes brought about by the development of logistics activities remains outside the scope of this rhetoric. The negotiations about the planning of logistics zones and their facilities, the type of firms allowed to occupy them, the protection of the environment around the warehouses, as well as the different forms of pollution produced by logistics activities and the vehicle traffic associated with them, continue to take place behind closed doors. Public and academic discourses on the 'logistics revolution' do not tackle these questions of urban development and governance, which appear to be raised in public only if environmental and neighbourhood movements manage to make enough noise. This limited form of politicisation also fails to address the working and living conditions of warehouse workers. One may hope that the contributions to this issue of the journal will help to open the black box of logistics, highlighting what goes on in warehouses, describing who the logistics workers are, and engendering public debate about this growing component of the capitalist world.
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Finance, extraction and logistics as axes of the third neoliberal moment in Latin America

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ABSTRACT

With the notion of 'operations of capital', focused on the interaction between the dimensions of finance, extraction and logistics, authors such as Mezzadra and Neilson have highlighted some 'underlying transformations of capitalism' that go well beyond a generic idea of neoliberalism as 'the hegemonic circulation of economic doctrines or processes of deregulation and governance'. The aim of this article is to investigate the strong articulation of finance, extraction and logistics in Latin America by focusing on the creation of new infrastructural corridors in the continent during the 'third phase' of neoliberal hegemony in the region. This article brings together elements from the so-called 'critical logistics studies' literature with a range of other theoretical perspectives, including insights from the work of David Harvey, Giovanni Arrighi, Michel Foucault and Saskia Sassen. It applies this theoretical background to the Latin American reality, drawing on regional-specific literature and general data using a trans-disciplinary perspective.

Introduction

In recent years, the concept of logistics has developed as an important theoretical lens for the analysis of contemporary capitalist transformations. In Latin America, however, this perspective has remained largely unexplored, despite growth in the planning and construction of important infrastructural projects and corridors, the multiplication of

special economic zones and the rapid emergence of platform and 'just in time' economies throughout the entire region.

This is due, partially, to the overwhelming importance, in Latin America, of the concept of neoextractivism[1] and the so-called 'Commodities Consensus' (Svampa, 2013) and its necropolitical logic. Originally taking the form of the extraction of natural resources from the territory, primarily minerals and hydrocarbons, and on their large-scale exportation abroad in the form of commodities, this idea has recently been productively extended to other sectors (e.g. agribusiness, cellulose, fishing, also tourism) and to other social realms (e.g. to cities, via the phenomenon of gentrification). As a result, even the construction of infrastructure is now largely considered in the Latin American literature to be, almost exclusively, an extractive operation which has a significant impact on the territory as well as on the dispossessed populations, without considering its fundamental role in the advent of so-called supply chain capitalism.

In a recent article, Sandro Mezzadra and Brett Neilson (2015:1) proposed to connect the logic of extractivism and extraction both to finance, whose growing tendency is 'to penetrate and subsume economic activity and social life as a whole', and to logistics, 'the art and science of organizing the turnover of capital to maximize efficiencies of transport, communication, linking, and distribution'. These two authors suggest that it is important to understand the way in which extraction, finance, and logistics interact and coexist in contemporary capitalism by using the concept of 'operations of capital', with an operation seen as 'a moment of connection and capture that exhibits the materiality of even the most ethereal form of capital'.

We argue here that such an approach can be extremely powerful for capturing some interesting issues and analytical mediations that have, until now, remained hidden, despite the development of the concept of neoxtractivism, which draws attention to the extractive dimension at the expense of other dimensions of logistics and finance which articulate with extraction. At the same time, we also consider the emergence of a strong articulation of extraction, finance, and logistics as a specific pattern of what we call the 'third neoliberal moment' in Latin America, the first phase being that of dictatorships and monetary shifts during the late 1970s/early 1980s which served as a kind of 'shock therapy' that led to the brutal conclusion of the previous ISI (Import Substitution Industrialisation) model, and the second phase being the period of 'transition' to democracies that were managed by a series of new think tanks and international organisations in alliance with the USA.

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1   The concept of 'neoextractivism' has been used in the critical literature in two different senses. On one hand, Eduardo Gudynas (2009) considers it as the continuation and enforcement of economic policies based on the extraction of primary and mineral goods under so-called progressive governments. In this sense, the prefix 'neo' refers to the major role of the State in capturing a part of the surplus value and redistributing it in the form of social plans. On the other hand, increasing numbers of authors have been using the term in a wider sense, in relation to the priority that such policies gained among all regional governments, and referring with the prefix 'neo' to the quantitative and qualitative increase in these practices, and the use of modern technologies such as surface mining, fracking and pre-salt oil extraction. Despite considering both meanings as fruitful, I will use the notion more in the latter sense, by focusing on extraction as an operation of capital common to both progressive and conservative governments.

Mezzadra and Neilson (2015:1) also observe that 'many analyses that make reference to the concept of neoliberalism in a generic sense point to the hegemonic circulation of economic doctrines or processes of deregulation and governance without really taking stock of the underlying transformations of capitalism'. An analysis of the historical path of neoliberalism in the region and of its conflicts and discontinuities will enable a new way of understanding these transformations through both the endogenous and exogenous dynamics and tendencies that have been shaping capitalism in Latin America. If we understand that extraction, finance and logistics are, in fact, the emerging dimensions of today's global scale capitalism, this approach in no way denies the unevenness of this development, or the historical, social and geographic specificities it incorporates.

The three phases of neoliberal penetration in Latin America

It has been widely accepted by historians that the neoliberal turn in Latin America began with the coup of 11 September 1973, when the Chilean Air Force, under the command of General Pinochet, attacked the Presidential Palace of La Moneda in Santiago de Chile, provoking the murder of President Salvador Allende and bringing about the bloody end of the socialist experiment of the Allende government. The moment represented just one of a number of political coups that crossed the region in the 1970s, but it was particularly significant for two reasons: the overthrow of an explicit attempt at democratic socialist transformation; and a high level of ideological consciousness that directed the neoliberal policies that Pinochet's military government implemented. The demise of this ideological consciousness was also supported by the cooperative participation of many academics and intellectuals who, during the previous decade, had coalesced around Professor Milton Friedman and his famous 'Chicago Boys' at the University of Chicago. The political programme of the military cabinet was elaborated by them, under the leadership of Sergio de Castro, in the document called *El Ladrillo* (de Castro, 1992). This was originally formulated in 1969, as an economic programme for the candidate of the National Party, Jorge Alessandri, who would be defeated by Allende in the election that took place the following year, but it remained hidden and unpublished until 1992, with the return of democracy in Chile. Within de Castro's group there were also various members of the Christian Democratic Party (PDC), who provided the inclusion of important elements that came from the ordoliberal tradition that had been promoted and diffused into the Latin American Christian Democracies by the German Christian Democratic Union (CDU). Quite famous is the analysis made by Michel Foucault (2005) of ordoliberalism in which he emphasised the point that, in the view of its theorists, neoliberalism was by no means a project of 'minimum state' as the old liberal one had been. Instead, it was a strategy in which the state would function as the guarantor of the market, the creation of markets being not a natural fact but the very political aim of the state and the product of continuous active state policies. This idea is exactly what is suggested in *El Ladrillo*.

As Beatriz Stolowicz (2016) has analysed, *El Ladrillo* in no way reduced its own neoliberal idea to the politics of 'laissez-faire monetarism', with simple state withdrawal

from the economy through privatisations. If elements such as control of inflation and price liberalisation were not in question, the participation of the State in the economy and even its social policies, expressed by the idea of a social market economy, were included and strongly considered in the document; and the promotion of infrastructure by the State was included as a central point.

Following Stolowicz's reading of *El Ladrillo*, the reductionist idea of 'laissez-faire monetarism' only represents the first step of a two-stage strategy of neoliberal hegemony: first, the 'shock therapy' moment aimed at the violent and abrupt destruction of the existing developmentalist and inclusive model of industrialisation, and second, the return to a system that is more dependent on external markets. To implement such a violent transformation it was necessary to sacrifice democracy in many countries: a few months before the Chilean coup, there was another one in Uruguay, while in Argentina the military coup took place in 1976. Countries like Bolivia, Paraguay and Brazil were already in the hands of dictators.[2] In other cases, most significantly in Mexico, the authoritarian but formally democratic regime never changed, but the neoliberal turn would be imposed in 1982 by the new monetary policies of the US Federal Reserve, the default of its economy due to debt crisis, and the structural adjustment plan imposed by the International Monetary Fund (IMF).

If *El Ladrillo* could be considered as a necessary first step in structural destruction, the second step would have been the reconstruction and stabilisation of the model, in which the role of the State and its active economic and social policies would be crucial. Such a stabilisation of the model was realised in two different moments: the return to democracy, and a moment of social reform that, thanks to the ambiguities of the concept of neoliberalism, could present itself as postneoliberal.

The second phase of the neoliberal penetration into Latin America coincided with the political openness of the mid-1980s. The transition to democracy was an open process not devoid of conflicts and uncertainties. The general orientation that prevailed, however, was one of a general consensus of the main political forces around a process of economic continuity. The international platform that managed the transition was the Inter-American Dialogue, which would produce the so-called Washington Consensus. However, as Stolowicz (2016) points out, the strong participation of international organisations such as the Inter-American Development Bank (IDB), Latin American historical organisations such as the *Comisión Economica para América Latina y el Caribe* (CEPAL), and a wide range of Latin American intellectuals, politicians and businessmen lends testimony to the idea that the consensus was less a unilateral imposition than a real adhesion. In the words of Paul Singer (1998:np), it was a shift from a 'tolerated dependency' to a 'desired dependency'.

Even if the first reactions to this neoliberal shift would occur by the end of the 1980s, with the so-called Venezuelan *caracazo*, the first general social opposition to the Washington Consensus would not emerge until the Zapatista uprising of 1994 and

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2   However, not all these countries embraced the neoliberal principles. In the case of Brazil, for instance, the military regime would remain anchored to the old developmentalism until its collapse in the mid-1980s and the transition to neoliberalism would only occur under democracy. In general, the transition to neoliberalism and the succession of the three phases mentioned above was not temporarily homogeneous and linear, presenting instead significant differences case by case.

would not become widespread at a continental level until the end of the century. As popular dissent grew, governors and international organisations began to change their discourse toward a critique of neoliberal excess and to draw attention to the social effects of privatisation and deregulation. Along with the rise of popular opposition, these actors had to face a period of continuous and dramatic speculative bubbles and financial crises, whose epicentres where both external and internal, such as the so-called Tequila Effect in Mexico, in 1994, the Samba Effect in Brazil, in 1999 (a direct consequence of the 1997 crisis of the Asian tigers) and the Tango Effect in Argentina in 2001. In this last case, financial crisis and social upheaval coincided, generating a major political crisis that was only partially solved with the electoral victory of progressive Nestor Kirchner in 2003.

In the meanwhile, leftist governments were beginning to emerge in Venezuela (with the victory of Hugo Chavez Frías in 1998), and in Brazil (with the victory of Luiz Inácio Lula da Silva in 2002). The subsequent leftist victories in Uruguay, Bolivia, Honduras, Ecuador, Nicaragua, Paraguay and El Salvador brought about the formation of a progressive block aimed at contesting neoliberal politics and US geopolitical hegemony in the region. In this context of escalation of popular uprisings and progressive electoral victories, the traditional think tanks and the Bretton Woods Institutions elaborated a strategy of co-option and political influence to these emerging political forces. Their plan consisted of adopting a post-neoliberal rhetoric around three main crucial directions: first, an anti-privatisation rhetoric aimed at promoting the return of state investments in several aspects of political economy, which led to the proliferation of so-called post-privatisation policies and the establishment of a legal framework for Public–Private Partnerships (PPPs); second, a broad discourse around the fight against poverty that was implemented mostly by the 'new' World Bank under its vice-president Joseph Stiglitz (1997–2000) leading to the creation of several social programmes and the multiplication of micro-credit policies across the region, and to broad-reaching policies of financial inclusion of the subaltern classes; and third, an anti-deregulation rhetoric aimed at the creation of a huge logistics and infrastructural leverage in order to 'territorialise' the financial surplus into 'productive' sectors. In the background, the discourse that encouraged countries to take advantage of their abundant natural resources, in order to enforce their role of direct exporters of minerals, energy and agro-industrial commodities within the global value chains, was maintained.

All these points reflected a strategy that was uncritically shared by all governments and political forces that governed in the region (with only a few rare exceptions, the most significant one being in Venezuela), in spite of their not unimportant differences, and by all geopolitical blocks at stake. They represented those aspects of continuities that can be better understood by the analytical perspective of the 'operations of capital' as anatomised by Mezzadra and Neilson and their articulation achieved by bringing together the dimensions of finance, logistics and extraction.

Infrastructure as an engine of the 'new developmentalism'

The construction of a huge infrastructural leverage can be seen as a means to connect the financial surplus value, which was continuously at risk of devaluation as a result of

the frequent crises, to the accumulation cycle. David Harvey (2014:155) describes this situation as the capacity of capital, in periods of crisis, to create 'spatio-temporal fixes', where 'fix' means both capital's 'fixing' itself into that territory for a relatively long period and its 'adjustment', that is to say the spatial solution to the problem of over-accumulation. Harvey has pointed out in various works how the construction of infrastructure, in order to absorb capital and/or labour surpluses, has always been a classic capitalist device for achieving this, at both regional and metropolitan level. As he showed in a widely read book on urban development and conflict (Harvey, 2013:64), in the USA, the dramatic boom of the real estate market and subprime mortgages followed the end of the high-tech bubble and the fall of the stock market in 2001. It was during the same decade that China reached the highest growth in its frenetic urbanisation accompanied by massive public investments in roads, railways and other multi-million infrastructural projects. This tendency to see investments in infrastructure as anti-cyclical policies in the context of financial devaluation continued to be repeated, eventually, even after the financial crisis of 2007–08. The reason for this is that infrastructure has a slower, but safer and more durable rotational time while also providing the basis for an acceleration of the transportation of commodities, energy and people in a following moment. It is particularly safe because, as Stolowicz (2016:743) affirms, the aim in the Latin American case was that 'state activism' could provide capital, juridical and political security, adequate levels of profit, and access to credit. What was significant, in this case, was that the 'productivist' rhetoric that surrounded this operation was by no means a 'productivism' that led to the return to the old ISI industrialisation model but rather one that signified the openness and the availability of the territory and its resources for international markets. Also favoured by the dramatic increase in the prices of primary commodities, these new logistical infrastructures therefore provided leverage for the export of such commodities abroad and the import of industrial goods.

Two important plans were elaborated to connect and reorganise the entire Latin American territory: IIRSA (Initiative for the Integration of the Regional Infrastructure of South America, 2018) and the Mesoamerica Project.

In April 1998, the Second Summit of the Americas of the Organisation of American States (OAS) held at Santiago de Chile discussed the creation of the American Free Trade Area (FTAA), an extension of NAFTA (North American Free Trade Agreement) to the entire American continent, and mandated the Inter-American Development Bank (IDB) to develop a general plan for the facilitation of the participation of the private sector in local and transnational infrastructural projects (Stolowicz, 2016:748). This led to the IDB presenting the IIRSA project at the First South American Summit of Presidents in August–September 2000 in Brasilia. Although the FTAA was considered a too explicitly US-led geopolitical project and was abandoned in 2005 thanks to the opposition of the emerging progressive alliance, IIRSA, with its hidden and imperceptible logistical power, remained largely unquestioned and was even expanded. The plan now crosses all South American countries, includes ten logistical inter-modal corridors and 562 projects (some finalised, but the majority either under construction or only planned) for a total investment of US$199 billion. Among these, 90% are transportation projects and 50%

are highways; one-third of the total investment is in energy, the majority of which is in hydroelectric projects.[3]

While the huge infrastructural projects were being organised around the IIRSA plan in South America, from the late 1990s Mexico and Central America were also organising their own project of logistical interconnection. Under the presidency of Ernesto Zedillo, Mexico planned a National Plan of Urban Development (1995–2000) which was aimed at creating seven bio-oceanic corridors along which it was planned to build *maquiladora* facilities, greenhouses for export, toxic trash incinerators and canals for the extraction of strategic resources such as minerals, oil and water, and to encourage bio-diversity (Barreda Marín 2002:4). These corridors were then integrated with others in the Puebla Panama Plan (2002) that was inaugurated by President Fox in 2002, and included, in addition to the Mexican states of Veracruz, Puebla, Guerrero, Oaxaca, Chiapas, Tabasco, Campeche, Yucatán and Quintana Roo, the Central American countries of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panamá. Colombia was added to the plan in 2006 and it was eventually transformed, in 2008, into the Mesoamerica Project, with the setting up of a joint Committee of Promotion of Inversion (CPC) whose main financiers were the IDB, the Andean Development Corporation (CAF), and the Central American Bank for Economic Integration (CABEI; Stolowicz, 2016:757).

With the development of IIRSA and the Mesoamerica Project a new geography began to take shape in Latin America, a geography where the strongly modernised ports and the great enclaves of surface mines and soybean plantations represent the crucial nodes between which logistical corridors run in a way that is, at the same time, both embedded with the regional history and tremendously new.

An infrastructural platform for the export of commodities

As already noted, in Latin American analysis, the issue of logistical and infrastructural interconnection has mostly been subsumed by the paradigm of neoextractivism. The concept of 'neoextractivism', which moves away from the idea of a reprimarisation of the economy in the region (and therefore from the deepening of its historical dependent role in the world system) has emerged in the last decade as a successful theoretical approach because it takes into account the growth of extractive operations in the region. The concept has the value of providing a clear theoretical tool that can be used by many of the territorial, social-environmental and indigenous struggles that, in the last years, have been challenging the attacks on the territory by both conservative and progressive governments.

The acceleration in the extraction of natural resources and agricultural goods with the aim of export abroad has been an important feature of the last two decades, and has been growing in parallel with the infrastructural boom. This has been driven by the rapid increase in the international prices of commodities during the first decade of the century. This can be illustrated by some examples, drawn from the most abundant

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3   www.iirsa.net.

commodities in the region. The price of crude oil rose from US$27.59 per barrel in November 2001 to US$147.85 in May 2008. That of copper surged from US$0.67 per pound in December 2001 to US$4.54 in February 2011. Natural gas went up in price from US$2.54 in September 2001 to US$15.17 in June 2008. The price of gold increased from US$370.4 per ounce in April 2001 to US$2,027.58 in August 2011, while that of silver increased from US$6.06 in October 2001 to US$45.44 in August 2011. Iron ore saw an even more spectacular rise (from US$1.37 per ton in March 2002 to US$28.7 in May 2008) while the value of soybeans went up from US$4.18 per bushel in July 1999 to US$17.36 in September 2012.[4]

These dramatic prices rises gave economic operators and regional governments the illusion of indefinite growth and a reproduction of the idea of abundance which important intellectuals such as Eduardo Galeano (2004) and Alberto Acosta (2009) have brilliantly argued to be the historical curse of Latin America. They also allowed the new wave of progressive political forces in power in many states to avoid any kind of structural change in the productive model and to build a new social compromise whereby the popular classes they represented could improve their conditions and get included into consumption (through minimum distributive mechanisms) while transnational companies could maintain and even increase their profit rates. Not surprisingly, however, the sudden and dramatic fall in commodity prices since 2013 has revealed the fragility of this new equilibrium and all these governments entered into crisis with many of them ending up losing political power.

This increasing dependence on commodities is an important part of the current context, in which the creation of such an important infrastructural platform must deal with the need to provide better access to these natural resources, and their faster export abroad, following Marx's (1978:539) famous statement that capital needs to 'annihilate space by time'. This is exactly the concern of logistics. But just as logistics and extraction are more entangled with each other than ever, their articulation with finance is equally important.

As already noted, infrastructural construction plays a strong role in the absorption of financial surpluses. Nevertheless, it is important not to underestimate the constant possibility for such an operation to multiply speculative risks in the longer term. For instance, in the case of current worldwide speculation in shipping it is clear that the phenomenon of container ship gigantism far exceeds any real necessity of transportation economy (Bologna, 2013). But the articulation of logistics, finance and extraction goes even further. We have already seen that the point of encounter between the leftist political forces that emerged from the crises at the turn of the century and the strategy of the more intelligent elements of the international organisations was a rhetorical commitment against deregulation, to which a presumed return to productive capital would represent the solution. Such an idea was used to promote both the development of logistics and of extraction as forms of a real economy that was in some way opposed to financialisation. This is an idea that was

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4   Macrotrends (2018).

mobilised by the vice-president of Bolivia, Alvaro Garcia Linera, as Veronica Gago and Sandro Mezzadra (2015) have pointed out. Gago and Mezzadra extend the concept of extractivism to some important dimensions of Latin American societies, such as the financial subsumption of popular life in the slums of the big cities and even in the rural areas, but even if we set this insight aside, it is still clear that the classic extractive activities are by no means separate from financial operations. One example, that was brought vividly to life in the global financial crisis of 2007–08, was the role played by financial derivatives, including futures (one of the most important financial derivatives) which supply the fundamental mechanism that establishes the price of commodities at a world level and hence the ups and downs in these commodity prices.

The financial dimension of today's commodity markets reinforces the structural dependence and lack of economic sovereignty of Latin American countries, regardless of the emphasis that the progressive left places on celebrating the productive alternative and the stronger role of the state. Rather, it is precisely the renovated and more active post-neoliberal state that has been used as an important articulator of logistics, finance and extraction in this third phase of neoliberal penetration in Latin America.

PPPs and the activism of the post-neoliberal state

As has been pointed out by Stolowicz (2016), a direct thread links the old ordoliberals to their post-neoliberal heirs. This thread is, however, obscured by the rhetoric and the discourse of the latter who, by explaining neoliberalism as simply 'laissez-faire monetarism' have created the illusion that they themselves represent a real and significant alternative. This thread, of course, has its nucleus in the role of the State and in its capacity to create and continuously mould and expand markets.

Two aspects of postneoliberal State activism have repeatedly been highlighted by its critics: first, the social plans, the most famous of these being the Brazilian *Bolsa Família*, have been highly praised for having raised 36 million people out of extreme poverty over a 12-year period; and second, the strategic state intervention in the economy through so-called PPPs. As far as the social plan is concerned, it is evident that a direct relation exists both to extractivism, in the form of a re-direction of part of the surplus generated by extraction toward social needs, and to finance, in the way it is connected to the mechanisms of micro-finance, financial inclusion and the expansion of credit to the subaltern classes, as has been explained in some depth by Veronica Gago (2014) and Beatriz Stolowicz (2016).

This active role of the state, however, is particularly crucial in the promotion and construction of infrastructure. In this regard, the PPPs establish the formation of a specific form of governance whereby the State and the 'productive capital' of the constructors directly articulate with financial investors. Where the PPPs differ from classic forms of privatisation, making them a clear example of what has been propagated by the World Bank as post-privatisation, is that with the PPPs the State does not lose the formal ownership of the activities carried on by private actors while, simultaneously using its permanence to serve as a guarantee in the face of eventual private losses. As Stolowicz (2016:1038) notes, 'the active "regulator" post-neoliberal State regulates in order to renounce several of its powers and to oblige itself to

subsidiarity'.[5] Despite variations in the legal forms adopted for PPPs in different national and international legislations, they have one key mechanism in common: that is, that the direct executors are private companies which enjoy concessions that may last as long as 50 or more years, but the ultimate ownership of the property remains public.

The state provides these private companies with such incentives as tax exemption, access to cheap credit and direct financial support. In addition, it may subsidise the tariffs to the private company if the profit rates of the project fall below a certain level. Furthermore, the state typically provides a wide range of other guarantees should any of its own negative actions (such as nationalisation or confiscation) prove threatening, in case of breach of contract by the financial investor, or in order to protect the concessionaire from competition and to offer it other services related to the infrastructure in question (Stolowicz, 2016:1048–49). Finally, the institutional investors are in many cases public banks, or private pensions funds that have been capitalised during previous reforms of privatisation of the social security system. This is particularly important in the case of Brazil, whose construction companies have, in recent years, been the executors of the majority of the projects related to IIRSA.

Brasil Potencia and the politics of the 'national champions'

In the last 20 years, following the guidelines of many international institutions, almost all Latin American countries have established some kind of legislation on PPPs regardless of whether they have been led by conservative or progressive forces. Among these, the example of Brazil is undoubtedly the most interesting since, during the governments of the PT (Workers Party) between 2003 and 2016 such partnerships served as a strategic lever for the renewed geopolitical ambitions of the country.

In Brazil, state intervention, through the use of PPPs, served as a fundamental tool for the politics of 'National Champions'. By this means the state provided direct public support to several important private companies, in sectors such as construction, petrochemicals, food and mining as well as the public company Petrobras, the second largest oil company in the world (Zibechi, 2013:59) in order to transform them into transnational companies (TNCs), thus enabling them to invade and dominate markets abroad, primarily in Latin America and Africa. This strategy was facilitated by the important role of a financial system supported by the state, providing further evidence of the importance of the relationship between finance, extraction and logistical infrastructure. It is noteworthy that among the investments in infrastructure in Brazil and South America, those furnished by the Brazilian Development Bank (BNDES) exceeded those provided by international organisations. The BNDES is the most important investor in the IIRSA plan through its participation in and financial support both to the biggest construction companies in Brazil, such as Odebrecht, Camargo Correa, Andrade Gutierrez, OAS, and Queiroz Galvão, and its main extractive companies, Petrobras and Vale, the latter being the second most important mining

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5   Translation mine.

company in the world (Zibechi, 2013:59). The construction companies have been financed by BNDES and other important institutional investors, such as the public pension funds, using PPP mechanisms, demonstrating the importance of public support to such public–private operations. This points to the way that the framework upon which the relationship between finance, logistics and extraction relies is taking place over the heads of the social body and particularly the working class. Other than the obvious case of the pension funds, the BNDES itself is almost totally financed by the Treasury Department and the workers' consumption fund.[6]

The emergence of a new form of governance and the disarticulation of space

Logistics cannot be reduced to infrastructure even if the latter represents an important component of it. As a principle of redefinition of the relations between production and distribution at a world scale, logistics and supply chain capitalism also imply powerful processes of spatial redefinition and assembly and the transformation of their governance. As Brett Neilson (2012) puts it, logistics is also political power. This can be discerned in several ways.

One issue that makes it visible is the multiplication of the zones. Due to its long history of extractivism and colonial pillage, Latin America has always been a region of enclaves, a region in which gold and silver enclaves, as well as plantation areas, have uninterruptedly alternated with traditional forms of subsistence economy. In this regard, the advent of the railway in the late nineteenth century and the recent rise of container transportation represented two steps of a significant leap in this Latin American tradition. As Alfredo Falero (2015) points out, the 'enclave economy' of our times in the region is a mix between some classical extractive patterns, now redefined and modernised through the new technologies of fracking and surface mining, with other kinds of enclave activities such as the *maquiladora* industry and informational and high-tech enclaves.[7] As in the rest of the world, new institutional definitions of these zones have also emerged in the continent, resulting in the creation of specific forums and think tanks such as the Free Trade Zones Association of the Americas (AZFA). According to AZFA, in Latin America there are now more than 600 'free trade zones' within 23 countries where more than 10,800 companies employ 1,700,000 workers.[8]

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6   Through the participation of the *Fundo de Amparo ao Trabalhador*, FAT, and the *Programa de Integraçao Social-Programa de Formaçao do Patrimonio do Servidor Publico*, PIS-PASEP, which are the funds dedicated to the payment of workers' benefits (Zibechi, 2013:58).

7   Falero (2015) reports the case of Zonamerica, a zone situated close to Montevideo where 9,000 workers are employed in activities of logistics, distribution, financial services, consultancy, call centres and software development. Another very famous case is that of the Zones for Economic Development (ZEDES) in Honduras. This is a project that has drawn much interest and support from Silicon Valley and other high-tech actors, offering a means to protect companies from certain forms of regulation over data practices (Lynch, 2018). Unlike the majority of the Special Economic Zones, the ZEDES, otherwise called '*ciudades modelo*', show a total privatisation of police and security services. They also enjoy a completely different jurisdiction from that of the rest of the country, since in their territories only six of the 379 articles of the Honduran Constitution are applied. Nevertheless, at the time of writing the ZEDES seem to be an economic and social failure (*The Economist*, 2017).

8   Asociación de Zonas Francas de las Américas (2018).

In many cases, these zones are situated within the regional logistical corridors which result in the 'production' of a completely different connected space (Lefebvre, 2013), but one that excludes territories as much as it connects them. At a macro scale, the corridors produce important and rapid geographical re-articulations while the zones also have an impact at the micro scale. This impact, however, is by no means one of total separation, but results in continuities and discontinuities and patterns of inclusion and exclusion that are continuously managed and reproduced. Following Saskia Sassen (2010), these can be defined as strategic territories where the global tendencies are localised and where the national functions of the State are being 'disassembled'. Rather than regarding this as a simple replacement of a national space for a global one, Sassen's concept enables us to see the way that certain aspects and prerogatives of the national relate to and articulate with the global. From this perspective, the relationship between the special zones and the rest of national territory can be further problematised.

In the specific Latin American case, the state interacts with private actors in many ways, from the normative decision to create the special zones as such to the financial support it provides to the companies and the different ways it guarantees, along with its private partners, the availability of the territory and the repression of opposition. At the same time, these private actors interact in multiple ways with the territory itself and with the surrounding areas via the implementation of the so-called 'bottom of the pyramid business' (Stolowicz, 2016:903–946), which allows the transnational corporations to subsume the agricultural activities of communities to their global value chain and through other forms of 'corporate social responsibility'. In this sense, the articulation between the state, companies and NGOs has been a powerful device for ensuring the submission of peoples and communities and in the co-option and fragmentation of social movements.

However, if the porous character of the zones in relation to the surrounding areas has been widely underestimated, it is nonetheless evident that the creation and multiplication of 'free' zones has had important consequences in the form of guarantees for business security and for social repression within these privileged spaces. To investigate this further, research aimed at an analysis of militarisation and the proliferation of violence on Latin American strategic territories, from the perspective of what has been described by Cowen (2014) as 'supply chain security' is urgently needed. In countries like Mexico, Colombia and Honduras, for example, it is becoming evident that the formation of a very necropolitical governance around corridors, zones, ports and infrastructural nodes suggests an unhealthy collaboration between the state, paramilitaries, drug cartels and the local *caciques* (traditional or native political bosses) as a fundamental feature.

Geopolitical uncertainties and the projection toward the Pacific

In his important book, *The Long Twentieth Century*, Giovanni Arrighi (1999) argued that there is a crucially important dialectical relation between two different logics in capitalism: first, a territorial logic, which sees power as the extension of a territory and its population and considers capital as a means for achieving this; and second, a capitalist logic, according to which power represents a control of resources and the

acquisition of territory is a means to obtain it. Along the history of capitalism, these two logics have coexisted, and they still do. In a 2009 article, the geographers Deborah Cowen and Neil Smith postulate a progressive shift from a state-centred idea of power as a product of the political union between a homogeneous territory and its national society, economy, culture and citizenship to a system of domination directly responding to market imperatives. That is to say, they suggest that the capitalist geo-economic logic is becoming increasingly more important than the territorial geo-political one. However, if we substitute Foucault's (2005) idea of 'strategy logic' for a 'dialectical' one, it becomes possible to analyse such a tendency not as the imposition of capitalism over territorialism, but rather as a shift that maintains a dynamic of articulation, coexistence and fission. In this way, rather than speaking of the end of geopolitics, it is possible to consider it as something that is being redefined in the context of today's supply chain capitalism.

With the changes that have occurred since the turn of the century in Latin America, geopolitical assets have been dramatically redefined. The emergence of progressive governments and their adhesion, to a major or minor extent, to a geopolitical bloc of Russia and China began to challenge the USA's traditional hegemony in the region in an unpredictable way. Amid this changing scene, Brazil (as we saw with the politics of 'National Champions'), and, to some extent, Venezuela (with its ALBA project[9]) were able to build their own hegemonic ties and relations in the continent. However, as we have also shown, certain patterns continued unaltered, such as the growing importance of logistics, finance and extraction as specific capitalist operations. This is reflected, for instance, in the permanence and in the deepening of the IIRSA plan despite the abandonment of the US-led FTAA trade agreement. As the geographer Carlos Walter Porto-Gonçalves (2017:63) pointed out, 'The same physical infrastructure that served the Free Trade Area of the Americas serves now for the integration to the new geographic centre of industrial capital in Asia, in particular in China'.[10] Such a projection to China is increasingly evident with the planning of other huge infrastructural and logistical projects such as the modernisation of the Mariel port in Cuba (built with Brazilian capital and where a new special economic zone was implemented), the plan for a trans-oceanic canal in Nicaragua, and the extension of the Panama Canal, the latter two being financed by Chinese investors. Not surprisingly, China is rapidly becoming the most important commercial partner of the region, and the IIRSA plan is increasingly being linked to its new Maritime Silk Road policy.

Today, progressive governments are in crisis as a result of the fall in the prices of commodities. In Argentina and Chile the right has been democratically returned to power, as is also the case in Brazil, though in a much less democratic way, while Maduro's Venezuelan government is now facing a dramatic economic and political crisis. Nevertheless, if these changes lead to a return of the old pattern of a political alliance with the USA, they do not seem to question the general tendency toward the Pacific and the territorial reconfiguration at stake. Neither do they have any particular effect on the centrality of the financial, logistical and extractive operations that exist in

9   'Bolivarian *Alliance* for the Peoples of Our America'.
10   Translation mine.

the current phase of Latin American capitalism. In this context, the role of the state remains important. Because even if the move to the right of the political spectrum has determined the end, or the decline, of certain policies of social aid directed at including the subaltern classes in consumption, the state does not seem to be losing its active role in providing direct support to finance, logistics and extraction.

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Logistical tools for refugees and undocumented migrants:
smartphones and social media in the city of Fès

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ABSTRACT

This article reports findings from fieldwork and analyses the impact of mobile technologies and social media on increasing migration flows in Morocco, particularly in the city of Fès. The role of smartphones as a means to support the use of maps, global positioning apps and the use of social media like Facebook and WhatsApp have become essential tools for refugees and undocumented migrants. This article focuses on these logistical aspects, intended as constantly changing adaptations between life-forms and interactions with the social, political and economic conditions to which migrants are exposed. Logistics is understood as the nexus between migrants and these various logistical tools, influencing their mobility and identities, as well as modifying the organisation of communities and cities (of provenance, transit and destination).

KEY WORDS

refugees, migrants, logistics, smartphones, citizenship, social media, Fès city, Morocco

Introduction

Morocco was historically considered a 'sending' country as the Moroccan diaspora has now exceeded 4 million people. However, in the mid-2000s it became recognised as a 'transit' country. For most African migrants who arrive in this country wishing to reach Europe, either through the Spanish enclaves of Ceuta and Melilla, or through the Canary Islands, it is seen as a temporary base before crossing the Mediterranean or the Atlantic Ocean.

In recent times, since the beginning of the Syrian Civil War, Morocco has received a large influx of refugees and undocumented migrants. The Office of the UN High Commissioner for Refugees (UNHCR) in Rabat estimated in 2018 that 62% of the 6,912 refugees and asylum seekers currently in Morocco came from Syria, and the rest were from different African and Arab countries.[1]

The Moroccan government, the UNHCR and non-government organisations provide assistance to these refugees and irregular migrants. The Moroccan Ministry of Education, for instance, guarantees the right of all children to enrol in elementary schools, regardless of legal status.

Most of these refugees use Morocco as a step to reach Europe, trusting that it is the safest passageway, though most end up waiting for months or years in appalling conditions. Despite this, however, about 200 refugees cross to Europe each week (Hassouri, 2017).

The status of refugees and undocumented migrants in Morocco has become problematic for the Moroccan government, as the number of refugees continues to increase and the fear of terrorism rises. However, the Moroccan government and the European Union remain committed to finding a long-term solution so that the rights of refugees and undocumented migrants are guaranteed.[2]

After the so-called 'Arab Spring' in 2011, the Moroccan government developed a new national policy on migration and asylum and adopted an exceptional regularisation policy for migrants in 2013, making Morocco the only country in North Africa and the Middle East (MENA) to address the problem of undocumented migrants and refugees through a regularisation process.

While Syrians, Yemenis and Libyans are considered refugees because of the civil wars in their countries, most Sub-Saharans are not treated as refugees, as they do not fit the 1951 Convention definition of a refugee. In effect, they are primarily seen as economic irregular migrants. Those leaving their countries in the hope of leading sustainable lives include women. Many of the women we interviewed in Morocco, particularly from Nigeria, were victims of trafficking.[3]

The international legal provisions that have been put in place since 1951 define a clear distinction between a refugee and a migrant. Refugees may be registered with the UNHCR and then acquire residency and work permits in Morocco. Some may be eligible for resettlement from Morocco to third developed countries, chiefly those refugees who meet the UNHCR's resettlement eligibility criteria and whose legal and physical protection needs cannot be met in Morocco. Migrants, however, do not qualify for these protections (Hassouri, 2017).[4]

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1   See the article. Accessed 21 May 2018 from https://www.huffpostmaghreb.com/entry/toutes-les-deux-secondes-une-personne-est-forcee-de-fuir-son-pays-dans-le-monde_mg_5b2a60c7e4b05d6c16c99b90.
2   See this informative link. Accessed 19 December 2017 from https://borgenproject.org/about-morocco-and-refugees.
3   The *New Yorker* devoted a lengthy article to the issue of trafficking out of Nigeria. See the article. Accessed 21 March 2018 from https://www.newyorker.com/magazine/2017/04/10/the-desperate-journey-of-a-trafficked-girl.
4   See this article based on UNHCR research by Parastou Hassouri, published 12 September 2017. Accessed 20 November 2017 from https://reliefweb.int/report/morocco/refugees-or-migrants-difficulties-west-africans-morocco.

This article investigates the growing use of mobile technologies and social media by these migrants and refugees in their journeys to successfully migrate. Efficiency, optimisation, speed and timing have always been crucial in logistics and technologies, and in this sense mobile technologies can be seen as logistical tools. The article analyses the extent to which such logistical tools influence the flow and mobility of migrants and the forms of flexible integration, as well as communication with their families and their home countries. We see the connection between logistics and digital technologies, in this context of migration, as the effects (positive and negative) of smartphones and social media on the spatial movements of cross-boundary refugees and undocumented migrants. They are thus constituted as logistics, since digital technologies influence and support the circulation of migrants and their spatial settlement.

This interaction strongly affects identity, participation, economy and the sense of membership of these migrants on the move, concomitantly with logistics serving as a device producing subjectivity (Cuppini, Frapporti & Pirone, 2015) and shaping the co-construction and (partial) autonomy of the migrants' coordination.

Migration processes are usually seen only from the perspective of their points of departures and arrivals. People are usually defined as 'emigrants' or 'immigrants'. However, the temporal continuity and the contemporary 'dimension' of migration processes characterising our era forces us to focus not only on the 'nodes' but also on the flows of migrants. This means understanding the movement of people rather than only the places where they settle, and framing it in the intersection between migration flows and citizenship, beyond but also still intertwined with nation-states (Nyers & Rygiel, 2012), especially in the Maghreb area (Perrin, 2014).

This suggests that migration needs a constant consideration by all actors concerned, because of economic needs and for humanitarian purposes. All social actors should continuously take migrants into account, especially their socio-economic needs and the necessity for governments and non-government organisations (NGOs) to provide them with assistance.

Based on 27 structured and semi-structured interviews conducted in Fès, the article further investigates the roles of smartphones and social media as logistical devices. Today, amid a range of accelerating evolutions and in an increasingly digital environment where technological transformations are affecting the evolution of migration processes and of society at large, the need for research is especially important.

In this article, we survey the main challenges regarding digitalisation and logistics and their inevitable impact on the journeys and lives of undocumented migrants. Migrants' expectations and different needs require speed and timing, which are drivers of several important changes in technologies and logistics. Although there is a direct connectedness between them, they have mostly to do with information and communication. Alongside digital forms of communication, there is also the physical world of goods, paper documents, the money sent online, shipping and any other treatment of goods, to name but a few. Ultimately technologies and logistics have one task: making sure that any of the mentioned needs are satisfied at the right time and place under the best possible conditions. Such conditions are also influenced by possible pitfalls, since the information, data and resources produced by digital

technologies may not be adequately and sustainably resourced. They can produce more harm than benefit if they disseminate misinformation.

Technologies and logistics are related but different, depending on the exact activity, but they all focus mainly on data and information. At any rate, digital devices matter in logistics. Several technologies are being increasingly adopted to minimise risks and proactively turn migration challenges into opportunities, but these also entail threats (Latonero & Kift, 2018).

This article investigates how these technological devices facilitate the sharing of knowledge and connectivity, peer-to peer cooperation and mutual support. It attempts to test the idea of 'mobile commons' developed by Papadopoulou-Kourkoula (2008) and Trimikliniotis, Parsanoglou and Tsianos (2015) and demonstrate that labour, mobility and security are connected with the scheme of State sovereignty through differential inclusion of mobile populations. Citizenship (and its dimensions) is both the governing tool of this tripartite relationship and the specific form it takes in different social and political contexts.

Founded in the eighth century by Moulay Idriss II in the North Centre region of Morocco, Fès is characterised by its cultural, ethnic and religious diversity. It has historically been able to deal with difference in reference to its Andalusian connection; it has been a commercial centre and city of cultural exchanges for centuries.

Over the past few years, the city of Fès has become a destination for transnational European and Sub-Saharan migrants. The latter perceive Fès in terms of the historical, spiritual, trading and student haven roles it has played over the centuries (Berriane, 2015).

