Amazon Country: Platform Logistics and Landscapes of Fulfilment

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The candidate confirms that the work submitted is their own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

This thesis identifies a spatial gap in literature researching the corporation and platform Amazon, sought through a theoretical analysis into the emergence of logistical space as an organising principle in the post-industrial economy. This comes in addition to a local probe into Amazon's distribution facilities in Tees Valley in the North East of England that make up part of its UK 'fulfilment network'. It finds that there is a pattern and formula to Amazon's monopolising platform power that can be brought to bear through an applied reading of spatial sociology, Marxist geography, cargomobilities, infrastructure studies, and landscape urbanism. It draws attention to the landscapes behind the concept of the ubiquitous 'everything store' that Amazon strives to make a reality, defining these landscapes as a peripheral assemblage of physical distribution centres linked to a single digital interface through which Amazon customers are able retrieve a smorgasbord of products at almost instantaneous speeds. The analysis will show how this linking between interface and distribution network mobilises various digital technologies, geographical spaces and supply-chain infrastructures to create what to customers appears as a seamless and weightless experience of delivery, but what is really a creatively destructive method to accumulate capital in the post-industrial economy based on treating space as a means of production and time as money. For this reason, the research argues that the 'everything store' is an assault on the architectural and urban basis of society because it has become a driving force in how we plan our towns, our cities, and (especially) those bits in between. That force, it will conclude, cannot be one for good, since it is indifferent to the injury and exploitation that Amazon workers encounter when fulfilling orders, all the while creating a world in which we pay no attention to departures or journeys and all that they entail.

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In his essay for the *New Left Review* titled 'Critique of Techno-Feudal Reason', Evgeny Morozov (2022) mounts a critique against the intellectual scaffolding of the contemporary Left's approach to the task of theorising and critically evaluating our present social and economic system. That is, global capitalism, in what can broadly be described as the 'digital era', where the economy is gripped in the process of multiple converging technological revolutions in telecommunications, data analytics, automation, virtualisation, artificial intelligence, surveillance – the list is endless. So endless in fact that attempts to conceptualise this new form of capitalism have delivered a plethora of new terminology in the shape of such designations as *digital capitalism, informational capitalism, algorithmic capitalism, surveillance capitalism, cognitive capitalism, communicative capitalism*, and *semiocapitalism*, to name but a few (Ström, 2022: 23). More important than the typology of this new terminology for Morozov is what it seeks to communicate about the contemporary state of capitalism itself: that somehow, somewhere, at some point, the structural prominence within the capitalist system shifted, or more accurately *regressed,* back to social relations that appear more in alignment to a type of feudalism, with its emphasis on *extraction* and *expropriation* rather than production. Implicating the likes of Jodi Dean, Mariana Mazzucato, Yanis Varoufakis, Wolfgang Streeck and Shoshana Zuboff, Morozov (2022: 89-92) laments the 'speculative' and 'apocalyptic' retreat in Left intelligentsia from a substantial critique of the productive (and destructive) dynamics of our current economic model towards a 'discursive swamp' (Durand, 2022: 29) that reframes capitalism's life-systems according to the media-friendly, 'meme-friendly', logic of 'feudal-speak'. Rather than being the foundations of a radical praxis capable of confronting the new regime of cybernetic capitalism (Ström, 2022), Morozov (2022: 92) sees the popularity of these techno-feudalist epithets as testament to the Left's intellectual weakness and inability to develop a theoretical model that is able to engage with the current state of affairs without "mobilising the moral language of corruption and perversion". Stern words that have triggered a number of rejoinders (see for example, Dean, 2022; Durand, 2022; Ström, 2022).

Ignoring how this broad-brush *critique of the critique* bundles the work of multiple scholars together in a manner that obscures their individual contributions to a relatively unchartered and constantly evolving field – not least Dean's (2005; 2009; 2012) important theory of communicative capitalism and the idea of a 'pure circulation' of

communicative exchanges at the expense of their use value (James, 2014) – Morozov raises some interesting questions in terms of how we should confront the totally unparalleled power of our 'digital overlords' – not that he would entirely agree with tapping into the feudal lexicon to construct this framing to begin with. As Therborn (2022: 25) writes, there is no real precedent in world history for the "speed of the high-tech companies' surge and the scale of their world-market dominance", with concentrated capital thriving to such an extent that even Harry Braverman (1974), Paul Baran and Paul Sweezy (1966) – together producing invaluable intellectual work on capitalism's tendency towards monopolisation – would have a hard time imagining. Before indicating why this debate is absolutely central to the address that this research sets out to embark on, and more about that particular conquest laid out in its own distinctive framework, let us flesh out the themes of that debate in a level of detail that will make that task all the more straightforward. To do so, rather than relying on any of the aforementioned theoretical registers, which all to varying degrees depict more than anything else the new *technological* basis of contemporary capitalism, this research proceeds with a concept that gets closer to the question of the new *structural* composition that characterises the economy and its social relations: platform capitalism.

Platforms, at their most generalised level, are what Srnicek (2017: 43) describes as digital infrastructures that enable two or more groups to interact by positing themselves as intermediaries that bring together different users, be they customers, advertisers, producers, suppliers, and so on. At a more specific level – as in, their actually existing presence in society – platform *capitalism* is what Hill (2020: 523) defines as a version of capitalism in which "a small group of powerful technology firms have vertically integrated a vast range of services and functions that they then provide to others". Platforms and platform capitalism, then, are historically and technologically determined phenomena, as conditioned by the metamorphosis of capitalism and the information technology revolution. This research looks to build on mounting literature on the platform as it gradually becomes an immovable part of our everyday lives and transforms social relations in its own image. In introducing platform capitalism and its rise to prominence as a conceptual apparatus, one can begin to address Morozov's assertions at the same time as introducing a component that both he and his interlocutors have a tendency to overlook amongst the immense complexity and diversity of this debate. That is, the modern

logistical processes that are to be regarded as its teleological foundations. This research is about them in particular.