According to a survey carried out by the Moroccan Association for Studies and Research on Migration (AMERM) in 2013, Nigerian nationals remain the most numerous (15.7%) among the migrants, followed secondly by Malians (13%). Next are Senegalese (12.8%), Congolese (10.4%) and Ivoirians (9.2%). In all, it is estimated that over 50 nationalities are involved in these illegal flows. The survey reveals that only 20.3% of the study population were women and 79.7% were men. The average age was 27.7 years (see Khrouz & Lanza, 2015; Sidi Hida, 2015).

One of the striking features of this migration is the relatively high level of education of migrants, which contrasts with the classic image of illegal migrant illiterates: 48.5% of those interviewed had a higher level than primary education, 32.4% had passed the secondary level and 16.1% the upper level. Those with no level of education at all accounted for less than a third of migrants (31.7%) (Khachani, 2006, 2013; Ennaji, 2012).

This article is divided into four main sections. The first section is concerned with methodology. The second section is devoted to the impact of logistical tools such as smartphones and social media on irregular migration. The third section deals with the issue of citizenship and the fourth formulates conclusions.

Methodology

This article is based on fieldwork carried out in Fès. In all, 27 structured and semi-structured interviews were undertaken between April 2017 and March 2018. The data are derived from ethnographical trajectories with undocumented migrants and refugees (six Syrian, six Libyan, and 15 Sub-Saharan; ten women and 17 men). They were contacted in the neighbourhoods where they lived and in the streets and cafés they

most often visited. They gave us information about their use of technology, their migratory routes, their demographic and socio-economic profiles, their daily lives and their relations with society, along with the prospects for their migratory project.

These migrants were followed intensively, in the city of Fès, for a period of between 4 and 8 months. Following the face-to-face interviews, contact was maintained on an ongoing basis through telephone calls and various social media, such as WhatsApp and Facebook. Conversations were held through chat and voice messages, online voice calls and telephone calls, and most data were subsequently anonymised. The period of data collection officially ended on 30 April 2018.

The respondents had varying levels of education, which influenced their 'digital literacy', that is their ability to take advantage of opportunities offered to them through the internet and mobile technology networks, as shown in Table 1.

In the following section, we discuss the role of information technologies, particularly smartphones and social media, in the spatial movements of cross-border refugees and undocumented migrants.

The impact of smartphones and social media on irregular migration

Despite the fact that information and communication technologies (ICTs) have been recognised as major issues in migration (Zijlstra & van Liempt, 2017), there is very little knowledge about how the use of ICTs precisely affects the way that migration operates. In this article, we first investigate how the use of smartphones and social media impacts irregular migration trajectories and techniques. Then we explore how they influence

Table 1: Characteristics of participants in trajectory ethnography[5]

Answerer	Country of origin	Gender	Age	Level of education
Respondent 1	Senegal	M	21	University
Respondent 2	Senegal	M	25	High school
Respondent 3	Cameroon	M	23	University
Respondent 4	Niger	M	22	High school
Respondent 5	Niger	M	23	University
Respondent 6	Niger	M	24	University
Respondent 7	Niger	F	20	High school
Respondent 8	Niger	F	21	High school
Respondent 9	Nigeria	F	23	High school
Respondent 10	Nigeria	F	27	High school

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5   Respondents' names were anonymised.

Respondent 11	Ghana	M	29	University
Respondent 12	Ivory Coast	M	23	University
Respondent 13	Guinée	M	23	University
Respondent 14	Guinée	M	22	University
Respondent 15	Guinée	M	23	University
Respondent 16	Syria	M	25	University
Respondent 17	Syria	F	26	High school
Respondent 18	Syria	F	25	High school
Respondent 19	Syria	F	26	High school
Respondent 20	Syria	M	22	University
Respondent 21	Syria	F	27	High school
Respondent 22	Libya	M	32	High school
Respondent 23	Libya	F	29	University
Respondent 24	Libya	M	31	University
Respondent 25	Libya	M	33	University
Respondent 26	Libya	M	26	University
Respondent 27	Libya	F	28	High school

decisions regarding destinations, and finally we look at how they impact the financing of irregular migration projects.

Information gathered from friends, relatives and other personal contacts and social media usually spreads quickly (Dekker & Engbersen, 2014). This might potentially increase a migrant's knowledge and information about which directions to take, destination country to choose, favoured travel means and the best time and place for crossing borders.

Research has revealed that well-informed potential migrants are not necessarily more successful in reaching their desired destination than the average migrant (Zijlstra & van Liempt, 2017). The element of trust is of paramount importance to information. The quality of information and the trust any individual migrant places in it has an impact on his or her ability to cross effectively, and, some migrants, failing to distinguish high-quality information from spam, may simply suffer from bad luck. However, migrants tend to trust commercial operations, particularly smugglers, and the information they provide because these networks have no interest in dampening migration since it benefits their business (Latonero & Kift, 2018; Boyd, 1989).

Dekker and Engbersen (2014) argue that younger and more highly educated migrants are better able to make use of the Internet, while less-educated migrants rely more on traditional forms of communication.

Information provided by various related websites is often about legal permits and migration laws provided by government authorities; they are understood only by well-educated migrants. Some migrants may not have easy access to the information required, as the institutions or websites they consult do not always offer the appropriate information for migrants. Irregular migrants often have to rely on non-official sources of information, such as those sources recommended by smugglers. The latter typically provide information for asylum seekers in the areas in which they live, as they are knowledgeable about border crossings and are well-informed about visa procedures. When required, smugglers may provide migrants with needed information regarding readmission agreements between concerned countries (Koser & Pinkerton, 2002). Our respondents stated that they benefited from very precise information provided by smugglers. Nevertheless, more research is badly needed on the degree to which traffickers share this kind of information with migrants. At times, migrants are offered vague or incorrect information by unethical smugglers for whom the migrants' well-being is not a primary concern. This is surely a dangerous dark side of digital technologies for migrants.

Migrants often share the contact details of traffickers with other potential migrants. Likewise, traffickers use social media to provide effective assistance. They use Facebook to publicise their programmes and occasionally form charitable organisations for some countries of destination (Brunwasser, 2015). The beneficiaries are often those who have arrived in the destination country.

On many Facebook pages, migrants can verify the honesty and credibility of some smugglers and pass on information on the most efficient ones. Additionally, social media and smartphones can help migrants in deciding who to trust. Successful smugglers are those who provide migrants with the correct information about their favoured destination. As a result, they have more customers because they have been recommended by the former migrants (Triandafyllidou & Maroukis, 2012:200).

Thus, the use of mobile technologies, such as smartphones and tablets, significantly impacts on the experiences of the sample of migrants. The latters' relatives are kept informed about their travel conditions using Facebook and text messages, and sharing photos of the travels with their families and friends (Germann Molz & Paris, 2015). In addition to their normal social utility, smartphones may also be used to ask for help when the migrants are in difficulty, such as when they have lost their way to a destination.

Mobile technologies are also useful when migrants are in dire need of financial resources in order to carry on the trip. The accessibility of smartphones has thus made some migrants so confident and autonomous that they can sometimes organise their travels by themselves, without the need for smugglers. Collyer (2007:674) uses the expression 'do-it-yourself migrants' in this context.

Nonetheless, there are migrants who are incapable of using mobile devices effectively during their travels. This implies that although high-skilled individuals are able to make use of these devices efficiently, many cannot. Hamel (2009) argues that there is a 'digital divide' in terms of 'access' and 'the ability to use different forms of ICTs among migrants. Those with poor technology skills tend to be less competent in accessing sources of information to ease their travel conditions. For this reason, mobile devices may influence the choice of migration routes and destinations (Massey et al., 1993:453).

Technological advancement in this area can also be beneficial to irregular migrants, who use mobile technological devices to cross borders without the assistance of smugglers. Cases of migrants using this plan for crossing frontiers have been observed for the trip from Niger to Morocco. Nevertheless, all the migrants in our sample relied on traffickers for certain elements of the journey, such as particular border crossings or the procurement of fake papers. As one interviewee declared,

> Sometimes, I have to choose between food and Internet connectivity, I must stay in touch with my family back home. When I need money I make them a call through WhatsApp, and they send it via Western Union really fast. (Respondent 4, 22-year-old from Niger)

Such stories are quite common among undocumented migrants. According to the UN's agency for refugees in Rabat, refugees may spend about a third of their budget on staying on the Internet.

When refugees leave their homes, they fully rely on their mobile phones. Their importance goes well beyond staying in touch with people back home. They share news and pictures of friends and family who have reached their destination, thereby motivating more migrants to set out.

A major danger for migrants is the spread of fake news and misinformation. According to Respondent 12, a 23-year-old from Ivory Coast, he arrived in Morocco mostly because he read somewhere on the Internet that in Morocco he would be sent to a European country as an asylum seeker who was attending school. He had heard that Morocco accepts all refugees aged under 16. He was wrong, and he was risking his own life every night trying to get onto a truck crossing the Mediterranean Sea by ferry.

Several migrants turned down the services of smugglers and decided to continue their journey by themselves, using GPS and Google Maps. They did not trust traffickers, who, in their opinion, only led the way, but could not avoid the latent dangers.

For most migrants in our sample, contact with relatives in the country of origin was a central condition for reaching the favoured country of destination in Europe. At various points during the trip, they relied greatly on the financial support provided by their families. The funds were generally transferred by means of mobile technology, which also provides evidence of the sound economic side of the use of logistical tools.

Less dramatic was Respondent 2's journey to Morocco. He is a Senegalese migrant, who had paid a large amount of money to a trafficker he already knew and who could reassure him that he would not get caught in Algeria. This respondent was constantly on WhatsApp talking with his mother back in Senegal, who actively helped him to find a good trafficker. It was most likely because of his strong negotiating skill and the direct help from his mother that he managed to arrive in Fès directly, without any problems. This illustrates how advanced mobile technology facilitates migrants' journeys by building physically detached 'hybrid networks' of traffickers at different points of their journeys, and keeping in touch with family members back home (Schaub, 2012:135). Through staying in contact regularly and at little expense, the family of the migrant can become more closely involved in the migration process and influence the routes that are taken (Papadopoulou-Kourkoula, 2008; Wissink, Düvell & van Eerdewijk, 2013). This implies that smartphones enhance migrants' likelihood of reaching their

destination country, even after unforeseen events such as the arrest of Respondent 2's smuggler in Algeria.

Migrants without strong ties, whether in the country of origin or in that of destination, usually have longer journeys and more difficulty in reaching their intended country (Herman, 2006). For instance, in our sample, it took Respondent 22 a total of 8 months to travel from Syria to Morocco, in spite of a constant and differentiated use of tools (including to communicate, to orientate with maps, to exchange experiences, gain specific information with social media, get economic support from the country of origin and organise arrangements).

This migration trend shows the significance of the autonomy of individual migrants for understanding the role of citizenship in the sovereign control of mass migration. There is a new configuration of mobility emerging against this type of control, particularly the sharing of knowledge and infrastructures of connectivity, mutual support and solidarity among migrants along their journeys. Thus, logistical tools facilitate migration, information and economic flows. The hectic fixation on security issues is confronted by the building of a common culture of migration for survival, 'a mundane ontology of transmigration, an ontology which we will describe as the mobile commons of migration' (Papadopoulos & Tsianos, 2013).

Our goal is to place undocumented migrant challenges and digitalities at the centre of larger changes that are happening. Through the movement of these migrants, we examine the formation of new types of commons that redesign the spatial and social environments of the cities of departure and of arrival in search of freedom and better opportunities. These changes are considered from the point of view of refugees and undocumented migrants who are often ignored, blamed for unemployment or criminality, or viewed as subaltern. We argue that these migrants must be brought to the centre stage in order to identify and tie their will, agency and praxis into both particular and general struggles and claims to rights by precarious individuals, be they migrants or non-migrants. These claims are reminiscent of the 'right to the city', as well as the politics of 'the production of space' as a new type of commons, which is generated through mobility and digitalities (Lefebvre et al., 1990).

It is well known that cities are not only public spaces where diverse groups live and replicate new and old forms of inequalities. They are also precarious situations where people live and resist. City dwellers living in these circumstances persistently draw attention to their lack of rights and 'mark their identities' through their continuous struggles 'to find a place in the city', as stated by Georgiou (2013:66).

Thus, undocumented migration to and from Fès reveals the relationship between urban migrant movements, traffickers and digitality, which transforms public space, creates mobile commons, and displays patterns of commonality and inter-dependence (Trimikliniotis, Parsanoglou & Tsianos, 2015).

The relationship between migration and the digital can now be seen as one of the major global developments in the twenty-first century. Traditionally, the digital has been treated as external to migration, politics and society at large, that is, as an independent driver for global, unilateral transformation. Rather than supporting this traditional perspective of the relationship between migration and the digital, we argue for its specificity:

the digital is best examined in terms of folds within existing socio-technical
configurations, and as an artefact with a set of affordances that are shaped and
filled with meaning by social practice. (Kaufmann & Jeandesboz, 2017:315)

In conceptualising the digital as providing tools that are computable, material, storable, traceable and interpreted, it becomes clear that it cannot be separated from migration issues nor from socio-political aspects in general.

Since this refugee-migration crisis began in 2015, the migration movement towards North Africa and Europe has drawn considerable public attention in the Global North. This crisis has also contributed to the increased attention of scholars towards the protracted and fragmented journeys of migrants. A perspective that is mobile and recognises the journey as a modern logistical 'site of power and struggle' (Neilson, 2012) and that follows migrants along their trajectories offers a productive practical approach for understanding these unending long-term and long-distance migratory journeys. Our data illustrate that this approach is useful for grasping the manifold interactions between mobility systems and migrants. We argue that such a subject-oriented approach has the potential to open geographical perspectives on migration by not limiting the analysis to specific regional or national contexts. It questions the decisive power of mobility commons as institutionalised sets of regulations, and also characterises migrants' use of technology devices and the way they creatively use spaces to shape and negotiate their legal conditions. Likewise, we argue that the trajectory does not look at the individual perspective of action that structures and differentiates migratory im/mobility. It is actually the junction between them that provides the empirical and conceptual value of this approach (Schwarz, 2018).

Sub-Saharan African migrants who aspire to reach the European Union (EU), often undertake fragmented and dangerous journeys to the North. Refugees and irregular migrants who have found employment in Morocco, for example, state that they send remittances back home occasionally, but those living in refugee camps who have not been able to obtain a job permit usually rely on receiving funding from family and friends back home or from elsewhere.

Current migration trends foresee that the number of refugees and irregular migrants will continue to increase as will the demand for mobile devices and services among these populations. This implies that mobile devices and money services will revolutionise financial management for refugees.

Finally, in many conversations with refugees and irregular migrants, Internet connectivity has become a small-scale industry, generating income for migrants themselves. Our fieldwork found, however, that a slow Internet annoyed refugees and migrants alike, who also complained about the high costs. Additionally, there was no irrefutable evidence that mobile devices like tablets enhanced learning. In spite of these challenges, the research has shown optimism, as there are endeavours being made to explore the potential of digital learning for refugees and their children.

Most respondents noted that exclusion from connectivity was a real issue, especially for certain groups. We found that women, the elderly and the less educated were less likely to have access to technology, information and mobile devices, echoing the

findings of other, non-refugee-related studies of exclusion, such as those in rural areas who are also significantly less likely to have access to connectivity.

The data suggested that even among groups like Syrians, among whom smartphone use is almost universal, there are disparities and complexities. While the primary custodian of the phone was usually male, the younger family members were often the most frequent users and the most technologically literate.

Undeniably, many refugees and irregular migrants have difficulty in accessing mobile connectivity because it is not affordable or because of the low skills of the migrants. For example, continuity of education, access to financial services via mobile money transfers, access to information and family reunification, are all decisive needs that can be met through connectivity. Mobile devices, apps and infrastructure services need to be considered over the long term for refugees. Given the growing refugee crisis in North Africa and Europe, the social and economic challenges to access these mobile services will continue to grow.

However, there are pitfalls to digital technology which entails that vast amounts of data can be collected and stored. Just a single infringement or loss of a smartphone can mean huge amounts of private information getting into the hands of criminals, terrorists, enemies or other malign entities. Examples of this include terrorists using social media to promote themselves and encourage others, and traffickers and drug dealers using the dark web to trade. It has become much harder to maintain personal privacy in the digital world, in addition to the risk of personal data being stolen or sold. Moreover, it is not always easy for migrants, like others, to discern what is real and what is fake anymore (Johnson, 2004).

The recent literature on the topic (see Leurs & Smets, 2018; Latonero & Kift, 2018; Sánchez-Querubín & Rogers, 2018) talks about 'digital migration', which emerged as a developing field of research during the European refugee crisis in 2015. The extensive spread of news images of Syrian refugees carrying smartphones, and taking selfies after arriving safely on European soil went viral and became useful for many decision makers and civil society actors in Europe to work on new ways to manage the new migration flows. Leaders in organisation theory offer a new category of online service referred to as Digital Humanitarianism, using social media to respond to such crises. Digital humanitarianism can make vital information available faster, and in emergency situations, it saves lives. Digital humanitarians are volunteers who support research and relief action through online work, regardless of their geographical location. Digital technologies have been utilised in different ways by different actors: for instance, as a means of accepting present-day migration and as a tool to manage, confine or stop migration movements (Meier, 2015).

Mobile technological devices and citizenship

Smartphones and social media play a crucial role in linking participation, identity and membership in a frame of citizenship. This is in general true, and more so in a context of migration, where everything starts from the capacity of individuals to participate in the collectivity (building their identities and marking the perimeters of membership), as well as in the possibility for adjustment, participation and integration given to them from the institutional sphere.

In addition to the obvious logistical advantage smartphone technology affords to migrants, it is also fosters new online-digital communities that go beyond, but are not detached from, the traditional notion of the nation-state. Although migrants, especially undocumented ones, are not 'citizens', they do engage in behaviours that mimic those of a traditional citizen within their communities and host nations. Logistical devices such as smartphones and social media play a very important role in the development of multi-layered forms of interaction within nations and migrant communities by tying migrants together through shared experiences both online and in the physical world. As migrants begin to interact with the local collectivity, albeit with a perspective of 'differential inclusion' (Mezzadra & Neilson, 2014), overcoming, *de facto*, the dichotomy inclusion/exclusion, technology continues to play a vital role in socialisation both between new arrivals and host communities. Indeed, because migrants obtain most of their information through smartphones anyway, their perceptions of the host nation will also be significantly shaped by what they see online, and this is also a potential threat. Additionally, these tools will continue to provide deeper connections to the migrants as they discover new opportunities in their host nation online, and furthermore, communicate with their fellow migrants, with their relatives in the place of origin and, possibly, build families in the new city. These are forms of, direct or indirect, political presence and participation (McNevin, 2009, 2017) in the cities, beyond borders and nation-states.

Since borders have become less relevant, and online communities have grown in influence, the concept of citizenship is now in flux. Online 'citizenship' now modulates what we understand a citizen to be. If one can interact with fellow migrants or citizens of the host nation online from any location, what is a citizen anyway? It is necessary to identify new forms of citizenship emerging in the context of transformations in the global migration system, since a set of factors, such as technological devices, which are used as powerful logistical tools enabling mobility, allow us to conceptualise the 'politics of movement' (Nyers & Rygiel, 2012).We argue that citizenship behaviours can be effectively cultivated online before a migrant even reaches a place (Leurs & Ponzanesi, 2018), and that the development of these behaviours through online communities creates 'citizens' out of migrants even before they arrive.

Hence, the extensive, and not always proper, use made of this category in many different contexts hints at different meanings. Citizenship is usually intended, in juridical terms, to signify the tie between the individual and the state as an institutional entity, but it is increasingly being used in a broader sense as the analytic-reconstructive parameter implying the quality of the individual, while also defining access to certain social resources in an institutional context. Rethinking citizenship in an intercultural perspective can be viewed as a deepening of the nexus of responsibility between the individual and the political community, by outlining all those juridical, social, economic, cultural and institutional factors that characterise the nature of such a nexus in different contexts.

Framing migration in a logistical setting means understanding to what extent *caring citizenship* (in the broad sense of horizontal interaction between citizens, rather than vertical interaction between the citizen and the state, as mentioned) can contribute to instilling in citizens a common sense of consistency and responsibility feeding this

nexus (Bignami, 2017). In the words of Engin F. Isin (2017a:196), 'Internet has clearly created spaces by enabling people to traverse borders with their digital acts', but this sense of social and political membership has to be understood by means of a participative and nurturing attitude, in spite of the many discontinuities that characterise current societies and which dismantle social ties.

Both political and sociological approaches acknowledge that citizenship can also be the product of ongoing social and political deliberation and construction based on circumstantial criteria (Benhabib, 2004). In the case of migrants basing their movements on logistical tools such as smartphones and social media, this circumstantial aspect is predominant, as we have seen in the previous analysis of the migrants in Fès, leading us to assume an active role in the process of defining and expanding citizenship itself (Menezes, 2003:431).

Fostering orientation towards active contingent citizenship, in effect, amplifies migrants' perceptions about citizenship and raises the question of how to support it. One approach to encouraging citizenship learning situations would be by engaging migrants as active change agents first towards themselves, and their perception of being (or not) a member of a certain community and then in their capacity to 'build' their identity. As mentioned above, the use of technologies implies manifold pitfalls, and can open the field to manipulation. This is intertwined with awareness of participation, since it requires a perception of being a citizen instead of a client or a consumer (Pinkett, 2000:2), thus leading to a dislocation from the 'knowledge about' towards 'action', mobilising experiences.

An analysis of the responses of our 27 research participants confirms that technology is a powerful means to implement practices that make subversive strategies which have a transformative impact on society, since each migrant works as a digital-spatial node. In other words, these migrants' experiences demonstrate what Steinberg (2009) argued about the modern era: that the dichotomies inside/outside and fixity/movement are no longer appropriate for interpreting their positions in a frame of socio-spacial logics of the state.

Connected to these practices are issues related to reconstituted actions of citizenship, intended as acts towards a 'performative citizenship' (Isin, 2017b), when people act as political subjects, whether they are authorised to do so or not (McNevin, 2009, 2017; Isin, 2008). With migration then, undocumented, informal or irregular, the notion of citizenship can no longer be reduced to a mere legal category, but overarches other dimensions of participation, membership and identity.

Conclusion

This study has shown that smartphones and mobile technologies can amplify the movements of migrants by enabling them to access online information during travel and by reinforcing migration frameworks, irregular ones in this specific study but also regular ones in general. Smartphones and social media are also helpful for promoting the use of new mobile technologies by undocumented migrants, who are considered knowledgeable, experienced, and well-informed because they have previously made the trip. The data also show that mobile technologies impact the evolution of irregular migration by facilitating the movement and integration of migrants. Likewise, mobile technologies provide migrants with a form of independence in organising and financing their travels; they also

allow traffickers to contact prospective immigrants and disseminate information far and wide, and more rapidly than ever before (Zijlstra & van Liempt, 2017). In this regard, digital technologies also represent a threat, since they can expose migrants to information, data and resources that come from inadequate, unreliable or illegal sources.

Mobile devices facilitate money transfers and the administration of financial services. International money transfers are another practical tool for refugees and irregular migrants, which can be accessed at a reasonable cost and mainly through mobile devices. This is a useful service, but the other face of the coin is that it can also represent a peril when migrants are forced or blackmailed to delivering or withdrawing money.

This article has also tried to gain more empirical insights into refugees' and migrants' journeys. It has been able to grasp expected steps and unexpected turns in individual migration trajectories. By discussing three main components (motivation, facilitations and speed) of journeys, we have put into a logistical perspective the challenges caused by irregular migration.

The increasingly large numbers of those coming to Morocco, and Fès in particular, who are unable to enter Europe, occupy a liminal space of sorts. They can neither move forward nor wish to return to what they have left behind. In this case, the migrant does not suffer from a 'double absence' from the place of origin and within the host city (Sayad, 1999) but rather has a multiple presence.

Despite some efforts to address this situation through limited regularisation programmes, most migrants will not be absorbed, though reaching Europe will continue to remain their ultimate goal. As long as the underlying factors pushing these migration flows are not addressed in a fundamental way, and as long as the only solution envisioned by the developed countries is one of prevention or containment, migrants will continue to seek different and sometimes more perilous paths towards Europe, and the crisis will worsen, as, at the time of writing, we have lately read in the news ('Hungary refuses to take any more refugees').[6] This movement affects individuals, their networks and the cities (of provenience, transit and destination) in which those individual trajectories occur. Migration should be analysed, then, as a logistical system rather than as a social problem to be resolved.

The use of tools like smartphones and social media, framed in a logistical approach in migration processes, opens an interesting debate on intercultural sensitivity and on the concept of citizenship, considered as a mechanism for generating new forms of responsible citizenship, which aims to increase the possibility of political participation, regardless of borders and nation-state. The ongoing theoretical debates on citizenship are enriched by the arrival of undocumented migrants and refugees, which have resulted in citizenship becoming a productive area for new perspectives of cultural interaction. The performative production of a new identity and membership is, thus, confronted with the challenge and complexity of migration flows (Isin, 2017b).

The information technologies, organisational types and forms of resistance used by migrants should not be neglected; otherwise, this will lead to potentially biased attitudes and policies of migration. Avoiding relating to others' struggles and drawing

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6   See this article. Accessed 5 June 2018 from https://www.thelocal.it/20180605/
italy-eu-reform-dublin-rules-asylum.

from their physical/spatial movements along the migration journey, and readily depriving the migration movement from the interconnectivity within a particular context, is a formula for failure.

Concerning digitality, migration and the generation of mobile commons, our findings reveal that digital forms of representation in the context of migration and transnational population movement vary in terms of their impact and visibility. Through technologies, the networking between different actors is generally maintained and consolidated. Migrants and refugees are surely transforming the politics of representation of local, national, regional and global governance, and they are just as certainly challenging borders and the concept of the nation-state. The challenge of migration as a social movement in general calls for rethinking urban questions such as integration, identity, participation and the right to the city: questions, in other words, strictly linked with citizenship.

Thus, migration and mobile commons are reshaping politics both locally and globally with the daily use of digitalities. Digital materialities are transforming our lives, the terms of social struggles and social migration movements. The question is how to describe and interpret them appropriately so as to envisage how the new rights to the city marking mobile commons and migrant digitalities are affecting the future of societies.
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Labour and the contradictory logic of logistics

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ABSTRACT

Since the early 1980s, the way in which goods and materials are exchanged
and moved has changed in what has been called the 'logistics revolution'.
In the USA, the value of goods moved as freight has doubled since the late
1990s, the number of warehouses has grown by two-and-a-half times, while
the amount carried by intermodal transport has grown by five times over these
years. This article will argue that the system of logistics that has taken shape
in the last two or three decades is deeply affected by contradictions inherent
in capitalism that magnify the potential power of labour to disrupt supply
chains. Among these are: the tension between the desire for the seamless
movement of goods and the disruptive reality of competition and the fight for
value appropriation up and down the supply chain; the push by both retailers
and manufacturers for ever faster delivery of goods to market; the burden of
high fixed costs that underlie the structure of contemporary logistics; and the
growth of huge 'logistics clusters' concentrating tens of thousands of manual
workers in important metropolitan areas. It will be argued that each of these
contradictions renders the firms in these logistics networks highly vulnerable to
worker actions. While such actions have been relatively rare so far, community-
based pre-union organising in some major clusters, such as Chicago, is laying
the basis for a future upsurge in worker organisation.

KEY WORDS

labour, logistics, supply chain, value chain, warehouse, risk management, value
appropriation, competition, logistics clusters

Introduction

Logistics is the art of moving things for specific purposes such as trade, and above all
war. The contribution of the military to the development of both logistics theory and
practice has, indeed, been enormous (Cowen, 2014:1–8). While many of the elements

of contemporary logistics have been in use for some time, the last two or three decades have nevertheless seen a 'logistics revolution' in supply chain organisation across the world (Bonacich & Wilson, 2008:3–22). In the USA, logistics as we know it today was not possible until deregulation of transportation in 1980. Shipping containers, which had crossed the seas for some time, only became viable for land-based intermodal transport in the 1980s. As Levinson put it in his history of the container, 'Deregulation changed everything' (Levinson, 2006:261). By the mid- to late 1980s, just-in-time (JIT) production and delivery accelerated the speed at which goods moved, while computerisation improved coordination (Bonacich & Wilson, 2008:96–101; Levinson, 2006:266–7). But the take-off in the transformation of inland logistics came in the first years of the twenty-first century.

The dollar value of freight moved within the USA doubled from 1998 to 2017 (US Department of Transportation, 2004:9, 2017:2–2). Intermodal freight transport by truck and rail soared fivefold from 43 billion tons in 2002 to 214 billion in 2012 (US Department of Transportation, Bureau of Transportation Statistics, 2017: Table 1–58). The number of warehouses in the USA grew by 250% from 1998 to 2017 to 17,000, mostly now located in suburban areas, while their size increased dramatically, and the workforce more than doubled from 1990 to 2017 to 840,000 (US Census Bureau, 2011:409; Bureau of Labor Statistics, 2017a, 2017b:2–5). By 2013 about 3.2 million workers were employed directly in the US logistics sector as a whole by one estimate, not including railroad, postal, utility and IT workers (van den Heuvel et al., 2013:21).

Driven largely by the rising competition of Big Box retailers, notably Wal-Mart, in the 1990s and accelerating in the twenty-first century with the coming of e-commerce, information technology (IT) such as bar codes, GPS, EDI (electronic data interchange), WMS (Warehouse Management Systems' software) tracked and guided the movement of goods – and workers – more rapidly and reliably. The number of US companies using EDI rose from just under 12,000 in 1991 to over 100,000 by 2013 (Bartholdi & Hackman, 2017:33; Logicbroker, 2013:3). Also newer in application was Radio Frequency Identification (RFID) tagging which became general only after receiving an international standard and becoming cost-effective in the first decade of the twenty-first century (Roberti, 2002; Huber, Michael & McCathie, 2007). Logistics had been transformed in ways that have disoriented both workers and trade union leaders through new technology, suburban relocation and the use of precarious forms of employment, while at the same time opening up new possibilities for the exercise of workers' power on the job.

Methodology

This article will examine the major contradictions of contemporary logistics as they affect existing and potential workers' organisation and action. The methodological framework of this article will be that of critical political economy, in particular the centrality of profitability and the concept of 'real capitalist competition' drawn from Marx and developed by political economist Anwar Shaikh among others, on one hand, and the centrality of labour in what are also chains of labour power, on the other (Shaikh, 2016; Botwinick, 2018; Roberts, 2016). In general, competition is waged through reducing relative prices by cutting labour costs and 'never-ending

technical change' via capital investment (Shaikh, 2016:261). This approach allows us to see more clearly the interrelationship between competing firms, the accumulation process, the conflict between workers and employers and the potential power of workers in supply chains.

This body of theory rejects the neoclassical view of firms as simply price takers in a world of 'perfect competition' as well as its Janus-faced partner 'imperfect competition' or 'monopoly', in which there is little or no real competition. Instead, it asserts the classical and Marxist view that capitalist enterprises large and small use prices and costs, as well as other tactics, as aggressive weapons in the competitive war for profits. This approach helps to illustrate the economic dynamics behind the well-known fact of supply chain vulnerability to worker action as well as the drive toward work intensification and decreasing real wages up and down the supply chain that can motivate such action. Thus, it is not the 'monopoly' or 'oligopoly' position of large ultimate buyers in the supply chain, the 'power regimes' discussed below, such as Wal-Mart, Target and Amazon or General Motors, Ford and Toyota, that explains their aggressive behaviour toward their suppliers, but precisely the intense competition between them characterised by the fight for market share and value appropriation in the supply chain. This is well illustrated in the process by which one innovative firm threatens to overtake another: Wal-Mart outpaces K-Mart, Amazon outpaces Wal-Mart, Toyota outpaces GM and so on (Marx, 1933:43; Botwinick, 2018:149–52; Shaikh, 2016:370–2, *passim*).

Due to space limitations this analysis will focus on the development and dynamics of mostly inland logistics in the USA with the understanding that much of this applies to many developed and developing nations as well. In terms of sources, this study will draw on US and international, academic, business, trade union, and government sources, along with interviews with workers and 'workers' centre' organisers.

Seamless movement versus competition, value appropriation and power

Contemporary supply chain management (SCM), which is at the heart of the practice of modern logistics, often narrowly theorises supply chains as an idealised series of dyadic or triadic relations of buyers and sellers, typically represented by lines and dots or a 'fishbone' diagram, leading seamlessly to a final customer. As both material and value chains, however, the 'nodes' and transport links of today's complex logistics networks are subject to the contradictory pressures of capitalist competition and value appropriation. As British logistics expert Donald Waters argues, 'No amount of cooperation can overcome the basic reality that each member of a supply chain can only make a profit by paying less for materials bought from one partner and charging more for materials sold to another partner' (Waters, 2011:59). In terms of costs and value appropriation, this competition for profits also applies to the transport, warehousing and other service firms, such as third-party logistics (3PL) providers, that are key links in supply chains but are too often excluded from supply chain analysis.

Furthermore, in proposing methods of collaboration or governance for supply chains, SCM proffers the problematic notion of what one critic calls 'management beyond the limits of ownership' (Bretzke, 2009:71). In reality, despite the exchange of information, itself often limited by 'commercial sensitivity', or contractual relations,

firms in a value chain manage themselves in accordance with their own interests, compete with others for business in the chain and attempt to maximise their share of value at the expense of others through the exercise of relative power (Bretzke, 2009:71–7; Reimann & Ketchen, 2017:3–7; Waters, 2011:181–2; Brito & Miguel, 2017:61–74).

Long-term contracts which attempt to regularise supply chain governance and relationships don't end the problem of competition and self-interest. As one study of supply chain relationships notes, 'Because long term contracts cannot foresee all exigencies, the parties must rely on further negotiations or institutions for resolution of issues' (Clott & Hartman, 2014:4). Even the major theorist of transaction cost economics, which emphasises the role of the contract in the governance of exchange between firms, insists that contractual frameworks 'almost never accurately indicate real working relations' and, at best, 'afford a rough indication around which such relations vary . . .' (Williamson, 2010:679).

The self-interest of firms in 'real competition' remains dominant and works in all directions. As political economist Anwar Shaikh puts it, 'Competition pits seller against seller, seller against buyer, and buyer against buyer.' And, ultimately, this competition in all these directions is about profits (Shaikh, 2016:260). While this is the norm in capitalist competition, the difference for logistics is that firms in a supply chain are highly dependent on one another and increasingly constrained by time so that the impact of competition is more immediate and disruption more forceful. Supply chain governance, in other words, remains a realm of conflict between firms to capture value and between firms and their workers to reduce costs and increase competitiveness.

The pressures of competition typically start at the top of the supply chain between the ultimate buying firms, mostly big retailers or final-assembly manufacturers which have the ability to choose between competing suppliers. While many discussions of power in supply chains emphasise the role of large retailers, an average of only about a third of domestically produced goods are 'finished goods' and not all of those are even sold through retail giants like Wal-Mart and Amazon, so that manufacturing supply chains remain a major shaper of logistics (Council of Economic Advisors, 2011:257; Bureau of Economic Analysis, 2018; US Department of Transportation, 2017:2–4). This is apparent in 'power regimes' (Cox, Sanderson & Watson, 2001) where large manufacturing firms attempt to improve their competitive position by instituting 'best practices' such as 'lean' or 'agile' production methods that put pressure on the workforce, while also dictating terms to first-tier suppliers, who compete for the business of the ultimate buyer. This competition involves more than the negotiation of price. It includes demanding innovations by suppliers that will constantly improve costs. This is often created through, as one study puts it, 'commodification and standardisation' of the supplier's product, which increases competition among suppliers. The first-tier suppliers, in turn, try to impose cost-cutting and innovation on those further along the chain of production and transport (Cox, Sanderson & Watson, 2001:28–35; Cox, 2001:44; Reimann & Ketchen, 2017:3–7; Brito & Miguel, 2017:67–71).

Even where a buyer has long-term relationships with suppliers it is common to put pressure on prices and practices by comparing them to alternative suppliers (Wilhelm & Sydow, 2018). For example, in 2014 General Motors announced more 'transparent'

qualifications for current and potential suppliers that would allow them 'to see how they stack up against their competitors' (Colias, 2014). Here too, the struggles over relations of exchange between firms and those between workers and employers are constant and interrelated.

Whether the ultimate buyer is a retailer or a manufacturer, these competition-driven power relations are also employed in the struggle between firms up and down the supply chain over value appropriation; that is, the capture of a larger share of the total value created by labour in the entire production and delivery chain (Cox, Sanderson & Watson, 2001; Reimann & Ketchen, 2017). This is typically done by increasing market share, manipulating prices, demanding cost-effective production methods down the chain (and, hence shifting investment costs), shifting transport or related costs, delaying payments further down the chain or, conversely, transferring risks to suppliers by imposing fines for delays (Waters, 2011:155–7).

This fight to appropriate value also involves efforts to increase the efficiency and control over supply chains by reducing the number of suppliers for both retailers and manufacturers, meaning that, in turn, suppliers must compete with one another to enter or stay in the supply chain (Christopher, 2016:16–18). This has certainly been the case in the major ongoing reorganisation of supply chains in the US car industry that eliminated hundreds of suppliers between 1992 and 2013, when the number of auto parts plants in the USA dropped by 800. The trend has continued. In 2013 Ford, for example, announced a 40% reduction in suppliers (McAlinden & Smith, 1993; Trudell, 2013; US Census Bureau, 2015a).

In most of the academic and industry literature on logistics, the only actors appear to be firms or customers. Workers are scarcely mentioned. Looked at from the vantage point of those who create the wealth within and between these firms, however, a supply chain is also a chain of labour power and the humans who provide it. As such, in addition to lost revenue during a strike, worker action can increase what Botwinick (2018:224–44) has called the employer's 'cost of obstruction' of worker demands by thwarting a firm's efforts to appropriate value. The tighter and leaner the supply chain, the more rapidly and quantitatively are these costs inflicted on the employer.

Ultimately, the quest to appropriate value, as with the competition to enter or remain in the supply chain, is met by the most basic contradiction in capitalism: the conflict between labour and capital over the distribution of surplus value. The employer's principal method of lowering prices to capture market share (and hence value) is inevitably to reduce labour costs by intensifying work, denying benefits and/or keeping wages below inflation and productivity. Recent interviews with warehouse workers in the Chicago area, for example, revealed not only increased work intensity and low pay, but that rather than working a traditional 8-hour shift they work a 10-hour day, which has been shown to be the optimal length for maximising worker effort and productivity (Shaikh, 2016:138–9). In addition, different forms of employment – direct employment, temporary agency, third-party logistics firm (3PL) – are used to pit worker against worker (Warehouse workers and organisers, 2018).

However, just as unions can take advantage of competition between firms by playing one against the other, so workers up and down a supply chain can threaten to undermine a firm's ability to compete or to appropriate additional value at the expense

of others, while at the same time fighting for an increase in their share of the value they create and/or relief from onerous working conditions. The pressures of lean production methods and technology-driven labour intensification essential to contemporary competition provide an incentive for workers to take advantage of the vulnerabilities of today's tightened supply chains.

Time versus 'resilience'

By the early twenty-first century it was widely acknowledged that the very efficiency of JIT supply chains had made them increasingly vulnerable to disruption by IT failures, supplier or transport delays, natural disasters and labour disputes. A disruption to almost any firm in this constant battle to appropriate value, moreover, can have a 'ripple' or 'snowball' effect far beyond the facilities immediately affected (Jüttner, 2005:127–8; Swierczek, 2016:1002–34).

Consequently, a new field of 'supply chain *risk* management' (SCRM) arose after 2000 to assess and reduce the impact of potential disruptions (Waters, 2011:4–13; Sheffi, 2015:23–5; Stanczyk, Cataldo, Blome, & Busse, 2017:41–2; Fan & Stevenson, 2018:211). While SCRM advocates a return to 'just-in-case' spare capacity and multiple sourcing in the name of 'resilience', and some firms are beginning to take this advice, competition continues to make timeliness and leanness central factors in business success – and vulnerability (Waters, 2011:10–13, 95–6; Beesley, 2014:67–88; Sheffi, 2007:138–40, 179; Sheffi, 2015:129–57; Clott & Hartman, 2014:6).

More recently, in addition to JIT norms, 'time-based competition' has become central to supply chain operations (Christopher, 2016:135–9; Beesley, 2014:67–88; Fernie, 2014:303–6). These efforts to speed production downstream have led to fewer suppliers, single sourcing of materials, reduced spare capacity, and 'cross-docking' warehouses, all amplifying firm and supply chain vulnerability and potentially increasing the leverage of worker organisation. At the same time, speed of throughput has become a greater factor in the competition between warehouse operators. As one warehouse designer observed, 'There has been a trend towards goods moving through distribution centres rather than being stored in them, thus becoming "switching yards" rather than "holding yards" (Baker, 2006:208). This has been accomplished by the rise of cross-docking or, as one study put it, 'high speed' warehouses where there is little or no storage. These now compose almost half of all US warehouses and are viewed 'as being the future for warehousing' (Bartholdi & Hackman, 2017:219; Richards, 2014:10).

The potential rapidity of the impact on a JIT supply chain by a disruption, even at a single supplier, was demonstrated when, on 2 May 2018, fire closed a Michigan-based auto parts supplier that was part of Ford's JIT supply chain. As a consequence, by 9 May, Ford had been forced to close assembly plants in Kansas City, Missouri and Dearborn, Michigan that produced the model for which the missing part was essential. The disruption spread quickly beyond Ford causing BMW and Mercedes Benz also to halt production in their southern US plants. These shutdowns were expected to last for a number of weeks as companies scrambled to find alternative (competing) suppliers (Thibodeau & Naughton, 2018; Isidore, 2018).