0.1 The Emergence of Platform Capitalism

The fundamental sticking point of Morozov's bugbear is the presupposition that today's ruling class do not make their way in conformity with the orthodox Marxian economic logic of exploiting labour for less than its value in the production of commodities, which reached its peak during the backend of the industrial era – the epoch that Marx himself sought to critique. Rather, thanks to the influx of digital economic ecologies, this age-old investment formula has seemingly been abandoned in favour of a novel form of *rent-seeking* that is more akin to how feudal lords ruled over the lands between the tenth and fifteenth centuries according to a 'parcelised' sovereignty of arbitration and vertical and horizontal state fragmentation (Anderson, 1974; Meiksins Wood, 2002). For example, Dean (2020) argues that we should interpret the so-called 'tech giants' of today as effectively being the new watermills of the feudal period, controlled as they were by lords, with peasants obligated to have their grain ground at their lord's mill for a monthly fee:

> So not only did peasants occupy and till land that they did not own, but they dwelled under conditions where the feudal lord was, as Marx says, "the manager and master of the process of production and of the entire process of social life." Unlike the capitalist whose profit rests on the surplus value generated by waged workers through the production of commodities, the lord extracts value through monopoly, coercion, and rent.

Unlike the General Motors, General Electrics, and DuPonts of the mid-twentieth century, who, owing to the Fordist and Taylorist techniques of mass production, were able to generate returns on their investments for the process of capital accumulation principally through producing a surplus from their labourers' daily toil, today's corporate equivalents in Google, Facebook and Amazon need not conceivably get their hands dirty participating in such outmoded activities of commodity production, instead investing in the 'forces of predation' (Durand, 2022: 39). For Dean and beyond, they no longer pursue a purest conception of capitalist development as constituted through the mechanism of money-commodities-money (M-C-M) in Marx's theory of money, but an *extra-economic* expropriation enabled through surplus extraction via the exercising of political power granted by the superiority of neoliberalism, which David Harvey (2005) had always

described as a political project intent on restoring class domination. In other words, there is little need for the dialectics of competition and innovation under a paradigm in which there are more than just economic means to guarantee accumulation, the act of *dispossession*, as theorised by Harvey (2003: 137-183; 2004), chiefly amongst them.

How did these new (or should we say, old) avenues of accumulation, predominantly of seeking rent from their *users* rather than their *customers*, come about? According to theorists of platform capitalism, this has everything to do with the growing appeal of 'infrastructural intermediation' (Langley and Leyshon, 2016: 7) that has come to define market transactions in the capitalist economy, where being the intermediary for an exchange amongst other actors is more sought after than actually being one of those actors. As Christophers (2020: 181) points out, all platforms are intermediaries in the sense that they intermediate trade that could take place without the benefit of intermediation, but which one or more parties privy to that trade believe is sufficiently facilitated by the platform to such an extent that they are willing to pay the intermediary for the service. In order to understand the popularisation of infrastructural intermediation and its relation to platform capitalism, we actually have to turn to Ludwig Von Mises and Friedrich Hayek's theory of the coordination problem in economics, otherwise known as the 'calculation debate', which many socialists in fact accept the basic premise of (even if it is towards radically different ends).

For Von Mises (1935), the key question for society, later developed by Hayek (1940; 1945), and which they also happen to argue serves as the reason why market-capitalism reigns supreme above all other systems, is first a question of logistical coordination: how do we organise the information that makes society function? In their defense of the market system, they proclaim that markets are the best possible means for coordinating economic actors with divergent incentives and preferences as well as efficiently allocating resources. This was because they viewed the market, already highly algorithmic (Benanav, 2020: 200), as effectively being an information technology that acts as a 'distribution system' assigned the logistical task of collecting and analysing vast quantities of complex, multifarious data associated with production and consumption (Brennan-Marquez and Susser, 2022). This then, was a comment on the capacity of markets to facilitate allocative efficiency in a fast-changing environment, based on the presupposition that a functioning system needs certain incentives built into its fabric to guarantee people's participation.

It was not simply a technical question, however, of developing the right arithmetic to solve the coordination problem. This is an issue that Yeager (1994), Morozov (2019), Benanav (2020) and Brennan-Marquez and Susser (2022) have all raised in their work, arguing that whilst computation and applied mathematics provide information to such a degree of detail that production could very well be planned along socialist lines, there is still the element of tracking those allocative needs as they evolve over time and transmitting this information back to all the actors in the economy (Phillips and Rozworski, 2019: 27). Thus, along with mathematical equations, coordination needs to account for the constant changes in individual behaviours in the dynamic social world. In other words, the true difficultly of the coordination problem stems from its social quality; not the *how* but the *what* (Phillips and Rozworski, 2019: 60; Brennan-Marquez and Susser, 2022). Benanav (2020: 197-8) calls mapping these changes the matter of planning 'protocols' that are necessary to update the calculations about production according to emerging trends and patterns, contending that "an economy is not a set of equations waiting to be solved [...] It is better understood as a network of decision-makers, each with their own motivation, using information to make decisions, and generating information in turn". Similarly, Morozov (2019: 36) terms this 'feedback infrastructure' to describe how matching production with consumption requires tracing the "hyper-complexity of social organisation in fast-changing environments". This, for Von Mises and again for Hayek, was where price signals entered the frame. In a market-based system, together they argued, prices create transactional infrastructure that provides the feedback for the system to update itself against. Steel-manning his argument, Phillips and Rozworski (2019: 60) note Hayek believed that "only the market can bring together the information that is normally isolated in the heads of different individuals". Within the transaction, all the information a producer could seemingly ever need was made available, with which they could adjust their production lines accordingly.