Unions have sometimes taken advantage of JIT component delivery to win gains or organise workers in suppliers to major companies. For example, in 1998 long strikes by

two local unions of the United Automobile Workers (UAW) at GM plants in Flint, Michigan closed 25 GM assembly plants and hundreds of its suppliers, costing GM US$12 billion in sales and US$3 billion in profits. The strikers won their demands (Parker, 2017:187; Moody, 1998). In 2014, in a fight for union recognition, 70 UAW members struck at Chrysler Jeep's JIT brake and struts supplier Piston Automotive at 9:00 a.m., fully aware this would have closed down the Jeep assembly plant across town in a matter of hours. By 5:00 p.m. that day Piston gave in and recognised the union (Slaughter, 2012:15–16).

Not surprisingly, industrial action by dock workers, who are at the centre of the global economy *and* the entry point for the flow of imports of both intermediate and finished goods and materials inland, often through JIT supply chains, has a particularly powerful impact on the outcome of labour conflict (Fox-Hodess, 2017). The 2002 lockout of West Coast dockers that brought Pacific shipping to a halt, disrupted inland transportation including the GM-Toyota NUMMI plant, and cost the US economy US$2 billion a day is a frequently cited example of this power (Waters, 2011:231; Sheffi, 2007:505–1, 66–67; Bonacich & Wilson, 2008:112, 194; Olney, 2018:245). Less often mentioned was the impact of work-to-rule actions by members of the International Longshore and Warehouse Union (ILWU) on the Los Angeles-Long Beach docks during the protracted 2014 longshore negotiations which not only left 33 cargo ships idle off-shore, but delayed exports for weeks, increased inland transfers from two or three days up to four weeks, and cost retailers US$7 billion into 2015 – indicating that even action short of a strike can have a serious impact, at least at major 'chokepoints' in the global movement of goods and capital (Brenner, 2015:1, 3–5; Porter, 2015:4–5; Collins & O'Riley, 2015:1; Fox-Hodess, 2017:633, *passim*).

In the last decade or so, 'time-based competition' has been pushed even further by the rise of e-commerce, which by early 2018 accounted for 10% of retail sales, half of that by Amazon, with its same- or next-day delivery, increasing the intensification, quantification and standardisation of labour processes (Cowen, 2014; Michel, 2017; Waters, 2011:205; Dolliver, 2018). The technology that monitors the flow of goods also sets the pace and content of work. This is important not only in manufacturing and transportation but also in warehousing, due to its place in the overall process of value production and realisation. Inevitably, this collides with the physical, emotional and creative needs of the humans whose labour still composes 45% or more of warehouse operating costs despite relatively low wages (Richards, 2014:279–82; Cisco-Eagle, 2017). If, as Marx famously put it, the object of capital is 'the annihilation of space by time' (Marx, 1973:524), space and time, in turn, become global weapons in the hands of organised workers even in local workplaces.

Globalisation as material infrastructure and the burden of fixed costs

Globalisation has frequently been measured by international financial, trade and Foreign Direct Investment (FDI) flows, (e.g. see United Nations Conference on Trade and Development, 'World Investment Report', 2016:29). Such quantitative measures of money values can seem overwhelming. Indeed, this approach is one of the reasons so many argue that capitalism is in an era of 'financialisation'. As Ronaldo Munck has

suggested, however, 'By reducing globalisation to the hypermobility of finance and the famous time-space compression, dominant accounts strip the global of its social determinants and conditioning factors' thus overlooking the potential impact of 'local' action on these economic flows (Munck, 2008:20–21). From a working-class perspective, it is more strategically effective to look at globalisation, and for that matter the national economy, as the material networks of immobile and mobile constant capital, and the social relations inherent in them, that are the arteries along which labour moves the goods, services and real value of the economy. 'The global economy is thus based on the backbone of freight distribution', write leading transport geographers Rodrigue, Comtois and Slack (2017:72).

This transportation network, in turn, rests on massive accumulations of embedded infrastructure. As David Harvey puts it, 'The spatial mobility of commodities depends upon the creation of a transport network that is immobile in space' (Harvey, 1982:386). Or, more specifically, as US logistics guru Jossi Sheffi writes, 'Physical infrastructure dominates logistics investment' (Sheffi, 2012:60, 173–4). Along with the underlying infrastructure, warehouses themselves are capital intensive, with fixed costs amounting to about half of operating expenses (Ackerman, 1997:18). But it isn't just in immobile capital that investment occurs. The US railroad companies invest nearly US$20 billion a year in upgrading rail networks and equipment (Sheffi, 2012:155). Indeed, from 1992 to 2015 investment in transportation equipment grew by two-and-a-half times in value, nearly twice that in industrial equipment and almost five times faster than in information processing equipment (Bureau of Economic Analysis, 2016:6.13–6.21). In other words, logistics rests on a mass of embedded and mobile fixed capital costs, which is, in turn, a consequence of competition between the various logistics providers who make these investments.

From the perspective of working-class interests, organisation and actions, it is this capital-heavy infrastructure network that offers one of the greatest potentials for increased leverage and power. The embedded nature of much of this investment (ports, airports, warehouses, utilities, IT infrastructure, internal roads and rails) and the frozen routes of movement (Interstate Highways, rail networks, inland waterways) means that, unlike individual firms, the major clusters and their links are not able to relocate abroad or even elsewhere in the host nation. Logistics clusters and the firms rooted in them do compete for traffic by reducing costs through work intensification, low wages and investment in technology and infrastructure, but not by moving. As the Chicago regional planning agency wrote about Chicago's 'freight cluster', 'massive investments in the built environment have entrenched freight operation in the region' (Chicago Metropolitan Agency for Planning, 2012:4). At the same time, the high fixed costs of the owners and leasers of these facilities increase the cost of strikes or other worker actions. As political economist Anwar Shaikh writes, 'Capital-intensive industries will also tend to have high levels of fixed costs which will make them more susceptible to the effects of slowdowns and strikes' (Shaikh, 2016:751). While such actions have been relatively rare so far, the literature on risk management often points to 'industrial action', 'a wildcat strike' or 'labour strikes' as unpredictable disruptions 'designed to inflict maximum economic damage' (Sheffi, 2007:50–51; Waters, 2011:7).

Global supply chains versus clusters of workers and capital

Perhaps the greatest contradiction in the development of logistics in the early twenty-first century, however, is the emergence of huge concentrations of labour in urban-adjacent 'logistics clusters' that are at the centre of the movements of goods, information and capital. As supply chains have stretched across space, they have required major hubs or 'nodes' that sort out, transfer and direct goods along the 'spokes' and 'corridors' of transportation, information and money. At the heart of these clusters are transportation cross-roads and geographical concentrations of warehouses, intermodal facilities, ICT centres and sunk infrastructure that are the major chokepoints in the movement of goods and the circulation of capital. And all of these employ thousands of mostly manual workers.

In the USA, there are 61 such logistics clusters by one count (Rivera, Sheffi & Welsch, 2014:226). Most are located in large metropolitan areas and employ a highly diverse workforce of tens of thousands or more in a finite geographical area. The same study puts 85% of logistics workers in the USA in major metropolitan areas (van den Heuvel et al., 2013:19). For example, Metropolitan Chicago employs 160,000 workers in logistics jobs; Memphis' 'areotropolis' employs 220,000; 100,000 or more are employed in Los Angeles' 'Inland Empire' warehouses; Alliance, Texas's Logistics Park north of Fort Worth employs 93,000 workers directly or indirectly; and Louisville's UPS hub employs 55,000 (Organisation for Economic Co-operation and Development, 2012:203; Sheffi, 2012:238; Bonacich & Wilson, 2008:134; Kaoosji, 2018:214).

In the largest clusters, the majority of these workers are black and Latino and about a quarter to a third are women (Warehouse Workers for Justice, 2010:13; Reese & Struna, 2018:82–3). Many such jobs are based in the suburban counties of these metro areas, such as Los Angeles' Inland Empire and Chicago's Midwest Empire. Interviews with warehouse workers in the Chicago area and other evidence suggests that more and more of the workers who fill the facilities in these clusters live in these suburban counties (Warehouse workers and organisers, 2018; Warehouse Workers for Justice organiser, 2018). This has been part of both the 'filling-in' of the metro areas in the USA as the suburbs grew faster than central cities and the transformation of suburban areas from sites of 'white flight' to multi-racial and multi-ethnic places of residence between the 1990 and 2010 censuses (Frey, 2011).

By 2010, in 36 of the top 100 metro areas at least 35% of the suburban population was composed of 'minorities' according to a Brookings study by William Frey. While there is still segregation within and between suburban units, the picture of the 'chocolate city and vanilla suburb' no longer holds (Frey, 2011:1). As another Brookings study put it, 'demographic convergence within US metropolitan areas . . . is blurring the lines that have long separated cities and suburbs' (quoted in Berube, 2011:1). Table 1 shows the percentage of non-white residents of the suburbs of some of the largest metropolitan logistics clusters.

In effect, capital has recreated the concentrations of manual workers it sought to escape when production moved out of cities like Detroit, Cleveland, Gary and many others. It has also replicated the diversity of many of the urban working-class

Table 1: Minority population percentage of metro suburbs in major US logistics clusters 2010

Metro area suburbs % 'minority'
Los Angeles–Long Beach 66%
Riverside–San Bernardino (LA Inland Empire) 61%
Dallas–Fort Worth (Alliance Logistics Park) 41%
New York–Northern New Jersey 38%
Chicago–Naperville–Joliet 36%
Memphis 36%

Source: Frey (2011, Appendix A).

populations it sought to flee in favour of semi-rural settings. Here in these metro areas, in particular, lies the potential for new worker organisations. For one thing, surveys have long shown that African Americans, Latinos and women are more favourable to unions than their white (male) counterparts (Freeman & Medoff, 1984:26–30; Chang, 2003). For another, despite the long-standing decline of union membership in the USA, a number of the major metropolitan area logistics clusters still have large concentrations of union members from which to draw sources of support to organise the mostly non-union warehouse workers. This ranges from over half a million in the Chicago Metro area to more than a million in Los Angeles and its adjacent 'Inland Empire', and the New York–New Jersey cluster as well (Hirsch & Macpherson, 2018).

The convergence of transportation networks, embedded capital, large concentrations of manual logistics workers, diversity in the workforce and significant existing union membership in these changing metropolitan centres make them key strategic 'chokepoints' for the exercise of workers' and trade union power. These strategic centres of labour, of course, reach out across the rails, highways, airways and channels of information to the sites of much of the nation's goods and service production. If the clusters are chokepoints in the economy, the 'spokes' that form the links and corridors that carry the nation's goods and materials across supply chains are the paths to further organisation in both manufacturing and services. Location, space, time, embedded capital and the competition of firms give workers and their organisations the tools to reverse the fortunes of labour across much of the world.

Barriers to worker organisation

Although all the reorganisation, population relocation, new technology and changes in work organisation have contributed to potential workers' power and organisation, they have also been disorienting for both workers and trade unions. In addition, capital and its academic and industry advisers have, of course, become aware of many of the sources of vulnerability. Indeed, as noted, the relatively new discipline of SCRM emerged after the turn of the century to deal with the many risks of disruption. There

are also barriers to worker action in US industrial relations laws, and, as with any organising effort in the USA, aggressive employer resistance, legal and otherwise (Bronfenbrenner, 2009).

In addition, fragmentation of employment status is a problem with warehouse workers who may be employed by a retailer or manufacturer, the warehouse owner, a temporary employment agency, or a 3PL firm (Warehouse workers and organisers interviews, 2018; Warehouse Workers for Justice, 2010:13; Bonacich & Wilson, 2008:227–8). It should be remembered, however, that employment in other industries that were eventually organised, such as docking and meat packing, was highly precarious prior to unionisation (Winslow, 1998:5–6; Halpern, 1997:23–6).

As union strategist Peter Olney points out, chokepoints can shift in importance and disruptions of one chokepoint are not always enough to bring victory for a single union or organisation. Greater coordination and solidarity is called for. This has been particularly the case in efforts to organise the nation's 40,000 port drayage truckers, most of whom are classified as 'independent contractors' ineligible for union recognition under US labour law. He notes, for example, that the powerful International Longshore Workers Union has yet to use its power to consistently back the Teamsters' drive among port truckers (Olney, 2018, 249–53). The Teamsters union has been attempting to organise drayage drivers in the ports of Los Angeles and Long Beach since 1998. While a number of law suits have won many truckers 'employee' status, and 15 strikes in the last few years have clogged the port, winning some truckers union recognition, the union has yet to win recognition or employee status for the majority and many remain 'independent contractors' (Jaffe & Bensman, 2016:67–71; *Los Angeles Times* Editorial Board, 2018). Clearly, careful analysis of the relevant supply chain as well as greater support and coordination between unions will be needed to realise the potential power workers have and to organise the non-union sectors in the logistics networks.

Chicago: laying the basis for the future

There are efforts across the USA to organise various groups of logistics workers. One of the most promising is in the Chicago metropolitan region. The Chicago Metropolitan Area logistics cluster is the largest rail centre in the USA and the only one in which six Class I rail systems meet. Some 500 freight trains pass through the Chicago area every day. The region is also the juncture of seven major Interstate Highways. Its inland 'Midwest Empire' in the Chicago-Joliet-Naperville Metro area is home to the CenterPoint logistics park, 'the largest master-planned inland port in North America', opened in 2002, and two new intermodal rail yards in operation since 2002 and 2010 respectively (CenterPoint, 2018:1–2; Warehouse Workers for Justice, 2010:9; Warehouse Workers for Justice organiser, 2018).

The fastest site of growth in the Chicago metropolitan logistics cluster is suburban Will County with a total of 88 million square feet of warehouse space as of 2010, and where the giant 6,400-acre CenterPoint warehouse and intermodal complex is located (Warehouse Workers for Justice, 2010, 2017a). Its population grew from 502,255 in 2000 to 683,995 in 2015, while the proportion of whites fell from 82% to 66% over that period (Census Viewer, 2000; US Census, 2015). During those years, the number of

establishments in transportation and warehousing in the county rose from 447 to 1,130, while employment in that sector jumped from 4,542 to 16,610 (Census Viewer, 2000; US Census Bureau, 2015b).

It was in Will County in 2009 that Warehouse Workers for Justice (WWJ) was founded with the support of the United Electrical Workers as an independent non-profit 'workers centre' engaging in community-based pre-union work to 'teach workers how to organise to win improvements such as raises, paid sick days and holidays, better safety conditions and a voice in the workplace' (Warehouse Workers for Justice, 2017b). As well as two experienced organisers, WWJ has a 'Leadership Committee' of warehouse workers that directs its activities, such as workshops on workers' rights. Over the years, WWJ has helped workers win unpaid wages by 'a series of actions, external pressure and legal actions (that) got people their money.' WWJ members have used petitions in warehouses to gain more permanent jobs for those starting as temporary workers. Furthermore, WWJ actions 'pretty much stamped out' Wal-Mart's illegal practice of paying workers to load or unload by the truckload rather than by the hour (Warehouse workers and organisers, 2016; 2018).

In 2013, Will County workers struck at CenterPoint, Wal-Mart's massive warehouse, a number of times, disrupting the flow of goods. In addition, WWJ mobilised 1,000 supporters to close down the warehouse for a day. This series of strikes was part of a national set of walkouts at Wal-Mart warehouses that were eventually found to be legal by the National Labour Relation Board that oversees the main US labour laws (Warehouse workers and organisers, 2018; Layne, 2016). While strikes remain rare at the nation's warehouses, this finding was important for the future of organising in this sector.

One of the biggest gains for warehouse workers in Illinois was won when a coalition of unions and workers' centres, including WWJ, which brought warehouse workers to the state capital, succeeded in getting the Illinois State Legislature to pass 'The Responsible Job Creation Act in 2017'. This law, which will cover 850,000 temporary workers in that state, will require temporary agencies to help place workers in permanent positions as they become available which, by creating a more stable core workforce over time, will aid organising efforts. In addition, it will address problems of discrimination and health and safety when it comes into effect in June 2018 (Schrurke, 2017; Warehouse workers and organisers, 2018).

Although WWJ is not a trade union and does not engage in collective bargaining, by training workers in their rights and helping them to organise actions and win gains it is laying the basis for a higher level of organisation in the future.

Conclusion

Historian Eric Hobsbawm argued that the growth of labour movements does not come as 'a mere rising slope', but as 'waves' or 'leaps' produced by 'accumulations of inflammable material which only ignite periodically, as it were under compressions' (Hobsbawm, 1964:129–39). This has certainly been demonstrated in the USA in the labour upsurge between 1933 and 1939 when the industrial unions of the Congress of Industrial Organisations (CIO) were formed through mass actions and plant 'sit-down' strikes or occupations (Bernstein, 1969). Following the Second World War another

round of mass strikes in the USA followed, this time setting new patterns of wages and benefits between 1945 and 1950. Again, in the 1960s and 1970s, inspired by the civil right movement and sparked by 'speed-up' of work in major industries, workers' strike levels soared again bringing a working-class dimension to the general social upheaval of that period (Brenner, Brenner & Winslow, 2010). Internationally the same dynamic has been documented in the works of Silver, Kelly, Mandel, Cohen and others (Silver, 2003; Kelly, 1998; Mandel, 1995; Cohen, 2006). Silver, in particular, charted the rise and fall of labour unrest in the developed economies from the 1880s up to the 1990s, particularly as they were affected by wars (Silver, 2003:125–8). While such 'explosions' are usually unpredictable, they also have a pre-history characterised by the formation of a 'militant minority' of workers who play a leading role in any upsurge – a process that takes time. Each upsurge, in turn, has followed both changes in the nature of work, from the rise of the factory system in the 1880s, to the spread of Taylorism in the early to mid-twentieth century, to the post-Second World War speed ups. Today, workers across industries face the pressures of lean production and electronically driven work. Nowhere is this more forcefully evident than in the contradictory vortex of time-driven logistics.

The work of WWJ appears to exemplify this sort of preparatory organising. A WWJ organiser recently told a reporter that a spark was needed to ignite a wave of union organising in logistics (Allen, 2017). Nor is WWJ the only such project. Even though much of this work remains under the media radar and is, as yet, little studied in academia, there is reason to believe that a rebellion is brewing in the dense and contradictory logistics networks on which the USA and, indeed, the global economy depends. The changes in the organisation of production and distribution discussed in this article have created both the 'compression' in the forms of work intensification, low wages and economic insecurity that can bring action and the vulnerabilities that open new opportunities for the assertion of workers' power. Perhaps the spark is not far off.
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INTERVIEWS

Warehouse workers and organisers for Warehouse Workers for Justice interviews conducted at the 2018 *Labor Notes* Conference in Chicago, 7 April 2018.

Warehouse Workers for Justice organiser interview conducted during a tour of the CenterPoint logistics park and BNSF Intermodal Rail Yard outside Chicago, 11 April 2018.

Warehouse workers and organisers for Warehouse Workers for Justice interviews conducted at the 2016 *Labor Notes* Conference in Chicago, 3 April 2016.

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Unfree shipping:
the racialisation of logistics labour

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ABSTRACT

**The logistics revolution has transformed the ways that goods are produced and
transported around the world, producing numerous deleterious outcomes for
workers, including the deterioration of wages and labour standards, attacks on
unions, and the increase of precarious contingent labour conditions. A related,
yet underexplored, process related to the logistics revolution has been the role
of racialisation in further amplifying the deterioration of working conditions
across the global supply chain. In this context, this article explores how the
racialisation of labour impacts logistics workers in the greater Los Angeles
metropolitan region. Drawing on case studies of low-wage, non-union Latinx
workers in the warehouse and port trucking industries of Southern California, I
argue that racialisation has accelerated the negative labour impacts related to
the logistics revolution across these sectors.**

KEY WORDS

**racialisation of labour, logistics, unions, low-wage work, labour subcontracting,
supply chains, warehousing, trucking, ports, migrant and immigrant workers**

Introduction

Amazon, the world's largest online retailer, is both the fastest growing corporation in
the USA and the first public company to have reached a US$1 trillion market cap. A
key component behind Amazon's increasing power in the global economy is its
mastery of the logistical supply chain. The rise of Amazon, and other major retailers
such as Walmart (the largest private company in the world) is indicative of a broader
shift in global capitalism; namely, the 'logistics revolution', or the transformation in
the way goods are produced and transported around the world, which has increased
retail power in today's global 'just-in-time' economy (Bonacich & Wilson, 2008).
This shift, coupled with neoliberal economic policies and austerity measures, has
produced deleterious consequences for working-class people across numerous

industries, including the global logistics and warehouse industries (Alimahomed-Wilson & Ness, 2018).

The logistics revolution has propelled a shift in the global economy from the traditional mass production model to the current neoliberal flexible specialisation production system. A key innovation in the movement of goods and trade throughout the global shipping industry was the development of containerisation, which allowed for intermodal transportation of goods (i.e. the movement of goods between ship, rail and truck without ever having to unload or reload the cargo) (Alimahomed-Wilson & Potiker, 2017). Driven by a neoliberal supply chain management paradigm which promotes the efficient movement of goods (capital) through anti-worker policies and attacks on unions, the logistics revolution has contributed to an overall weakening of working-class power in the global economy. In addition, the normalisation of precarity, including within previously unionised logistics sectors, coupled with growing rates of contingent labour relations and casualisation, underemployment and misclassified employment statuses have become common throughout the global logistics industry. A related, yet underexplored, process connected to the logistics revolution has been the role of racialisation in further amplifying the deterioration of labour conditions. In this context, this article explores the ways that racialisation intensifies the labour exploitation process for logistics workers in the greater Los Angeles metropolitan region's supply chain. Drawing on case studies of low-wage, non-union Latinx[1] workers in the warehouse and port trucking sectors in Southern California, it analyses how racialisation has accelerated the negative labour conditions generally associated with the logistics revolution across these sectors.

Logistics and the transformation of Southern California's supply chain

In 2018, California surpassed the United Kingdom to become the fifth largest economy in the world.[2] Without a doubt, the logistics-driven economic transformation of the greater Los Angeles metropolitan region, which includes the largest port complex in the USA, has played a key role in California's economic growth (Bonacich & Wilson, 2008). While the changes associated with the logistics revolution transformed the economic landscape throughout much of the world, including the USA, Southern California serves as the preeminent US region where these changes have taken hold most firmly. Southern California's logistics industry, which employs over 600,000 logistics workers, generates approximately US$224.6 billion dollars of economic output annually, and on any given day, 1.6 million tons of goods travel throughout the region across various modes of transportation (Los Angeles Economic Development Corporation, 2017).

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1   'Latinx' (a gender neutral or non-binary alternative to 'Latino/a') refers to people of Latin American origin or descent. The majority of Latinx workers analysed in this case study are of Mexican origin or descent; in the Southern California port trucking sector in particular, workers of El Salvadoran origin or descent comprise a significant proportion in this sector.
2   http://fortune.com/2018/05/05/california-fifth-biggest-economy-passes-united-kingdom/. Accessed 2 November 2018.

The world's largest transnational corporate retailers, including Walmart and Amazon, are also heavily invested in Southern California's logistics and transportation infrastructure. Today, Amazon is the largest private employer in the Inland Empire region (which combines Riverside and San Bernardino counties) – one of the world's largest warehousing hubs. By 2019, Amazon will directly employ 20,000 employees in the region along with an additional 50,000 indirect employees in the state.[3] Amazon, along with its corporate e-commerce and retail competitors, relies on the exploitation of tens of thousands of low-wage, non-union, predominately Latinx warehouse and logistics workers. These workers comprise the vast majority of economically precarious workers in Southern California's logistics supply chain. In fact, nearly 80% of all workers in the Inland Empire's warehousing industry are Latinx, of whom about half are immigrants (Struna et al., 2012). Additionally, approximately 90% of port drayage (short-haul) drivers in the Los Angeles harbour area are Latinx. Without a doubt, Latinx workers, including a large number of immigrants, represent the primary blue-collar labour force in Southern California's logistics industry. It is not a mere coincidence that Latinx workers became the driving blue-collar logistics labour force given California's pre-existing racialised economic conditions that served to both structure and accelerate the negative labour outcomes related to the logistics revolution. This research draws on two case studies of Latinx workers in Southern California's warehouse and port trucking sectors in order to analyse the numerous ways racialisation shapes labour and working conditions in the logistics industry. The logistics revolution's transformation of the Southern California economy has relied upon the racialisation of labour which has contributed to the lowering of both wages and working conditions in these sectors, while simultaneously leading to higher rates of capital accumulation for large retailers.

The racialisation of labour

Omi and Winant (1994) define racialisation as the process whereby socially constructed racial attributes and meanings are projected onto a previously racially unclassified relationship, group of people or social practice. The racialisation process depends on the social, temporal and political forces shaping its formation. Racialisation is also multifaceted and can affect different racialised groups in varying ways and degrees, depending on a group's ascribed status position. Therefore, racialisation is a historically specific economic, political and social process, whereby a group of people is cordoned off for special, exclusionary treatment, typically based upon a combination of physical appearance, or ancestry. Racialised groups may also be defined as collectively underserving, or as threats to the dominant status group. That is, racialisation is a form of othering, its distinctiveness being its potential for harsher, and even permanent mistreatment (Gans, 2017). Finally, racialisation is linked to the denial of full

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3   https://www.businesswire.com/news/home/20181102005324/en/Amazon-Announces-14th-Inland-Empire-Fulfillment-Center. Accessed 2 November 2018.

citizenship rights to racialised groups, coupled with other forms of unequal or discriminatory treatment, such as xenophobia.

While the motivations behind racialisation are complex and varied, labour is a key site where racialisation processes occur. In 'The Racialization of Global Labor', Bonacich, Alimahomed and Wilson (2008) analyse the impact of the racialisation of labour by exploring the ways racialisation structures the working conditions and wages for hyper-exploited racialised workers in the Global South. They argue that the racialisation of labour plays a key role in globalisation by denying racialised workers basic citizenship and other commonly accepted rights. Racialised workers, they contend, can be subjected to excessively exploitative labour regimes and processes, often with little public outcry. Moreover, the racialisation of labour is typically linked to forms of unfree labour (Almaguer, 1994; Glenn, 2002). Indeed, corporations can benefit, whether directly or indirectly, from the racialisation of labour since higher profit margins can be extracted from low-wage racialised workers, who have limited recourse for defending themselves due to a lack of access to citizenship (including workers') rights. According to Glenn (2003), employers 'take advantage of existing inequalities by using groups (people of colour, immigrants, refugees, women, the poor, lower skilled workers, felons, and the less educated) that could be hired more cheaply' (80). Ironically, racialised workers are often blamed for the erosion of wages or working conditions.

Contingent employment arrangements are on the rise for all working-class people, but particularly for racialised workers. Racialised workforces, whether in the overseas production of low-cost goods for retailers, or those toiling in warehouses, are increasingly employed via arm's length relationships with parent companies, either through temporary staffing agencies or labour subcontractors. Contingent employment gives corporations the ability to avoid social, moral or financial responsibility for the oppressive conditions their contract labourers work under. Moreover, contract labour arrangements allow capital increased flexibility while simultaneously undermining union organising efforts. The increase in contingent employment relations becomes further magnified in racialised labour markets, such as in Southern California's port trucking and warehouse sectors.

A wide array of approaches has been adopted in racialisation research (Han, 2010; Murji & Solomos, 2005; Powell, 2012). Regarding the cause and effects of racialisation, Gans's (2017) survey of racialisation research identifies two competing approaches: first, racialisation as a cause of negative treatment; and second, negative treatment as an effect of racialisation. Gans identifies the perception of threat, real or imagined, by the dominant group as the primary cause of racialisation. Perceived threats include fear or threats to individual or group safety, along with the dominant group's collective worries about downward mobility, particularly those resulting from fears about racialised newcomers 'taking' their jobs for lower pay (346). Studies measuring the effects of racialisation typically rely on analyses of (mis)treatment. For the purposes of this research, I contend that the racialisation of labour was certainly *not* created by the logistics revolution, but rather, that racialisation as a process contributed to the further erosion of wages and working conditions for Latinx workers in Southern California's

warehouse industry and port trucking sectors. The general outcomes associated with the logistics revolution, namely, the increase in contingency and attacks on unions (Bonacich & Wilson, 2008) became further intensified in California's racialised economy. As a result, the hyper-exploitation of Latinx workers became embedded within the logistics labour system due to pre-existing racialised economic, political and social conditions, particularly those linked to immigration.

Sáenz and Douglas (2015) argue that immigration is a site of racialisation. They analyse the shift in the USA from 'ethnic immigrants' to 'racialised immigrants' over the past 50 years, the time period when non-European immigrants have become the primary groups of immigrants into the country. 'Racialisation is also a process', Gans (2017) argues, 'which generally begins with the arrival of new immigrants, voluntary or involuntary, who are perceived as different and undeserving' (342). In recent years, the racialisation of immigration has also re-emerged in US politics. For instance, President Donald Trump's 2016 presidential campaign reinforced a racialised dichotomy between 'good immigrants' (i.e. desirable white immigrants of European descent, such as Norwegians) and 'bad immigrants' (i.e. undesirable brown immigrants of Latin American descent, such as Mexicans). In this case, the racialisation of immigrant labour, particularly Latinx immigrants, cannot be detached from the broader racial meanings and connotations present. Other studies have examined the racialisation of labour as it relates to domestic work (Hondagneu-Sotelo, 2001), labour strikes (Bonacich & Wilson, 2008) and day labour work (Murga, 2012). Murga's (2012) research on the racialisation of day labour work demonstrates how day labouring takes place in racialised spaces and contexts. Murga also situates the ways race impacts not only the day-to-day work experiences of Latinx day labourers, but also how a worker's racialised immigration status can increase rates of unchecked exploitation. This analysis can be extended both to Inland Southern California's warehouse sector and to the Los Angeles harbour trucking sector, since both of these labour markets were structured within a similar racialised economic context.

Racialised immigrants also experience increased hostility and resentment (compared to their non-racialised immigrant counterparts) and are often scapegoated for social and economic problems (Sáenz & Douglas, 2015). The exploitation of foreign-born migrant and immigrant workers (non-citizenry), who collectively experience othering from members of dominant, native-born workers (citizenry), is related to the racialisation of labour processes. The racialisation of immigrant labour therefore becomes naturalised when infused with other forms of social, cultural and/or ethnic othering practices and policies, which reinforces xenophobia and/or nativism. Ultimately, racialisation contributes to the further splintering of workers along racialised lines (see Alimahomed-Wilson, 2016).

Below, I present two brief case studies examining the ways the racialisation process has functioned in Southern California's logistics industry. Beginning with the Inland Southern California's warehouse industry, located about an hour's drive from Los Angeles, and followed by the Los Angeles port drayage trucking sector, these case studies explore how the racialisation of labour can accelerate the impact of the logistics revolution by driving down wages and working conditions for racialised workers. I chose to analyse these sectors in particular because they represent two of the primary

logistics sectors in the Los Angeles supply chain that have high rates of the following outcomes associated with the logistics revolution: low wages, contingency and weakened unions and/or a majority non-union labour force (Bonacich & Wilson, 2008). The case studies draw upon a combination of primary and secondary data. Some of the interview data stems from my own qualitative research, which was originally collected in collaboration with Edna Bonacich, for our co-authored book, *Getting the Goods: Ports, Labor, and the Logistics Revolution* (2008). In addition, I also draw upon secondary data, particularly from labour reports and social scientific studies from leading scholars and labour organisations.[4] These brief case studies are not meant to be exhaustive in scope. Rather, they should be viewed as preliminary 'industry portraits' that provide the necessary socio-political context related to factors such wages, working conditions and demographics, in order to analyse the overall impacts of racialisation. I then utilise this information to assess how racialisation has impacted and structured labour conditions across these sectors.

The racialisation of warehouse labour in the inland empire

The Southern California region, with a population over 20 million people, is not only defined by a large regional consumer market but it is also located adjacent to the two largest ports in the USA. These factors helped accelerate the logistics-related transformation of the region. In fact, logistics jobs in trucking and warehousing represent the fastest growing job market in the Southern California region. Imported goods from Asia are moved across the vast Los Angeles region, starting from the ports, toward a massive rail and highway infrastructure network connecting the harbour area of Los Angeles County, to Orange County, and eastward to the Inland Empire warehouse region. The remaining goods that are not consumed by the regional consumer market (which amounts to about half) are transported to other major markets across the Southwest, or onward to Chicago's greater metropolitan area via the nation's rail, air and highway transportation networks.

Warehousing fulfils a central function in global supply chains. Goods must be unpacked, sorted, stored, repacked and sent out to their correct destinations in an efficient manner in order for the system to function. However, in the just-in-time era, warehousing involves far more than these basic functions (Bonacich & Wilson, 2008). It also entails value-added processes, such as simple assembly, checking for errors and correcting them, and making the goods store-ready. Therefore, warehouses and distribution centres serve as key components in logistics systems where the state of inventory is assessed, and from which replenishment orders are placed. Warehouse labour is often a fast-paced, dirty, physically demanding job that requires skills but typically lacks high wages or prestige. Modern warehouses are often located in places

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4   I am particularly grateful for the excellent scholarship and reports produced on Southern California's warehouse and port trucking industries, especially the work from the following experts: Edna Bonacich, Juan De Lara, Sheheryar Kaoosji, Ellen Reese and Jason Struna; and from the following organisations: The Los Angeles Alliance for a New Economy (LAANE), The National Employment Law Project, Warehouse Workers Resource Center and Warehouse Workers United.

where there is a shortage of alternative jobs, or where unions are weak, or non-existent. Warehouse work is treated as an unfortunate inevitability for workers with relatively low levels of education, particularly those who are further marginalised by racial, ethnic and immigrant backgrounds (Struna, 2015).

Over the past few decades, both capital and supply chains have become more concentrated. The key nodes in logistics systems today are mostly located on the outskirts of major urban metropolitan areas and depend on large concentrations of labour, most of it low-paid (Moody, 2017). Therefore, the logistics-driven transformation of Southern California was not solely an outcome of the region's transportation infrastructure, or its large consumer market, but also flourished due to the area's significant racialised workforce. Labour scholar, Kim Moody, contends 'these [new warehouse] clusters are based around large metropolitan areas and all draw on what you might call the "reserve army of labour" – mostly workers of colour who came into these warehouses in the last ten to fifteen years' (Alimahomed-Wilson, Fox-Hodess & Moody, 2018). Similarly, De Lara (2018) notes that global commodity chains transformed Southern California just as Latinxs and immigrants were turning California into a majority non-white state. Indeed, the transformation of the Inland Empire into one of the world's largest warehousing hubs coincided with broader demographic shifts in California. Thus, the impact of the logistics revolution in Southern California cannot be divorced from the broader socio-political context of Latin American immigration and the arrival of a new and significant racialised labour pool of low-wage workers. The Inland Empire exhibits all of these characteristics. In an effort to recoup some of the manufacturing jobs that were lost in the 1980s and 1990s due to neoliberal economic restructuring and outsourcing across the USA, Southern California, like many other regions across the country, turned to logistics (De Lara, 2013). Local politicians and cities aligned their interests with rail companies and major shippers such as Amazon, Walmart, Target, Kohl's, Home Depot and other corporations by building an extensive logistics network starting from the ports of Los Angeles and Long Beach and onward across the region's freeways, rail lines, airports and warehouses (De Lara, 2013). Over the next few decades, economic projections indicate that there will be a further increase in the quantity of goods circulating throughout the Southern California supply chain. This means that we can expect that many more massive warehouses will be built in the region, although they will probably continue to be pushed even further inland (eastward). An important exception to this trend has been the growth of 'last touch', or 'last mile' warehousing, a shift generally associated with the growth of e-commerce. Last touch warehousing represents the reintroduction of (smaller) warehouses back into urban areas, which makes product-to-doorstep consumption more efficient, as supply chains become increasingly extended closer to a consumer's place of residence.

As noted earlier, racialisation can magnify other aspects of the labour exploitation process, including the further deterioration of working conditions, increased susceptibility to wage theft, higher job turnover rates, poverty wages and the normalisation of precarious labour conditions, which, in the case of warehousing jobs, are correlated with contingent third-party employment arrangements. According to Cho et al. (2012), 'Case studies of logistics facilities confirm the relationship between

contracting, subcontracting and a high representation of Latino workers'. Contingency, especially in racialised labour markets, therefore not only increases the flexibility and control of capital but also simultaneously undermines unionisation efforts. Thousands of blue-collar warehouse jobs scattered across the region are defined by such conditions. De Lara's (2013) report, 'Warehouse Work: Path to the Middle Class or Road to Economic Insecurity?', found that when controlling for job type across the warehousing sector in the Inland Empire, the industry's claim that the average blue-collar warehouse worker earns roughly US$45,000 a year is a myth. The *actual* median income for all warehouse jobs is US$22,000 a year. Approximately, one-third of these warehouse workers are Latinx women, who on average are the lowest paid of any group of warehouse workers. Latinx women earn approximately US$4,000 less than their male counterparts. This points to the intersection of the racialisation of labour with gendered divisions of labour in the warehousing sector. As Bonacich, Alimahomed and Wilson (2008:342) note, 'Racialised labour systems are gendered, creating a complex intersection of race-class-gender divisions among workers. All women face a gendered division of labour, but women of colour face especially onerous pay and poor working conditions'. Allison, Herrera, Struna and Reese's (2018) study of earnings inequality among Inland Southern California's warehouse workers found that Latinx immigrant women are disproportionately employed in the low-wage packing warehousing jobs. They describe this intersectional exploitation process as a 'matrix of domination', whereby gender and citizenship status significantly impact the annual incomes of warehouse workers, with Latinx immigrant women earning far less than other warehouse workers. Thus, Southern California's warehouse industry is largely defined by the poverty-level wages paid to its mostly Latinx workforce, with contingent Latinx women representing the lowest earners of any group.

Aside from logistics, California's temporary employment industry grew by 35% from 2010 to 2015, making it one of the state's fastest growing industries (Kirkham, 2015). According to Cho et al. (2012), the rapid acceleration of domestic outsourcing across the logistics industry, defined by the practice of subcontracting out warehousing, transportation and goods delivery to third-party firms, has lowered the quality of jobs in Southern California, disproportionately harming Latinx workers. 'Not coincidentally, the same industries that implement contracting-out and employ vulnerable workers, many of whom are Latino, frequently also have the highest rates of workplace violations of core labour standards' (Cho et al., 2012:16). It is important to note that reports on 'industry wage averages' typically fail to consider the fact that the majority of warehouse workers are temporary workers, including seasonal workers, and are therefore not the direct employees of large shippers like Amazon and Walmart (De Lara, 2013). In Southern California, Latinx warehouse workers are most likely to be employed via temporary staffing agencies. Contingent, temporary workers are also the lowest paid workers in the industry.

Over 60% of the Inland Empire's warehouse jobs are employed via temporary staffing agencies. This means there are approximately 30,000 temporary workers present in the Inland Empire's warehouse industry (see De Lara, 2013). On average, contingent warehouse workers, including seasonal temporary workers, earn about US$10,067 per year, which amounts to less than half of their non-contingent

counterparts' annual earnings (De Lara, 2013). A reason for this imbalance is the limited number of hours available for temporary workers (both weekly and seasonally). Contingent warehouse workers face alarming rates of underemployment, which allows employers to avoid paying health benefits, further contributing to the overall economic precarity for workers in the industry. The rise of contingent labour is also associated with greater reliance on undocumented workers (Cho et al., 2012). Thus, contingent labour practices disproportionately impact racialised workers. The 'use of undocumented warehouse workers facilitates wage repression and mistreatment of workers in this industry' (Cho et al., 2012:2). Indeed, undocumented warehouse workers face alarming rates of workplace violations, including illegal retaliation by management when they complain about unsafe working conditions or participate in union organising efforts (Cho et al., 2012). De Lara (2013) sums up the impact of underemployment for temporary workers:

> Approximately 70% of all temp workers in warehouse occupations reported working less than 40 weeks (roughly less than 10 months) out of the year. When they did find work, close to 40% of temporary workers in warehouse occupations reported working less than 30 hours per week. The combination of low wage occupations and underemployment results in wages that fall far below the industry average (De Lara, 2013:4).

The racialisation of labour not only contributes to wage repression and higher rates of precarious contingent employment, including underemployment, but the process also accelerates an overall deterioration of working conditions. Historically, racialised workers have been over-represented in the dirtiest, most hazardous, dangerous and backbreaking jobs, which can also lead to an inordinate exposure to environmental hazards. Bullard (1990) documents the ways racialised workers are disproportionately exposed to workplace environmental hazards, an outcome of 'environmental job blackmail'. Indeed, in terms of unequal exposure to toxic air pollution, the goods movement sector disproportionately harms working-class Latinx communities which are clustered around many of the warehouses in the region.

The working conditions for thousands of predominately Latinx warehouse workers also replicate many of these general trends. According to the (2011) report, 'Shattered Dreams and Broken Bodies: A Brief Review of the Inland Empire Warehouse Industry', which surveyed 101 current and former warehouse workers, it is common for warehouse workers to face dangerous working conditions (Warehouse Workers United and Deogracia Cornelio, 2011). First, warehouse workers are regularly exposed to toxic and hazardous chemicals in the workplace. According to the report, approximately half of the workers surveyed reported that they were exposed to chemicals, and nearly 40% reported either getting hurt or feeling ill due to chemical exposure (Warehouse Workers United and Deogracia Cornelio, 2011:2). Second, pollution emitted from exhaust fumes emanating from diesel trucks and forklifts is ever present on the loading bays, exposing workers to hazardous air particulates that cause headaches, nosebleeds and other health maladies.