That such a blunt instrument as the price mechanism could ever promise such organisational efficiency is disputed since prices compress complex multidimensional preferences into a single, unnuanced number (Morozov, 2019: 36), not to mention the lack of economic democracy and unequal concentration of wealth and power in capitalist markets, where managers and not workers make the decisions (Benanav, 2020: 203). This question is unfortunately beyond the scope of this study. The important thing to note for the purpose of this research is rather how platform capitalism responds to the

coordination problem set out by Von Mises and Hayek, and in so doing why the *platform* has become so popular and in turn all-powerful as an alternative to the traditional capitalist firm. If there is going to be a discoordination in market exchanges between supply and demand because of the dynamic social world that immensely complicates the task of economic calculation (Yeager, 1994: 99), an inescapable mismatch between what is produced and what is required, then the underlying intermediary logic of the platform, enacted by a new technological frontier of algorithmic management and big data, promises to solve it by developing networks where economic agents can find each other to transact (Langley and Leyshon, 2016: 5). Platform economics, acting as infrastructural intermediation in a market setting, has the capacity to *circumvent* the problem that Hayek and Von Mises structured their entire argument against socialism around (Brennan-Marquez and Susser, 2022). Here is how.

Leigh Phillips and Michael Rozworski (2019) effectively roll out this argument in *The People's Republic of Wal-Mart: How the World's Biggest Corporations are Laying the Foundation for Socialism*. They make the case that there *are* in fact alternatives to price signals that exist to various extents in the world economy today, offering up several retail giants, Wal-Mart and Amazon amongst them, as proof of this practical reality that Von Mises and Hayek held was socialism's theoretical Achilles heel. Take how they depict Amazon, for example. Amazon, thanks to its logistical and operational triumphs, commensurate with the logic of the platform, can disseminate intra- and inter-firm information across its mega-structural network in a manner much more consistent with socialist planning than the free market:

> Amazon, building its retail market position on the back of the internet revolution, is the largest technology company using the fruits of modern IT to distribute consumer goods. In short, Amazon is a master planner [...] The untold billions of gigabytes of customer data that Amazon collects and the algorithm marvels it uses to parse this data give it an incredibly detailed picture of what people want to buy and when. Meanwhile, integrating operations with producers ensures that products can be ready in sufficient quantities. (Phillips and Rozworski, 2019: 77-79)

In other words, Amazon's protocols, deployed in concert with its algorithms to coordinate the general mismatch in supply-demand, are no longer shackled so tightly to price signals. As Brennan-Marquez and Susser (2022) write, Amazon's own feedback infrastructure is a

social order built on surveillance where rather than having to rely on the transactional incentive of the price mechanism to coordinate activities, they turn to data instead: “information is collected directly, often as the epiphenomenal result of platform interactions”. Amazon uses surveillance data techniques to capture involuntary information about its customer’s consumption patterns through their navigation of its website and app and the digital footprint they leave, in turn generating the protocols that update its marketplace for its host of producers. It attracts those producers, who, at one end, have greater knowledge and access to the people who fuel its demand, at the same time as it attracts consumers, who, at the other end, are connected with a greater variety of the commodities to choose from (though this ‘choice’ is not all it professes to be, as will be raised momentarily). This triggers the ‘network effect’, where the more interactions that occur on its platform, the better at coordinating Amazon get (because they can finetune their machine-learning models and train their artificial intelligence), leading to more users interacting on the platform to share in its benefits. Like Srnicek (2017: 45) notes, the synchronisation of economic actors at each end of the supply-chain through the infrastructural intermediation of the platform “generates a cycle whereby more users beget more users, which leads platforms to have a natural tendency towards monopolisation”. Such is where the power of the platform is located, since producers and consumers grow dependent on Amazon’s ‘disciplining infrastructure’ (Cohen, 2019: 41) or ‘closed platform’ (Srnicek, 2017: 63), having only the theoretical and not the practical reasoning for moving their activities elsewhere. Vertical integration creates a closed loop, because “rather than turning to an internet search engine for buying goods online, users would search for goods, compare, purchase, track and review, all without ever leaving the Amazon platform” (Srnicek, 2017: 63).

Locking economic actors into its eco-system, we start to see how the tecnho-feudal reasoning of many on the contemporary Left perceives a monopoly like Amazon, who use their power to extract rents from those who interact on its platform. Recall that Dean (2020) states that the feudal lord extracts value through monopoly, coercion, and rent. In Amazon’s case, the first of these is achieved as previously stated: through the socio-technical phenomenon of network effects. Closely linked, coercion is exercised via how the closed platform gradually diminishes choice at the same time that the user involuntarily and opaquely hands over their data – accumulation by dispossession. Finally, rents are extracted through the power of the platform to guarantee its users access to commerce

through supply-chain integration, coming again from the first process as a result of 'natural-monopoly rents' (Morozov, 2022: 114-5). Together these processes reconfigure networked digital communications infrastructures for data-based surplus extraction (Cohen, 2019: 40) in describing the fundamental tenets of platform capitalism. Would it not be better at this point however, to refer to this trend as platform *feudalism,* given the propensity for platforms to appropriate value without ever having to engage in production? Here we find ourselves returning to Morozov's original criticism of those who have resorted to the framework and language of feudalism to describe the current epoch. Is Amazon a lord and we its digital serfs?