Additionally, workers reported adverse reactions to accumulated dust that often covers shipping boxes as they enter the warehouses. The dust can consist of rubber from forklift tyres, a variety of substances released during the unloading of

international shipping containers, and/or a myriad of particles that accumulate while boxes are stored on racks for months at a time. Such dust makes working difficult (Warehouse Workers United and Deogracia Cornelio, 2011:3).

In addition to exposure to caustic chemicals, many warehouse workers in the Inland Empire must deal with extreme heat, particularly challenging for workers who unload heavy boxes from trucks or pallets, sometimes containing boxes upwards of 200 pounds (90.7 kilos) inside the shipping containers. The average temperature for the month of August in San Bernardino County, where many of the warehouses are located, is 96 degrees Fahrenheit (35.5 Celsius). Inside the shipping containers, the temperatures are even higher. Extreme temperatures, coupled with irregular access to drinking water and bathroom facilities, long hours and physically demanding working conditions, regularly produce injuries, fatigue, illnesses and exhaustion for countless warehouse workers, most of whom lack health care insurance.

Finally, workers report high incidents of ergonomic injuries from overexertion and a host of injuries associated with repetitive stress, resulting from the frantic pace of warehouse work (Warehouse Workers United and Deogracia Cornelio, 2011). Over one-third of the warehouse workers surveyed reported ergonomic injuries, which were caused either by performing repetitive tasks, or in a single incident, where a worker was hurt due to lifting a heavy object. The management-by-stress model, present in Amazon's warehouses around the world, also creates alarming levels of mental anguish (see Amazon Workers and Supporters, 2018). Workers toil under constant pressure, which is exacerbated by the use of performance quotas and speed-ups (Warehouse Workers United and Deogracia Cornelio, 2011).

Warehouse workers' resistance

Although the Southern California warehouse industry is demarcated by the racialisation of labour, workers continue to fight back against many of the deplorable conditions present in the warehouses. For these workers, there have been numerous important victories, as well as some defeats. Reese and Struna (2018) analyse the exploitive labour conditions present in the warehouse industry in Inland Southern California while also highlighting warehouse workers' efforts in fighting back, including the Warehouse Workers United campaign (WWU). Since 2008, warehouse workers in the Inland Empire have organised and fought to improve their working conditions, involving a series of workers' strikes and other collective actions, culminating in a 50-mile (80.5 kilometre) march by Walmart's contracted warehouse workers. This worker action, called the 'Wal-March', accompanied a series of legal complaints filed by workers against Walmart and its third-party contractors and logistics providers (Reese & Struna, 2018). WWU's efforts won millions of dollars of back wages for warehouse workers who experienced labour law violations and contributed to the passage of a new state law to better regulate the industry. Together with other members of the 'Making Change at Walmart' campaign, WWU members also obtained an agreement with Walmart to improve its safety standards and to better monitor the labour conditions of its contractors. Warehouse workers' organising efforts remain ongoing and represent a key workers' struggle in the global supply chain (Reese & Struna, 2018).

The rapid growth of the Inland Empire's warehouse industry is the outcome of a complex combination of economic, social and political forces. The changes in global production and distribution systems, resulting from the logistics revolution, created the structural conditions that have helped to transform Southern California's Inland Empire region into one of the world's largest warehouse hubs. However, the process of racialisation provided an additional context that ultimately intensified contingent employment relations and the exploitation process. The following section examines how the racialisation process contributed to the further erosion of wages and working conditions in the Los Angeles harbour port trucking sector following the deregulation of the trucking industry.

Deregulation of the Los Angeles port trucking sector

Port drayage is a logistics-related subsector of the trucking industry. Drayage is a term used in the logistics and shipping industry to describe the process of transporting goods, typically, in the form of containerised shipping containers, short distances from the port to a rail yard. For decades, the trucking industry in the USA, including the port drayage sector, was regulated by the federal government. However, the Motor Carrier Act of 1980 ended government regulation, producing a significant impact on unionisation rates in the US trucking industry. The Motor Carrier Act of 1980 led to a reduction in the Interstate Commerce Commission's (ICC) regulation of the industry, resulting in an increase in the number of trucking firms, which had more than doubled by 1987. Restrictions on entry into the industry were also lightened and discount rates were permitted. While the non-union TL (truck load) sector grew rapidly, the unionised LTL (less than truck load) sector declined. The driver workforce also grew from 1.1 million truckers in 1978 to 1.9 million in 1996, although there was an overall decline in union membership. Deregulation also led to the withdrawal of labour agreements, including the National Master Freight Agreements (NMFA), which had previously supported national bargaining (Belzer, 2000). Talley (2004) found that the number of truck drivers grew from an average of 919,000 during the government regulation era, to approximately 3,911,000 following deregulation. The wages of truck drivers plummeted following deregulation. On average, weekly real wages dropped from US$579.21 to US$502.86, and hourly wages dropped from US$12.07 to US$10.66. Prior to deregulation, port trucking was a unionised sector largely represented by the International Brotherhood of Teamsters (IBT). IBT Local 692 represented all drivers in the Los Angeles harbour area and union drivers made approximately US$12.50 per hour on top of other fringe benefits. During this time, port truckers earned a decent wage, but by 1985, the Teamsters had 'lost the harbour' (Bonacich & Wilson, 2008).

Local carriers were also undermined as a result of these changes, since after it had been enacted the major shippers could refuse to accommodate requests for pay increases, which had been the standard protocol during the regulatory era. As competition between local carriers increased, wages fell even further. This led to the undercutting of wages by new local trucking firms and an increase in contingent labour defined by the misclassification of port truckers as 'owner operators'. Therefore, deregulation fundamentally changed the dynamics of the industry. For the Los Angeles harbour region, in particular, deregulation provided the institutional context that

allowed the racialisation process to take hold across the port trucking sector. Today, port (drayage) trucking jobs throughout the Southern California harbour area typify racialised labour conditions that have been described as 'sweatshops on wheels' (see Belzer, 2000) as port truckers are now considered contingent workers (Bonacich & Wilson, 2008). Instead of having steady employment, their work has been outsourced.

According to a study by Sears (2018), independent contractor drivers work an average of 59 hours per week, which produces an average annual income of US$28,783 (Sears, 2018:42). Although they appear to be independent small businesses who arrange for work with a drayage company as independent contractors, the reality is that these drivers are actually misclassified employees of drayage companies. Since they get paid in a single lump sum for the job, and have to take care of all of the costs of the job themselves, drayage companies no longer have to pay these added costs. Monaco and Grobar (2004), who conducted a study of port truckers in Southern California, describe the job situation of the drivers as follows:

> Though most are owner operators, they do not typically operate within their own authority – they contract with harbour drayage companies. Given that these drayage companies typically do not have any employee drivers, they seem to serve as brokers, linking drivers and loads. Port drayage drivers are dispatched by the firms and proceed to the terminal where the load is to be picked up or dropped off. Though some terminals at the Port of Long Beach have appointment systems it is typical that these are not used (or only used for the first trip of the day). The driver waits for the proper load inside the terminal and is provided this load on a chassis that is typically owned or arranged by the ocean carrier. The driver then leaves the port and delivers the load (typically to a local destination). (quoted in Bonacich & Wilson, 2008:312)

Within 5 years of the passing of the Motor Carrier Act of 1980, the new system of contingent independent contractor drivers, the majority of whom were immigrants from El Salvador and Mexico, had become normalised, with drayage drivers quickly becoming among the lowest paid workers in the region (Kaoosji, 2018). Therefore, within Los Angeles' racialised economic context, the overall impact of deregulation was intensified due to the process of racialisation.

Sheheryar Kaoosji (2018), co-executive director of the Warehouse Worker Resource Center, sums up how the process of using contingent, misclassified drivers coalesced with broader demographic changes in the Southern California harbour workforce:

> As Southern California changed with the influx of Latinos in the 1980s, the workforce also changed. Central American men, in particular, flooded into the sector and created a culture able to simultaneously contain, on one pole, individualism and entrepreneurism, and at the same time fierce and radical solidarity exhibited through regular wildcat strikes. These occurred despite the fact that as independent contractors, any form of collective action by drivers was legally actionable collusion. (Kaoosji, 2018:218)

The combination of neoliberal attacks on the unionised trucking sector, via deregulation, coupled with a significant wave of Latinx immigration, thus provided the

structural conditions contributing to a rapid process of racialisation of port trucking labour in the Los Angeles harbour area.

The racialisation of labour in the port trucking industry

In the years preceding deregulation, Southern California's drayage drivers were not racialised workers. In fact, most port truckers were unionised, native-born, white male workers. These unionised workers made decent wages and worked under tolerable working conditions. As noted earlier, presently over 90% of the Los Angeles harbour area's 16,000 port truckers – or 'troqueros' as they are more commonly referred to – are from Central America, mostly from El Salvador (Bonacich & Wilson, 2008). Drivers of Mexican descent comprise the next largest ethnic group of Latinx drivers, making up approximately 10% of the total workforce (Bonacich & Wilson, 2008). The majority of port truckers are not undocumented workers, in large part due to licensing requirements; most are either citizens or have green cards. Despite this, drivers experience labour conditions that combine poor wages and working conditions. The deterioration of working conditions in the port drayage sector has been further amplified by the misclassified employment statuses of these drivers, which has also further undermined collective action efforts and fuelled a race to the bottom. Following deregulation in the early 1980s, a wave of Central American immigrants entered the labour force. By 1983, about 10% of the workforce was Central American (see Bonacich & Wilson, 2008). Ernesto Nevarez, a long-time port trucker organiser in the LA harbour area, describes the process of how the sector transformed after deregulation from a white majority unionised workforce to today's non-union majority Latinx workforce:

> . . . in 1983–84 you have the Central American conflicts. In 1983, 5–10 percent of the work force [in LA's drayage industry] was Central American . . . The immigrants worked their asses off and brought down the standards. They didn't mind a 36-hour tour of work. The expansion of landbridge [cross-country intermodal freight shipment, typically via rail] at this time led to the exodus of the first and second generation, and the rise of the Central Americans. A padrino would bring you in. These were the 'caciques'. (Bonacich & Wilson, 2008:212)

'Cacique' is a term that Latinx drivers use to describe the absolute worst employers who exhibit tyrannical employment practices in the harbour area. Over a period of a few years, the workforce became racialised, and most of the white native-born drivers left the industry. The drayage companies shifted to employing more owner-operators (or independent contractors), further displacing union drivers. This led to a proliferation of smaller firms, resulting in increased competition. The basis of pay shifted from hourly to a piece-rate, per load arrangement (see Milkman & Wong, 2001). Moreover, the process of racialisation also undermined multiracial class solidarity in the goods movement sector. In 1985, the Teamsters called for a port trucking strike on the US West Coast, but it was unsuccessful. At that time, many of the Central American drivers, particularly those who were undocumented, were suspicious of the union due to issues related to green card requirements. Nevarez recalls, 'The Teamsters thought they were still living in the 1970s, when people wouldn't cross a picket line. They blamed the Latinos' (Bonacich & Wilson, 2008:312). By 1984, the industry was approximately half Latinx and half

white. Many of the white drivers blamed Latinx drivers for undercutting their jobs and the erosion of the industry. By 1985, most of the white drivers had left the port trucking sector entirely and the Latinx presence doubled between 1984 and 1986. Today, port drayage drivers remain misclassified in terms of their employment status, which has furthered eroded wages and working conditions in the harbour. The misclassification of drivers also means that they now have to work longer hours, and shoulder increased expenses, such as fuel costs and other expenses related to maintaining their rigs. Previously, these costs were paid for by trucking companies. However, these conditions have also spawned waves of resistance by the drivers (see Kaoosji, 2018).

Port truckers' resistance in the ports of Southern California

There is a strong tradition of Latinx-led labour militancy in the Los Angeles harbour area. Port drivers have organised numerous wildcat strikes in the struggle for fair wages and against mistreatment and poor working conditions, conditions that are directly related to their misclassified employment status. In recent years, there has been a joint effort by the Teamsters and the Los Angeles Alliance for a New Economy (LAANE) to challenge the misclassification of port truckers. Kaoosji (2018) documents that in 2011–12, the Teamsters set out to organise one of the biggest employee-based companies at the Port of Los Angeles, Toll Global, thereby establishing the first union contract in decades. Following this, in order to address the vast majority of drivers who remained misclassified as independent owner-operators, the Teamsters and LAANE formally challenged the independent contractor employment model's legality. This resulted in gaining a determination of drivers as employees at the California Labour Commissioner's Office in 2012–13. By 2017, thousands of port truckers had been involved with claims of misclassification through the California Labour Commissioner, most of which resulted in determinations of employee status. This led to payouts of thousands of dollars in back wages and illegal deductions owed to drivers (see Kaoosji, 2018). Today, Southern California's port trucking industry remains an ongoing site of struggle.[5] In October 2018, over 300 port truckers went on strike in front of warehouses serving the ports, protesting the misclassification of drivers as owner-operators.

In summation, the deregulation of the port trucking sector produced numerous challenges for organised labour ultimately leading to the elimination of union driver jobs in the harbour. As competition between private trucking firms increased, a large pool of low-paid, Latinx immigrants entered the labour market, contributing to a racialisation of the workforce. Thus, the broader racialised economic factors present in Los Angeles at the time propelled the rapid acceleration of forces associated with the logistics revolution, such as increased contingency and the weakening of unions.

Conclusion

As one of the world's largest logistics sectors, Southern California's supply chain has been restructured by global capital. Despite California's massive economy and a recent

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5   https://www.latimes.com/business/la-fi-port-truckers-strike-20181001-story.html.

record low in the state's unemployment rate (4.9% in November, 2017),[6] the state has the highest poverty rate in the USA, with nearly 8 million Californians (nearly 20% of the state's population) living in poverty.[7] Latinxs comprise the majority (59%) of California's working poor.[8] Therefore, in order to fully understand the impact of the economic transformation of labour throughout the region's logistics sector, it is crucial to contextualise how racialisation amplifies the conditions that harm workers. The case studies explored in this article provide insights into the role of racialisation in accelerating the oppressive economic conditions connected to the logistics revolution. In each case, racialisation has played a defining role in providing a large pool of low-wage workers, along with an unchecked erosion of working conditions, across Southern California's logistics supply chain. Racialisation magnifies rates of contingency and overall economic precarity, particularly for racialised Latinx workers in the port trucking and warehouse sectors. The racialisation of labour has therefore played a key role in the growth of Inland Southern California's warehouse industry, by subsidising the rapid growth of the logistics industry and further enhancing the structural position of capital. Moreover, the racialisation of labour has further undermined the ability of racialised workers to achieve decent wages and working conditions and weakened class solidarity between dominant groups of workers and racialised workers. As evidenced in the port trucking sector of Southern California, the harbour trucking industry was also transformed, via deregulation, in the 1980s, which provided the economic context for the racialisation of the workforce to flourish. In just a few years following deregulation, the harbour trucking industry was transformed from a previously unionised, majority white trucking sector to a non-union, majority Latinx industry.

While the case studies examined in this article are not generalisable, and must be contextualised within the specific racialised economic conditions inherent in Southern California, similar conditions are likely present in other logistics sectors in other parts of the world. Indeed, the scapegoating of immigrant/migrant workers remains an unfortunate reality in numerous countries and regions. In the United Kingdom's warehousing sector, in particular, foreign born migrant/immigrant workers, particularly those from Romania and Poland, are disproportionately employed in low-wage warehouse jobs. These workers not only face language barriers, but occupy high rates of subcontracted labour positions making them especially vulnerable to precarious living standards in the warehousing industry.[9] Similarly, scores of low-paid, non-unionised Eastern European truck drivers are working in the United Kingdom.[10] These cases may warrant future research on the role of the racialisation of logistics

6   https://www.usnews.com/news/best-states/california/articles/2017-12-22/california-unemployment-rate-falls-to-46-percent. Accessed 2 November 2018.
7   https://www.sandiegouniontribune.com/opinion/the-conversation/sd-california-poverty-rate-20180913-htmlstory.html. Accessed 2 November 2018.
8   https://www.ppic.org/publication/the-working-poor-in-california/
9   https://www.cbsnews.com/news/inside-an-amazon-warehouse-treating-human-beings-as-robots/. Accessed 2 November 2018.
10   https://www.theguardian.com/commentisfree/2016/aug/02/industrial-failure-uk-lorry-trade-truck-driver-squalor-low-pay-no-unions. Accessed 2 November 2018.

labour in accelerating some of the deleterious economic consequences associated with the logistics revolution in countries such as Canada, the UK, Italy (Benvegnù & Cuppini, 2018), France, Spain and other countries, particularly where there are growing numbers of migrant and immigrant workers employed in low-wage logistics jobs.
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On the last mile:
logistical urbanism and the transformation of labour

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ABSTRACT

In recent years, the last mile of delivery has become a crucial focus of
logistical operations in urban contexts due to the rise of online shopping
and the spread of platforms including Amazon to Foodora, Deliveroo and
others. This article claims that the increasing importance and time-sensitivity
of delivery reconfigures both urban spaces and labour relations. Through
an analysis of labour relations in different segments of last mile delivery it
argues that we are observing profound changes driven most importantly by
digital technologies and the hyper-flexible employment relations facilitated
by online platforms. Labour on the last mile is increasingly characterised by
intense time pressure, standardisation, algorithmic management and digitally
enabled surveillance on the one hand, and platform-driven precarisation and
flexibilisation on the other. These developments can also be observed in
other areas of logistical labour and across different industries. Hence, labour
on the last mile might be understood as a specific but important expression
of a broader tendency of the transformation of labour in digital capitalism.
At the same time, the new importance of the last mile also signals changes
in the production of urban space in the context of platform-driven forms of
production, circulation and consumption, that are discussed as an emerging
logistical urbanism.

KEY WORDS

delivery, labour, last mile, platforms, gig economy, digital Taylorism, logistics,
urban space

Introduction: delivery from the air

If one wants insights into the future plans of secretive corporations such as the retail and logistics giant Amazon, it is sometimes surprisingly helpful to analyse the patents filed by these corporations. One of the most spectacular filings by Amazon is a patent for an 'Airborne Fulfilment Centre utilizing unmanned aerial vehicles for item delivery' (US Patent 9305280 B1, 2014). The patent describes a flying distribution centre, designed as an airship, that hovers at an altitude of approximately 45,000 feet. This airship takes over the function of the infamous warehouses run by the company on the outskirts of many bigger cities. As a flying distribution centre, it is designed to circle over populated areas and function as a base for autonomous drones, delivering to private customers in the area below. Smaller airships ('shuttles') are to be used to replenish the flying Fulfilment Centre (FC) with inventory and transport workers to and from their airborne workplace.

While further steps to implement this spectacular idea remain to be seen, the development of delivery drones is in full swing. On 7 December 2016, Amazon delivered its first commercial package via drone to a customer on the outskirts of Cambridge, UK. According to Amazon, the delivery by the autonomously operating drone took 13 minutes 'from click to delivery' (Hern, 2016). It was part of a private trial only open to two customers in the Cambridge area, where Amazon had been testing drone delivery since the summer of 2015. Besides high costs, legal aviation restrictions are currently amongst the biggest obstacles to automating the last mile through commercial drones in most countries. These restrictions, however, have not prevented Amazon and a range of other corporations, such as Wal-Mart, DHL, Maersk and Google from investing heavily in the development of such systems.

The reasons for this are not hard to comprehend. With the increasing importance of online commerce and the app-based ordering of almost everything, the requirements of capacity, speed and flexibility on the so-called last mile of delivery have grown exponentially in importance. The last mile of deliveries to customers has become a site of extreme competition between a number of companies and the focal point of a far-reaching transformation that does not only include patterns of consumption but also profoundly impacts labour and the production of (urban) space.

This article focuses on labour on the last mile in the context of a developing logistical urbanism. In spite of all attempts at automation, the last mile remains one of the most labour-intensive sections of logistical operations. Labour on the last mile is situated at the intersection of an expanding logistics industry and the so-called gig economy, and therefore provides a crucial entry point into the analysis of the current transformation of production, circulation and consumption. Situated at one of the most important and most expensive points of supply chains, labour in the delivery sector has increasingly become subject to intense pressure and been characterised by flexible and precarious labour arrangements for decades. At the moment, however, it is subject to dynamic changes. The contribution highlights two central aspects. First, it concentrates on new forms of the organisation and control of labour by means of digital technology. As in other areas of work, delivery labour is increasingly characterised by forms of algorithmic management and new technologies for standardising and measuring labour

as well as intensified surveillance. This development will be analysed as part of an emerging labour regime analysed as digital Taylorism. Second, while the labour process is increasingly standardised, the contractual and legal parts of the labour relation have become subject to further flexibilisation. The logistics sector, and delivery in particular, has increasingly become a sector characterised by outsourcing, subcontracting and flexible labour contracts. With the emergence of the gig economy, however, this process has been amplified and intensified. As many important corporations of the gig economy such as Uber, Deliveroo or Foodora operate in the sector of delivery and transportation, platform labour has become an important tool in a sector that is already transforming labour relations in the industry.

I will argue that these tendencies – the digitally enabled standardisation and intensification of the labour process, as well as the platform-driven flexibilisation and precarisation of labour relations – need to be understood as interrelated processes that can be analysed in the delivery sector as a paradigmatic and advanced example of a transformation of labour that can be seen in many areas of logistics as well as within the broader social division of labour. Furthermore, I argue that an analysis of the delivery sector does not only provide insights into current transformations of labour but also into the city as a space of production and reproduction. The army of bike and car couriers is one very visible expression of a new logistical urbanism, whereby logistical operations move from the industrial parks on the city's outskirts into their centres. Same-hour delivery and app-based ordering are re-calibrate the city 'as integrated service platform' (Lyster, 2016:13), whereby time becomes the most critical attribute of spatial production.

To start, the next section explores the rise of logistics to a position in which it has become a central discipline of contemporary capitalism and sketches its digitally driven saturation of urban spaces as the expression of a new logistical urbanism. The following section moves on to the last mile and describes the increased importance of this part of the supply chain in the context of online commerce and the rise of digital platforms. The analysis of labour on the last mile starts with a description of the impact of the digital technology used to standardise, control and intensify labour using the example of the drivers who navigate United Parcel Service of America's (UPS) famous brown vans. The following section concentrates on the flexibilisation of labour and the new possibilities emerging through the platform-based organisation and control of work in companies such as Deliveroo and Amazon Flex. In conclusion, I will argue that the developments observed on the last mile might provide insights into broader transformations of the world of labour.

The rise of logistics and the emergence of logistical urbanism

In recent years, logistics has become the subject of a broad critical debate spanning disciplines including sociology, geography, architecture and political economy (see e.g. Bonacich & Wilson, 2008; Neilson, 2012; Cowen, 2014; Grappi, 2016; Lyster, 2016; Rossiter, 2016). A starting point of these debates, which I share, is the argument that logistics has moved into the centre of global capitalism over the last 70 years (Altenried, 2016). The 'logistics revolution' starting in the 1950s and 1960s – 'the most

underinvestigated revolution of the twentieth century', as geographer Deborah Cowen puts it (Cowen, 2014:23) – is understood as the advent of a development which is not only a transformation of an industry but, more importantly, of capitalism itself.

In the context of this transformation, the physical circulation of commodities is growing in strategic importance for capital. Replacing the notion that transportation is a necessity following production, logistics comes to be understood as a paradigm referring to the integrated management of the whole supply chain, encompassing the entire cycle of production, circulation and, increasingly, consumption as something to be planned and analysed. This shift in perspective elicited the principle of modern logistics and set the changes in motion that are subsumed under the term 'logistics revolution' (see Bonacich & Wilson, 2008:3). The further integration of production, circulation and consumption can also be identified as a central practical effect of the logistics revolution.

This process entails, among many other things, a shift of power from producers to retailers. The most striking examples of this are corporations such as Amazon or Wal-Mart, both amongst the biggest and most important companies of our time. Wal-Mart's market power stems to a large extent from the fact that it is not only itself a logistics giant, but, perhaps more importantly, that its strategy is also logistical (see LeCavalier, 2016). The company's spatial planning revolves around its distribution centres, its tight control of the entire supply chain, and innovative computerised inventory management, as well as the precise forecasting of customer behaviour based on huge volumes of data warehoused in the company's own data centres and analysed by over 2,000 data experts hired to predict and model customers' desires and preferences. Everything is designed to accelerate the turnover of goods and minimise storage costs – crucial factors in making Wal-Mart by far the world's largest company in terms of revenue.

The rise of Amazon (whose founder Jeff Bezos took Wal-Mart as his inspiration), however, is also the story of the rise of e-commerce. Having started as an online book store, Amazon offers today a wide range of further services and products and is, amongst other things, one of the most important providers of cloud computing services. Its business model, however, continues to revolve around the e-commerce platform. The platform's strength derives from the huge assortment of products including almost all thinkable commodities, hundreds of millions of which can be ordered online. Amazon is continuously trying to speed up the delivery of these products. Through this, Amazon hopes to mitigate one of e-commerce's biggest disadvantages in relation to brick-and-mortar stores: the time between the act of buying and receiving the goods. Its important Amazon Prime subscription service has always promoted next-day delivery as a major selling point. In many areas, this has already changed to same-day delivery, and under certain circumstances even same-hour delivery.

In order to offer these services, Amazon needs to move its distribution centres closer to its customers and has complemented its larger distribution centres, usually located at the outskirts of major cities, with smaller distribution centres located in inner-city areas. These provide the starting point from which customers can receive deliveries within hours. By this means, Amazon is competing with a range of other businesses selling all kinds of products from food to electrical appliances. A major factor in this competition is speed.

Logistical urbanism: cities as timescapes

While 'logistical cities', understood as logistics parks, ports or special economic zones and their particular form of spatial and urban planning are most of the time situated at the margins of urban agglomerations (Cowen, 2014; Rossiter, 2016), this imperative of speed tends to further merge the space of logistical operations with city centres. A glance at the streets of these cities brings to light the ubiquity of logistical operations: These streets are swarming with delivery vans of all sorts, bicycle messengers, food delivery drivers on scooters and many others trying to deliver all kinds of products to customers with maximum speed. Architect and urbanist Clare Lyster, who engages with the way logistics reshape contemporary cities, argues that cities can no longer be understood primarily in relation to static objects (as it is common for architects) but increasingly through their logistical systems and procedural flows, claiming that time is now 'the most critical attribute of city making' (Lyster, 2016:13). 'Logistics', she writes, 'calibrates space according to time and thereby renders the city a timescape' (Lyster, 2016:3). The idea of cities as timescapes resonates very much with the business of same-hour delivery and the labour of the drivers navigating the city in vans and on bicycles. Logistical flows of goods, information or people are continuously reconfiguring contemporary cities. The production of space is thereby increasingly driven by algorithmic mobility systems that are a crucial infrastructure of today's 'global cities' (Sassen, 2013).

In the contemporary city, the last mile constitutes a focal point at the intersection of the rise of logistics that increasingly becomes a rationality of the integrated management of flows, and the rise of digital platform reconfiguring patterns of production, labour and consumption. Showcasing its importance, an industry website describes the last mile as the 'the final frontier of logistics' (Lopez, 2017). This is because the last mile is a highly complicated terrain, involving constantly changing routes and destinations. It is both cost- and labour-intensive and increasingly important in the context of the rapidly escalating demand for doorstep delivery. In 2016, a McKinsey report estimated the global cost of parcel delivery (excluding pickup, line-haul and sorting) at €70 billion, with China, Germany and the USA accounting for more than 40% of the market. The same report also showed explosive growth rates (expecting markets such as the USA and Germany to double within the next 10 years) and a high volume of venture capital, invested especially in food delivery services (Joerss et al., 2016). The largest share of this growth is due to e-commerce. In Germany, where approximately three billion parcels were sent in 2017 (Bundesverband Paket & Expresslogistik, 2017), one in seven of these parcels is sent by Amazon alone, according to estimations by industry experts (Tönnesmann, 2016). This explosive growth, the intensive price competition, in combination with the new demand for speed are the framework in which labour on the last mile takes place.

Labour on the last mile

Employment arrangements in the delivery sector vary widely. In the parcel delivery industry, we find a number of old postal monopolies and transnational corporations (sometimes the same entities) fighting for market shares with each other and a range of smaller providers, start-ups and lateral entrants. Starting from these big corporations,

there are normally subcontracting chains with different providers and contractors reaching down to individual self-employed drivers. Recent times have seen the entry of platform-driven corporations, especially in food delivery but also for parcel delivery and messengers. Naturally, this leads to a highly fragmented employment landscape with drivers encountering very different situations even within the same city. In spite of these differing arrangements (contractual and otherwise) there are a number of developments that can be observed in different locations and among different providers, most notably long working hours, high performance pressure and the intensification of work, as well as the growing surveillance of workers (Haidinger, 2012).

For the purpose of this article, I will address two crucial issues concerning labour on the last mile. First, I look at the impact of digital technology on the organisation, control and intensification of the labour process. The example here is UPS, a huge transnational corporation in parcel delivery. Second, I examine the question of labour relations with regard to new and old forms of flexibility and, specifically, the impact of digital platforms such as Amazon Flex and Deliveroo. While platform labour allows for different methods to maximise surplus value, there are also important similarities to companies such as UPS concerning, for example, the labour process and the digital organisation and surveillance of work.

Digital Taylorism: the case of UPS

UPS is among the largest private-sector employers in the USA, where it employs 374,000 of its over 450,000 global workforce. While UPS is today a differentiated logistics provider with its own cargo airline and freight-based trucking operation, package delivery remains its core business. In 2017, UPS delivered an average of 20 million pieces a day, or a total of 5.1 billion packages, and generated revenues of over US$65 billion (UPS, 2018). Its iconic brown vans have become a major cultural symbol of the US economy, featured in a variety of media formats. These vans are driven by more than 50,000 drivers in the USA (and even more in the peak period before Christmas). A particularity of UPS (at least in the USA) is the high number of directly employed drivers, a fact that is not least due to the degree of union organisation and militancy amongst UPS workers (Allen, 2017). This fact has continuously limited strategies for maximising profits by increasing flexibility in terms of labour contracts. Wages (and benefits) are also relatively high compared to industry standards, a fact that is also due to a great extent to the degree of unionisation and long histories of struggles at UPS. Compared to corporations such as FedEx or Amazon, where unions have little momentum, the nearly 280,000 workers organised by the Teamsters union are an astronomical number. In the light of these particularities, it becomes clear that the intensification of work is of the outmost importance to UPS in order to remain competitive. The sophisticated technologies employed by UPS for this purpose provide a prominent example for what can be described as digital Taylorism, a labour regime that is spreading across a number of industries.

While almost all full-time drivers at UPS have relatively few complaints about wages and benefits, long hours and the fast-paced, standardised and disciplined nature of the work are a common matter of discontent amongst drivers. UPS drivers have been working

according to standard operating procedures for a long time. In training, future drivers learn a huge number of protocols relating to how to save time, such as how to start the truck with one hand while buckling with the other. The guidebook handed out to drivers to maximise delivery efficiency is 74 pages long. Based on time and motion studies, these guidelines regulate the smallest details of drivers' labour, including questions such as where to put their pen (in the left pocket for right-handed drivers) (Bruder, 2015).

With the introduction of its 'telematics' system, UPS has further radicalised the standardisation and intensification of its drivers' work routines. Each delivery van is equipped with over 200 sensors, while the driver's handheld scanner ('Delivery Information Acquisition Device' – DIAD) produces additional data. The system collects a massive amount of data from the trucks (variables such as speed, braking, etc.), GPS data, customer delivery data and driver behaviour data. The system also monitors things such seat belt use, idle time and how many times a driver backs up. Each time the driver stops, scans a package or does any other thing the system records these details. A continuous flow of information is transmitted to UPS data centres where it is collected and analysed and, in part, provided to supervisors.

The company knows precisely how much even small efficiency gains in their labour processes will benefit them: 'Just one minute per driver per day over the course of a year adds up to $14.5 million', according to the company's senior director of process management, Jack Levis, speaking to the National Public Radio network (NPR, 2014). In public presentations, UPS stresses the savings it can make in fuel and maintenance as a major benefit from telematics but labour is clearly also a major issue. In a language both euphemistic and frank, UPS describes how the telematics system is used to manage labour:

> To maximize the benefit of telematics, we bring our drivers into the process. We give them and their managers detailed reports on how their behaviours stack up against the results we strive for, such as accelerating and braking smoothly to conserve fuel. Having concrete data empowers them to optimise their behaviour behind the wheel and make their 'rolling laboratory' even more efficient (Staples, 2014:96).

The software establishes performance indicators, which are in turn used to apply pressure on drivers. 'We have the driver data; we know how fast they're driving, how hard they're stopping,' the director of automotive engineering at UPS, Dave Spencer said, more frankly, in an interview with a business magazine. 'That driver will change bad habits before it costs us money' (Frank, 2014). The strength of the union has helped to reach an agreement that forbids UPS from firing workers based on low performance as evaluated by the telematics software, although UPS has found ways to work around this agreement and many workers report how the metrics are used to pressure them. UPS drivers report managers showing them printouts with details of their performance and asking them to increase their number of deliveries. Sensors installed inside the truck allow managers to scrutinise every break and even the style of driving; a printout of all the data generated by one driver during a shift can reach 40 pages (Kaplan, 2015). Drivers are often forced to justify toilet breaks and even minor deviations from the rules to their managers.

Another important feature of the technologies of algorithmic management employed by UPS is its navigation and route planning system called 'On-Road Integrated Optimisation and Navigation' (ORION). The ORION software addresses a

problem which appears straightforward at first, but is in fact incredibly complex: finding the shortest route to connect a number of points in space. Even when the number of addresses is fairly low, the number of options rises very quickly. The formalisation of the optimal solution to this problem, which came to be known as the Travelling Salesman Problem (TSP) in the nineteenth century, has become an important object of complexity theory, applied mathematics, algorithm theory and computational geography. A brute-force computation of a route with more than 20 stops would require more computer-years than there are particles in the universe (Burnett, 2012). ORION, however, stores more than 250 million address points, and a typical day tour of a UPS van includes more than 100 stops. This is why even the ORION algorithm, whose code would cover roughly 1,000 pages if printed, does not attempt to solve the TSP. Rather, it is a learning algorithm that works with automated feedback generated by the vans to provide a temporal map of its territory (UPS, 2016). Such maps are key for an understanding of the city as timescape, exhibiting the importance of algorithmically driven logistics in the production of urban space.

Like the entire telematics system, ORION is focused on details and small efficiency gains, such as reducing left turns. However, efficiency for UPS is related not only to routes, but also to driver performance. An important issue to UPS is backing up. UPS prefers its drivers to back up as little as possible, citing the increased risk of accidents. The telematics system monitors not only how often a driver backs up, but also the distance and speed with which this is done. If the software determines that a driver backs up too often, managers ask him or her to change their driving style. As one worker reports, 'Our max backing speed is supposed to be 3 mph. I got a message saying my backing speed was 3.7 mph on average and to please slow it down. I told them I would as soon as they installed a digital speedometer for me'.[1] Like him, many drivers find the ORION software inefficient and patronising and many workers question the efficiency of algorithmic management compared to their pre-digital routines. Notwithstanding the question of which routine is actually more effective, such forms of algorithmic management take even the smallest decisions concerning how work is performed out of the workers' hands.

Software such as ORION is a tool to logistically map urban and rural space according to variables such as speed, distance and fuel use, but it is also a tool to increase pressure on labour and raise productivity with a multitude of targets and indicators. UPS workers report that with the introduction of ORION, targets have risen without the software managing to raise the efficiency of their routes, making it necessary to sprint or ignore safety concerns in order to reach the new targets. Quotas, targets and other systems of key performance indicators (KPIs) are crucial to the management of labour in logistics (see e.g. Rossiter, 2016:40ff). Just like Amazon's infamous distribution centres, the brown vans are nowadays part of a system of real-time granular surveillance of every movement, while KPIs constitute seemingly objective parameters by which labour can be measured and analysed. KPIs play a decisive role in the micromanagement of labour, functioning as part of the seemingly neutral, abstracting and quantifying logic of

1   Post in an independent online forum run by UPS workers, January 2016.

algorithmic governance and standardised procedures. In reality, however, quotas are often unrealistic and always shifting and thus become accelerating technologies rather than objective measurements of good performance.

The digital strategy to increase efficiency and further intensify labour works for UPS. Within the first 4 years after the roll-out of the telematics system, the company was able to handle 1.4 million additional packages per day while the number of drivers had slightly declined (Kaplan, 2015). The way digital technology allows for the measurement, organisation, intensification and surveillance of labour at UPS, as well as in other areas of the logistics sectors and digital capitalism more generally, can be analysed as an emerging digital Taylorism. In recent years a small but growing number of academic and journalistic work has begun using the terms 'Neo-Taylorism' or 'digital Taylorism' to describe developments in the world of labour, mostly referring to new modes of workplace surveillance, control and deskilling (e.g. Head, 2005, 2014; Brown, Lauder & Ashton, 2012; Nachtwey & Staab, 2015). I am using the term to describe how a variety of forms and combinations of software and hardware as a whole allow for new modes of standardisation, decomposition, quantification and surveillance of labour – often through forms of (semi-)automated management and control (see Altenried, 2017). By invoking Taylor, I do not argue that a simple rebirth of Taylorism is occurring, but rather seek to emphasise how digital technology allows for the rise of classical elements of Taylorism such as rationalisation, standardisation, decomposition and deskilling, as well as the precise surveillance and measurement of the labour process in often novel and unexpected ways. However, it seems important to underline how digital technology is often merely extending and radicalising logics that have been at work for centuries. The way companies such as UPS or Amazon use time and motion studies to increase efficiency is clearly rooted in pre-digital times. However, while Taylor, Gilbreth and others faced a back-and-forth between their studies and improvements in the production process, digital Taylorism's horizon is a system of real-time control, feedback and correction. In this sense, the growing importance of algorithmic management based on sensors, networked devices and integrated software architectures can also be interpreted as a form of a real-time or cybernetic Taylorism (see also Raffetseder, Schaupp & Staab, 2017). The example of UPS shows also how digital technology in the form of networked devices, sensors and apps has moved Taylorist discipline as well as time and motion studies outside the enclosed spaces of factories and into the urban space of the logistical city.

Urban spaces, however, are reconfigured by these processes. Following Michel de Certeau, space 'occurs as the effect produced by the operations that orient it, situate it, temporalise it, and make it function in a polyvalent unity of conflictual programs or contractual proximities' (de Certeau, 1984:117). The sheer presence of these logistical operations and their manifold consequences in terms of, for example, traffic, pollution or infrastructural development profoundly reshapes the contemporary city. The example of UPS and its digital infrastructures shows, furthermore, how almost all movements that constitute such logistical operations and contribute to the making and remaking of urban space are nowadays mediated by software, hence showcasing the importance of digital technology for the production of the city as a space of movements.

Radical flexibility: the emergence of platform labour

Unionised drivers employed full-time at UPS represent one end of the employment landscape of the last mile. Over recent decades, however, UPS has been trying constantly to add further segments of part-time and fixed-term drivers. In spite of resistance by the Teamsters, these attempts have been, at least in part, successful. Amongst the latest attempts in the direction of flexibilisation is the company's idea to contract people using their own vehicle as delivery drivers, predominantly to respond to increased workloads in peak times. The idea itself is not original. Platform-based labour that is outsourced to independent contractors is becoming increasingly important on the last mile. Not only are there a number of corporations that have started as typical gig economy platforms but, at the same time, many older corporations have started to experiment with forms of hyper-flexible, platform-based employment.

Speaking of the uberisation of delivery, or logistics, is still misleading to a certain extent as it suggests that such labour relations have come into existence only through digital platforms. Rather, it seems necessary to reverse this narrative and to situate the gig economy within the genealogy of the logistics industry. In many ways, the logistics sector has always been a site of experimentation using hyper-flexible forms of labour in order to find lean and cheap answers to the contingencies of global supply chains. Labour relations that are characteristic of the gig economy were around in the logistics sector long before the advent of digital platforms. One example is the trucking sector in US ports. In the late 1970s, the deregulation of the industry started opening it up to the entrance of 'owner-operators' or 'independent contractors'. These terms describe individual drivers who own or lease their truck and contract their services to bigger freight firms (Bonacich & Wilson, 2008:103ff). In practice, these drivers are employees of those bigger corporations in almost all aspects except for their legal status. Contracting drivers as owner-operators who are often paid by the piece made it possible to reduce wages and push many of the entrepreneurial risks onto the drivers, who are not entitled to insurance, other benefits or overtime pay. Today, approximately 49,000 of the nation's 75,000 port truck drivers are independent contractors (Smith, Marvy & Zerolnick, 2014). These employment relations in the port trucking sector are in many respects an exact blueprint for the labour relations we find in what today is described as the gig economy. It seems important to me to acknowledge such pre-histories of today's gig economy, in order to gain a better, historically founded understanding of the continuities and transformations that characterise the current rise of platform labour.

Clearly, the logistics industry was an important site of experimentation with hyper-flexible labour regimes, long before the advent of digital platforms. Parcel delivery in many countries, such as Germany, is characterised by subcontracting chains at the end of which we often find self-employed individual drivers working under very precarious conditions (Haidinger, 2012; Holst & Singe, 2013). With these historical continuities in mind, I will now turn to platform-based employment on the last mile, which is currently growing in size and relevance.

While Amazon is the best customer of most big providers in parcel delivery, such as UPS or DHL, the relations between the retail giant and many of its delivery providers are nevertheless uneasy. While Amazon continues to downplay its push into last mile

delivery, its intentions to control the entire supply chain are clear. In the USA, Germany and other countries, Amazon has already started operating its own delivery to customers from its distribution centres, mostly run by subcontracted enterprises. With the Amazon Flex programme, the company has furthermore copied the model with which Uber is disrupting the taxi market, and introduced it into delivery. Rolled out in the USA in 2015, the programme has expanded continuously and has also been introduced in countries such as Germany or the United Kingdom.

'Be your own boss, set your own schedule, and have more time to pursue your goals and dreams. Join us and see how you can put the power of Amazon behind you', reads the advertisement with which Amazon is trying to recruit individuals as 'delivery partners'. The core of Amazon Flex is an app allowing people to register as courier drivers using their private vehicles. Following a background check, successful applicants can start working as independent contractors. The whole process is organised by the app which needs to be installed on one's private smartphone and also provides a number of instructive videos (instead of a training period). Once accepted, drivers can sign up on the app for shifts of one to five hours (so-called 'delivery blocks'). Before the shift, it tells drivers where to go to pick up packages. At the distribution centre, drivers get in in line behind other cars, check-in on the app, receive their packages, scan them and start their delivery route, organised by the app. Deliveries need to be confirmed on the app, sometimes including pictures of packages left at a doorstep. The app is not just a tool for navigation and scanning of packages, it is embedded into a software architecture that not only manages the labour process but is also designed to create a wider range of metrics (including customer feedback) to evaluate performance. These forms of algorithmic management of labour allow for the substitution, to a considerable degree, of direct managerial control over workers.

Workers, formally regarded as independent contractors, are promised earnings of at least US$18 to US$25 per hour, and equivalent amounts in other currencies. While the pay seems good to many drivers, it becomes clear that the US$18 minimum is not the real wage. A Flex driver summarises it in these words: 'You think you're making $18 an hour and tips but it all goes to gas and car maintenance. You put lots and lots of miles on your car'.[2] Many also complain about the number of packages assigned for one shift. Should drivers fail to deliver them in the time designated, overtime is, most of the time, not remunerated. It is the same with the time it takes to drive from one's home to the various distribution centres. While the technology would be able to precisely account for these extra working times, Amazon is strategically foregoing these possibilities in order to save money. Furthermore, insurance, taxes and other costs, such as social security, are also to be covered by the drivers. In general, real wages vary according to a number of factors but are, most of the time, far below the promised US$18 and not infrequently below minimum wages. Using the legal construct of the independent contractor therefore helps Amazon to lower wages while pushing extra costs, such as for equipment or insurance, as well as entrepreneurial risk onto the workers.

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2   Entry by user identifying as an Amazon Flex driver on an online job review website, March 2017.

The first drivers began to sue Amazon in 2017, claiming they ought to be considered as employees rather than independent contractors, given that they were fully integrated into the business and the way Amazon organised and controlled their labour. The plaintiffs also argued that, after expenses, their earnings generally fell below the minimum wage.[3] Some of the lawyers representing plaintiffs against Amazon Flex were also involved in a class-action suit against Uber along similar lines.

Precarity is exacerbated by strong fluctuations in the availability of work. Many Flex drivers complain about the insecurity. It seems that Amazon permits more drivers than needed, which often leads to bitter competition for shifts. This is highly typical of the app-based algorithmic management of independent contractors and is also a major problem for Deliveroo workers, for example. In an online forum, one driver reported that 'they [Amazon] continue to hire more and more people so competition has only increased. It has gotten to the point where the only way to acquire shifts is to obsessively be swiping one's offers screen all day'.[4] Many drivers use auto-tap applications trying to gain an advantage in securing themselves shifts over workers using only their fingers.

In case of complaints or problems, Amazon can dismiss the independent contractors far more easily than regular workers, a fact that is also a disciplining tool across the gig economy where workers try to avoid complaints and go out of their way to keep customers and platforms happy, get high rankings and thus obtain more work, and avoid having their accounts closed – the gig economy equivalent of a dismissal letter.

For Amazon, platform-based employment of independent contractors allows the creation of a highly flexible and scalable on-demand workforce with very low fixed costs. For the drivers, however, these employment arrangements are also flexible, which is valued by many drivers, especially those with additional jobs, but at the same time highly precarious in a number of aspects. Nonetheless, their number is growing. While it is hard to obtain exact numbers, there are clear indicators. The company-run closed Facebook group for Amazon Flex Drivers already had over 27,000 members at the time of writing. At the same time, a spokesperson for Amazon gave the sketchy number of 'thousands of delivery partners' driving for Amazon Flex in the UK alone (Kramer & Frisse, 2017). To Amazon, these drivers are important for keeping pace with customer demand and increasing flexibility. In many ways, the employment model of Amazon Flex is not very different from the employment relations that have existed in parcel delivery at the end of subcontracting chains for a long time. The digital platform, however, cuts out intermediaries and allows for an intensification of flexibility. While it is clear how platform labour with its short 'gigs' allows the flexible reaction to customer demand, an often-neglected aspect is how platform labour also depends on the digital organisation and surveillance of work in order to be effective and cheap. The various technologies of standardisation and algorithmic management reduce training times and increase (automated) organisation and control of the labour process, enabling flexible

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3   Lawson v Amazon Inc, case filed at United States District Court of California, 2017, http://www.courthousenews.com/wp-content/uploads/2017/04/Amazon.pdf (last accessed 8 August 2017).
4   Entry by user identifying as an Amazon Flex driver on an online job review website, April 2017.

and short-term solutions in the recruitment of labour. It is precisely the new possibilities for algorithmic organisation and digital control that make hyper-flexible labour at the scale of Flex efficient, manageable and scalable.

It is clear that the rising importance of the last mile signifies important transformations in consumption patterns concerning activities such as shopping and eating. These activities play a crucial role in determining the ways that cities are built and navigated. Inner-city shopping areas or restaurants, and corresponding practices of consumption and everyday mobility – hence urban spaces as such – are subject to change as a result of the rise of platforms. A very visible sign of this development is the growth in platform-based delivery of food. The urban landscape of Berlin, London and many other cities is populated by an army of couriers on bikes or scooters working for food delivery platforms like Deliveroo, UberEats or Foodora. Many of these drivers are also independent contractors. Here, we encounter similar contractual arrangements and forms of app-based algorithmic management of the labour process. Some are paid by the hour, others based on their number of 'drops' (deliveries), yet another form of reducing fixed cost for corporations and another tendency across the gig economy that might be described as the return of piece wages (see Altenried, 2017). Many of Berlin's bike couriers are migrants, often from crisis-ridden European countries, who can be integrated into delivery labour via apps easily even if they do not speak German, hinting at the importance of migrant labour across many logistical operations as well as the way platforms are reconfiguring the stratification of the labour market.

In spite of difficult conditions, it is also the workers in food delivery who have shown that resistance in the gig economy is possible. Recent years have seen a wave of struggles and strikes all across Europe, driven by inventive forms of organising and striking and thereby also showcasing the challenge platform labour poses to unions, as well as hints towards the successful organisation of platform workers (Woodcock, 2016; Tassinari & Maccarrone, 2017).

Conclusion: the last mile and beyond

Looking at the infrastructures of transportation and communication, which today we call logistics, Marx speaks of 'the annihilation of space by time' (Marx, 2005:524) vividly characterising the logic of logistical operations. The last mile is currently a focal point of such operations. On one hand, it represents the 'logistification' of production, circulation and consumption, and, on the other, the rise of platforms. These two trends meet at this 'final frontier of logistics'. In the context of a ubiquitous 'on-demand' logic, the last mile has become an important factor in the time- and flow-driven remaking of urban geographies that can be described as an emerging logistical urbanism. This is not only a matter of new transportation infrastructures, urban warehouses or streets congested by delivery vans but also, for example, the future architecture of retail and public spaces in cities that are already changing because of the rise of online retail and ever faster possibilities of doorstep delivery.

In spite of all attempts at automation, living labour remains crucial to the last mile. Labour on the last mile is being transformed by two important and interrelated developments. First, possibilities are opened up by digital technology to track, trace, measure and even automatically manage workers, which result in a labour regime

that can be described as digital Taylorism. Second, the last mile is changing through the platform-driven further flexibilisation and casualisation of labour relations. While it is necessary to be cautious with generalisations, it seems that many of these developments are not limited to the delivery sector. The forms of algorithmic management and surveillance that can be observed at UPS, for example, appear in many other areas of logistical labour, most famously in Amazon's distribution centres. While it is not easy to measure, it is also clear that platform-based forms of hyper-flexible labour are increasingly important (Huws, Spencer & Joyce, 2016; Kässi & Lehdonvirta, 2016). While there are of course many specific characteristics of work and across the last mile, it is safe to say that the major tendencies observed in this article correspond to similar developments in other areas of the logistics sector, and digital capitalism more broadly. In accordance with many of the findings of this article, Ursula Huws speculates that we are observing the emergence of a new paradigm of work she calls 'logged labour' by which she means labour that is increasingly standardised and made measurable, subjected to continuous surveillance and increasingly managed via online platforms (Huws, 2016). While the world of labour is maybe more fragmented than ever, it seems clear to me that those are indeed patterns that can be observed across a number of industries and locations. These are crucial factors in transforming labour relations, in the recomposition of living labour as well as crucial conditions for the struggles that will accompany this transformation.

Arguably, the last mile, and logistics more broadly, are crucial sites for analysing this transformation. The brown vans of UPS are in that sense not only 'rolling laboratories' in terms of the technology employed; they are also laboratories for the labour conditions of the future. With this, the last mile has also become a laboratory for workers' organisation and struggle.

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Towards the mapping of port labour systems and conflicts across Europe:
a literature review

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ABSTRACT

This article presents a literature review on labour dynamics in European ports. The aim is to provide a detailed and critical appraisal of the recent academic literature on port labour studies, in order to develop a comprehensive mapping of the variety of port labour regimes and conflicts in Europe with the ultimate aim of revealing the changing profile of labour requirements as a consequence of the structural transformations in the overall logistics chain. The review mainly considers the literature published during the period 2000–2017. Since ports have been explored by means of different theoretical approaches, paradigms and perspectives, the study aimed to foster a multidisciplinary approach between some streams and to consolidate them wherever possible. In the first part of the article, the main definitions, ideas and concepts developed in the literature by scholars on seaport research and port studies are reviewed and analysed. The second part discusses the literature on port geography and the third part addresses port labour dynamics in particular. The conclusions draw from the perspective of the maritime-logistics chain to analyse the variety of port labour systems and summarise the literature reviewed, stressing the need for further studies.

KEY WORDS

port labour systems, maritime-logistics chain, intermodality, global supply chain, port studies

Introduction

In recent decades, European ports have experienced a paradigm shift, transforming themselves into nodes within broader supply chains and global production networks (Robinson, 2002). The changes in shape and size related to the intermodality (namely

the technological revolution of the transportation of goods), has been regarded by many scholars as resulting from the need to support economic globalisation (Levinson, 2006; Cudahy, 2006; Bonacich & Wilson, 2008; Kumar & Hoffman, 2010). Ports have played a crucial role in this process, alongside the revolution in the logistics chain embodied by the development of the container and of intermodal transport. Ports stand at the junction of global value chains and global production networks; they represent pivotal links within maritime supply chains and global production networks, while also being embedded within specific, path-dependent, spatial and institutional frameworks.

The main purpose of this article is to provide an extensive literature review on labour dynamics in European ports, with the aim of offering a detailed and critical appraisal of the recent academic literature on port labour studies, in order to develop a comprehensive mapping of the variety of port labour regimes and conflicts in Europe. Three main points form the rationale of the following article:

First, the variety of port labour systems in European ports is currently influenced by the strategies of a range of (global) players along the maritime-logistics chain as well as institutional actors at supranational and national level. However the most significant transformations in the port segment of the chain that concern labour are driven mainly by the changing and unstable dynamics of the maritime industry. In particular, two major forces affect the port sector: changes in port organisational structures as a result of privatisation or deregulation processes and the efforts of shipping companies to control the whole logistics chain. Empirical studies (Van de Voorde & Vanelslander, 2014) have shown to what extent shipping lines have pursued greater integration among the players along the logistics chain in order to leverage economies of scale and gain greater control over the entire chain. Furthermore, the increasing size of vessels, horizontal and vertical integration and mergers, acquisitions and alliances between shipping companies have transformed the overall landscape both at sea and on land. Ports have been strongly influenced by these processes in recent decades, as have the organisational structures of port labour at the workplace. The strategies of the main players along the entire logistics chain, in their search for economies of scale, have increasingly affected the role and the economic behaviour of the terminal operating companies, posing new challenges for the future of port labour systems and port business.

Second, the compatibility between national regulations and neoliberal policies and regulations at European level has been a strong influence on the variety of port labour systems and schemes. The aim of European institutions in recent years has been to liberalise port services, including port labour, according to the principles of the European Treaty on freedom of establishment and freedom to provide services (Article 49 of the TFEU, Treaty on the Functioning of the European Union), whereas national port labour systems and schemes in Europe, in addition to other variables, very often tend in the opposite direction.

Third, there is a need to map the variety of port labour issues and conflicts across Europe in order to gain an idea of the common trends that European ports share in the context of the external pressures and structural and material constraints. This necessitates an extensive literature review on ports and port labour systems, in order to identify the main gaps in the ongoing debates.

This article, therefore, aims to analyse the issues of port labour systems in European ports in a broader perspective, a field that has been scarcely researched by maritime economists, and partially ignored by economic sociologists. The recent economic literature on seaport research and port studies lacks a homogeneous framework for analysing the changing dynamics of port labour systems. These are nuanced and complex topics, with conflicting interests, strong contradictions and political factors in play. In most cases, the economic literature on port studies does not consider labour as an analytical category. However, some exceptions, as we shall see, explore the issues linked to port labour systems in Europe.

Since ports have been studied by means of different theoretical approaches, paradigms and perspectives, the following analysis aims to foster a multidisciplinary approach between some consolidated streams. This is a challenging aim because the topic explored is a multidimensional one, in which a large number of different elements and drivers overlap. Six of these can be singled out: first, local juridical factors (e.g. national legislation and ongoing reform processes); second, supranational juridical factors (acquired regulations from the European Union, compatibility among supranational and national rules, jurisdictions of the European Court of Justice, Social Dialogue, etc.); third, economic factors (the market strategies of global players, convenience of business operations for cargo handling companies and other chain actors); fourth, competitiveness of services and ports (quality of the operations, frequency of strikes, etc.); fifth, social factors (working conditions, levels and stability of employment and remunerations, conflicts, training systems, etc.); and finally, institutional factors (governance models, contractual relationships, the various management structures of labour pools in different European countries).

There is evidently a need for more in-depth investigation, in particular into the labour regimes and arrangements along the maritime-logistics chain (Bottalico, 2018; Wilson & Ness, 2018). This study approaches the topic by observing the entire chain. This analytical perspective fosters an investigation not only of the dynamic and complex structure of the maritime supply chain but also of the background tendencies occurring in the overall context in which ports are situated, and hence the variety of port labour systems. For example, a focus on container handling and the labour that is associated with it reveals the triple nature of the maritime-logistics chain (Meersman, Van de Voorde & Vanelslander, 2009) considered in relation to the intermodal transport unit. This article argues that an 'intermodal gaze' is required to grasp the main trends concerning labour in the pivotal link of the logistics chain and consequently that it is fruitful to explore the key changes that have taken place in port labour dynamics in recent years by looking at the overall picture on one hand, while simultaneously focusing on the particular segment of the chain under investigation on the other.

The lack of a homogeneous framework for analysing labour issues in European ports necessitated a preliminary literature review characterised by a 'bird's-eye view'. In this stage, the aim was to analyse the main ideas and concepts developed in the recent economic literature by scholars of seaport research and port studies. In order to achieve this goal, a structured review of the existing academic literature on ports, labour dynamics and the container industry was carried out, taking into account the main

paradigms and definitions, central areas of debate and key points raised in the most important theoretical approaches in the economic literature on ports. The purpose at this stage was to set the parameters and identify the background, main features and key issues affecting ports in general through a coherent overview of the field of port studies research. The criteria for selection of the sources were defined and revised as the research progressed, in parallel with fieldwork periods in two European ports. In addition to the few sociological studies in this field, a more in-depth review of the literature was conducted midway through the research, in the course of a visiting period in the department of Transport and Regional Economics (TPR) at the University of Antwerp in Belgium.

Although in each case the aim of the review was to gain an overview of the subject and to assess how and whether previous research has approached the same field of enquiry, the mid-path literature review conducted in Antwerp aimed primarily at acquiring in-depth knowledge about the container industry and the port business in terms of their institutional, operational and economic features.

The huge body of material and its heterogeneous nature necessitated sharp selection criteria from the outset. Use was made of university libraries in Europe to carry out a detailed review of specialised newsletters, scientific literature and technical literature, dissertations, academic and non-academic articles as well as other material including various specialised reports, conference presentations and other documentation. With some important exceptions, the review focused on literature published during the period 2000–2017, without underestimating the importance of key previous studies.

Within this period, particular attention was paid to the different – and overlapping – research themes, trends and issues in the maritime-logistics chain outlined above. This required an ongoing critical appraisal to establish, within this broad spectrum, the most important questions relating to port labour dynamics, in a process that gradually circumscribed the field of inquiry. The studies of the port literature provided some useful insights into the specific role of the European port labour system, despite the fact that labour remains a neglected field of enquiry in the broader framework of port studies. Indeed, the review of the economic literature revealed that the changing image of dock labour requirements is strongly linked to structural transformations in the maritime and logistics environment, drawing attention to the fact that this connection has not received the attention it deserves.

Since ports have been explored from a range of different perspectives, there was an ongoing effort to foster a multidisciplinary approach between some consolidated streams.

Port studies

The study of ports does not belong to a specific discipline. Several disciplines, indeed, are often present in this research field (Woo et al., 2011).

Bridging the distinction between shipping economics and maritime economics as autonomous fields of investigation, since 1991 the International Association of Maritime Economists (IAME) has certified the autonomy of the discipline. A review presented at the annual conference of IAME in 2009 summarises the huge and

variegated economic literature on port business. The taxonomy provided by Pallis and other scholars classifies the content of published research in port economics, policy and management (port studies) published from 1997 to 2008 under the following research themes (Pallis et al., 2011): terminal studies, ports in transport and supply chains, port governance, port planning and development, port policy and regulation, port competition and competitiveness, spatial analysis of seaports.

In the first category, the most important studies take terminals as the unit of analysis. A number of researchers have suggested that the terminal, rather than the port, is the most important focus of competition. Pallis et al. (2011) state that there is room for further methodological advances for the measurement of terminal efficiency, especially in relation to other production factors, such as labour. Following this line, the authors stress the lack of research on the specific role of 'port labour and the human factor in terminal operations' (Pallis et al., 2011:455). When labour is considered in this literature, it is conceived as a pure commodity, a dependent variable of production.

The role of ports in the transport and supply chain is an important theme in the port literature. The existing paradigms no longer provide adequate explanations for the pervasive restructuring of the supply chains and the logistics pathways in which ports are embedded. Ports must be analysed as elements in value-driven chain systems (Robinson, 2002). Such a view has pointed many studies in the direction of the port–hinterland relationship. The important role of the hinterlands for ports has become a significant structuring element in the European transport network. In relation to this issue, Notteboom and Rodrigue (2008) have argued that the future is likely to bring attempts to cope with three particular geographical scales: the continental level, the regional level and the local level.

Another relevant theme in the context of port studies is that of port reform. Port governance models and structures have been addressed in many countries. With respect to port labour, Talley (2002) has studied the impact of deregulation on dockworkers' earnings and Turnbull and Sapsford (2001) analysed dockworkers' union bargaining power in Europe and at a global scale. Miller and Talley (2002) focused on the role of technological change whereas Ircha and Balsom (2005) investigated ways to enhance port training and education.

The World Bank (2007) Port Reform Toolkit provides an analysis of port management structures and ownership models. This study identified a number of factors affecting the way ports are organised, structured and managed. These include: the socio-economic structure of a country (e.g. whether it is a market economy or has open borders), historical developments, the location of the port (e.g. whether it is within an urban area or in an isolated region) and the types of cargo handled (e.g. liquid and dry bulk, containers).

According to the World Bank, four main categories of port have emerged over time. They can be classified into the following models: service port, tool port, landlord port and private port (either fully privatised port or a private service port). These models are distinguished by how they differ with respect to public, private or mixed provision of services, local, regional or global orientation, ownership of infrastructure, ownership of superstructure and equipment, and the status of dock labour and management (World Bank, 2007).

In Europe, the main model is the landlord port, which typically has a mixed character and aims to achieve a balance between public (port authority) and private (port industry) interests. The exceptions are currently the UK ports and the port of Piraeus (which are fully privatised). In the mixed public–private orientation of landlord ports, the Port Authority acts as regulatory body and as a landlord, while port operations are carried out by private companies.

Today, the landlord port is the dominant port model in large- and medium-sized ports. In this model, infrastructure is leased to private operating companies involved in logistics or industrial activities. The private port operators provide and maintain their own superstructure, including buildings. They also purchase and install their own equipment on the terminal grounds as their business needs dictate. In landlord ports dock labour is generally employed by private terminal operators, although in some ports some labour may be provided through a port-wide labour pool system (World Bank, 2007).

Competition, pricing, market access, finance, environmental, safety and security-related policy practices can also be regarded as port policy and regulatory issues. Port competition, however, remains an important topic, because of its impacts on employment and investment. While the existing literature on the subject strikingly tends to regard ports as rather homogeneous entities, in practice it is increasingly apparent that ports are strongly heterogeneous environments (Meersman, Van de Voorde & Vanelslander, 2009).

Major changes have taken place in port governance around Europe. Port authorities have gained a more autonomous status via commercialisation, corporatisation and privatisation processes. Drastic port reform schemes have taken place in many European countries. The European Commission has taken steps towards the development of a European port policy (Verhoeven, 2011), creating a European perspective on port and transport policy issues.

The trend towards increasing the size of vessels, and the effects of this trend, has been one of the main issues addressed by scholars in recent years (Sys et al., 2008; Bologna, 2017; Van Hassel et al., 2016). These studies have focused on the margins for shipping lines and terminal operators, the rapid transformation in the environment for both liner shipping and port markets, but also on consolidation processes in the shipping industry. Van Hassel et al. (2016) explore the impact of scale increases of container ships on the total generalised chain cost. Observing the entire structure of the maritime supply chain, the authors examine how the increase of container ship size influences the cost ratio between the different chain elements (maritime, port and hinterland legs).

Few studies have addressed the impact of megaships in terms of social costs or negative externalities – for example, congestion in the hinterlands – or concerning dock labour settings – for example, peaks and troughs in container handling operations. A recent study commissioned by the International Transport Forum[1] about the impact of

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1   International Transport Forum (ITF) is an intergovernmental organisation with 54 member countries with the objective of helping shape the transport policy agenda at a global level.

megaships observes that container ships have grown constantly over recent decades due to a continuous search for economies of scale by shipping lines. In the past, this strategy has contributed to decreasing maritime transport costs, facilitating global trade. However, the increasing size of vessels in the container business has consequences for the rest of the transport chain (International Transport Workers' Federation [ITF], 2015). Big container ships require infrastructure adaptations and productivity levels that increase costs for port operators, port authorities and other stakeholders in the supply chain. Moreover, megaships cause peaks in ports with consequences for labour organisation, and put a strain on hinterland transport. The report observes that whereas containerisation has regularised port labour, megaships have enabled more flexibility. The impact of megaships on the container terminals has generated an increase in the intensification of the pace of work, shrinking of handling time, peak workloads, shortages and higher flexibility. In order to achieve economies of scale, shipping companies are putting pressure on the terminals, influencing the functioning of the dock labour pool itself. However, the main solutions to the unrestrainable increase in the size of ships (and the imbalanced bargaining power determined by the strategic alliances between shipping companies) have to be found in the institutional role of the member states and the regulatory bodies involved. Although this is very difficult, only a process of institutional regulation – a set of constraints and basic standards aimed at regulating the market – can discipline these trends. This would enable beneficial outcomes for the overall management of the supply chain. At the same time, the political approach of the European Commission in this regard has not yet tackled these issues by setting up common standards.

The increasing size of vessels has also had strong effects on market structure, in terms of oversupply, decreasing freight rates and profitability. However, container terminals managed by terminal operating companies, being constrained to follow the pace of an apparently unlimited growth, have been affected by structural overcapacity, congestion, decreasing operational time and fierce competition. The studies that assess the impact of megaships emphasise the pressures on the terminals and the resulting drive to invest in new facilities and infrastructures (Sys et al., 2008). These pressures are also felt by port authorities, policy makers and other institutional actors. The issues linked to the impact of the mega vessels on ports and terminals have shown how tight the link between the shipping industry and the port sector is, and, at the same time, how divergent the perspectives between shipping companies and terminal operators are.

The economic literature has devoted attention to the strategies of the shipping lines in the container industry and to the effect of the external pressures on the terminal operating companies (Meersman, Van de Voorde & Vanelslander, 2009; Alexandrou, Gounopoulos & Hardy, 2014; Rodrigues et al., 2015). In addition to the impact of megaships, the empirical studies show the extent to which, as trade processes become more concentrated, shipping companies aim towards a greater integration among the actors along the logistics chain in order to exploit economies of scale and to optimise and gain control over the entire chain (Van De Voorde & Vanelslander, 2014). In recent years, economies of scale in the maritime shipping industry have been achieved internally by operating larger vessels, and externally through horizontal cooperation, mergers and takeovers. Additionally, shipping companies have set their sights on

terminal operators and inland transport services, as operations are increasingly approached from the perspective of complex logistics chains, whereby each link must contribute to the constant optimisation of the entire chain. This has altered the competitive balance in the market, as shipping companies have gained in power through their overall control of logistics chains.

In order to gain control over the supply chain and the associated cost, many shipping companies have become involved in vertical integration movements. In this regard, Van de Voorde and Vanelslander (2014) underline how the port and the maritime industries have undergone a dynamic evolution in recent years. These scholars discuss in detail the various forms of cooperation, concentration and integration in the maritime industry. Vanelslander and Van de Voorde illustrate trends in the maritime logistics chain through the analysis of the degree of vertical integration by container shipping companies into port terminal operations, hinterland transport operations and hinterland terminal operations. It emerges that (as of January 2014) 14 of the top 20 shipping companies in the container market were involved in port terminal operations.

Some shipping companies have even established a terminal operating subsidiary. It is clear in the literature that, among other factors, the maritime and port industry is shaped by changes initiated by players from within the maritime logistics chain. Vertical cooperation and integration movements are an important part of this process. For example, a shipping company may, through vertical integration, have gained control over the terminal where its vessels are loaded and unloaded. That company will find it relatively easy to determine in which links of the chain the greatest cost savings may be achieved by distributing resources differently so that the productivity level of the different links is modified. Horizontal cooperation between shipping companies and market concentration trends has also produced more cooperation among terminal operating companies, who have established their own global networks. Port authorities, for their part, have seen their role reduced to the granting of concession contracts to the terminal operating companies (Van de Voorde & Vanelslander, 2014).

The port sector in Europe also has to deal with the impact of mergers and acquisitions between shipping lines. This process produces an unbalanced bargaining power between the actors involved in the port activities, as well as an abuse of market power (Meersman, Van de Voorde & Vanelslander, 2009, 2010). These trends have an impact on competition regimes as well as social and economic regulation.

Verhoeven (2009) observes that port policies and regulations are two sides of the same coin. Policies set out the overall aims and goals, while regulations ensure compliance and certain behaviours. The focus, for Verhoeven, is on the governance of public policy and regulation.

Port governance may take place at various levels: the local level (city, municipality or port authority); the national or regional levels; the supranational level (e.g. the European Union); or the intergovernmental level, for example the IMO (International Maritime Organization), ILO (International Labour Organization) or UNCTAD (UN Conference on Trade and Development).

In the economic literature, the shipping sector and container handling are referred to as a global market that takes the form of an oligopoly in which a few main global

players handle a substantial share of capacity in the main trades (Sys, 2009). The container shipping sector is currently dominated by shipping companies that have created three major strategic alliances over time. The main customers of the port sector have thus become more and more concentrated. During 2016, an unprecedented number of mergers and acquisitions took place in the shipping industry. In the same year, the South Korean shipping line Hanjin collapsed, described as the largest bankruptcy in the ocean freight industry.[2] From 1 April 2017, the ocean carriers have formed three new alliances representing 77.2% of global container capacity and 96% of all container capacity in East–West trades. The 14 largest shipping companies make up 73.1% of market share, and almost all of them belong to alliances.[3]

Like other change processes that have occurred in recent decades, the alliance reshuffle has had an impact on ports in terms of throughput, capacity, cost structure, bargaining power, profitability and work organisation. Yet, there is room for further scientific studies about each of these issues, enabling in-depth analysis of the effects of such dynamics on labour in the port sector.

Vertical and horizontal integration in the terminal and shipping industries and a search for diversification among financial investors have contributed to the global expansion of port operators. On one side, maritime shipping companies went into the terminal operation business to help secure maritime traffic and the profitability of both seaside and landside operations. On the other, stevedore companies expanded their operations from their base port or region into new markets to diversify and replicate their business models. Organic growth, as well as mergers and acquisitions of existing facilities, were common strategies, in which terminal operators differed little from their manufacturing and retail counterparts in their responses to globalisation.

Port geographies

In relation to the spatial analysis of ports, the most important topics relate to the spatial reconfiguration of the port landscape, the spatial study of port systems – from ports as *spaces* to ports as *places* – and the port city interface. However, following Castells (2002) and his concept of the shift from the *space of places* to the *space of flows*, it is noteworthy that here the reverse process seems to be taking place – with a shift from ports as *places* to ports as *spaces*.

The models of spatial development of port systems have remained virtually unchanged since the understanding of the spatial dynamics in port systems pointed out by Notteboom and Rodrigue (2005), who introduced the 'port regionalisation' concept to describe a process whereby efficiency is produced by achieving higher levels of integration with inland freight distribution systems. Market forces and political influences gradually shape regional load centre networks with varying degrees of formal linkage between the nodes of the networks. In this regard, Rimmer and Comtois (2009) argue that port regionalisation is nothing more than decentralisation.

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2   Dupin (2016).
3   iContainers (2016).

Spatial port studies in recent years have undergone a fundamental epistemological shift in the conceptualisation of the port, from a single fixed spatial entity to a network of terminals operating under a corporate logic. In the port triptych 'foreland–port–hinterland', research has focused on developments in maritime and/or hinterland networks and the ways they shape the spatial hierarchy of port systems.

Port research is not a new field of investigation for human geographers, evidenced by numerous conceptual models and empirical cases of port evolution and development in the literature. Wilmsmeier and Monios (2015) apply a critical and radical perspective to the analysis of port operations. Drawing on concepts taken from Marx and Harvey, the authors reflect on the production of capitalist smooth space in the global port operations sector, in which a handful of multinational corporations manage portfolios of major ports across the globe. In this approach, port devolution and development cannot be understood in the absence of a critique of their capitalist context.

Using a pluralistic approach, Ng et al. (2014) analyse these issues, as well as the changing waves and development of port geography. Prior to the 1980s, ports in most parts of the world were administered by public authorities and financed by public funds. Due to this dominant governance model, ports were considered as homogeneous entities. However in the 1980s, this picture of governance began to change. The mounting strength of neoliberal ideology among policy makers coincided with a growing research interest in port governance models. The World Bank supported this trend and published the abovementioned Port Reform Toolkit, focusing on port governance reform.

Since the 2000s, attention has clearly shifted from descriptive studies of port reform processes towards analysis of the outcomes of reform implementation and the role of port authorities in the new governance setting. Ports now face new challenges in responding to local funding priorities and planning.

Port reform and devolution have become a global process, giving rise to empirical research using broad samples. The research has demonstrated that the World Bank's model of port reform is simplistic, that there have been different processes in each country. Such diversity demonstrates that 'as much as globalisation and the neoliberal ideology are tending to homogenise space, institutional factors are giving rise to local diversity' (Ng et al., 2014:91). According to these authors, this conclusion is similar to some findings in economic geography, where the concepts of path dependency, embeddedness and convergence are used to explain how social, cultural and institutional factors produce spatial differences in economic activity (Ng et al., 2014).

A further paper by Notteboom, De Langen and Jacobs (2013) applies insights on the role of institutions and institutional change in port governance reforms. They deal in particular with path dependency in seaport governance. Starting from the concept of path dependency and lock-in, they argue that port authorities, in their attempt to develop new routines to cope with external challenges, are often constrained by their governance structures and/or institutional environments. They apply the theoretical concept of institutional plasticity to highlight how port actors strategically stretch existing institutional arrangements to their purpose, without breaking out of the dominant development path.

In sum, the topic of governance has clearly enlarged the research field of port geography. While the impetus for port reform has come from globalisation and neoliberal ideology, it has resulted in a very diverse set of governance structures around the world. Spatially, it has produced a re-scaling of the concept of the port, in which individual terminals, managed by firms with different business goals and practices, are influencing port performance, hinterland penetration and market coverage.

To conclude, this review of the port literature has shown to what extent ports are characterised by an extremely heterogeneous environment, with many different market players and conflicting interests. The 'port product' is complex and non-transparent, while competition has increased strongly across the chain. It should be underlined that the prototypical port does not exist. The review of the economic literature on ports has highlighted recent challenges in the port sector, driven by the changing dynamics in the shipping industry. The increasing size of vessels, horizontal and vertical integration, and the importance of mergers, acquisitions and alliances have all been taken into account in this review, because of their implications on labour and on the terminal operating companies, which are increasingly affected by the search for economies of scale in the maritime industry.

Bigger ships and alliances have led to more rigidity, less supply chain resilience and lower quality of services. In a broader sense, a substantial indifference to externalities has been noticed in the economic literature. There has also been a neglect of the labour dynamics in the maritime-logistics chain. There is scope for more empirical studies concerning these issues. There is also a need for more studies of the impact of alliances and megaships on the operations in relations to costs, labour organisation, and profitability of the container terminals.

To sum up, the maritime sector is a key driver in the increasing globalising trends in the world economy as well as being a highly competitive industry. Its main strength lies in the ever-increasing rates of seaborne trade, marked by the growing volumes transported over long distances and the corresponding increase in the size of seagoing vessels. In recent years, there has also been a gradual paradigm shift towards vertical integration along the maritime supply chain, such as shipping lines venturing into the operation of port terminals, all of this occurring at global levels. This implies a corporate ideal aim of developing global networks offering fully integrated transport and logistics services and capturing the maximum market share possible, which also provides an edge in terms of bargaining power within the industry.

Port labour systems and dynamics

This broad review of the economic literature on port issues has addressed the major changes that have taken place in the port maritime industry, pointing to a range of different factors, addressed from a variety of approaches. Increasing ship size, for instance, carries consequences for cargo handling operations, in terms of technological innovation and investments. These trends have a direct impact on work organisation at the operational level and on dock labour systems in general, which are restructured by such exogenous factors. In addition, this literature has shown how the container shipping industry has been transformed by the consolidation process in the container shipping sector, vertical integration and the establishment of shipping alliances.

Meanwhile, the institutional environment has also been changing gradually. The literature has examined these structural and institutional changes in considerable detail. However, less attention has been paid by scholars to the extent to which these trends are altering the environment for terminals and affecting the dock workforce. Indeed, it is generally acknowledged that additional research is needed in order to explore in detail how those dynamics influence terminal operations and working conditions in the medium and long term. Empirical research on labour in ports, the behaviour of the (multinational) cargo handling companies operating within them, and the way they handle labour depending on the institutional frameworks within which they operate, is limited. Few studies focus on the mutual interaction between the institutional assets – at supranational and national level – the changing dynamics and the organisational models of port labour systems in Europe.

In this section, the existing literature on port labour will be critically reviewed, aiming at identifying the current gaps, debates and opposing views.

Ports are territorially embedded in institutional, path-dependent frameworks that are simultaneously both enabling and constraining. However they also form links within maritime supply chains and global production networks. This means that they sit on multiple spatial scales within the globalised economy. This dichotomy also could be applied to the dockworker, who usually handles global cargo, but at the same time is locally situated and socially embedded. This is one of the reasons why ports are sites of major clashes and conflicting interests, as a result of which the equilibrium between market requirements and labour regulations is often delicate. In order to understand the transformations of port labour systems in European ports, it is necessary to develop a perspective that highlights the interactions between the economic and institutional mechanisms within global production networks and the role of the social actors invested in these phenomena.

With some exceptions, the existing literature on port labour is dominated by juridical disciplines, whereas the scientific debate on the maritime-port sector, which is predominantly economic, does not takes labour too much into account. The debate on labour in the maritime-port sector is mainly carried out in an economic framework which considers labour as a passive item or as a dependent variable of production. Although the efficiency with which loading and unloading operations in a port takes place remains an important cornerstone of a port's competitiveness and its ability to generate wider economic effects in terms of employment and the creation of added value, labour seems to be a residual item in the field of port studies. Studies about ports tend to disregard labour, or assume a fixed relation between labour, the quay and the yard equipment used. Comparative empirical studies on labour issues in Europe are lacking. The impact of the strategies of the main players across the logistics chain on the structure of port labour has not yet received the attention it deserves.

A first issue lies in the variety of definitions of 'port worker' used in the literature, which can be represented through the conflicting distinction between status and contract. Port workers or 'dockers' are defined as 'manual workers engaged in the loading and unloading of ships in ports, ancillary services such as the checking, storage and intra-port transportation of cargo, and operations at passenger terminals' (Van Hooydonk, 2013:13). The word 'docker' originates from given spatial areas – dock and

warehouse – whereas the term 'port worker' acknowledges that the profession now requires special skills and qualifications. The legal status of the dockworker may vary as well. Dockworkers may have the status of civil servants in state-owned service ports, workers directly employed by a private terminal operating company or workers employed through dock labour schemes. Quite a number of port labour systems require that only registered dockworkers can perform dock work in the port. This obligation can be imposed by national or regional legislation or might also be the outcome of collective bargaining agreements between port employers and trade unions.

In those ports where employers have to use registered dockworkers, the criteria for recognition of dockworkers and the entities involved in the recognition process differ among ports. In a general survey of reports concerning the Dock Work Convention, the ILO (1973) recognises the diversity of views concerning the definitions of port labour and dock work[4] and specifies that the definition of the term 'dockworker' should be left to national law or practice. However the term 'dockworker', in this case should be extended to any worker engaged in handling goods in a port area, whether on shore or on board ships, despite the fact that there can be no universal and absolute definition of dockworker or dock work.

However, a generally accepted definition of the term 'port labour' does not exist, either in the academic or non-academic literature. Port labour can be considered as the loading or unloading of ships, or as all forms of cargo handling in a port area. The definition does however have a significant geographical meaning. Depending on the various regulations at a national level, there are a number of spatial delimitations related to port labour. Port labour may be considered in broader terms, within a port area and its vicinity, or may be sharply defined, with reference to a map. The work environment of the dockworker remains the dock and the boat hold, but at the same time, the spatial dimension may vary according to the specific contexts in which the worker is situated. It must be emphasised that the quayside is the meeting place for a variety of contiguous as well as distant working regimes – including seafarers, dockworkers, truck drivers and logistics workers.

In this article, port labour – or dock work, or dock labour – is not considered as a generic job, whose exercise can be entrusted indifferently to any one individual who is at hand, or whose services might be made available through a temporary work agency. On the contrary, port labour or dock work is considered to be a specialised and professionalised job that can only be entrusted to people who have certain training and requirements – not only for safety reasons.

A 2016 study undertaken by Walters and Wadsworth, and commissioned by IOSH (Institution of Occupational Safety and Health) and the labour union ITF (international Transport Workers' Federation), addresses the issues of health, safety and welfare of dockworkers in the global container port industry. It identifies a number of continuing dangers, causes for concern and weaknesses in the management systems employed by operators.

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4   Article 3 of the International Labour Organization (ILO) convention 137 refers to the registration of dockworkers: 'Registers shall be established and maintained for all occupational categories of dockworkers, in a manner to be determined by national law or practice'. Furthermore, 'registered dockworkers shall have priority of engagement for dock work'.

Although specific port labour systems vary among the European countries, one of the common peculiarities of port labour is related to the uncertain dynamics of maritime traffic. Dock work depends on the relentless and unpredictable rhythm of the arrival of the goods. Ports and container terminals are always subject to an exogenous factor, which is the ship. It is further acknowledged among dockworkers that the berth must wait for the ship, and never the other way round, which means that a degree of flexibility is always required in cargo handling operations. Dock labour is therefore distinctively different from many other forms of wage labour, with its anomalous character determined by three factors: the unpredictability of the work, the strong impact of the shipping industry on port business and the legal constraints that shape the status of dock workers. Typically, the demand for dock labour by a port employer is based on the average level of trade and, in moments of peak workloads, the use of temporary work, which represents the element of flexibity part that is required to handle the cargo. There is a sense in which dock work depends ultimately on the goods.

In her study, Alice Mah (2014) looks at the way that 'waterfront work' intersects with questions of urban identity and global legacies of casual labour. Analysing waterfront work through an ethnographic lens, she examines the narratives, memories and experiences of intergenerational working lives in relation to wider urban, regional and global dynamics. Her study focuses on the three port cities of Marseilles, Liverpool and New Orleans. Mah rightly emphasises how dockworkers are symbols of urban identity within port cities. This old form of casual labour is indeed linked with place identity in a way that is similar to the way that traditional industrial workers with certain industrial cities. However, dock labour is also distinctively different from manufacturing work because of its irregularity. Dock labour is a male-dominated, traditional form of waterfront work, related to militancy, casualism and close-knit communities.[5] However, each dock labour force is highly insular, with strong intergenerational traditions of sons following fathers into the docks (Mah, 2014:9).