Morozov uses Google as the chief exemplar here to argue that whilst the tech giants do indeed engage in a variety of tactics to consolidate their power in a manner not entirely dissimilar to the lord, they should still be treated as standard capitalist firms. Firstly, because Google *does* produce a commodity, in Morozov's view: its search engine results, or rather "real-time access to vast amounts of human knowledge", which it sells to advertisers (Morozov, 2022: 111). Secondly, because Google do not have to pay the publishers whose pages it indexes, and because the real-time access it provides is given away to users for free, it does not fall so neatly into the familiar structures of feudalism. Morozov argues here that data extraction is merely an *add-on* to the original commodity it produces that makes that commodity all the more valuable, rather than the platform's *raison d'être*. Lastly, if Google were feudal rather than capitalist, it would conceivably not have the same incentive for productive investment. Morozov (2022: 118) pours cold water on this idea, pointing to the vast amounts of money the platform pumps into research and development each year. "Does that not count as 'lifting a finger'?", he asks of the techno-feudalist theorists. Morozov, then, ultimately insists that we regard Google like any other capitalist enterprise when he writes that "if one accepts that Google is in the business of producing search-result commodities—a process that does require massive capital investment—there is no great difficulty in treating it as a regular capitalist firm, engaged in normal capitalist production" (Morozov, 2022: 120).

The notion that a platform's priorities determine whether it is capitalist or feudalist is indeed important, if only it were not wedded to rather rigid distinctions of either system that likely cause headaches for theorists on both sides of the argument. Morozov dedicates a significant portion of his 'Critique of Techno-Feudal Reason' to exploring how different theoretical traditions attend to feudalism, ultimately arriving at the position that

one would be best served taking the Marxist view that each society, being 'pregnant' with a new one (Marx, 1938: 532), also harbours fragments of its former societies which it can never shake off. We might argue instead then that platform capitalism is an example of how our social and economic conditions have developed in such a way as for feudal relations to take off *inside* the capitalism system, where platforms discover novel ways to extract from the global pool producing a surplus of value for capital. This would be to agree with Srnicek (2021: 40) that the struggle takes place *within* the structural imperatives by capitalism, rather than signaling a return to feudalism by digital means or an emergent new mode of production. Let us now bring Amazon back into the mix to illustrate this point.

The irony of Amazon's platform model calling into question Von Mises and Hayek's fundamental assertions regarding the calculation debate is not as simple as it may first appear. As Benanav (2020: 202) reminds us, the firms that supply goods to Amazon still ultimately rely on market signals to figure out the best way to make their product. This sounds an awful lot like Morozov's contention that the data-extraction that makes Amazon's platform irrefutably more coordinated, optimised, efficient and valuable, is still, fundamentally, an appendage. There is certainly no prospect of Amazon achieving its economies of scale without it, thus 'add-on' might not be the perfect word to describe what is happening here. Moreover, we can be confident that Amazon do indeed undermine the price mechanism, not least through its 'predatory' pricing strategies where it predates value from suppliers and third-party companies participating in its platform (Coveri et al., 2022: 14; Rikap, 2022). Nonetheless, it still leaves the question of whether Amazon produce a commodity and enter into productive investment in the same way that Morozov argues that Google does as evidence that it still has the interests and incentives of a run-of-the-mill capitalist firm. In order for Morozov to reach this assertion, he necessarily asks us to expand our definition of commodity production, as with Google's being its search engine results. Where Amazon is concerned, this is equally complicated. Amazon distribute physical goods rather than making them, expropriating value that started its life elsewhere. Thus it is still the object that Amazon is concerned with, but at an advanced stage of its lifespan. This is certainly not a new phenomenon, being part of the parcel of the accumulation process that Marx (1993: 299) himself conceptualised:

> A capitalist who employed no variable capital at all in his sphere of production, hence not a single worker (in fact an exaggerated assumption), would have just as much an interest in the exploitation of the working class by capital and would just as much

> derive his profit from unpaid surplus labour as would a capitalist who employed only variable capital (again an exaggerated assumption) and therefore laid out his entire capital on wages.

Evidently, whilst platform rentierism might promise to threaten the stability of the price mechanism in the long run owing to how rentiers prevent the equalisation of the profit rate by impeding the flow of capital into its direct competitors (Srnicek, 2021: 39), the relationship between productive and non-productive capital remains lucrative such that it might not have surprised Marx to know that Amazon partake in spoils of value that it did not itself create. It metastasizes the social order of the day (Brennan-Marquez and Susser, 2022) while still remaining loyal to it. And yet, neither does the situation that Marx laid out accurately describe Amazon in all its complexity (it obviously never intended to). Like Google, Amazon spend fortunes on research and development, $42.7 billion in 2020 alone in fact (Morozov, 2022: 118). Moreover, it is more than just an 'exaggerated assumption' to say Amazon does not employ, and thus does not exploit, its own workforce, having over 1.6 million workers worldwide on its books (Coppola, 2022). So what does all this R&D investment and worker exploitation get put towards? That answer is comparatively simple. A significant proportion of Amazon's productive activity is directed towards logistics. This gets right at the centre of this research, which is to understand precisely why and how Amazon deploy logistical strategies, played out through configurations to the spatial composition of the planet, to achieve platform dominance. To understand Amazon we effectively have to treat it as a logistics platform who deal in one peculiar commodity in particular: fulfilment space. By producing the fixed capital for its logistical operations, Amazon expands the overall pool of value that the economic actors on its platform generate at the same as creating sinkholes that extract value from the growing inventory of commodities it controls. First let us take a look at how platform scholars have approached Amazon previously.