Dempster (2010) observes that at the beginning of the twentieth century most of the goods handling in European ports was carried out by casual labour which was, over time, replaced by recognised dock labour registers, in order to cope with the casual and seasonal nature of this kind of work. The history of port labour has been characterised by constantly oscillating processes of casualisation and de-casualisation, obtained after a long series of union struggles, also well described in the literature on labour history (Bologna, 2010; Levinson, 2006; Davies et al., 2000, Phillips & Whiteside, 1985; Tonizzi, 2014).

The management and governance of port labour are particularly important with regard to the application of the basic rules of the European Treaty (TFEU), as pointed out by Verhoeven. The organisation of dock labour schemes is mostly subject to Treaty rules on competition at European level (Verhoeven, 2011). How these principles should be applied to port labour systems is one of the key debates in the port sector. Verhoeven focuses on the compatibility between port labour systems and European policies, showing how delicate is the equilibrium between market requirements and regulation in the port sector. His perspective emphasises the variety of dock labour schemes in

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5   Koenzen (2016) also addresses these topics.

Europe, and the failed process of the European Commission's proposed Directive on port services. Strongly contested by trade unions (but also by private port terminal operators and public port authorities) the proposal would have introduced the right for service providers in ports to employ personnel of their own choosing as well as the right for port users to provide port services using their own personnel (self-handling). The Commission's proposal to 'open the market' led to a 'war on Europe's waterfront', as pointed out by Turnbull, and was the only Directive to be rejected twice by the European Parliament (Thomas & Turnbull, 2016).

The debate between the Social Partners at European level refers both to forms of 'protection' against the external pressures to which port labour is subject and to 'restrictions' to the free market. Among the authors who have addressed this, Verhoeven has the merit of identifying and describing the delicate question of labour pool organisation, and the complex balance between total liberalisation and total monopoly of the port services. Nevertheless, there remains a need for scientific studies that assess empirically the social and economic impacts of such processes.

A study commissioned by the European Commission on port labour provides an overview of the sector from a legal perspective (Van Hooydonk, 2013). The starting point of this study is that the market for various port services is not always 'open' to competition. In particular, port labour markets are classified as a source of market barriers and restrictive practices and, as such, constituting a 'headwind' against further marketisation (Turnbull, 2016). The study provides a comprehensive mapping of port labour arrangements in European ports, albeit based on the questionable assumption that the law ends where the port area begins (Van Hooydonk, 2013).

The reaction of the unions to this study was not long in coming. The ETF (European Transport Workers' Federation) responded with the claim that the study was biased, and that European policy making accords supremacy to economic freedoms over fundamental social rights (ETF, 2013).

While the contrasting positions are clearly defined among the Social Partners, it is hard to find objective studies that address the economic and social aspects of these dynamics. Focusing mainly on industrial relations, Turnbull (2016) observes that in the port transport sector, both product and labour market outcomes are the result of social conflict between the main actors. Some of the existing studies on port labour indeed focus mainly on the social dimension and role of unions (Wilson & Ness, 2018, Hodess, 2017). Turnbull (2016) notes the changing bargaining power of dockworkers over time, in a recent study of the marketisation processes and neoliberal restructuring in Europe, exploring the evolution of European port policy. The port transport industry is indeed, he concludes, 'one of the remaining transport sectors in Europe where there are still a significant number of market barriers and restrictive practices' (Thomas & Turnbull, 2016:933). Turnbull observes that by testing the legality of dock labour arrangements against the four freedoms of the single market, the strategy of the Commission has led to a hollowing out of the protective institutions of industrial relations in many European ports (Thomas & Turnbull, 2016). One limitation of this insightful perspective is the missing analysis of the economic sphere.

Perhaps no impact has been as pervasive as that of the technological innovation that has been introduced in the organisation of port labour, as well as the automation

processes, which represents another sensitive issue. The idea that automation modifies skills, rather than replacing them, is not very widespread among scholars in this field. Automation processes have led unavoidably to a contraction in the number of dockworkers. Researchers interested in port innovation usually explain this effect with reference to competitiveness, taking the automation trend for granted, without challenging critically the externalities related to it.

In a recent study, Serra, Fadda and Fancello (2016) evaluate alternative scenarios of labour flexibility for dockworkers in maritime container terminals. The authors compare five new scenarios for increasing the share of daily working flexibility with respect to current work organisation practices in Italian container terminals. The results are unsurprising: they conclude that increased flexibility in container terminals operations can lead to a significant reduction of the operating costs and greater efficiency. The authors overlook the evidence that there is an ongoing increased flexibility regardless of the factors they describe, dictated by the strategies of the shipping companies in the pursuit of economies of scale and the resulting pressures on the container terminals. Another limitation is that the authors consider the specific case of the Italian container terminals, but there is nothing specific to this case. Furthermore, the discussions about the importance of labour flexibility in port areas and the opportunity to implement interventions on flexibility policies cannot disregard the hypotheses that labour flexibility 'at all costs' has not been proven to restore port competitiveness. The bias is mainly in the assumption that port competitiveness leads towards the abolition of the existing labour regulations.

These issues are addressed in another seminal report provided by the Observatory of Transport Research and Training Institute ISFORT (Istituto Superiore di Ricerca e Formazione per i Trasporti): 'Far west Italia' (2012) provides a state of the art overview of logistics in Italy, focusing in particular on the future of ports and port labour. The report collects the work done in the course of the research on port labour in Italy carried out by the National Observatory on Freight Transport and Logistics. The first section describes the variegated scenario of ports and port labour in Italy, within which both the port labour carried out by the employees of the terminal operating companies and that done by the dockworkers of the labour pools is located. The second section presents the results of a survey conducted in five national ports, which represent the diversity and complexity of the Italian landscape. The third section singles out the peculiarities of the Italian context, by means of an overview of port governance models at international level.

This report emphasises that many different situations can be found with respect to the organisational model of port labour, which the legal framework provided by the Italian law 84/1994 had not prevented from developing. Even the title suggests the heterogeneity of the Italian ports in terms of port labour systems, organisations and settings. Each port has found its *modus vivendi*, according to the report, while still formally following the rules provided by the legal framework. In Italy, indeed, there is no single working model of port labour. Each port tends to self-organise according to its own rules, relationships and convenience, and thereby creates a specific model of work organisation, which is mainly the result of a particular synthesis between the macro-indications expressed by the port reform and path-dependent, local specificities.

The common point underlined in the study is the indeterminacy of trade, which is inevitably reflected in the work organisation of the cargo handling companies in ports. This study emphasised that, *de facto*, cargo handling companies in the Italian ports tend to transfer the effects of the flexibility requirements of port labour onto the labour pools, shifting the risk in cases where decreasing volumes are handled.

A sociological study by Della Corte (2002) highlights some peculiarities of port labour by looking at the impact of technology. This author focuses on the transformation of dock labour in the light of the new technologies by means of a comparative analysis of the transhipment ports of Gioia Tauro (Italy), Felixstowe and Southampton (UK). The results highlight, in particular, the relationship between the introduction of information technology and the control exerted over the workforce. The research analyses changes in the labour processes associated with these new developments and demonstrates the ways in which the synergy of the working operations is planned, managed and imposed by the technology. The crucial point of innovation, according to this author, is not so much the fact that technology conveys a certain organisational model of work different from previous phases, but rather the fact that in the new organisational form the tools necessary for production are at the same time used to control the workers (Della Corte, 2002). In practice, production and control tools merge to the point that it becomes difficult for dockworkers to identify the dual nature of IT systems. The risk to be avoided in interpreting such results, recognised by the author, is to fall into technological determinism by assuming that, given the same technology, all workers will necessarily be supervised and penalised in the same manner. Countering this risk, this labour sociologist points to the contrasting realities of the three ports studied, where human resources practices are not neutral. It turns out that in the – old – port of Southampton, the dockworkers were able to negotiate with the management a very different set of working arrangements from those that were developed in the – new – ports of Gioia Tauro and Felixstowe.

Another crucial point emphasised by Della Corte concerns the changing nature of dock work: both the skills eroded by standardisation and the new cognitive skills that are emerging. The new organisation of labour tends to destroy the traditional work gangs based on craft skills, but, at the same time, requires for some operations new cognitive skills that, being different from the traditional ones, create new forms of internal differentiation among workers. While this gives rise to new forms of technologically enabled discipline, at the same time it also gives rise to forms of aggregation and solidarity that boost greater strength in the dock workforce.

Another useful input to research on the European port labour system comes from the report of Notteboom (2010), prepared for the European Sea Ports Organization (ESPO), an independent lobby for seaport interests at European level. Notteboom's framework focuses on the market pressures exerted by the main port actors. Notteboom concludes that the requirements of the market players identified in the study drive a requirement for a maximisation of the performance of dockworkers in terms of productivity and flexibility, an optimisation of the direct costs of port labour, and a minimisation of indirect costs resulting from eventualities such as shortages, strikes and other incidents. The forms of internal organisation that result from this take place within a wider setting of legal and social conditions. The framework, although

meaningful, poses some limitations to a more detailed comprehension of the labour dynamics in European seaports. In order to provide further insights, four main points are identified:

First, the perimeter of the framework is well delimited, but the links between the main items of the internal and external organisations are presented in a deterministic way. In most cases, reciprocity among the items occurs. The market-driven approach does not encompass the full range of factors that shape the real setting of the port business. Second, the framework enables the context to be defined clearly, but the breadth of its aims and coverage produces a lack of depth, providing only a shallow overview with few supporting empirical evidences. Third, the question of the social and institutional conditions, though mentioned, is not sufficiently elaborated, and the difficulties of measurement are not explained satisfactorily. The direct impact of the social and institutional contexts on the overall picture needs more attention; in particular, there is a need for further analysis of the means whereby the external organisation interferes directly and strongly with the internal labour regimes and arrangements. Finally, the framework is based on a market-driven approach, but needs and actors in this field are not only those of the market. In addition, some economic actors in the market are particularly influential. Consolidation processes, vertical integration, increasing vessel size and other factors have produced a new scenario, which sharply influences the relationships among the economic actors. It is therefore only partially appropriate to put all the actors in the chain at the same level, since each market player has divergent interests, influencing the internal – as well as the external – organisation of port labour.

The framework provided by Notteboom, although inspiring in several respects, is not sufficient in itself to explain the changing dynamics of port labour as they are related to the complex structure of the logistics chain. It should be noted that Notteboom does not assess the quality of labour in ports. Moreover he does not consider either the perspective of the workforce or its composition. Cargo handling in ports requires flexibility, but how the workers involved respond to that flexibility, for instance in the negotiating of working hours, perhaps in light of an increase of volumes and the pace of work, is not questioned. However, there is considerable evidence that the operations of cargo handling in ports have led to arduous work. Instruments for increasing productivity such as performance-based bonus systems or other incentives are not allowed in certain ports (such as the port of Antwerp, widely used as an example by the author) for safety reasons, and neither is multi-tasking and multi-skilling. Meanwhile, this is not the case in other European ports, such as Genoa. A discussion of the role of the human factor in the European port system that excludes the viewpoint of some of the actors directly involved is not only misleading, but will inevitably provide a very limited perspective. This report, which is in several respects inspiring, shows that dock labour issues offer plenty of challenges for further research, in particular with respect to the requirements of global supply chains and their impacts on labour dynamics. Nevertheless, there remains a paucity of studies that can tell us what the European port environments are producing in social terms, as opposed to a purely economic perspective.

To sum up, this review of the literature on port labour dynamics allows us to underline two main points. The first of these concerns the complex and conflictual nature of the port industry. The second emphasises the heterogeneity and lack of

uniform definitions in studies of port labour issues. The analysis of the literature shows a fragmented landscape in which the endemic issues have only been addressed partially by scholars. Port labour is confronted with specific challenges not commonly found in many other industries. In addition to the spatial and social definitions of port labour, there remain key questions related to the definition of dock work, the lack of coherence between supranational and national regulations and ongoing automation processes. The peculiarities of port labour systems and schemes are nevertheless path dependent and embedded in the particular history of each port.

Conclusions: port labour and the maritime-logistics chain

The structure of the maritime supply chain modelled by Meersman, Van de Voorde and Vanelslander (2009) considers both the variety of labour regimes within the maritime-logistics chain and the overall frame within which port labour, in particular, is embedded. The perspective of this analysis makes it possible to grasp the common trends, taking into account the management of the chain, the relation between global factors and logistics labour, and power relationships across the chain. From this angle, it is possible to sketch not only a general overview of port labour dynamics across the chain but also an outline of the interdependencies, tensions and connections between each leg and the central nodes or 'chokepoints' (Wilson & Ness, 2018). The observation of the entire logistics chain fosters an analysis of the complexity of the supply structure of goods, its multi-scalar nature, its dynamism, and the labour that is incorporated within it and crosses it.

Van de Voorde and Winkelmans (2002) consider three types of competition in the port business: first, intra-port competition, between operators within a given port with regard to a specific type of traffic; second, inter-port competition, between operators from different ports, within the same range, serving more or less the same hinterland; and third, the inter-port competition at port authority level, which focuses on the utility mission of seaports.

An additional level of port competition is along the logistics chains, clearly illustrated in the structure of the maritime supply chain. According to Meersman, Van de Voorde and Vanelslander (2010), unlike in the past, competition takes place all along the logistics chains that connect origins to destinations, involving a multitude of actors, and not only shipping companies or ports. These latter entities represent the central link of the chain. The interest of the maritime economists remains focused on competitive advantage and the coordination of all activities carried out by both public and private actors, in order to ensure the smooth flow of goods from the ship to the hinterland and vice versa. In this view, ports will aim to become a node in the most successful logistics chains in order to increase their market share and improve their economic impact. Current port competition takes place predominantly at this level, as the term 'maritime-logistics chain' suggests. The vitality of ports is therefore affected by the requirements of shipping lines and infrastructures, and is shaped by a variety of market requirements that cross the entire chain.

A maritime-logistics chain and the current configuration of competition among ports are formed by three integrated dimensions: the maritime activities, goods handling in the port area and hinterland transport services. The formation of chains,

however, depends on maritime connections, cargo handling operations and distribution to the hinterland. Essentially, a large seaport requires all these three elements to be competitive, including adequate connections with the hinterland (Meersman, Van de Voorde & Vanelslander, 2010).

Two major forces identified by the maritime economists affect the port sector: changes in port organisational structures as a result of privatisation or deregulation processes, and the efforts of shipping companies to control the whole logistics chain. To understand the new challenges, hence, it is necessary to consider them in their totality (Van De Voorde & Vanelslander, 2014).

Despite the different purposes of the authors, from this perspective it is possible to analyse the complex structure of the maritime supply chain and, with some additional items, to gain a view of the labour requirements for handling goods along the chain. Once this is clear, it is further possible to understand how value is created and distributed in the global supply chain sequence. This view also reveals the social embeddedness, the power relationships between the actors and the pressures that run across the logistics chain.

The large number of parties involved in port activities gives rise to a strong heterogeneity, both within the port and between ports. The major challenge is to organise this complex playing field in such a way that market forces can guarantee an unhindered flow of goods along the logistics chain in the most efficient way. Because ports are links in logistics chains, it does not always make sense to consider the productivity of a terminal or port as an isolated entity. Resolving a pressure point in one link may simply transfer the problem to another. In this manner, productivity improvements in one section of the logistics process can actually increase costs elsewhere. Increasing the capacity of vessels, for instance, will spread the cost of sailing over more containers, but at the same time, it requires a greater processing capacity and thus the deployment of more substantial means at the terminal. Otherwise, the bottleneck will simply be shifted from the maritime route to the port and hinterland section of the transport chain.

The study of the structure of the maritime-logistics chain should be enriched with additional elements, in order to introduce the question of how labour is incorporated within the logistics chain, and in particular how its organisation is changing within a specific leg – the port segment. In accordance with the approach adopted, it is therefore appropriate to include in the analytical framework a number of additional variables mentioned above. These include both exogenous variables (such as global factors and European regulations) and endogenous variables (such as national regulations and dock labour systems). The analysis of port labour issues in Europe, indeed, requires a multi-scalar investigation, in order to identify how dock labour schemes and settings are influenced by global constraints, European policies, national regulations and the organisational structure of the terminal operation at the workplace.

Port labour issues need to be observed across the perspective of the maritime-logistics chain, through a gaze that tries to shed light on the details of each segment, as well as the overall structure of the transport chain that shows the mobility of goods, the actors involved, the asymmetries of power and the tensions along the chain. Two classes

of variables introduced into the framework make it possible to investigate the relationship between global factors, European regulations and labour in the port segment.

From this particular perspective, it is further possible to assess how the fulcrums of power of logistics workers have changed over recent years – moving across the chain, where the main tensions are situated, and why conflicts are increasing in specific legs of the chain. The search for economies of scale combined with the oligopolistic consolidation of the shipping/logistics industry, together with an increasing imbalance in bargaining power between the main market players, appears to be bringing into being an unprecedented scenario, with new challenges for the actors involved. The impacts of these dynamics are affecting the overall landscape both on the seaside and on the landside. This can be illustrated by the way that nowadays, for instance, dockworkers and their unions are negotiating not only with the terminal operating companies but also with their customers and shareholders.

However, it is also important to highlight the increasing fragility and rigidity of the transport chain and the central role played by the logistics workforce in the global supply chain. Although stakeholders continuously strive for solutions to render their supply chains leaner, for instance through automation processes, the structure of the maritime logistics chain reveals that they still have to deal with a variegated, fragmented workforce involved in a common structure of value creation. The workforce across the chain should be considered not just as a dependent variable of production but also as an active social actor. The relationships between workforce and transnational companies along the maritime-logistics chain can be interpreted with reference to the awareness of a structural power in the hands of the former, despite the variety of labour regimes and working conditions both across the chain and within European ports. The challenges for the future of dock labour systems in Europe should also be approached by looking across the overall logistics chain, without losing sight of the complex structures within which labour is embedded. This article has tried to overcome the limits in the conceptual framework of Notteboom previously described by emphasising and applying an 'intermodal gaze', which is required for interpreting labour dynamics in the maritime-logistics chain, in particular with respect to the port segment (Bottalico, 2019).

To conclude, this review of the literature about port studies and port labour dynamics has made it possible to identify two main points: first, the complex and non-transparent nature not only of the port industry but also of the overall maritime-logistics chain; and second, the heterogeneity and lack of uniform definitions in the analysis of port labour issues, in particular the lack of a clear and recognised definition of port labour. The topic of port labour is complex both analytically and in relation to policy issues.

The in-depth analysis of the existing literature on port labour has revealed a fragmented scenario, with many endemic issues only partially addressed by scholars, with a few exceptions. Port labour is confronted with specific labour challenges not commonly found in many other industries. Some studies shed light on the current changes and challenges in port labour regimes and demonstrate how the economic effects of seaport activities are no longer limited to the local environment but are spread over a much wider geographical area and among a broader range of market players. The economic benefits of port activities are expanding from the local system towards a

much larger economic system, showing a dissolution of the port space, which is both territorially embedded and at the same time de-territorialised through the process of regionalisation.

The strategic action of the main players along the maritime-logistics chain is modifying the working mechanisms of port labour, altering the matching of labour supply and demand and opening up new decision-making prospects for transnational terminal operating companies in European ports. However dock labour policies to date have not been updated to reflect this, except for deregulation processes, mainly driven from the supranational level. In other words, the organisational models of labour in European ports, more or less in contrast with the European principles of the free market, seem to be being undermined by the processes of globalisation, competition along the entire logistics chain, and Europeanisation of labour policies.

The general trends towards open and autonomous pool systems, use of temporary work agencies and pressure for continuous working and flexible and variable shift lengths, have not received much attention in the scientific literature. However, some issues such as the influences of the global players across the chain and the compatibility between national and supranational regulations are objects of delicate debate and conflicting positions between the actors involved (Thomas & Turnbull, 2016). Despite major differences in union power across seaports and countries, labour unions, typically very visible at the dock labour front, play an important role at supranational level.

Conversely, while a great deal of information has been produced on the port environment, the features of port labour systems and the occupational and social structures of the workforce are more or less unknown. This suggests a need for further scientific studies, capable of empirically exploring the impact of the changing dynamics on labour in ports and in the transport chain in general, of which ports represent the pivotal link.

Albeit with a differing pace of change among European ports, it is clear that port labour in Europe is undergoing a slow process of deregulation in the forms of protection from the impact of external tensions. This tendency faces resistance from a workforce that is capable of paralysing and disrupting the smooth and seamless flow of goods along the maritime-logistics chain with a single strike in one of the leading European logistics hubs.

The literature review has also drawn attention to several other aspects that need to be considered to gain a clear understanding of these processes. Ports are characterised by path-dependent elements, and by particular structures affected by exogenous variables, market and institutional pressures. Given its anomalous and hybrid nature and its varied and implicit negotiating mechanisms, the port business seems to be an arena in which a 'non-capitalist' organisation of labour still persists.

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The ambivalence of logistical connectivity:
a co-research with Foodora Riders

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ABSTRACT

This article explores the notion of *logistical connectivity* as a twofold and ambivalent lens. On one hand, connectivity can be seen as a pervasive logistical tool for labour exploitation and surveillance. On the other, it opens up opportunities to establish new kinds of social relations and forms of worker organisation. The analysis draws on empirical data gathered during 2016 in Turin, a city in northern Italy, during mobilisations by Foodora workers. The findings show that logistical connectivity constitutes an unprecedented form of pervasive control, but – under certain conditions – can be shaken and reversed by workers and become a mode of mobilisation and self-organising.

KEY WORDS

platform capitalism, gig economy, workers, subjectivity, digital connectivity, logistics, conflict, Foodora

Introduction

This article explores the notion of *logistical connectivity* as a twofold and ambivalent lens through which we can understand logistics and, more broadly, labour phenomena linked to the so-called gig economy. On one hand, connectivity can be seen as a pervasive logistical tool for labour exploitation, surveillance and an indirect mechanism that allows the internalisation of workers' dynamics of self-enactment (Scholz, 2016). On the other, connectivity opens up opportunities to the same workers to establish new kinds of social relations and self-organisation and, by strategically cutting across 'log in' and 'log out' dimensions, to enable them to make a political space of struggle out of logistical space (Neilson, 2012).

While both in lay and scholarly discourse logistics tends to be mostly considered as an asset in the sphere of production and circulation of commodities, we aim at *re-territorialising* (Deleuze & Guattari, 1987) and therefore politicising logistics, which we understand as the realm where the dimensions of space, movement and strategic thinking productively meet each other. We accomplish this by distancing ourselves from the typical capital-productive perspective and considering instead the resistant kind of logistics implemented by organised and 'connected' labour. More specifically, we will examine the subversive logistics of gig economy bike riders active in the food delivery business organised by Foodora, who navigate the structured space of the city in novel and resilient ways.

In this context, we aim to understand how subjects relate to their work on an everyday basis and how they manage to re-approach it through antagonism and practical re-signification of the logistical connective nexus. In fact, it is the inherent contradiction of the logistical connective dynamic that allows Foodora riders to push back against unfair working conditions. We substantiate this theoretical argument with an empirical analysis that draws on original data gathered during 2016 in Turin, a city in northern Italy, during mobilisations by Foodora workers. Our study is based on *co-research*, a form of inquiry that challenges the division between the subject-researcher and object-researched (Alquati, 1993; de Molina, 2004), which is specifically designed to acknowledge the workers' agency in antagonising capital. In fact, our study sheds light on the riders' remarkable capabilities for self-organisation and engaging in labour struggles (Leonardi, 2017) in the context of digital platforms and logistics, which are understood as an ambivalent bio-power[1] that makes possible a rethinking of the role of living labour and the production of subjectivity (Neilson, 2013).

Theoretical framework: platform capitalism, logistical connectivity and neoliberal subjectivities

Platform capitalism (Srnicek, 2016; Armano, Murgia & Teli, 2017; Vecchi, 2017) is a term that brings together a number of different concepts. It reveals not only the post-Fordist character of logistics but also the convergence of a hyper-mobile labour force

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1   Bio-power is a term originally coined by Michel Foucault. It is a power that no longer deals simply with legal subjects over whom the ultimate domination was death, but a mode of power exerted over living beings, and over life in general, through 'an explosion of numerous and diverse techniques for achieving the subjugation of bodies and the control of populations' (Foucault, 1979 [2008]:140).

with means of communication and means of transportation that are configured as a functional and dynamic networked space. Digital platforms can thus be seen as logistical 'intermediary digital infrastructures that efficiently coordinate "subjects" and "objects", by mediating customers, commodities, information, advertisers, service providers, producers and suppliers' (Srnicek, 2016:43–45), thereby *de facto*, bringing about a digitalisation of logistic principles.

Such a logistical colonisation of labour space through digital technology can perhaps be traced back to the 1980s (Castells, 1989), but, along with the digitalisation of cities, it has accelerated in the aftermath of the 2007–08 economic global crisis (Drahokoupil & Fabo, 2016; Scholz, 2016; Valenduc & Vendramin, 2016; Drahokoupil & Jepsen, 2017). In fact, the recent economic downturn triggered a powerful wave of capitalist colonisation of urban space via mobile connectivity and 'spatial and locative technologies' (Kitchin, Lauriault & Wilson, 2017:ii).

The platform economy is essentially logistic-driven capitalism that finds its condition of possibility in the deployment of information and communication technologies by post-Fordist capital (Dyer-Witheford, 1994). It does this in order to flexibilise and mobilise work through its displacement from the environment of the factory to offices and homes, thus 'all of society lives as a function of the factory and the factory extends its exclusive domination over all of society' (Cleaver, 1992:137). In such a context, previous logistical practices that were tied to specific working environments such as factories, transport hubs and warehouses expand, colonise and capture new forms of labour.

There has always been an elective affinity between logistics and information and communication technologies in the same way as means of transportation most frequently overlap with means of communication. That is because the general goal of logistics is to connect and circulate productive assets such as subjects, objects and information effectively, thus overcoming spatio-temporal barriers (Neilson, 2013). Accordingly, logistics epitomises a mode of production based on commodity and supply chains (Galloway, 2006).

A concept that signals such a profound link between logistics and ICT is connectivity, which implies both a complex technological infrastructure for mobile and internet-connected multimedia communication and a contradictory relational modality. The concept of connectivity makes it possible to describe how the use of technology can both enable and deny communities and sociability. This concept is thus ambivalent in several respects, because connectivity is simultaneously both an 'objective' ICT structure and a 'subjective' modality for operating within such a structure.

While connectivity represents the content of this objective/subjective communicative/informative structure, logistics represents its 'form', constituting the rationale through which animate and inanimate commodities, living and dead labour, are appropriated by capitalism for the purposes of valorisation and capital accumulation. This is because ubiquitous connection means ubiquitous labour and the ceaseless circulation of commodities. As Neilson and Rossiter (2011) put it, 'logistics plays a role in controlling the movement of labour power as much as it applies to the passage of other commodities' (63). It is according to such a capitalist 'form' that

logistical connectivity deconstructs and reconstructs social digital spaces by reconfiguring traditional boundaries and parameters such as present/absent, member/stranger, near/far, included/excluded, interior/exterior, north/south and east/west.

We therefore claim that the connectivity–logistics nexus allows us to explore important transformations of current working modalities, by treating work as a category of valorisation taking place anywhere and everywhere (Dujarier, 2008) whose boundaries then become limitless (Loriol, 2017), incorporating, via its digital facets, important logistical components.

Platforms for managing work have existed since the early 2000s (e.g. eLance, Freelancer, oDesk) and have paved the way for the growth of on-demand/gig economy platforms and for substantial changes in work organisation (Huws, 2017). Nowadays, individuals can valorise their own condos (Airbnb), creative production (Etsy) or transportation means (Foodora) by circulating them inside a digital network. As a consequence, connectivity has further encouraged the pre-existing trends, by incentivising the logistically effective circulation of freelance work and therefore the whole gig economy mode.

Investigating the logistic–connective nexus here enables us to look deeply into the capability of digital platforms to valorise linguistic practices, affective links, cooperative relations, life-world and subsume them, through logistical rationales of circulation of commodities via ICT-powered networks. This leads us to conclude that logistics subsumption takes place when means of communications become almost completely interchangeable with means of commodity transportation as well as means of valorisation.

Moreover, at a meso level of abstraction, platform capitalism is characterised by its capability to increase the organisation of workers and markets logistically in order enhance its flexibility. Illustrative of this is the process of 'uberisation' (Abdelnour & Friot, 2016; Cingolani, 2016), which signals the extreme mobilisation and flexibilisation of work by emphasising its freelance aspects via the intermediary agency of digital platforms.

In such a context of connective logistical highways, freelancing systematically moves most of the risk-taking onto the single worker, with the result that individuals enter into an unconventional environment combining on one hand the enabling perspective of being their own entrepreneurs (Foucault, 1979 [2008]) with, on the other hand, very high levels of precariousness (Beck, 1992; Armano, Bove & Murgia, 2017). In this article, we analyse how such tendencies are implemented through the specific forms of work arrangement, relational configurations and ICT technology provided by digital platforms, which thereby provide a condition for the shaping of neoliberal subjects (Boltanski & Chiapello, 1999; Bologna, 2018). However, as we will mention later on, while logistics try to shape workers as instrumentally flexible subjects that efficiently adapt to the imperatives required by the conditions of circulation, such a contradictory subjectivation process can generate antagonism and resistance and, with it, the potential to break the whole logistics chain (Cuppini, Frapporti & Pirone, 2015).

Among different types of digital platforms (De Groen, Maselli & Fabo, 2016; Schor, 2016), we focus here on one that could be categorised as a 'lean platform' (Srnicek, 2016:50). This category is characterised by a concentration on a specialised task food delivery and by the displacement of the business risk by outsourcing most

of its assets. By 'lean' Srnicek means that these kinds of businesses tend not to own the means of production (such as bikes, cars or outfits), relying on the worker's investment in these things, and donot to enter into an employment relationship but 'partner' with self-employed workers.

Such a combination of self-employed work arrangements, ICT and logistic instrumentality allows work boundaries to become blurred, uncertain and therefore problematic because it is in this very opacity that 'free labour' hides (Terranova, 2010; Hesmondhalgh, 2010; Huws, 2014; Armano et al., 2017). In the context of this blurring of boundaries, we are particularly interested in how the neoliberal subject navigates a way through this contradictory logistical scenario. And it is in this liminal context that we will seek to make sense of the capability of the Foodora riders to re-appropriate the logistical connective nexus. As a realm of bio-political management[2] – which does not affect the formally autonomous character of freelancers – logistics can therefore be conceptualised both as a site of power and as a struggle (Neilson, 2012).

Fieldwork: co-research as method and transformative process

Consistent with our goal of exploring how subjects navigate the logistical–connective space, we aimed to develop a participatory form of knowledge production in order to analyse the concrete ways Foodora riders have been dealing with contradictions and everyday conflicts, in order to generate an understanding based on their lived experiences (Hamm, 2015).

Foodora is a German online food delivery company that delivers ready-prepared food to customers' homes from restaurants that otherwise would not offer the option to deliver. It started off in Munich in 2014, then relocated its headquarters to Berlin and has since expanded to more than ten countries, serving around 9,000 restaurants. Foodora customers can choose to access this service via the company's website or through a mobile app, enabling them to browse restaurants in the area, place their order and pay. Once the order is ready, it is picked up by one of Foodora's couriers and delivered to the customer 'in about 30 minutes'. The company relies on an online platform which coordinates the movement of the cyclist couriers through the delivery process. The so-called riders – who work for the company as self-employed workers – access their work by logging on to the platform via their cell phones. Once connected, orders are assigned automatically by the platform (De Stefano, 2015; Prassl & Risak, 2015).

In our fieldwork, we gathered empirical data through in-depth interviews and focus groups, embracing what Alquati (1993) defines as *co-research*, which is a collective process of production of knowledge and action realised through interaction and observation of everyday practices. Doing co-research means creating a collective space where experiences can foster critical consciousness about common-sensical praxis, therefore normatively aimed at re-gaining a sense of agency. We understand

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2   Foucault (1976 [1979], 1979 [2008]) made a distinction between the two political technologies that compose biopower: discipline and biopolitics. Biopolitical techniques of managerial control operate through the government of the freedom of the subjects, whose autonomy is therefore not directly questioned.

Table 1: Socio-demographic characteristics of research participants

Riders' (fictitious) names	Age	Sex	Educational degree
Roberto	23	M	High school diploma
Giovanni	36	M	Bachelor's degree
Pietro	40	M	High school diploma
Luca	29	M	High school diploma
Paolo	25	M	High school diploma
Alessandro	20	M	High school diploma
Graziella	24	W	High school diploma
Giuliano	27	M	Bachelor's degree
Simone	29	M	Bachelor's degree
Luigi	23	M	High school diploma

narratives of experiences as a self-reflective resource of the workers, especially when the workers in question must deal with powerful neoliberal narratives. In this respect, the stories that emerge produce an alternative frame and with it a possibility of transformation.

We were able to access the field by attending various protest initiatives organised by Foodora workers, starting with their first picketing activity on 8 October 2016.[3] During the following weeks we attended a number of meetings and assemblies organised by the workers. This gave us an opportunity to make contacts and craft the first reports. Initially, we arranged in-depth interviews and subsequently organised some focus groups. We selected ten workers who were particularly involved with the labour mobilisation, and examined their insights into the ambiguities of their working condition. We focused on the peculiarity of the relational aspects and on the conflicts that ensued, in order to interpret our empirical material in the broader context of the transformations of the labour market. Table 1 provides a brief summary of some of the characteristics of these riders.

Most of our interviewees represent the typical urban-based demographic of platform capitalism workers (European Commission, 2016; Smith, 2016): young college students.

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3   The date most usually quoted as marking the beginning of the protest of the Foodora riders in Turin is 8 October 2016, the day the riders organised the first informational gathering in Piazza Vittorio Veneto, one of the meeting places for riders, at the beginning of their shifts. However, Foodora workers tend to identify the beginning of their fight some months earlier, when they created a WhatsApp group and started organising a petition.

However, due to the crisis and the consequent lack of job opportunities, among the riders interviewed, at the time of our field research, there were also some older adults who had to find alternative work following the loss of their previous jobs.

Those workers earned about €5 per hour (or, when paid piece rates, €3.60 per delivery), a very low income which they initially accepted peacefully, given the absence of real alternatives and the initial phase of adjustment of the company, which had just entered the Italian market. However, when the company moved beyond this adjustment phase, working conditions were not improved and levels of income were not increased. On the contrary, Foodora tried to worsen the working conditions, by switching to payment by piece rates, causing a general sense of frustration.

Findings

The logi(sti)cs of permanent connection

According to the theoretical framework we outlined in our introduction, the ambivalences of the logistics/connectivity context can be understood as outcomes of the tension between (infra-)structural elements and subjective practices. In the specifics of our case, such tension is first of all exemplified by the riders functioning logistically when permanently connected to the algorithmic (and human) management of the platform. Here, we can understand logistics/connectivity understood as an aspect of the technological infrastructure. However, when inquiring about the algorithm, the interviewees claimed that the assignment of shifts was actually made by a human being – the person in charge of the Turin area, although the allocation of tasks during those shifts was made by the algorithm assigning deliveries during the working shift, demonstrating that there was also a subjective aspect.

The friction between the purely technological and the human forms of management derives from the fact that the manager can exercise a certain discretion in the assignment of the shifts, but cannot intervene in their management in terms of task allocation. The mechanism can be illustrated by a borderline case in which a high-performing worker, consistently assigned the most distant deliveries, asked for an explanation and was told by the manager that he could not over-ride the computation made by the algorithm; he could only advise the worker in question to cycle at a slower pace in future in order to prevent the algorithm from assigning him increasingly demanding tasks:

> One of our colleagues, who went very fast, was always assigned the most distant orders. At one point, he went to the office to complain to the fleet manager who told him 'Oh yes, it's true that the algorithm gives you the furthest deliveries . . . slow down!' (Roberto, 23 years old)

Unlike what happens with respect to the pace of work, the discretion of the managers plays an extremely important role as regards the mechanism of assignment of shifts. In fact, personal knowledge and relationships come into play, in a way that is not very different from what happens in work that is not mediated by platforms. In this case, the contradictions of logistics/connectivity display the overlap between connectivity understood as technology and connectivity understood as an inter-subjective relational dimension:

> *Foodora relies on an online platform called Shift-plan, which provides a weekly chart with the various shifts and you select the ones you want. At that point the manager of the shifts selects the riders [. . .] it really depends on how nice you are to those who assign the shifts. (Alessandro, 20 years old)*

> *I was on good terms with the shift manager, he knew I was always available, when he was in trouble he called me and in return he tried to give me the shifts I wanted. Such treatment was not reserved for everyone and above all it was not reserved for those who did not have a personal relationship with that person . . . it is a matter of personal relationships. (Giuliano, 27 years old)*

The assignment of shifts is managed through an online platform, which in this case is used, according to our interviewees, in a completely arbitrary manner by the managers. Thus, the 'objective'/'subjective' overlap concretely turns into an aggravating combination of non-intelligibility of the algorithm with the opacity of the system of assignment of shifts used by the persons in charge. In this process, the riders experience a progressive reduction of agency and find themselves lacking any tool for collective negotiation of their working conditions. The experiences of the riders we interviewed thus highlight how digital logistical connectivity is instrumentally utilised as a labour control tool that reproduces asymmetric power relations between Foodora's management and the workers.

The working life of the interviewees was therefore quite far from the rhetoric used by the company to describe how to 'become a rider and enjoy the freedom'.[4] Freedom and flexibility, in fact, are explicitly mentioned both in company publicity and by recruitment agents during the job interview. In both cases the activity carried out for Foodora is described as a job that takes place 'whenever one wants,' which perfectly matches the main motivation that pushed the interviewees to become a rider: the possibility of being paid for the passion of biking, together with the advantage of flexibility. In a Foucauldian perspective, the workers who are requested by the company are in this sense 'docile subjects' (Foucault, 1975 [1995]), shaped by power, coercion, but also by powerful narratives. In this case the key word is flexibility, which operates both at subjective and objective levels of logistical-connectivity: acting simultaneously both as a personal motivation and as a systemic imperative of logistical commodity circulation.

According to the interviewees, however, this notion of 'working when one wants' is challenged: it turns out that in practice they must be always available, constantly connected and not take their eyes off the screen of their smartphone. This results from competing with each other against a scarcity of shifts and abundance of workers. This dictates a form of work organisation for the riders in which the required levels of logistical functionality do not just dictate their constant availability but also their steady response in taking orders:

> *When you say you are available, you cannot really take on other commitments, so Foodora also takes the time when you gave the availability, because obviously you*

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4   See Foodora's website: https://www.foodora.com/careers/riders.

> *do not go to the cinema, you cannot carry out other jobs. Maybe if you work as a translator or proofreader at least you can work meanwhile on the computer, but generally if you declare yourself available, then that free time is held. (Paolo, 25 years old)*

> *They send the order to you and then you have to accept it. Even if you are careful, the application may not work . . . If it notifies you five minutes later, then the order may get either re-assigned or the algorithm takes note that you took too long to accept the order. (Luca, 29 years old)*

As already mentioned, limitless connection means limitless labour. In fact, the fact that workers must declare their availability, and have to constantly check their mobile phones, has the effect of occupying most of their days, even when there are no orders to be completed. Workers must always be available, otherwise they will be quickly replaced by anyone from the large reserve army of potential Foodora riders. A reservoir of labour is constantly reproduced because hiring does not cost anything, which means that Foodora can circulate labour (as a commodity) for free. In this way, the company can afford to hire people without making them work. In fact, Foodora is not even obliged to assign shifts or guarantee any minimum number of hours and/or a corresponding fee because riders are hired through self-employment contracts.[5]

The need for continuous availability is reinforced by the fact that the company only confirms shifts two or three days in advance, and this means that the riders are not able to organise their free time or other jobs to fit in with their work patterns. This means that the vaunted possibility of being able to freely choose one's working time becomes more a desire than a reality, displaying once again how subjective and objective levels of the logistics/connectivity nexus can sometimes overlap while sometimes being very distant. Even a simple shift change request becomes complicated in work mediated by platforms:

> *There was a whole period in which management demanded that we find substitutes for ourselves . . . Now this thing has waned because we are really so many who want to work that people are queued up waiting to take on any available tasks so there is no need to look for a substitute. As long as your substitute does not accept it, you stay on duty and if he/she do not show up, it's you who did not show up for the round. (Giuliano, 27 years old)*

With the introduction of piece-rates (instead of hourly pay), it was a common experience for workers to spend hours of their work shift without receiving any order of delivery, and consequently without receiving any compensation. This took place while the rider was wearing an outfit that advertises the company's brand, which could be

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5   In 1995 an Italian regulation introduced a hybrid status between employment and self-employment, the so-called 'coordinated and ongoing collaboration' contracts (*contratto di collaborazione coordinata e continuative*, abbreviated as 'co.co.co'). 'Work is carried out on a continuous and coordinated basis with the contractor. Services are mainly personal in nature' (Article 409, paragraph 3 of the Italian Civil Procedure Code, and Article 2 of Legislative Decree 81/2015 (Jobs Act – Labour Contracts Code)) (Eurofound, 2016). More precisely, workers continue to be classified as self-employed workers but are supposedly given special status with regard to social protection.

regarded as work in all respects, albeit unpaid, since the worker is required to perform the function of 'living advertising' without recompense. For Foodora this system is unquestionably cheaper than buying advertising space: it is indeed actually free. Free labour is present in multiple forms, for example in relation to promotions aimed at customers. For instance, this happened when workers were required to go to the company headquarters during periods of special promotions, in which customers are offered free drinks at the time of order delivery, without any extra payment. Moreover, riders are expected to constantly read and respond to text messages, even when they are not working, because they are the main communication channel used by managers, as well as the Foodora app, to check the availability of new jobs:

> To be honest, I must say that many of those beers ended up in improper hands . . . (laughter). (Alessandro, 20 years old)

The remark above suggests how several riders resisted the company's imposition of unpaid tasks – such as to carry the weight of promotional complimentary beverages – by appropriating the merchandise. Although we identified different forms of resistance to the requirement for constant availability at work – as we will illustrate in the next section – the margins of autonomy promised in the recruitment phase are very limited in the daily life of Foodora riders. In fact, if flexibility is one of the main incentives that initially motivates aspiring riders, workers soon discover that, beyond the proclamations of an informal and friendly atmosphere, there is in fact a significant asymmetry of power between riders and managers, mainly based on the requirements of being always available and permanently connected.

The algorithm as battleground and modality of resistance

Capitalist innovation affects the world of work by transforming its essential modalities, through a recombination between the means of production and the human agent (Alquati, 2001). The starting point for a critical analysis of this issue is a grasp of the ambivalences of innovation and the technology that accompanies it.

In our case study, connective technology acts as a logistical tool of control, exemplified by the algorithm that allocates orders and measures the riders' performance, indicated by the necessity to log in at the start of the shift and the constant geo-localisation. However, at the same time, workers can use these technologies in their own favour as a means of mobilisation for the improvement of their working conditions.

In this article, we have analysed the forms of control to which riders are subjected, but we are also interested in the riders' practices aimed at improving their working conditions. In order to obtain workers' rights, riders re-signify logistical mobilisation as political mobilisation: rather than behaving as independent units of production; rather than being in permanent connection with the company, they enter into a relationship with each other, discuss, reason together and collectively create strategies. This illustrates once again the importance of placing the accent on the relational dimension. In this context it is important to note that the riders we interviewed had met virtually (by joining a company chat group set up by the managers) before they actually met in person:

> *[We had] a WhatsApp group created by management where we were signed in at the time of recruitment, through which they coordinated shifts, and could deal with problems in real time during the shift. When the chat began to grow we also began to know each other virtually through that chat then we re-met on the street, we recognised each other by the outfits. (Paolo, 25 years old)*

The fact of not knowing each other personally, but only through a WhatsApp's chat, did not prevent workers from building personal relationships and activating processes of aggregation and confrontation that have subsequently resulted in mobilisations. If logistics aims at reducing the risk of over-stocking and flawless circulation, the riders' initiatives exemplify how the constrictive boundaries of the logistical–connective nexus can be overcome by subjects operating within such structures:

> *Oh yes, it has created a strange sociality, which then consolidated. I think I can say that one of the merits of this little struggle is to have created a very strong community. (Luca, 29 years old)*

As the riders established dialogue amongst themselves, they started taking advantage of being already included in the same chat: they exchanged telephone numbers and created another chat exclusively devoted to Foodora workers' discussion of working issues. In other words, they turned what Alquati would define as the technical composition of labour created by the logistics–connective infrastructure into a means of political engagement, thus revealing how logistics-connectivity can become a circuit of mobilisation of struggle rather than just the circulation of commodities:

> *We created a group that was called 'Foodora damage refund', which was meant to obtain reimbursement for the maintenance of the bikes. Everything started from there and since then has grown slowly and has reached these levels. Our strength in my opinion was that of having made a community that unites us through the will to make a change. And this is what in my opinion allowed us to go beyond virtual friendship [. . .]. There are several strategies that allow us to use to our advantage the same technological tools used by the company. In the absence of official media – managers did not use either email or paper letters – for example, we quickly learned to keep screenshots of conversations in order to protect ourselves: I made a nice collection of screenshots, I kept everything. (Paolo, 25 years old)*

As we write this article, a group of workers has taken legal action against the company for breach of privacy, because they used to address individual workers by means of the publicly used chat. Furthermore, the riders have challenged the company's constant geo-location surveillance and the fact that they have to use their personal mobile phones for work (e.g. the requirement of downloading the application; providing their personal data to the restaurants associated with the service and to the customers who make the home delivery orders). The use of the 'corporate chat', in which texts are sent to all colleagues, regardless of whether or not they are directly concerned with the content of the message, meant that the WhatsApp group became a place where the workers could express their grievances, a sort of virtual tool for 'washing dirty laundry in public':

> *Unpleasant dynamics emerged from using the 'official chat'. Because there was not a physical company or a chance to meet physically, the chat turned into a grievances room. It became the only way one could express discontent and speak to anyone from the lowest ranked employee to the Manager of Foodora Italy. (Giuliano, 27 years old)*

Once again, the centrality of the relational aspect implied by digital connectivity and logistical needs is crucial for understanding how the alliance between Foodora workers and power dynamics are configured in a technologically mediated working environment. The fact that the Foodora workers have created their own WhatsApp group alternative to the company's own chat room to coordinate their activities and be able to hold free discussions without fear of repercussions, shows the ambivalence of online platforms, as well as the opportunities for action that subjects can put in place to re-appropriate what, until recently, were effective corporate control tools.

The need arose from an extremely simple request: demanding the company to take over the maintenance of bicycles. This was an important issue for workers because the means of transportation, as well as mobile phones, were not provided by the company so they had to pay from their own pockets for this maintenance. From these requests, the workers told us, the first forms of mobilisation began: they met, after having known each other only virtually (a circumstance that is different from many other workplaces). They broke the isolation of their condition and started organising the first assemblies, refusing to talk individually to bosses in face-to-face meetings and demanding the presence of the union at these meetings.

The first Turin protest did not lead to immediately positive outcomes. Especially among those who participated in mobilisations, losing shifts assignment of work was rather frequent. At the time when the interviews and focus groups were conducted, for example, the most exposed riders reported not having been given any shifts for about two weeks. The non-assignment of shifts obviously follows a punitive logic, as these workers had also been eliminated from the chat created on WhatsApp by the company, which is the main channel of communication between managers and riders:

> *When we started complaining overtly, individual punishments came out, which ranged from temporary suspension, from the chat, and then being cut off from the only channel of communication with the whole company and colleagues, when cutting shifts for 1–2 days. [. . .] Every time we have been expelled from the chat then they are deprived of blocks of shifts. Therefore: 'You cannot talk anymore and you cannot even work anymore'. (Luca, 29 years old)*

From the company's point of view the goal was to prevent workers from expressing their opinion if this was deemed inconvenient, as well as to bar them from participating further in the discussion, even as a listener, and finally, to prevent them from being assigned shifts. Furthermore, these punitive measures were enacted publicly, in order to set an example to other workers. Within Foodora, dismissal can be carried out effectively simply by a failure to assign shifts, without any obligation for formal communication. Workers are logged out or no longer have access to the application that regulates the operation of the delivery service. This is how a simple disconnection from

the logistic circuit of the profile from the company platform takes the place of a letter of dismissal, thereby circumventing the whole system of guarantees and protections typical of traditional employment relations.

Despite the negative consequences for the riders after the first mobilisations, their counter-use of the technology used by Foodora shows the dialectics of combining connective logics with logistical goals of online platforms and the possibility of opening spaces for collective action. In the following months, the Turin riders went to meet their colleagues in Milan to coordinate protest initiatives at a larger intra-regional scale and then aimed even further, escalating the struggle to the national and European levels. This process contributed significantly to raising their issue at the level of public national debate, thus expanding the protest to other Italian cities, such Bologna, where riders set up a local trade union, the 'Riders Union Bologna'. While limited this initiative points to the accomplishments of this kind of mobilisation, which has already produced successful campaigns against companies such as Uber in the UK and Pony Express in the USA.

Logistical–connective ambivalence: some provisional conclusions

The findings of our analysis significantly support our initial theoretical considerations about logistical–connective ambivalence: while being instrumental to gig economy labour, the logistical–connective nexus can also become a productive terrain of antagonism as 'connected' workers employ the tech-savvy communication skills, for which they were hired, for assembling a language and a practice of insubordination through the disruption of logistical circuits. Thus, while logistical connectivity constitutes an unprecedented form of pervasive control, under certain conditions, it can be shaken and reversed by the workers and become a mode of mobilisation and self-organising.

Understanding the forms of resistance of riders and, in particular, the ways in which these forms can increase their agency is important for developing insights into their capacity for self-organisation, which albeit of a reactive nature (instead of proactive), was based on the workers' critical analyses of their own situation.

From a contractual point of view, it is clear that self-employed work arrangements do not allow these workers to enjoy labour rights and social protection, while at the same time denying them the much-vaunted flexibility, which remains in fact the prerogative of the company. The workers' narratives also unveiled how lean platforms use the rhetoric of self-improvement, suggesting that their workers operate in a world in which activities are freely chosen and each individual can decide his or her own lifestyle and work styles.

The subjects' experiences showed unambiguously how the very devices that should (according to the company) increase the degrees of freedom of the riders, prove in practice to be powerful means for activating new and unexpected forms of free work and self-exploitation, because uninterrupted connection means uninterrupted work. Free work is mainly hidden interstitially in all those 'shadow' activities, unpaid but necessary, placed upstream, downstream and alongside the paid work. So, behind a smart and captivating language, founded on the rhetoric of freedom of choice, lurk instead a series of imposed activities, which often make a self-employed job indistinguishable from a precarious one (Abdelnour, 2012).

In this context, technological innovation and the promise of flexibility and autonomy are harnessed to a progressive regression of workers' protection. Moreover, at least in the case of our study, we detected a growing power asymmetry between the workers and the company's top managers, as the latter increasingly displayed authoritarian attitudes and refused to attend meetings when the workers acted as a group.

On the other hand, our research has shown how connectivity can open up the possibility of transforming logistical territories into trenches of resistance by signifying connective technology and a system of workers' recomposition. During these years, in fact, the fragmentary relationships among workers have increasingly developed in an intermediate space between being face-to-face and being online, with the creation of self-organised tools for their own use. As we have seen, in 2016 'Foodora damage refunds' was born, the chat on WhatsApp for riders only, the first tool for reflection, sharing and organising. Shortly thereafter, a document proposing working improvements was prepared to be signed up to and presented to managers.

The riders managed to create a comprehensive campaign of protest and boycott, raising the public debate at the national level. They have thus been able to combine traditional organisational methods such as flyers, strikes, marches, local assemblies and contact with workers in other cities, with a variety of newer media-driven tools, for example participating in television broadcasts, interviews and creating a commotion on social media. The Turin Foodora riders have shared the story of their fight by these means and used their Facebook page, the Deliverance Project, to circulate their activities, develop new demands and expand their community, which is now composed of riders working for Foodora, but also for other companies, such as Deliveroo, JustEat and Ponyzero.

The escalation of this campaigning has made clear to the riders that the stakes are no longer just about negotiating a decent contract with the company, but questioning more generally the state of affairs in which a job market has developed that systematically creates precarity. Thinking of a broader community of struggle, they write that

> In the struggle we have shared intelligence, practical skills, useful contacts, bonds and trust, we have known and recognised, we have become something more than mere colleagues, something different from atoms running in traffic to orders from a computer. (Deliverance Project, 2018)

This brings us back to the issue of lack of collective representation which continues to play an important role. As much research has shown in other contexts (Conaty, Bird & Ross, 2016), even in the case of these riders, the reaction to approaches by the trade unions has been one of substantial distrust and difficulty in understanding their own condition. In this sense, the case of Foodora confronts us with several important questions. In our view, the challenge that they pose is not mainly concerned with regulation but above all, with interpretation. Some of the new research questions opened up by this investigation include the general theme of the forms of subjectivation that matured within the mobilisation, the specific aspects that are linked to the subversion of logistical logics and the need to focus on the relational dimension, all of which would benefit from being explored in other broader contexts.

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Divided we stand:
reasons for and against strike participation in Amazon's German distribution centres

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ABSTRACT

**Little attention has been devoted to the individual motivations behind strike
participation – particularly in minority strikes, such as the labour struggle
affecting Amazon's German distribution centres. This study surveyed 223
Amazon employees asking questions relating to strike participation, income,
reliance on trade unions, work dissatisfaction, employment status, professional
background and demographic background. Our results, based on logistic
regression analysis, evidenced that work dissatisfaction, reliance on trade
unions, and having temporary or permanent positions predicted decisions vis-
à-vis strike participation with 92% accuracy. The union's main goal, improving
workers' income, did not play a major role.**

KEY WORDS
strike behaviour, trade union confidence, working conditions, Amazon

Introduction

Since the 1990s, as a result of globalisation and the 'logistical revolution' (Vahrenkamp,
2012:255ff.; Allen, 1997), logistics and transportation have become global in range,
thick in density and now constitute an independent factor of production. In commerce,
this development has enabled a just-in-time and customised turnround of commodities
and ensures a 'when-I-want-it-where-I-want-it service' (Lierow, Janssen & D'Incà,
2016) made possible by a few big companies such as DHL and Amazon. These
companies share some characteristics: they are known for their technological
innovations and often exhibit a specific relation between capital and labour. In terms of
German industrial relations, Artus (2017) classified Amazon as a so-called third world

company (Schroeder, 2016:379f.): a company unwilling to negotiate with trade unions, not even permitting marginal structures for workers' co-determination and rejecting collective bargaining agreements outright. In line with this designation, Amazon management has exhibited an anti-union attitude in its everyday work practices (Boewe & Schulten, 2017), as well as adopting a personnel management approach based on the hire-and-fire principle.

Research has shown that transportation workers have historically been, and will probably remain, central to capital turnover and profit ratios and that, in contrast to industrial workers, their specific material conditions might even favour internationalist labour unrest (Silver, 2008:101–3). However, the acceleration of communication along the supply chain made possible by technological innovation of labour processes in combination with anti-union attitudes and multiplied contract statuses potentially weaken the possibility for labour unrest and allow companies to impose working conditions unilaterally. This article focuses on a present case that might point in both directions: the strikes in German distribution centres run by Amazon.

Case study: individual strike motivations in Amazon's German distribution centres

The ongoing labour struggle between United Services Union ver.di (*Vereinte Dienstleistungsgewerkschaft*) and mail-order giant Amazon has been one of the longest and most prominent labour disputes in Germany since ver.di's foundation in 2001 and serves as the empirical basis for this study. Ver.di built support for these strikes in Amazon's German distribution centres with a call to raise Amazon workers' salaries to the same levels as those already established in collective bargaining agreements in the rest of the retail and mail-order sector. Strikers were in a minority throughout the campaign[1] but were active in eight out of nine locations. At the time of writing, neither have the strikes been stopped nor is their outcome certain. Little is known about the reasons for participating in or staying away from strikes under the conditions of minority strikes outlined above (for an exception, see Gajewska & Niesyto, 2009). The general aim of this article is to address this question by investigating individual motivations for and against strike participation.

The *first answer* to the question of why the strikes at Amazon began and have yet to cease relates to a strategic shift on the part of ver.di, which has cultivated a growing orientation towards conflict since the mid-2000s (Kocsis, Sterkel & Wiedemuth, 2013). This shift effectively led to rising numbers of industrial actions and slowed union membership losses (Dribbusch & Birke, 2012:3–5; Dribbusch, 2017). Moreover, it facilitated a number of minority strikes, particularly in companies where trade unionists were under-represented. As several recent studies (Akkerman, Born & Torenvlied, 2013; Van Stekelenburg & Klandermans, 2013; Gallagher & Strauss, 1991; Martin & Sinclair, 2001) argue, the decision to participate in a strike appears to be based on the relationship between workers and trade unions because going on strike

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1   The strike campaign in Germany and Europe is extensively described and discussed in Boewe and Schulten (2017).

with a minority of employees requires workers' reliance on and the efficacy of trade unions (Klandermans, 1986).

A *second answer* to the question concerning workers' long-standing support for the strike may be the specific response of Amazon management to ver.di – and *vice versa*. Previous research has shown that workers tend to go on strike when they exhibit a high degree of reliance on a collective advocacy group and are accustomed to the trade union's right to represent their interests vis-à-vis their employer (Akkerman, Born & Torenvlied, 2013; McClendon & Klaas, 1993).[2]

Although workers' affinity for and trust in trade unions is likely to have played a major role in the long-lasting strike at Amazon, the seemingly low chance of winning the battle – the strikes were never strong enough to completely halt work at the distribution centres – calls for additional motivational factors. After all, not all union members among Amazon employees go on strike, while some may even leave the trade union (Waddington, 2006; Waddington & Kerr, 1999). This suggests that workers' decision to strike may be influenced not only by the strategic decision of ver.di but also by motivational processes from other sources. In this respect, it is a problem that data on decisions to take part in strikes made by individuals with no engagement with trade unions are rare (for an exception, see Dixon & Roscigno, 2003).

Recently, we have argued that working conditions at Amazon resemble a real subsumption of sales labour (Apicella, 2016; for further elaboration, see also Barthel & Rottenbach, 2017) and that the experience of such working conditions may stabilise an individual's willingness to heed the strike calls. Labour in Amazon's distribution centres exhibits certain characteristics of digital Taylorism (Altenried, 2017; Head, 2003; for its impact on retail, see, for example, Wright & Lund, 1996), converting elements of sales work into factory-like labour. Although labour is formally organised in team structures, it is in practice executed individually and characterised by a high degree of Taylorisation. On one hand, it is highly rationalised, by dividing responsibilities within a hierarchical structure with asymmetrical power relations to improve productivity and repetitive, physically demanding tasks for simple employees. Some workers, called 'pickers', process up to 150 articles or more and walk up to 20 km during their eight-hour shift to retrieve items from shelves and bring them to the packing station. On the other hand, the planning of concrete labour is executed, coordinated and monitored by the company's own online sales platform and warehouse software.

Live, online communication and tracking of the movements of goods becomes possible through electronic devices connected to the Internet and the omnipresent bar codes found on shelf space, products, and packing materials – but also assigned to each worker, who 'badges' into the system with his or her personal code. The performance of individuals, teams and even different distribution centres are measured against one another and compared, on the basis of which feedback discussions are conducted. In busy periods, up to 1 million commodities are sent out per day per distribution centre,

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2   In Germany, union organising and collective bargaining are tied to specific industries and sectors. For a deeper explanation of the German 'dual system of interest representation' based on trade unions and employers responsible for collective bargaining and works councils as the primary form of workplace representation, see Dribbusch (2007:267ff.).

evidencing rigid and effective time management of labour processes. That said, the consequences of digital Tayloristic labour are surveillance, control, pressure on workers to perform and a deeply competitive work environment (Apicella, 2016; Briken & Taylor, 2018).

From previous research, we know that work dissatisfaction is an important factor shaping willingness to participate in industrial action (Jansen, Akkerman & Vandaele, 2014; McClendon & Klaas, 1993; Ng, 1991; Martin, 1986). Given the specific characteristics of sales labour in distribution centres, the *third answer* to our question is that strikers may be motivated by their criticism of and dissatisfaction with the concrete labour process. In a preliminary study on strike participation at one Amazon distribution centre in Leipzig (Apicella, 2016), we found that factors like constant surveillance at work may push workers to participate or hold them back from the local strike.

One factor that impedes the appraisal of such working conditions could potentially be the specific professional and educational background of individual employees. Studies suggest that higher levels of education have an inverse – that is, negative – relation to individual strike propensity (Martin & Sinclair, 2001). Amazon employees exhibit a large degree of heterogeneity when it comes to educational background and professional biographies, although lower educational levels predominate as Amazon provides job opportunities particularly for the unskilled labour force. However, it ought to be noted that a minority of highly qualified workers unable to find employment in their actual profession take these low-income jobs as well, which often provide the only possibility of professional advancement (see Cohen, 1992:1337 for the influence of qualification on strike motivation) for people unable to migrate to other parts of the country. Experiencing a loss of job autonomy due to the high degree of Tayloristic working conditions together with the experience of downward social mobility may motivate people to strike.

The importance of 'third world companies' is growing – even in countries like Germany. The Amazon strike offers the chance to analyse the motivation for a decision to strike. In the rest of this article, we will analyse the relative contribution of three main factors – the reliance on trade unions, work dissatisfaction and professional background – on strike willingness at two Amazon distribution centres. We also control for factors like income situation (as suggested by ver.di's strategy), demographic variables (gender, age, etc.) and employment status, using statistical regression analysis.

Method

A quantitative approach was used to collect and examine data to explore the question of individual motivations for and against strike participation.

Assessment of strike participation and questionnaire structure

A paper and pencil questionnaire was distributed by Sabrina Apicella for scientific purposes in August 2014 in Leipzig and in November and December 2016 in Rheinberg during the midday shift change outside the distribution main entrance of each distribution centre, after approaching and briefly talking to random employees. In this way 1,329 questionnaires (Leipzig = 240, Rheinberg = 1,089) were distributed altogether.

As shown in Table 1, the questionnaire encompassed 27 items, addressing information central to our hypotheses as well as our dependent variable. Both negative and positive phrasing was used. Answer scales were largely divided into five degrees ranging from 0 (*applies absolutely*) to 4 (*does not apply at all*), while some variables only allowed three (0 = *yes*, 1 = *partially*, and 2 = *no*) or two possibilities (0 = *yes* and 1 = *no*). Educational success was scaled in five degrees, and the options allowed to describe living arrangements were living alone, living with family and living in a shared apartment. Respondents at both locations were asked to specify whether they always, occasionally or never participated in strikes. In the following, the dependent variable was strike behaviour (persons who always went on strikes vs. persons who did not go on strikes).

The two distribution centres

Two locations were included in our survey: Leipzig, opened in 2006 and featuring 75,000 m² of warehouse space, and the Rheinberg distribution centre, opened in 2011, with 110,000 m² of warehouse space, one of the largest in Germany. Nearly 2,000 workers are employed at each location,[3] of whom around 1,700 hold low-level positions or work as foremen. Additionally, around 50 persons hold management jobs at each location. Further jobs include, for example, technicians, electricians, forklift operators and workers responsible for procurement. In the fourth quarter of the year, employment numbers double as workers for simple positions are hired.

The locations included in this survey are typical Amazon sites, with both featuring high unemployment rates and tertiarisation of their economies. Significant differences between Leipzig (Saxony) and Rheinberg (North Rhine-Westphalia) can be seen historically in regional demographic and social economic developments: the growing city of Leipzig was affected by German reunification, which dramatically affected pay gaps, trade union perception and workers' subjectivity, described as frugal 'east-German work Spartans' (*ostdeutsche Arbeitsspartaner*; Dörre, Goes, Schmalz & Thiel, 2016; Hinke, 2008; Behr, 2000), whereas the shrinking city of Rheinberg suffered from the negative effects of regional industrial monoculture in the Ruhr region, with its fading coal and steel industry and mixed experiences with trade unions, including both successes and defeats (Glock, 2006). Studying such divergent locations gave us the opportunity to analyse strike propensity more or less independently of any regional historical developments.

In both locations, strike activity began before the survey was conducted (May 2013 in Leipzig, June 2014 in Rheinberg) and took place on a regular basis throughout the year, with higher intensity in the weeks before Christmas. While the survey was being conducted, no strikes took place during the Leipzig inquiry, whereas in Rheinberg several strikes took place. Before beginning the Leipzig survey, between 200 and 600 (approximately 20%) employees participated in strikes, whereas during the Rheinberg survey, between 450 and 600 employees (approximately 11%–25%) abandoned their workplace.

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3   As Amazon neglects to publish employment figures, we rely on data provided by the trade union ver.di. The number given for Amazon employees does not include security, gardening, cafeteria and cleaning services, which are all run by external companies.

Table 1: Questionnaire items and their attribution to the hypotheses

Attribution to hypothesis	Code and scale	Formulation of the question/statement
Reliance on trade unions	1. Reliance on trade unions (five tier)	Regardless of whether you are a labour union member or not, I would like to know if you in fact trust the trade unions or not.
Income situation	2. Financial security (three tier) 3. Financial support others (three tier)	My income provides me with financial security. My income is enough to support others as well (partner, children, etc.).
Work dissatisfaction	4. Whether work is interesting (five tier) 5. Good relationship with colleagues (five tier) 6. Good relationship with superiors (five tier) 7. Sufficient co-determination (five tier) 8. Stress (five tier) 9. Cope with physical demands (three tier) 10. Enough breaks (three tier) 11. Worried about illness (three tier) 12. Feel controlled (three tier)	My work is interesting. I have a good relationship with my colleagues at work. I have a good relationship with my superiors at work. I am sufficiently involved and consulted with regard to all decisions concerning my work. Stress at work is a major burden. I can cope with the physical demands of my work. I have sufficient rest time and breaks during my shifts. I am worried that I may soon fall ill due to my work. I feel like I am under constant supervision at work.
Professional background	13. Highest degree (five tier) 14. Previously retail (binary) 15. Previously logistics (binary) 16. Way out unemployment (three tier) 17. Way out debt (three tier) 18. Overqualified (three tier) 19. Advancement opportunities (five tier)	What is your highest general educational degree? What was your profession before you were hired by Amazon? What was your profession before you were hired by Amazon? I work at Amazon because this was the way out of unemployment. I work at Amazon because it was the way out of debt. I am actually overqualified for my job at Amazon. I have opportunities for career advancement at Amazon, for example, through advanced training.
Demographic variables	20. Gender (binary) 21. Age 22. Citizenship (binary) 23. Care (binary) 24. Living arrangements (three tier)	Gender Date of birth What citizenship do you have? Are you responsible for childcare or caring for care-dependent people? Current living situation (alone, family, shared apartment).
Employment status	25. Permanent contract (binary) 26. Full-time job (binary)	Which of the following applies to your employment situation? Do you work full-time or part-time?
Different regional contexts	27. Location (binary)	Rheinberg or Leipzig

Note: Questions 14 and 15 had different answer options.

Statistical analysis

In a first step, chi-square and Mann–Whitney U tests were performed to examine the relation between single variables and the dependent variable or location.

Secondly, to reduce the number of questions concerning work dissatisfaction and professional background, we performed separate principal component analyses (PCA) and varimax rotation analyses using an eigenvalue >1 for factor extraction to explore the impact of these conditions on strike behaviour.

In a last step, a binary logistic regression analysis (forward) was performed with strike participation as the dependent variable. This procedure allowed us to see whether the factors from PCA and items related to reliance on trade unions, income situation (financial security, financing others), variables with regard to person and employment status (gender, age, citizenship, living arrangements, performing care work, full-time or part-time job, permanent or temporary contract) or different locations (Rheinberg/Leipzig) would be able to predict strike behaviour to a significant extent.

We used an alpha level of .05 for all statistical tests.

Results

In total, 353 completed questionnaires were returned (Leipzig = 132, Rheinberg = 221).

After excluding questionnaires with missing values and occasional strikers, a final sample of 223 employees remained for statistical analysis, consisting of 73 strikers and 150 non-strikers. Out of 1,993 employees at the Leipzig facility, 80 employees, or 4%, participated in the survey. In Rheinberg, 143 participated, representing a minimum of 3.4% from a maximum of 4,200 employees.

Table 2 shows that the proportion of Leipzig respondents participating in strikes (48.8%) was significantly higher than the actual number of striking employees, which remained at around 20%. In Rheinberg, the rate of strike participation was between 11% and 25% in November and December 2016. Furthermore, Table 2 also shows other significant differences between respondents in Leipzig and Rheinberg.

Table 3 depicts the personal and employment status and financial situation of strikers and non-strikers, irrespective of the location of their employment.

Applying the PCA to work dissatisfaction measures resulted in two factors reported in Table 4. The first factor covered four items addressed in the questionnaire – stress: 0.823, worry about falling ill: 0.810, feeling controlled: 0.633 and enough breaks: –0.615. This explained 40.7% of the variance and could be termed the 'stress and external control' factor. The second factor concerned the four items – good relationship with superiors: 0.786, sufficient co-determination: 0.696, good relationship with colleagues: 0.673 and interesting work: 0.672 and explained 13% of the variance. This factor can be called 'social interaction and hierarchy at the workplace' factor.

Applying the PCA to all variables concerning biographical ascent or descent resulted in two factors, seen in Table 5. The first factor encompassed the highest degree of education (0.750), being overqualified (–0.617), and previous retail experience (0.508) and explained 24.1% of the variance. This can be called the 'school education and status descent' factor. The second factor concerned unemployment (0.767) and debt (0.599), explained 16.9% of the variance and can be termed the 'escape from unemployment and debt' factor.

Table 2: Strike behaviour, gender, citizenship, and contract status according to distribution centre

		Leipzig (%)	Rheinberg (%)	Total (%)
Strike behaviour***	Striker	39 (48.8)	34 (23.8)	73 (32.7)
	Non-striker	41 (51.3)	109 (76.2)	150 (67.3)
Gender	Female	32 (40)	41 (28.7)	73 (32.7)
	Male	48 (60)	102 (71.3)	150 (67.3)
Citizenship***	German	79 (98.8)	97 (67.8)	176 (78.9)
	Non-German	1 (1.3)	46 (32.2)	47 (21.1)
Contract status***	Permanent	72 (90)	55 (38.5)	127 (57)
	Fixed-term, seasonal, subcontracted	8 (10)	88 (61.5)	96 (43)

Statistical significance *p < .05. **p < .01. ***p < .001.

Logistic regression analysis indicates that four variables predicted past strike behaviour with an accuracy of 87.7% for strikers and 94.7% for non-strikers (n = 223, p = .016). The first variable was contract status, distinguishing between temporary or permanent positions (β = −.58, p < .001). The second was reliance on trade unions (β = .39, p < .001). The third was the factor 'stress and external control' (β = .22, p < .001) and the fourth 'social interaction and hierarchy at the workplace' (β = −.11, p < .04).[4]

For a better interpretation of the result, we plotted a bar graph comparing strikers' and non-strikers' responses for the factors 'stress and external control' and 'social interaction and hierarchy at the workplace' factor. The two figures show that suffering from stress at work and experience of external controls were prominent complaints among the participants who went on strike.

Discussion

What exactly motivated Amazon employees to heed strike calls over several years, knowing full well that they would be a minority and probably not successful in the short run? Our statistical findings suggest that two factors external to the labour process and two factors from within the labour process played a significant role in this decision (Table 6). The two external reasons were reliance on trade unions (strong among striking workers) and contract status, as temporary contracts effectively inhibit workers from striking. The two internal factors related to perceived workload among strikers and social integration at the workplace and the desire for workplace co-determination. None of the other variables and factors contributed to our logistic

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4 Beta-coefficients were calculated following Menard (2011).

Table 3: Care, living arrangements, financial security, financial support for others and full-time or part-time employment for strikers and non-strikers according to gender

		Strikers		Non-strikers	
		Female (%)	Male (%)	Female (%)	Male (%)
Care for other persons	Yes	17 (63)	18 (39.1)	19 (41.3)	34 (32.7)
	No	10 (37)	28 (60.9)	27 (58.7)	70 (67.3)
Living arrangements***	Alone	5 (18.5)	20 (43.5)**	10 (21.7)	30 (28.8)**
	Family	20 (74.1)	23 (50)**	29 (63)	33 (31.7)**
	Shared apartment	2 (7.4)	3 (6.5)**	7 (15.2)	41 (39.4)**
Financial security**	Secured	12 (44.4)*	17 (37)***	36 (78.3)*	69 (66.3)***
	Partly secured	6 (22.2)*	9 (19.6)***	4 (8.7)*	20 (19.2)***
	Not secured	9 (33.3)*	20 (43.5)***	6 (13)*	15 (14.4)***
Financial support for others	Supporting	12 (44.4)	14 (30.4)	13 (28.3)	40 (38.5)
	Partly supporting	4 (14.8)	2 (4.3)	3 (6.5)	9 (8.7)
	Not supporting	11 (40.7)	30 (65.2)	30 (65.2)	55 (52.9)
Full-time	Full-time	24 (88.9)	45 (97.8)	44 (95.7)	102 (98.1)
Part-time	Part-time	3 (11.1)	1 (2.2)	2 (4.3)	2 (1.9)

Note: Tests were run for both strike behaviour and variables (listed in first column) and comparing female/male strikers, non-strikers and single variables (listed in columns with values).

Statistical significance * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4: Principal component analysis of questions concerning work dissatisfaction

Item	Factor 1 (stress and external control)	Factor 2 (social interaction and hierarchy at the workplace)
1. % squared loading (after rotation)	40.7%	13%
2. Work is interesting	−0.347	**0.672**
3. Good relationship with colleagues	−0.028	**0.673**
4. Good relationship with superiors	−0.209	**0.786**
5. Sufficient co-determination	−0.276	**0.696**
6. Stress	**0.823**	−0.075
7. Cope with physical demands	−0.441	0.284
8. Sufficient breaks	**−0.615**	0.303
9. Worry to fall ill	**0.810**	−0.086
10. Feel controlled	**0.633**	−0.295

Note: Bold values are factor loadings; significance does not apply.

Table 5: Principal component analysis of questions concerning professional background

Item	Factor 1 (school education and status descent)	Factor 2 (escape from unemployment and debt)
1. % squared loading (after rotation)	24.1%	16.9%
2. Highest degree	**0.750**	0.075
3. Previously retail	**0.508**	−0.013
4. Previously logistics	0.401	−0.284
5. Advancement opportunities	0.288	−0.403
6. Way out of unemployment	0.349	**0.767**
7. Way out of debt	−0.186	**0.599**
8. Overqualified	**−0.617**	0.260

Note: Bold values are factor loadings; significance does not apply.

Table 6: External and internal reasons to (stay away from a) strike

	External reason		Internal reason	
	Reliance on trade union	**Contract status**	**Factor 1**	**Factor 2**
Strikers	High reliance on trade union	Permanent contract	High workload	Socially integrated, low interest in work, strong desire for workplace co-determination
Non-strikers	Low reliance on trade union	Temporary contract	Low workload	Socially integrated, high interest in work, ambivalence towards workplace co-determination

regression analysis, the accuracy of which, given its 92.4% successful prediction rate, was considerably high.

The hypothesis that workers will probably go on strike if they orient towards a collective advocacy group vis-à-vis their employer and rely on the trade union to represent their interests proved to be correct. Both the hope of being able to resolve group-related interests through united efforts and collective trust in trade union representatives influenced mobilisation and thus cannot be underestimated as a determinant of strike behaviour (Van Stekelenburg & Klandermans, 2013:888f.). Clearly, this finding requires further clarification to identify the sources of individual trust and distrust in trade unions and is itself a very complex subject: is trade union trust connected to Amazon's anti-union management style?

There are other possible explanations. For example, reliance may just as well mean the perception of, or actual contact with, the trade union and/or possibilities of participation and decision making therein, as well as in workplace-related union structures (Waddington, 2006; Waddington & Kerr, 1999). Alternatively, the course and strategy of a concrete labour struggle or even the awareness of a union's past performance may play a role in generating reliance on trade unions (Martin & Sinclair, 2001; McClendon & Klaas, 1993). Either way, we can conclude that trust in trade unions plays an important role when making strike decisions, despite the fact that Amazon's management pursues what could be called the 'third world theorem' (Schroeder, 2016), that is, maintains an environment that is fundamentally hostile towards union activities of all kinds.

While trust in the trade union drew employees towards participation in strike actions, having a temporary contract often pushed them away. In fact, one central element of Amazon's human resources management – the high number of workers on fixed-term contracts, particularly during the high season before Christmas – reduced the overall numbers of workers going on strike. Following a power relations approach, we could explain this finding by citing the high risk that temporary workers take (e.g. the threat of a one-day cancellation period without justification), particularly for those seeking to prolong their contract or even work at Amazon on a permanent basis.

Additional constraints may come from workers' low expectations concerning potential gains due to the collective bargaining contract or a lack of long-term prospects at the company. Other employees, however, may work on fixed terms voluntarily – students in search for additional income, for example – and did not participate in the strikes for this reason. Further data are necessary to clarify these factors, including aspects such as longer organisational tenure, which in other cases has been shown to diminish strike willingness (Buttigieg, Deery & Iverson, 2008) and job flexibility (fixed-term contract and part-time labour) (Jansen, Akkerman & Vandaele, 2014). In future research, the group of temporary and/or precarious workers must be further differentiated to properly grasp the meaning of this finding.

Our study confirmed the importance of work dissatisfaction for strike behaviour (Jansen, Akkerman & Vandaele, 2014; McClendon & Klaas, 1993; Ng, 1991; Martin, 1986). Workers' criticisms of the concrete labour process pushed them to strike, whereas non-strikers were satisfied with their work. This can be seen in Figure 1, where we compared strikers' and non-strikers' responses using the mean value and standard deviation of the variables, with the highest explanation of variance in the 'stress and external control' factor.

At the same time, our results provide a more nuanced and differentiated view of dissatisfaction: the 'stress and external control' factor showed that stress, fears of falling ill due to the work and feeling constantly controlled, as well as insufficient breaks seemed to push workers to strike (Figure 1).
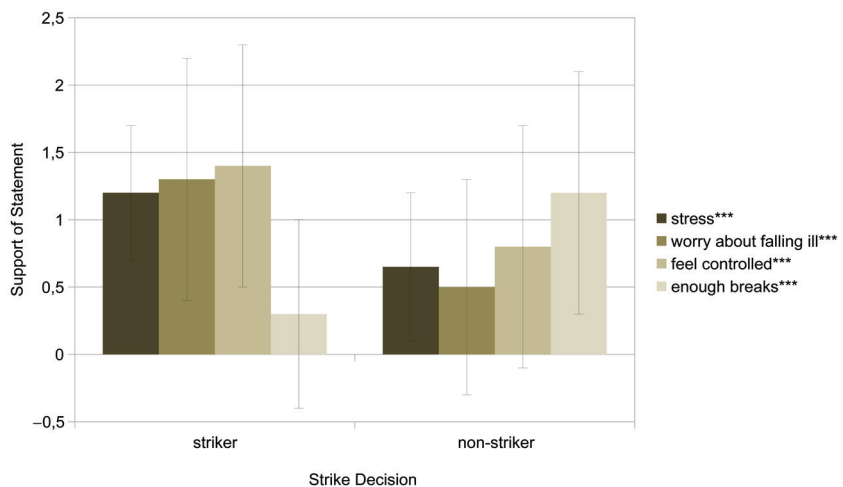

Figure 1: Estimated stress and external control as experienced by strikers and non-strikers

Note: Mean value by stress variable was divided by two to obtain a common scale for representation in diagram. Error bar ± 1 SD.

Significant group differences *p < .05. **p < .01. ***p < .001.

However, the 'social interaction and hierarchy' factor also contributed to our regression analysis. A good relationship with superiors, ambivalence towards workplace co-determination, and a high level of interest in the work distinguished non-strikers from strikers (Figure 2). Both groups, however, shared similar good relationships with their colleagues. These findings support our hypothesis that work dissatisfaction requires further study in strike research because the decision to strike exhibited a high correlation with the structure of labour at Amazon. Our results suggest the utility of expanding research on causes and effects of stress, control and hierarchies in the services sector, as well as their relation to conflict and interaction with work dissatisfaction, which may vary according to contract status (Wilkin, 2013).

As far as factors such as professional background (social ascent or descent), gender, and other demographic variables are concerned, two results emerged. First, none of them contributed to the logistic regression analysis. The assumption that formerly unemployed persons would be prone to strike was rejected. Thus, the hypothesis that strikers within the heterogeneous group of employees may have undergone professional descent was not confirmed by our data. Women decided to heed strike calls as often as their male colleagues did. Although Amazon workers exhibit high levels of diversity in demographic and educational background, our results do not confirm that these aspects predicted strike participation, as other studies have concluded (Buttigieg, Deery & Iverson, 2008; Dixon & Roscigno, 2003; McClendon & Klaas, 1993; Cohen, 1992). In this respect, it should secondly be noted that the composition of the workforce at the distribution centres in many respects does not – aside from the high proportion of fixed-term and seasonal employment – resemble that of the broader services sector with its high prevalence of women, precarious workers and migrants (Dörre, 2016; Artus &
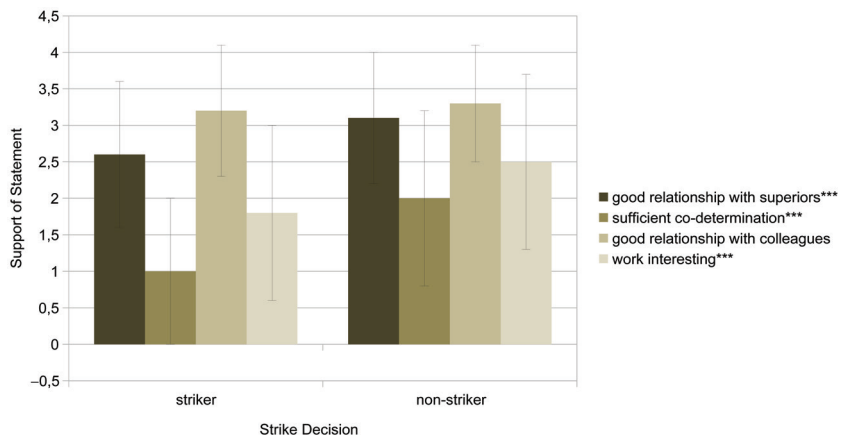

Figure 2:   Social interaction and hierarchy as experienced by strikers and non-strikers

Note: Error bar ± 1 *SD*.

Significant group differences *p < .05. **p < .01. ***p < .001.