0.2 Understanding Platform Logistics

Numerous attempts have been made to categorise the diverse types of platform that exist today according to the different ways in which they intermediate. Arguably, none of these extend their theoretical boundaries sufficiently to capture the true nature of Amazon. Let us start with Nick Srnicek's classifications in his pioneering book, *Platform Capitalism* (2017). Srnicek (2017: 49) distinguishes between five types of platform: *advertising*

platforms, cloud platforms, industrial platforms, product platforms, and *lean platforms*. Without detailing what defines each of these different platforms individually and who populates them respectively, it might already be clear from their titles that Amazon does not fit succinctly into any of them. Srnicek (2017: 50) is the first to admit this, noting how Amazon

> is often seen as an e-commerce company, yet it rapidly broadened out into a logistics company. Today it is spreading into the ondemand market with a Home Services program in partnership with TaskRabbit, while the infamous Mechanical Turk (AMT) was in many ways a pioneer for the gig economy and, perhaps most importantly, is developing Amazon Web Services as a cloud-based service. Amazon therefore spans nearly all of the above categories.

Evidently, even as Srnicek set the parameters of his own analysis he was conscious of what might get lost in the gaps between them, which indicates just how slippery Amazon is to pin down. The same can be read into Langley and Leyshon's (2016: 5-6) attempt to separate out the "typology of the primary domains and platform types that can be categorised as comprising the new digital economic circulation of platform capitalism". They equally differentiate between five types, but according more precisely to their 'domain of circulation'. These are: *online market exchanges, social media / user-generated content, sharing economy, crowdsourcing,* and *crowdfunding / P2P lending*. It might be clearer from these authors' categories where Amazon falls – that being online market exchanges – but it is no less straightforward in the sense that not only does Amazon again scale multiple platform types, it also is not identical in its activities to the others within the existing category it has been assigned. Langley and Leyshon also include the likes of eBay in the online market exchanges category for instance. Amazon and eBay certainly share commonalities, but in Srnicek's aforementioned qualification of Amazon he speaks to the fundamental divergence between them. That is, Amazon is fast becoming more than just an e-commerce outfit – it is a logistical powerhouse that maintains an inventory in its vast network of distribution centres for its third-party sellers – more like a 'hybrid' platform (Qin, Liu and Tian, 2020: 101). Hence, its platform logic runs much deeper than eBay's since its infrastructural intermediation has a physical component to it that eBay simply does not. This even threatens the clarity of Srnicek's (2017: 43) own definition of the 'platform' as being a digital infrastructure that enables two or more groups to interact, because what delineates Amazon as a platform is that it is more than just a digital infrastructure.

Platforms need to be thought of in this sense as not merely everyday encounters enabled with and between software but constituted through and by various socio-technical and material processes (Langley and Leyshon, 2016: 9).

Srnicek's definition is no obstacle for Brett Christophers' (2020: 184) categories of the different platform rentiers, mind you, arguing that conceptually speaking, platform rentierism is not new, pointing to both the stock exchange and the "humble shopping centre" as evidence to the contrary. It is even more telling, then, that Amazon does not make it into *any* of Christophers' platform rentier types, which are divided into four categories, one less than Srnicek and Langley and Leyshon, this time according to the nature of the trade that their particular platforms serve to intermediate. These are: *labour platforms, capital platforms, commodity platforms,* and *attention platforms*. These categories are arguably much less fixed than the other authors'. Despite this, Christopher's insistence that they overlap is not enough for him to find room for Amazon. The platform is so evasive to these categories in fact that there is barely a mention of Amazon in Christophers' chapter on platforms, who sees fit to devote the beginning of an entirely separate chapter to what sort of platform he suspects they are instead:

> Amazon is a different type of rentier, controlling a different type of asset base, and earning a different form of rent [...] From early on, [Amazon] built physical fulfilment and delivery capacity, and it began making this capacity available to companies via Amazon Marketplace around the same time that it opened server capacity to third parties. Thus was born FBA [Fulfilment by Amazon] [...] Both AWS [Amazon Web Services] and FBA are fruits, in other words, of Amazon's having built critical infrastructure for the delivery of its own services, and then making those service-delivery infrastructures commercially available – one might say, renting them out – to third parties for the delivery of *their* services. They are both, that is, *infrastructure rentiers.* Indeed, inasmuch as part of the price paid for, say, books by Amazon's own retail customers is payment to cover the costs of the proprietary virtual and physical infrastructure assets that make such a transaction possible, Amazon has always been an infrastructure rentier to an extent. However, with the development and growth of AWS and FBA, this rentierism has become not just more explicit, but – more significantly – increasingly Amazon's core enterprise. (Christophers, 2020: 277-8)

For Christophers then, Amazon is still at heart a platform rentier, but an outlier in that its intermediary logic has outgrown its adversaries to the extent that it is becoming an infrastructural utility and therefore must be awarded its own separate category. This is more of a business-to-business (B2B) model then, where the platform shares its self-supporting logistics service system with sellers (Qin, Liu and Tian, 2020: 102). As a microcosm, we can somewhat derive from Christophers' qualification of the unique categorisation of Amazon why Morozov is so unhappy with the invocation of the feudal lord to describe the workings of platform capitalism. Evidently Amazon do 'lift a finger', which effectively means that they expand value at the same time that they extract it. Indeed, Srnicek (2021: 39) is at pains to point out that infrastructural platforms do have an impact on value, even if he ultimately disagrees with Morozov by arguing that platform capitalism is still primarily based on the appropriation of value that is produced *elsewhere* in the global economy. In Amazon's case, its intermediary infrastructure reduces transaction costs and thereby raises the rate of profit for firms that rely on them. The actions Amazon take to secure this value are the subject of this research, which promises only to deliberate Morozov's point about the productive activity of platforms rather than supporting his argument against techno-feudalism reason wholesale. Amazon's platform model, though still very much reaping the benefits of non-productive rentierism, expands that rentier empire by registering productive activity in two interconnected areas, the second of which is the more precise subject of this research. Before introducing that though, a final word on the type of platform that Amazon is.