Pflüger, 2015; Artus, 2013; Kutlu, 2013). According to our data, distribution centres do not necessarily employ a high number of migrant workers, only a few workers have part-time contracts, and most workers are men (Table 3). Work at the distribution centres seemingly differs from other typical women's jobs such as those in bricks-and-mortar retail. Specifically, the predominance of full employment might explain why gender did not predict strike behaviour in this case since working full-time or part-time did not correlate with either women's or men's strike behaviour (Table 3). Furthermore, only half of all women surveyed were involved in caring for children or elderly relatives, nor was any statistical correlation found between strikers and non-strikers and care work (or for female strikers and non-strikers, $\chi^2(1) = 3.193$, $p = .074$).

Moreover, the income situation did not contribute to our regression analysis, despite the significant differences in terms of financial security found between strikers and non-strikers (Table 3). Concerning financial support for others, strikers and non-strikers exhibited no significant difference. Paradoxically, although ver.di's strike objectives (material improvement through a collective bargaining contract) differed from workers' personal reasons for striking, strikers' trust in the trade union remained central to their decision to participate in the strikes. In this sense, our results do not support findings which identify financial grievances as the dominant motive behind strike participation (Martin & Sinclair, 2001). What has already been shown is that more than half of all surveyed employees across these locations showed a modest or 'spartan' attitude towards their low wages insofar as they stated that they felt financially secure (Table 3), even though simple employees were paid low hourly wages which, at roughly €10, are above the guaranteed minimum wage (currently €8.84) but below the average wage level in retail and mail-order companies with collective bargaining agreements (currently around €13 for new hires). Accordingly, we need more information on what shapes workers' positive perception of their current level of remuneration, as well as what inhibits a majority of workers from striking under strike-friendly conditions, such as the low financial risk associated with strike participation (due to guaranteed strike pay for union members) or high commitment to the company due to scarce employment opportunities in regional job markets.

Our study nevertheless exhibits several limitations. Given our lack of access to data on Amazon's overall workforce, our results are not statistically representative. Therefore, the survey's risk towards bias is high. We nevertheless maintain that the results possess a degree of validity, given the large number of participants and the cross-locational nature of the study itself. Furthermore, we were able to motivate a high proportion of non-strikers (2/3 of the sample) to answer the questionnaire, making the distribution of strikers to non-strikers fairly similar to that in the total group of permanent employees. We would like to mention that descriptive analysis in fact revealed differences between the two locations requiring further explanation. To fill this research gap, qualitative research and comparative meta-data analysis could deepen our knowledge of the composition of the workforce in the company and of the regional population. Although strike action took place in both locations before the survey started, these are not fully comparable as the strike campaign spread across several locations during 2014 but became stagnant before the second survey in 2016 in Rheinberg. An intriguing research question for future study would be the extent to

which these results are transferable to other national contexts in light of Amazon's expanding global network of distribution centres, in which very few strikes have occurred thus far (for the development of activities in Europe, see Boewe & Schulten, 2017), although working conditions and processes are similar throughout Europe (for working conditions in France, see Malet, 2013, for Great Britain, see Briken & Taylor, 2018 and for Poland, see Owczarek & Chełstowska, 2018). Strike activities and ongoing organising, especially in Poland, France, Spain and Italy are still not well investigated, although they have been covered by numerous media reports and activist writings (Transnational Social Strike Platform, 2017; Amazing Workers, 2018).

It is also worth mentioning that this article has neglected to discuss the question of socialisation, both in the workplace and in society more generally. The origins and substance of workers' attitudes necessarily include labour-related aspects but also transcend the walls of the factory to encompass (familial) socialisation and lifestyles, as well as political attitudes (Klandermans, 1986:193f.). Future research should analyse which social-biographical factors contribute to confidence in trade unions and a rejection of hierarchy, stress and control in digital Tayloristic working conditions (Apicella, 2016; Akkerman, Born & Torenvlied, 2013).

Conclusion

The findings presented here contribute to the broader body of research on individual strike decisions. On one hand, they extend the subject of research to non-strikers, who tended to be the majority in our case study. This allowed us to test and partially confirm assumptions which had only been tested on union members thus far. On the other hand, they represent hitherto inaccessible information concerning workers in an economic sector currently experiencing massive growth. The findings of this study emphasise the importance of reliance on trade unions, of contract status and of work satisfaction for predicting strike participation with high accuracy. Our results suggest that strikes will continue in the future as the circumstance remains unchanged that Tayloristic and digital working conditions largely fail to satisfy workers' hopes and demands. These insights may have practical implications for ver.di in its ongoing labour dispute with Amazon. The divergence of the trade union's instrument – the collective bargaining contract which allows for negotiated material improvement – on one side and the strikers' wish to change how labour is organised because it is causing stress and illness, on the other, need to be taken seriously. Ver.di's internal debates on a collective bargaining contract for healthier forms of work management at Amazon distribution centres point in this direction and are emerging at a time when the nurses of Berlin's central hospital, Charité, have been striking for higher staffing levels instead of higher wages.

Our results relating to the sites Leipzig and Rheinberg indicate that regional and demographic differences are not relevant for taking part in industrial actions. Amazon homogenises and transnationalises working conditions, and we assume that workers' perceptions of them will be similar in all regions (as has been shown by this study) and even across European borders. Accordingly, the first collective bargaining contract in Amazon's history was concluded in May 2018 in Italy. However, in countries such as Great Britain or the Czech Republic no high intensive conflicts have taken part. We would argue that the two other relevant factors – reliance on the trade union and

contract status – may explain this difference, but transnational research would be necessary to see if still other reasons are in play.

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The Georgian logistics revolution:
questioning seamlessness across the New Silk Road

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ABSTRACT

**Georgia, the post-Soviet republic in the South Caucasus, is undergoing its
own logistics revolution. The government has pledged to complete by 2020
a spatial plan which aims to turn the country into a transit corridor for the
New Silk Road. While this development is still underway, logistics zones –
infrastructural hubs, free industrial zones (FIZ), manufacturing areas and
malls – are emerging across the Georgian space. The New Silk Road initiative
is promoting a perspective of a world without barriers, where logistics is not
a means but an end: a world in which connectivity is productive in itself and
where geopolitical reasoning has succumbed to geoeconomic calculations.
This article aims at problematising this view by providing a grounded analysis
of the workings of logistical spaces in Georgia, exploring the discourses,
frictions and histories which engender capital accumulation within and
beyond the Georgian space.**

KEY WORDS

**New Silk Road, geopolitics, geoeconomics, Georgia, Free Industrial Zones,
labour**

Introduction

The post-Soviet republic of Georgia is currently the recipient of large-scale
infrastructural investments. This development [or developments] is only partially a
response to the long-standing need for enhancing connectivity within the country. On
the contrary, it is pitched by local and foreign actors alike as a bid to solidify the
nation's position as a transit corridor in the context of the grandiose assemblage of
logistical projects known as The New Silk Road (Zabakidze & Beradze, 2017) or
officially as the 'Belt and Road Initiative' (BRI) initiative, launched by Chinese
President Xi Jinping in 2013. While the extension, the routes and the territorial impact
of this project are still under discussion, the Chinese government expects a traffic of

US$24 trillion worth of commodities by 2030 and is engaged in an unprecedented infrastructural effort, initially allocating almost a billion dollars to activate the BRI's various component corridors.

As many have argued, logistics entails far more than just the business of transporting commodities from one place to another; instead, it produces spaces, engendering new relations and spatial dynamics both locally and transnationally (Cowen, 2014; Easterling, 2014; Neilson, 2012). The network of corridors that is projected to compose the New Silk Road is expected to generate new markets on its way – a much sought-after outlet for restless Chinese capital – and consolidate China's influence as a hegemonic economic force on a global scale. However, even in its early stages, BRI is far from a coherent project containing, within it, competing and often contradicting territorial visons.

In this article, I will propose an approach for understanding the development of the New Silk Road that starts from an analysis of the development of logistics in Georgia. I will analyse this advancement in its discursive and material manifestations. My aim is to highlight the imbrication of global and local factors and narratives powering the construction of large-scale infrastructure across the countries that are bidding to participate in the Chinese-led initiative. Following critical logistics scholars, I understand logistics as a form of power (Neilson, 2012) and, in particular, look at the creation of 'corridors' as an emergent political tool aimed at generating a new territorial organisation of global space (Grappi, 2016, 2018). A political analysis of logistics in general, and the New Silk Road in particular, foregrounds the inherent multiplicity – of narratives and practices, but also of temporalities and spatial formations – at play in the construction of transit infrastructure (Mezzadra & Neilson, 2013; Neilson, 2012; Tsing, 2009). This article, finally, is an attempt to sketch a historically and geographically grounded map of an array of logistical connections which are currently still in the making. It is not my desire to provide definitive answers on the nature of logistics in Georgia; what I am interested in doing, rather, is to raise questions and highlight some of the key issues at stake in the articulation of a critical approach to the analysis of the New Silk Road.

My analysis is structured across different levels. My overall argument stresses the necessity of grounded analyses of logistics developments that take into account the intersection of local histories, geographies and temporal dispositions among which these infrastructures arise. By stressing this necessity, I aim to insert my contribution within the critical agenda outlined in the 'GENS manifesto' (Bear, Ho, Tsing & Yanagisako, 2015). The manifesto is a feminist intervention towards the study of capital accumulation. The GENS approach aims to 'reveal the constructed-ness – the messiness and hard work involved in making, translating, suturing, converting, and linking diverse capitalist projects – that enable capitalism to appear totalising and coherent' (Bear, Ho, Tsing & Yanagisako, 2015:n.p.). It is exactly this work that is erased by official and mainstream accounts of logistics in general and the New Silk Road in particular (National Development and Reform Commission People's Republic of China, 2015; Liu & Dunford, 2016). The pursuit of seamless connectivity, as shown by critical scholars, actively reworks old and morbid forms of oppression (Cowen, 2014; Khalili, 2016; Chua, forthcoming). To understand how these pre-existing processes are

constantly renewed, I concur with the GENS manifesto that it is necessary to inspect how 'inequality emerges from heterogeneous processes through which people, labour, sentiments, plants, animals, and life-ways are converted into resources for various projects of production' (Bear, Ho, Tsing & Yanagisako, 2015:n.p.).

To substantiate these claims, I examine two separate, albeit intertwined, realms. First, I reflect on the intersection of geopolitics and geoeconomics at the core of the BRI and its specific resonance in Georgia. To unpack the dominant discourses around the project, it is necessary to open up new critical approaches which problematise the smooth transition from the geopolitics of the Cold War and its immediate aftermath to a 'win–win' geoeconomics regime presented by BRI proponents. In the second part of this article, I draw on my ethnographic research as a starting point for showing the coexisting ethics and temporalities at play in the construction of logistics infrastructure in Georgia. These, I argue are key to an understanding of the regimes of exploitation as well as the potential for labour organising across emerging logistical spaces.

Geoeconomics

The transnational vision informing Georgia's logistics revolution was presented in Tbilisi in November 2017 at the Belt and Road Forum (BRF). The forum is the official conference promoting the BRI, following a meeting in China in May 2017 in which the Georgia BRF gathered together government officials and the representatives of international organisations involved in the project.[1] During the forum, the New Silk Road was presented as the pursuit of a new territorial rationality. Within this new order, according to the Chinese Deputy Commerce Minister Quian Keming, who introduced the first panel, old geopolitical rivalries will be overcome in favour of what he termed a 'win–win approach'. Such an approach, Keming claimed, will allow transnational connectivity and competition between corridors to replace the geographies of avoidance and enclosure that characterise geopolitical discourse. Keming's vision is one of a new geoeconomic order: here, the existence of a heartland of resources for which different powers must compete is rejected in favour of a vision predicated on the proliferation of trade corridors. Within this new configuration, global space is depicted as organised through continuous flows. Amid these flows, resources are no longer, solely, the specific materials, chemicals or supplies that can be sourced from a distinct location; on the contrary, what is here cast as a resource is the *flow itself*. No longer a place, the new heartland is thus the assemblage of infrastructures, territory, manpower and materials that compose logistical networks.[2]

Interestingly, this infrastructural race is no longer referred to as a 'scramble', as the father of geopolitics Halford Mackinder (1904) defined it, but as a fair competition between equal members. In China's vision, in fact, all participants are placed on the

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1   Attending the meetings, are ministries of different governments – Georgia, China, UAE, Iran, Ukraine, Moldova, Slovakia, Slovenia, Turkey, Kazakhstan, Azerbaijan – international institutions – European Investment Bank, European Commission for Transports, European Bank for Development and Reconstruction, Asian Development Bank, World Trade Organization, World Bank – and representatives of public and private companies with interests already defined in the projects of the new Silk Road – BP, Anaklia Development Consortium, Hualing, Azeri, Georgian, and Kazakh railways, Nenska Hydropower, Silk Road Group and the block-chain company Bitfury Group, stand out among many.
2   This analysis is based on the detailed field notes taken by the author at this event.

same level, including the Chinese state. In this way, geoeconomic arrangements will supplant geopolitical conflicts.

As Akhter (2018:232) argues, most political commentary on the BRI to date either legitimises the possibility of a win–win smooth strategy, without questioning its workings or implications, or presents it as a smokescreen obscuring a Chinese 'trap to gain global economic dominance'. These ostensibly different assessments, as Akhter continues, are nevertheless informed by identical, albeit diametrically opposite, visions of global interactions. Both of these views see global territorial arrangements as shaped exclusively by the desires of states, which in turn are presented as homogeneous actors. To counteract such a reductive outlook and to understand the implications and workings of the BRI, as they present themselves on the ground, it is necessary to understand the workings of geopolitics as a diffused discourse that exists beyond the utterances of nation states.

As Deborah Cowen and Neil Smith (2009) point out, geopolitics is a discursive and constituent practice that organises global space according to struggles for the territorial domination of specific areas. The functioning of geopolitics is based not only on warfare practices that exceed the territorial boundaries of nation states but also on what they refer to as the 'geopolitical social', namely the historical assemblage of diffused discursive practices that justify and materialise geopolitical calculations (Cowen & Smith, 2009:22–48). As critical geopolitics scholars have shown, these diffused discourses penetrate a variety of daily realms, from cartoons and videogames (Dittmer, 2010) to magazines (Sharp, 2003) and notions of time (Kinkle, 2012). What this understanding of the grounded and diffuse nature of geopolitics tells us is that geopolitical calculations are reflected in the organisation of social space, which is the daily space of interactions, impositions, crossings and renegotiations which makes up the inside of a nation state. Social space is neither smooth nor easily readable, yet this is not to say that capital and the state do not successfully dictate its forms and reorient it through their shifts, but, as Anna Tsing argues, these are processes that take place through the incorporation of heterogeneity, rather than its obliteration (Tsing, 2009).

The idea, put forward by the Chinese Government, that a novel geoeconomic rationality could supplant geopolitical calculations not only fundamentally erases the depth of the 'geopolitical social' but also ignores how corridors and the attempt to facilitate a seamless flow have been part and parcel of the geopolitics of colonial expansion – mostly defined by warfare – since its outset (Benton, 2010; Cowen, 2014; Khalili, 2016). Consequently, to understand the nature of the interaction between the 'geopolitical social' and the expansion of logistics and the territorial reorganisation which it engenders, it is necessary to look closely at the infrastructural investments which are composing this network, charting their relations to the socio-historical space in which they emerge, as well as their transnational ramifications.

The Georgian 'geopolitical social'

Is it not the pivot region of the world's politics that vast area of Euro-Asia which is inaccessible to ships, but in antiquity lay open to the horse-riding nomads, and is today about to be covered by a network of railways? (Mackinder, 1904:434)

At the turn of the twentieth century, British geographer Halford Mackinder placed Central Asia and the Caucasus at the strategic centre of the world: an area attracting the greatest world powers into a scramble for its control. As Andrew Barry notes, Mackinder's geopolitical postulations combined the political with the study of physical geography (Mackinder, 1887 in Barry, 2013:32). The imbrication of these two elements is what constitutes mainstream geopolitical discourses to this day (Dodds & Sidaway, 2004:293).

A reading of recent accounts of political events in the South Caucasus, both from foreign commentators and local political scientists (German, 2008; Tsereteli, 2014), confirms how pervasive Mackinder's arguments still are in shaping the language and focus of their inquiries. Commenting on the narratives concerning energy security and the threat of warfare in the region, Barry argues that 'all of these accounts of the Caucasus should be viewed as elements of a broader historical system of geopolitical representation' (Barry, 2013:37). Such a discursive system posits the different South Caucasian countries as part of a corridor granting access to and transportation of natural resources – mainly oil and gas – into Europe. The existence of this corridor is thus validated by geological and geographical factors: namely the presence of the valuable resources and the geography of the corridor's arrangement. These natural factors are however complemented by infrastructural developments allowing for the circulation of those essential materials. Controlling this area thus relies on a combination of territorial domination and technological innovation, in which power over infrastructures becomes as important as the control of natural resources.

The discursive production of this geopolitical order is, as Barry (2013:38) argues, not only informed by foreign policy decisions on the Caucasus but contributes to the creation of a mythical land:

> This strategically vital territory does not have a specific name, but is a border zone, lying roughly between Russia, Turkey, Iran, the Black Sea and Afghanistan. This is an imaginary region of espionage, political instability, corruption, violence and ethnic conflict, considered critical both to the security of the British, Ottoman and Russian Empires in the late nineteenth and early twentieth centuries, and to the energy and military security of the US, the UK and Russia at the end of the twentieth century. The contours and borders of the region are not given, but both inform and are redefined by the area's various conflicts.

The description of this imaginary pivotal zone is not only reproduced across the wealth of geopolitical analyses of the area but also permeates a variety of works on this region. Popular geographies of this area, from guidebooks to travellers' stories to magazine articles, orient their narrations across 'contested borders', pipelines, treacherous mountain passes and military roads (Grant, 2009:13–15; Manning, 2012). Spanning a spectrum from the mundane to the macro-analytical, the South Caucasus has not only been described as a space of geopolitics but also as what can be termed as an 'infrastructural space', defined in relation to its ability to facilitate or, indeed, halt the movement of people, goods, matter and chemicals.

From the 'geopolitical social' to logistics

In the years following the collapse of the Soviet Union, Georgia, now an independent nation, sought to translate this geopolitical imaginary into a source of economic profit. In the early 2000s, its position in between competing regions informed the decision to build a stretch of the Baku–Ceyhan pipeline across the Western regions of the country (Barry, 2013:31). The construction of the pipeline constituted a major event in Georgian politics, not only due to the substantial economic investments connected to it but also because of the proliferation of narratives and counter-narratives associated with it that opened up new spaces of political action within Georgia's public sphere (cf. Barry, 2013; Marriott & Minio-Paluello, 2012). More than ten years since the completion of the pipeline, the country is witnessing a new wave of infrastructural investment. Moving beyond the subterranean transit of oil and gas coming from neighbouring Azerbaijan and the Russian Federation,[3] the planned developments are visible structures such as ports, railway lines and a host of free industrial zones (FIZ) which are set to dot the country's territory in the hope of attracting the transit, assembly and manufacturing of foreign goods on their way to Europe.

Currently outside of the European Economic Area, Georgia takes pride in its bilateral trade agreements with both the EU and, as of January 2018, China. This favourable trading position, which is currently being enhanced by negotiations with India, makes the country a perfect platform for the multi-sited manufacture and transit of commodities (Hualing Group, 2015; Charaia & Papava, 2017). The Chinese corporation Hualing, one of the most prominent foreign investors in the country, claims that 'Georgia resembles a stretched-out hand, which accepts and connects Europe and Asia' (Hualing Group, 2015). This catchy phrase willingly plays with historical narratives that portray Georgia as a quintessentially logistical territory. At the centre of this definition, however, is an inversion: no longer a strategic place ravaged by conflict, Georgia is now an open corridor ready to receive the flow of commodities coming from the East.

This 'geopolitical/infrastructural social', as I have shown, permeates accounts of the Caucasus, shaping its geographic orientation. Infrastructural investment in Georgia, recent and old, takes shape within a social space where these discourses are dominant. Rather than a shift from one regime to another, as the BRI proponents predict, the establishment of logistics infrastructure across the New Silk Road is instead taking place in a complex social space where discourses of domination and collaboration coexist.

Soft infrastructure or deregulated regulation in Georgia?

Moving on from the discursive apparatus adjusting the BRI to the materiality of the infrastructures which compose it, we can observe a similar imbrication of histories and socio-economic dispositions. I will now look at the regime of deregulation which is

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3   Currently, four pipelines are active in Georgia. In addition to the BTC, the Baku–Supsa pipeline transports oil from the Azeri fields to Western Europe, the SCP gas pipeline follows the same itinerary as the BTC as far as Turkey and the Soviet-built NSMGP crosses the country from Russia to Armenia.

sustaining logistics development in Georgia and analyse its effects on the forms of labour that proliferate in logistics spaces.

Becoming a corridor, as many scholars have argued, requires foundations that are not only material but legislative (Arvis et al., 2014; Grappi, 2016, 2018). The sum of all measures needed to enable the transit of goods through a country has been termed a 'transit regime' (Arvis et al., 2014:33). In the case of Georgia, this regime has been assembled over a period of over 15 years, since the Rose Revolution in 2003, starting from the dismembering of Soviet bureaucracy, including its social provisions, from labour rights to welfare, and moving towards an economic system which prides itself on being one of the most deregulated in the world[4] (Wade, 2016:n.p.).

Currently, in Georgia, it is possible to open a business in a single working day, thanks to the lifting of most forms of licencing. Benefits for investors also include a flat rate of income tax fixed at 20%, and the recent introduction of the Estonian tax model, which grants an exemption from profit tax to companies that reinvest in the country. On the whole, as Sopiko Japaridze argues, the country possesses one of the most regressive tax systems in the world. Including the measures mentioned above, there are only six types of tax: a Value Added Tax at 18%, an import tax that ranges from 0% to 12%, and a property tax which is up to 1%. There is no progressive taxation and no inheritance tax, and there are no social security taxes (Japaridze, 2017).

The goal of facilitating business has been a unifying thread for the organisation of Georgia's economy and society since the Western-backed Rose Revolution in 2003, contributing to the accumulation of wealth and resources in the hands of a few actors. During the Forum, the Minister for Economic Development Dimitri Kumisishvili observed that foreign investors' money can be taken back from the country at any time without any penalty or repercussions (author's unpublished field notes, 2017). Kumisishvili belongs to the ruling coalition Georgian Dream, which defeated former president Mikheil Saakashvili in 2012 and has been in power ever since. While the coalition was elected on a promise to reverse the previous government's harsh neoliberal policies, the economic minister's statement is in line with the trajectory imposed by Saakashvili. As activist and researcher Tamar Qeburia explains in field notes, during Saakashvili's rule, a reorganisation of the economy took place which, heavily backed by Western powers, was highly ideological because it capitalised on the mistrust of public ownership that had emerged as a legacy of the Soviet Union. After Georgian Dream came to power, an ostensible effort by the government to reinstate the regulations scrapped by Saakashvili became visible, to tackle the wealth disparities generated by privatisation. This effort, nonetheless, can be understood as what Qeburia defines as, a form of 'deregulated regulation'. During the coalition's government, nominal barriers were put in place towards the protection of workers' rights and for the implementation of socially oriented reforms. These regulations exist to this day but, however, without the proper structures to sustain them. They therefore in effect contribute to the further deregulation of the country and the thriving of

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4   Georgia is currently number nine in the World Bank's Ease of Doing Business Ranking – a result which, as Robert Wade (2016) argues, is 'almost taken as a policy goal'.

private enterprises. While the authoritarian turn taken by Saakashvili was reversed by the Georgian Dream coalition, the 'liberal track' of his economic policies, as Nino Khelaia argues, was instead 'simply seen as the only right path' and thus pursued to the detriment of any alternative route to development (Khelaia, 2018).

In light of this analysis, it is possible to appreciate how the transition between Saakashvili's unabashed neoliberalism and the contemporary 'regulated deregulation' has left the uneven development plaguing Georgia essentially unaltered. One prime example of this mechanism can be observed in the attempts made by the government to protect workers' rights. During Saakashvili's presidency labour inspections were abolished; Georgian Dream reinstated them in 2013 in a bid to better working conditions in sectors which had been left to the whims of their private owners. However, inspections are performed only on a voluntary basis and the inspectors' reports do not entail any obligation for the company. Even in cases of the gravest violations of workers' rights and human rights, inspectors' recommendations can be ignored. The shortcomings of this system have been exposed multiple times and have resulted in fatal accidents. Recent incidents include the death of six miners in a privately owned coal mine in Tqibuli, West Georgia. The appalling working conditions in the mine, which ranged from a complete absence of toilets on the building site to the severe obsolescence of machinery, had been repeatedly reported by independent inspectors and labour NOGs, without any consequence for the company. Despite these nominal reforms, 1,215 workers have died or been severely injured in Georgia since 2012 (EMC, 2018; Chkareuli, 2018).

These conditions are exacerbated by a lack of proper union representation. As with many other countries in the context of neoliberal fragmentation of the labour force, Georgia has established unions which are failing to organise the great portion of workers who fall between the cracks among labour categories: day labourers, informal labourers and an expanding number of precarious service sector workers. This is paired with an ongoing distrust of institutional unions, dating from Soviet times, when trade unions were mostly not trusted because they were seen as an extension of the ruling party. Since then, industrial production has declined, agriculture has reversed into subsistence mode, and the emerging service sector is characterised by fragmentation and precarious employment conditions that present obstacles to sustainable unionisation. In addition, the majority of industrial companies still have functioning 'yellow trade unions', which are controlled by the companies themselves and are never loyal to workers' interests (Chubabria, 2017).

The promise of a seamless environment for business and smooth connectivity in Georgia rests on this stark situation. Rather than levelling the inequality generated by Saakashvili's all-encompassing deregulation, the soft infrastructures that have been put in place to attract logistics investment and cargo are strengthening investors' power while leaving their practices mostly unchecked. In the next section, I will present an example drawn from my own ethnographic research[5] to reflect on the encounter

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5   Between 2017 and 2019, I have undertaken periods of ethnographic research across a number of logistics sites in Georgia as part of my ESRC-funded PhD project.

between existing patterns of exploitation and the new spatial forms produced by the expansion of logistics.

Free Industrial Zones

During Saakashvili's presidency, the government put an impressive amount of effort into placing Georgia in international rankings such as the Heritage Foundation's Economic Freedom Index and the World Bank's Ease of Doing Business Index. These rankings, as Lincoln Mitchell (2017), a former consultant for the Georgian Dream coalition argues, are based on highly ideological and non-inclusive measurements that comply with free market ideology. For example their indicator for 'labour freedom' essentially measures the weakness of local unions (Mitchell, 2017). During the BRF, as the high positions reached by the country in these different economic indexes were showcased in investment brochures, the weakness of Georgia's labour code and its 'competitively priced workforce' were recognised as key factors underlying the country's ability to attract logistics investment. The combination of cheap land, business facilitation, a 'flexible' labour code and affordable energy resources create the ideal environment for FIZ. At present, there are four active FIZ operated by different companies in Georgia, and more are planned for the near future. The Georgian network of FIZ is concentrated mainly in West Georgia, Tbilisi being the easternmost location operated by foreign companies from Egypt, UAE and China, as well as the multinational cryptocurrency company BitFury which controls the Tbilisi FIZ. Standard tax exemptions in FIZ include profit and property taxes which normally apply to businesses, VAT, customs duty on products transiting and produced in loco (Poti FIZ, 2016). Moreover, capital repatriation is not restricted, making these zones the ideal transit spaces for large profits acquired from clients.

As Keller Easterling (2005, 2014) argues in her works on the architectures of extra-statecraft, logistics expansion is predicated on the emergence of 'zones'. These are 'spatial products' powered by a spatial/ethical/temporal regime that is exceptional with respect to those regimes that govern the rest of the territory that hosts them. Zones can take many forms, from special economic zones to bonded custom areas and FIZ to entire city states (Easterling, 2014:42). A spatial product is an architectural hybrid space that seeks to constitute its own jurisdiction within and against national boundaries. These zones are what Cowen (2010:614) defines as the 'spaces of action' between production and consumption. While Easterling's work seeks to highlight the power of such forms to engender similar environments worldwide, where the repetition of architectural forms shapes identical patterns of oppression and exclusion, by observing a Georgian FIZ, it is possible to appreciate the porousness of their spatial and discursive boundaries and the sheer messiness of their existence among the heterogeneous spatio/temporalities of the Georgian state.

Kutaisi FIZ

Hualing FIZ is located inside the abandoned carcass of what used to be one of the biggest factories in Soviet Georgia, the Kutaisi Auto Mechanical Plant. This factory, which at its peak employed over 15,000 people, was later abandoned and, like many former industrial complexes, pillaged for scrap metal and other materials. In 2009, the Chinese corporation Hualing brought the site with the intent to establish a FIZ.

Kutaisi is the third largest city in Georgia and is located in the west of the country, within 100 km of the port city of Poti and the planned deep sea port of Anaklia on the Black Sea. It is connected to Tbilisi and Zugdidi by Georgia's main highway which runs from east to west. Throughout the Soviet period, West Georgia was the industrial heart of the country, including mining towns such as Chiatura and Zestafoni and the industrial port of Poti, key to the extraction and trade of manganese under the Russian empire and the Soviet Union. The city is currently said to be at the centre of major logistical investment[6]: in September 2017, the Georgian Prime Minister Giorgi Kvirikasvili announced plans to develop the country's biggest logistics centre in the outskirts of Kutaisi, restoring the city's historical role as an industrial crossroads.

Hualing Zone covers a total area of 626,700 square metres of which 404,000 are projected to be devoted to market space. At the time of my first visit to the site in May 2017, much of the space was occupied by a large yellow building, the old factory, some of its windows broken. The person who showed me around listed the companies currently operating in the FIZ, which included a logging company, a number of Chinese textile firms and a Belarusian technology corporation. From his account, the FIZ seemed to be a lively multicultural trade paradise, at the proverbial strategic crossroad between East and West. The discrepancy between his account and the scene behind his back, however, was almost comic: a large pile of plastic and scrap metal burned in an empty field where a few workers were rearranging large stacks of logs.

The logging company that operates within the space employs workers on a daily basis, paid at 25 Georgian lari for 8 hours.[7] One of them, Misha,[8] a middle aged man, told me that he was happy with this pay and the method of payment – cash in hand at the end of the day. This form of daily employment is common across different sectors in Georgia, from industry to agriculture, and groups of men waiting at designated spots to be picked up in the morning by those who need them are a usual sight. According to Misha, this was the best he could get; he said, 'at least it's secure'. I asked him what he meant by security. He was working on a Sunday, without any legal contract which guaranteed his rights as a worker and with nothing to guarantee him that there would be work for him tomorrow. These kinds of cash in hand jobs seemed to me to be the very definition of precarity. After talking for some time about the lack of employment in Georgia and his fears as an ageing man, becoming old in a system where the state pension amounts to only 160 lari per month, he explained that previously he was working for a different company which had promised a higher monthly salary, which, however, he had never seen. Misha explained that he had borrowed some money against this expected salary, and now, having been unable to repay his debt in time, he was barely surviving.

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6   It must be noted that at the time of the completion of this article, none of the state-led logistics investments had yet been initiated.

7   A Georgian lari equals €0.35. The absence of minimum wage regulations makes it hard to establish the average minimum salary, however, according to the website Invest in Georgia, the average monthly salary is the country is US$410, approximately 1,000 lari (Invest in Georgia http://investingeorgia.org/en/georgia/labor [last accessed 23 January 2019]).

8   A fictional name, used to protect the worker's anonymity.

The working conditions to which Misha and his colleagues are subjected comply with Easterling's description of the majority of jobs in 'the zone' as '3D (dirty, dangerous, and demeaning) jobs where the bodies of workers are on the line' (Easterling, 2014:44). Despite being often portrayed as a people-less landscape,[9] populated by vast stretches of containers and machines, logistics is, in fact, a deeply corporeal business (cf. Toscano, 2015; Kanngieser, 2013). This corporeality, is, moreover, predicated on and exacerbated by the Zone's integration into pre-existing regimes of exploitation. Understanding the porousness of the Zone is essential to an analysis of its workings and those of logistics at large. Rather than being extracted from the patterns of exploitation, economic relations and dependencies, as well as the temporal dispositions that compose the territory on which zones emerge, these spatial products are, instead, powered by the frictions between these elements and the Zone's declared logic (Tsing, 2004; Gregson, Crang & Costantinos, 2017).

As stated on the Hualing FIZ website, 'Free Industrial Zones, similarly to Free Economic Zones or Free Trade Zones, are created to achieve an acceleration of the economic development of the country' (Hualing Group, 2017). Ostensibly, through the institution of zones, a compression and acceleration of space/time is enacted: the country's development is kickstarted and the times of production and distribution are shrunk to a minimum.

However, as noted in the GENS manifesto, 'in workplaces, acceleration is brought into relationship with complex social practices of space/time' (Bear, Ho, Tsing & Yanagisako, 2015). Within the FIZ, for instance, Misha's labour conditions, his willingness to accept little to no job security and the absence of labour standards to which he is subjected are dependent on factors external to the Zone's organising principles of seamlessness and acceleration, which are nevertheless incorporated into the Zone's workings.

Misha's predicament is, in fact, dependent on the intersection of economic crisis and debt which has shaped the past 25 years in Georgia (Khalvashi, 2015; Gilbreath & Khalvashi, 2013). Since the Rose Revolution, the rapid development of the Georgian banking system has led to the penetration of reckless financial speculation into the daily lives of Georgian citizens.

As Tato Khundadze explains, the Georgian banking sector is characterised by predatory lending (Khundadze, 2018). As household debt has skyrocketed over the past two decades, commercial banks in Georgia have become among the most profitable in the world (Gvinjilia, 2018). This is due to the absence of regulation of interest rates, which has allowed bank loans to reach a staggering 21% interest rate, paired with the ease with which loans are obtained and, finally, the harsh practices of debt repossession,

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9   Interesting in this context is Alberto Toscano's recent comparison of the work of two photographers portraying logistics: Edward Burtynsky and Allan Sekula. Burtynsky's pictures portray eerie and soul-less landscapes where machines inhabit spaces in a seemingly post-human world, where capital seems to regenerate itself without the aid of people. By contrast, Sekula's pictures of logistics spaces are centred around the experience of workers, who inhabit and give life to these giant structures. According to Toscano, the technological sublime portrayed by Burtynsky erases not only the labour involved in the creation of those landscapes, but also the possibility of struggling within them, a possibility which, on the contrary, is the motor of Sekula's work (Toscano, 2015).

that in some cases extend to properties which have not been offered as collateral for the loan. Anthropologist Tamta Khalvashi has shown in her ethnography of post-Soviet uncertainty on the Black Sea coast how debt organises landscapes and reorients temporalities, as material possessions and future dispositions become sucked into the vortex of debt repayment (Khalvashi, 2015:101–27; Khalvashi, 2018).[10] While the profits of the commercial banking sector in Georgia have grown exponentially in recent decades, Georgian citizens have been crushed by debt, resulting in the institution of a complex and multifaceted debt economy, the effects of which extend like tentacles into every aspect of Georgian citizens' lives.

Within the Georgian debt economy, moreover, new timescapes do not only emerge for debtors; creditors and capitalists are also bound by the temporality of debt. For instance, as emerged from my interviews, it is common practice for firms to delay paying their employees the wages they are owed, sometimes even for several months. This practice has been explained to me as a tactic to capitalise on the high interest rates guaranteed on current accounts by commercial banks. While companies gamble with workers' salaries, people like Misha are faced with increasing uncertainty about their future. The worker's preference for a smaller but guaranteed salary at the end of each day, might therefore be seen as a way to take back control of his own time. As such, Misha's association of security with immediacy can be understood as a specific temporal disposition developed in response to the rise of financial capital as an organising force for Georgia's space/time (cf. Bear, 2015). Rather than constituting a territory removed from the messiness and violence of Georgia's socio-economic space, Hualing FIZ, on the contrary, is immersed in and benefits from the temporal economic and spatial practices shaping its exterior. Here, in fact, the uncertainty engendered by the intersection between finance's timescapes and the practices that have arisen to domesticate them outside the zone is what facilitates Misha's further exploitation within it.

It seems hard to connect the messy space of the Kutaisi FIZ in its embryonic state, with open fires and manual labour, with the hyper-technological image of logistical spaces elsewhere. However, this place is not an exception, a strange post-Soviet take on an otherwise streamlined sequence of neat connections. On the contrary, in observing the making of Kutaisi FIZ what emerges is a process that is common across many logistical spaces. These are 'sites of multiple overlapping' (Easterling, 2014:20) where different regimes come awkwardly into contact, powering not only the production of commodities but also of spaces, politics and subjects (Neilson, 2012). The development of Georgian logistics and, in turn, of the New Silk Road in which Georgia strives to become a key node, is predicated on the exploitation – made possible by constant processes of translation and (re)negotiation – of these socio-temporal regimes resulting from the turbulent recent history of this post-Soviet nation.

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10   In the days before the second round of the Presidential election in December 2018, the Georgian Dream coalition announced a near total bailout of delinquent loans contracted before 2018. This is a measure of impressive proportions and is said to have erased a total debt of 1.5 billion lari. While this measure has been welcomed by the hundreds of thousands of Georgian debtors affected by it, the sustainability of such a measure remains unclear without long-term reforms to prevent further indebtedness.

Conclusion: logistics, social space and multiple timescapes

The rise of logistics as a central element of contemporary global capitalism has been tightly linked to the production of new forms of spatio-temporal organisation of global space, which is in turn feeding off and being contested by multiple localised spatio-temporal landscapes. As Thomas Reifer argues, since the logistics revolution which followed the invention of the container in 1956, global political economy has been profoundly reshaped, bringing the physical movement of commodities to the forefront of processes of capital accumulation and value extraction (Reifer, 2004:24). Just in time (JIT) emerged as a new regime of production that stretched out on a global scale and derived its profit from sustaining a continuous flow (Bernes, 2013:2; Levinson, 2006:481–503). The 'world making interrelation' of JIT and logistics (Levinson, 2006:481–503) has therefore brought the pursuit of seamless circulation to the fore of processes of accumulation. Virtually every author committed to the critique of logistics has highlighted the incongruities that underlie processes that are depicted as smooth, unearthing the multiple realms of friction which power the expansion of logistics, from the persistence of old colonial and warfare practices (Cowen, 2014; Khalili, 2016) to the complexity of social space (Mezzadra & Neilson, 2013) to the role of struggles in reorienting capital's trajectories (Curcio, 2017; Cuppini, Frapporti & Pirone, 2015) to awkward encounters between different agents at the core of global supply chains (Tsing, 2015).

In the case of Georgia, logistics investment has come after decades of uncertainty, wars and economic crisis, interrupted by harsh privatisation of spaces and services. Throughout these changes, moreover, geopolitics was at once a curse and the only hope for enabling the country to escape its unfortunate fate (Barry, 2013:36–8). At present, the pursuit of a seamless transit corridor is reshaping the country's internal geography as well as the arrangements of global territory. However, while substantial infrastructural effort is justified in terms of a break with Georgia's precarious geopolitical situation in favour of a future defined by connectivity, past inclinations still permeate present space/time (Massey, 1992).

Georgia's transit future, at once near and mythical, is symbolised by the year 2020 which has come to occupy a central place in narratives around Georgia's development, setting the country in a state of – seemingly perpetual – anticipation. Indeed, Adams, Murphy and Clarke (2009) argue that anticipation has become a dominant new virtue of capitalist time, giving us a particular temporal orientation (Weszkalnys, 2016). This temporality is one in which the continually receding horizon of the future determines actions in the present. In Georgia, this anticipation – or the fear that stems from its constant recession – is intermixed with the rhythms of credit and deficit and their central importance to the ordering of the lives of different social groups (cf. Bear, 2015; Roitman, 2003). All of these spatio-temporal orientations converge around the built forms of the new logistical developments.

By no means a coherent project, defined by the rational wills of nation states and governed by the invisible hand of the market, the infrastructural connections which materialise the BRI, in Georgia and elsewhere, are taking shape in a messy space of experimentation, where past histories and present dispositions are intermixed.

Throughout this article, I have sought to contribute to the growing body of critical literature on logistics by highlighting two realms of friction that are fundamental to the understanding of transit infrastructures in Georgia and more broadly to the theorisation of logistics expansion across the New Silk Road. On one hand, exploring contradictions enclosed in the dominant understanding of logistics as a 'win–win' project powered by fair competition, makes it possible to observe the continuous relevance of geopolitical discourses in shaping current infrastructural projects. On the other hand, the examination of the recent history of neoliberalism in Georgia and the temporal regimes it has engendered enables us to detect how logistics labour is powered by differences rather than the seamlessness that is its stated aim.

From this closer look, the emergence of the New Silk Road in Georgia appears as a composite ecosystem to be traced across cross-scalar connections and movements. As a plan for accumulation on a global scale, the BRI does not have a singular logic; on the contrary, it takes shape – at times awkwardly – 'through the relational performance of productive powers that exceed formal [geo]economic models, practices, boundaries, and market devices' (Bear, Ho, Tsing & Yanagisako, 2015). Appreciating this incoherence, without, nevertheless getting lost in particularistic accounts of single projects or contexts, as Akhter argues (2018:237), is fundamental for building a critical approach to the development of the One Belt One Road Initiative. The logistics ecosystems that populate this network must be traced to elaborate the 'polyglot language of class formation' (Tsing, 2009:175) capable of narrating the complex tensions between exploitation, renegotiation and resistance at play in the making of global infrastructural connections.

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