As the title of this subsection indicates, this research seeks to understand Amazon not as an industrial platform, a product platform or an online market exchange platform, or even necessarily as an infrastructure platform (although this gets closer to the issue than the rest of the proposed categories). Rather it approaches Amazon first and foremost as a *logistics platform*. By building a physical distribution infrastructure that behaves as an intermediary network and mobilising an army of just-in-time logistics workers labouring around the clock acting as the network's modular components, Amazon take the distance-shrinking networking capacities of the internet (Langley and Leyshon's, 2016: 3) into unchartered territory. If Von Mises and Hayek likened the market to a distributed system of pure logistics, then Amazon, in seeking to *become* the market itself, have a prolonged and targeted interest in the means by which that market can function at the highest of logistical capacities. The question then becomes how Amazon secures value-added in

logistics, both for the benefit of itself and the producers it locks into its rentier web. This question is as important to Jodi Dean as it is to Evgeny Morozov, almost regardless of how it informs the capitalist-feudalist relations debate (which we have already established exists in a symbiotic way), because it gets to the heart of the more pressing question of how we confront the tech monoliths in the age of platform power. The final part of this introduction will therefore set out where this research seeks to enter into the debate, identifying a critical gap in existing research on platform capitalism by paying more attention to Amazon as a logistics platform that has a significant stake in the spatial environment where its distribution network takes hold.

0.3 Amazon and Spatial Sociology

To reiterate, even if the techno-feudal framing is permissible insofar as their platform has developed an incredibly sophisticated extractive ecosystem, Amazon's power reaches well beyond controlling data gateways (Coveri et al., 2022: 14). The formula Amazon subscribes to in order to expand and extract value is twofold. The first, again, would not have been news to Karl Marx, who dedicated a sizeable chunk of the second volume of Capital (1993) to exploring how transportation workers contribute towards the accumulation process through the exploitation of their surplus value. Marx (1993: 134) noted how "there are certain independent branches of industry in which the product of the productive process is not a new material product, is not a commodity". Amazon would be one of them, since technically there is no production of new intermediary commodities that occurs in its logistics operations (although we have talked previously about the prospect of expanding the definition of the commodity). Rather, as Dantas (2019: 142) highlights, its network springs up within existing commodity flows to swallow those commodities up and spit them back out with added value:

> in transportation commodities from third-parties function as raw materials in some other industry: the transportation or communication entrepreneur must withdraw a commodity from circulation (in addition to equipment, energy, labour-power, etc.), transport the commodity elsewhere and then return it to circulation. Surplus value is extracted from the labour of railroad workers, seamen, truck drivers, telecommunication technicians, and so on.

We can interpret from this that in the logistics sector, exploitation of labour power is identikit to that in the factory. Where there is a divergence is structurally, being a separate sphere of investment of productive capital that "appears as a continuation of a process of production *within* the process of circulation and *for* the process of circulation" (Marx, 1993: 229). Significant research has been carried out regarding the processes via which Amazon employees, or rather 'associates' as they are known within the company, are exploited of their surplus value. Two recent publications come to mind, though there are certainly numerous others (see for example Briken and Taylor, 2018; Purkayastha and Tangirala, 2019; Hill 2020; MacGillis, 2021).

Edited by Jake Alimahomed-Wilson and Ellen Reese, *The Cost of Free Shipping: Amazon in the Global Economy* (2020) is a book specifically dedicated to all the workers impacted by 'Amazon capitalism'. Across its diverse collection of contributors, it paints a vivid picture of the gruelling conditions that individuals working in Amazon facilities are subject to. It notes how value-added in circulation is achieved through the minimisation of labour costs and the improvement of workplace speed and accuracy (Alimahomed-Wilson, Allison and Reese, 2020: 10), sought principally through labour control mechanisms such as the surveillance apparatus that monitors everything down to the worker's motions, as well as the constant harassment coming from managers to 'make rate' when processing orders. These mechanisms are what the authors argue have contributed significantly to the alarming manifestation of workplace injuries within Amazon facilities. Amazon warehouse workers suffer musculoskeletal injuries at a rate four times higher than the industry average (Long, 2022), with 9.6 serious injuries per 100 full-time workers registered in 2018 (Evans, 2019). We can be in little doubt that Amazon 'lifts a finger' then, with this finger pressed tightly against the literal bodies of its harried workers.

Building on this edited collection by fleshing out the technological and managerial techniques that subdue its workforce, Alessandro Delfanti's *The Warehouse: Workers and Robots at Amazon* (2021) produces a comprehensive account of life within an Amazon warehouse by speaking to workers and ex-workers at different levels within the platform, along with sorting and analysing tens of thousands of comments left by Amazon associates online. Its foremost accolade is depicting how Amazon has reinvented century-old logics derived from early industrial capitalism by augmenting them with digital technology and new managerial techniques that dispossess workers from precious knowledge that previous generations of warehouse workers have leveraged tactically in their fight against

exploitation (Delfanti, 2021: 143). The 'logics' Delfanti speaks of come under what a host of scholars are calling a new and improved version of Taylorism, a *digital* Taylorism (see for example Staab and Nachtwey, 2016; Stern and Cooper, 2017; Caruso, 2018; Holford, 2019). If Taylorism is concerned with labour control, then new technologies offer senior managers and executives greater control of their white-collar workers as well as blue collar workforce (Brown, Lauder and Ashton, 2011: 80). Through sensory and tracking technologies that feedback electronically derived data, traditional Taylorist methods are reshaped for the digitally augmented realm of work, where management has real-time access to data on workers' movements and are able to log periods of sedentariness (Moore and Piwek, 2017: 308) – all of which can be determined by computer software. Digital Taylorism, then, simply appropriates time-discipline for the twenty-first century workplace, so that what was once conducted by stopwatches can now been taken to the nth degree with computers (Fleming, 2015).

Through drawing on digitalised Taylorist methods of scientific management, Amazon squeeze more value from its employees in order to speed up the handling of commodities in distribution and reduce the turnover time of capital, thereby enabling less capital to be tied in the circulation process and more of it to be devoted to productive activities (Dantas, 2019: 142; Srnicek, 2021: 39). The work of scholars in work and employment theory and technology and automation studies have brought this to bear, generating a substantial theoretical framework regarding how Amazon manifests to dine on and contribute towards an already existing stream of value in circulation. And yet, this is only part of the parcel of its platform model, as the earlier analysis foregrounded when it noted that Amazon expands its rentier empire by registering productive activity in two interrelated areas. With the first area out of the way, where surplus value is extracted from logistics workers along the supply-chain, this research now turns its attention to the second area, which it argues has seldom been afforded the same attention as Amazon's (sometimes brutalising) working conditions. To raise this second area in continuity with the first, we can ask this: if the logistics sector temporarily withdraws a commodity from circulation in order to augment its value, where does it withdraw it to? In other words, where – in the spatial and geographical sense – does Amazon carry out its productive activity?

To get a better grasp on this question requires a theoretical departure (of sorts) from what has so far been presented. In order to understand Amazon, warts and all, we have to reckon with the platform as a *spatially* productive outfit. Following Neil Smith's (1984)

work on the uneven development of capitalism, this research registers an interest in emergence of *geographical space as a means of production*, where space is produced according to the spatial properties of the productive forces and the distance between origin and destination becomes a means of production in and of itself. As previously mentioned, Amazon's infrastructural intermediary is not just digital, but first of all material – that is, spatial. Its value-adding properties are realised elementally through the production of fixed capital in the form of physical sites of distribution through which its means of labour, handling commodities, can be extracted of its value. This requires the production of specially engineered logistical spaces that are purposefully designed to speed up the circulation of commodities, thereby enacting that all-important distance-shrinking par excellence of platform intermediaries between the different actors at each end of the market.

Although this is an under-researched field, that is not to say that there are not scholars committed to this particular line of enquiry, Jesse LeCavalier (2010; 2012; 2016) amongst them. LeCavalier (2016: 8) introduces us to the architecture of fulfilment, which he describes as a product of the emergence of logistics as an agent in the transformation of territory:

> If logistics is active in shaping territory, what means does it employ to define, produce, or otherwise transform space? What do these transformations look like, and what, if any, are the opportunities they might be freighting (or smuggling)? One point of entry to address these questions is through some of the very banal instruments of the logistical system themselves: the things that enable the movement and switching of vast streams of capital and merchandise and the things that mediate amongst territory, technology, and bodies – the things called buildings.

He might be playing it down by calling them 'banal', but LeCavalier is speaking to one of the most important ways that Amazon accomplishes platform dominance – by building logistics infrastructure in the form of warehouses. Warehouses have been an integral component of capitalism historically, as detailed in Dara Orenstein's book, *Out of Stock: The Warehouse in the History of Capitalism* (2019). Orenstein (2019: 18) shows how the logic of the platform to compress space-time between production and consumption is resulting "less in a global factory than in a global warehouse". So whilst warehouses are by no means a new phenomenon or asset of capitalism's value circuits, the rise of platform

logistics has certainly elevated their role and prompted a construction-drive of distribution facilities that can manage a new circulatory regime for capital. Part of the impetus for this research however is that both Orenstein's *Out of Stock* (2019) and LeCavalier's *The Rule of Logistics* (2016) devote a much more sizable portion of their analysis of the spatial sociology of logistics to Wall-Mart rather than Amazon. This is perfectly understandable, given that Wall-Mart were undoubtably the early movers in the e-commerce market and consequently the explosion of logistics-based real estate that likely informed the early phases of Amazon's emergence on the global stage.

But this research is more attentive to Amazon for two distinct reasons. Firstly, for all the reasons highlighted in this introduction regarding the unprecedented power of Amazon as a logistics platform, having well surpassed Wall-Mart's capabilities as a retailer several decades ago. Secondly, pertaining to the first, Amazon's infrastructural reach is now global, rather than being concentrated in the United States. Amazon build warehouse capacity everywhere from Doncaster to New Delhi, taking it steps closer to becoming the 'everything store' (Stone, 2013) that aims at the total organisation of all the world's commodities (Bratton, 2015: 198). The fact that this global behemoth has real tangible effects on localised scales of development is what has attracted this research's attention. In the North East of England, close to where this research is being conducted, Amazon now have four different distribution sites, all located in landscapes that share similar geographical, historical and social properties. In these spaces we get a closer sense of the hows, whys and wheres of Amazon's spatial production, encased within the broader transmutations of place as constituted through its historical development over the course of industrialisation and the concomitant process of deindustrialisation. There are no two ways about it: in order for Amazon to imprint its intermediary logic on the world, it must spatially conquer these sorts of spaces specifically. Clare Lyster does an exemplary job of situating Amazon's urban conquest in the appropriate historical framework in *Learning From Logistics: How Networks Change Our Cities* (2016), choosing to "hijack flow models" of network thinking in order to show how the 'network condition' is the primary motivator of urbanism that underpins Amazon. And yet the focus on post-Fordist landscape architecture that she and Waldheim (2016) map out again is too preoccupied to be able to move towards a place-based analysis of Amazon. Amazon is a global phenomenon at the same time as being a local reality. Therefore, this research adopts the funnel approach, starting with a deeper exploration of the rise of logistics as a source of value, before moving

towards generating a spatial sociology of Amazon that demonstrates how value is attained through treating space as a means of production. It engages with Amazon as a space-making logistics platform that must sink its teeth into regional urban development as a method to expand its distribution network. This engagement should hopefully bring about a detailed theoretical account of how Amazon's market dominance is, in no small part, contingent on its ability to dominate and configure the spatial terrain around us in such a way as to prioritise and privilege the unfettered movement of objects that populate its commodity distribution network.

0.4 Chapter Overview

The ambitions of this research belong to the development of a material account of Amazon's 'fulfilment network' in the UK that is pivotal to its platform logistics model, paying specific attention to the spatial production of a new distribution warehouse in the market town of Darlington in the North East of England. We start this journey by mapping the political, economic and geographical conditions that serve as the historical incubator for Amazon as it expands its spaces of operation across the world. Put another way, because the basis of this work derives from the logic of historical geographical materialism (Harvey, 1985: xii), a basic prerequisite is the fleshing out of a particular historical narrative itself. The beginning of this research traces the proliferation of logistical spaces like Amazon's 'fulfilment centre' in Darlington back through the history of logistics as it went from a cost-minimising industry to one that added value across circulatory systems (Cowen, 2014: 24) by transforming the spatial composition of the economy. By demystifying the platform's raw physicality, it begins the task of challenging the all-encompassing ontology of the digital economy that casts Amazon as a 'tech giant' with a waning interest in tangible space.

Chapter one will explore the political economy of logistics as a source of value for capital. In adopting Marxist concepts of value theory (Marx, 1938), the laws of motion (Marx, 1993), and the turnover time of capital (Marx, 1973), this chapter will begin to mount the argument that a modern logistics platform like Amazon can only be conceived of as the material outcome of a series of transformative events that took place over the course of the twentieth century. Originating in what Marxists depict as the *contradictions of capitalism* (Wright, 1978; Mandel, 1999; Harvey, 2018), it will argue that the economic consensus after the Second World War found itself on borrowed time once global

competition began to penetrate and undermine the nationally scaled configurations of fixed capital, industrial infrastructure and institutional organisation that had previously been responsible for generating growth and prosperity. An analysis of the period in question, approximately 1945-1970, will grant the possibility for this chapter to theoretically introduce logistics as a *safety valve* for capitalism as it attempted to navigate its way out of the crisis of Fordism and towards a model of flexible accumulation, or post-Fordism. Specifically, it will address how the expansion of the logistical economy correlated with Marx's thesis (1973) that as industrial capitalism (over)developed, the relations of production would prove increasingly subordinate to that of distribution, to the point that transportation and logistics would become more of a focal point for the capitalist class of owners and producers than manufacturing power.

Once the theoretical framework of the value attached to the modern logistics economy has been established, chapter two will look to situate this political and economic settlement, commonly referred to as 'neoliberalism', or 'post-industrialism', inside a critical engagement of the spatial and temporal environment in which logistics as a source of value makes and remakes itself. Developing a theory of spatio-temporality, the analysis will look to map how space and time are implicated in the mutating dynamics of *flexible production* (Harvey, 1989: 147). It will draw on social theory such as Henri Lefebvre's *production of space* (1991) and David Harvey's *time-space compression* (1989) and concentrate specifically on how these conceptual tools can be applied to the question of the modern art of logistics. It will scrutinise the weight of often conflicting academic arguments on the impending need to prioritise space over time, and vice-versa, in order to clear the way for a critical theory of Amazon's logistical operations. The chapter will ultimately arrive at the conclusion that the reality of logistics-in-action requires a specific dialectical approach that recognises the totality of speed in shaping modern logistical processes but that does not neglect the material role space plays in meeting the temporal requirements of capital in motion. It shall illustrate how Amazon, as a leading figure in the space-time economy, enact different spatio-temporal fixes in producing a source of value for the platform to pin its profits onto.

The third chapter will speak to the technological frontier in which the discourses expounded in chapters one and two are implicated. Namely, the 'logistics revolution' (Bonacich and Wilson, 2008; Cowen 2014) that unfolded in the final few decades of the twentieth century. It will again apply a materialist reading to historical development,

presenting the revolution as one where the competencies of military logistics met the needs of capital looking to annihilate space and time for its own reproductive purposes. The logistics revolution will therefore be interpreted through the lens of three interrelated technological processes: containerisation, computerisation and supply-chain compression. Together, these processes constitute what this chapter identifies as a *coming of age* in logistics: a logistical modernity (Bratton, 2015). It will argue that emergent info-technologies and management philosophies made for an entirely new way of organising economic geographies that continue to place an excessive emphasis on decentrality, mobility and flow. But the liquidity of capital is limited to the relative confines of its circulatory systems. These spaces, as examined towards the end of chapter three, have several inbuilt frictions that scupper the notion of a wholly flat world implicit in dominant conceptions of globalisation in academia. In the short term, it will demonstrate, this means offloading friction onto unsuspecting actors at the bottom of the supply-chain who are tasked with holding together logistical worlds at various nodes across the network. In the long term, it necessitates constantly rescaling and reorganising geographies in the image of logistics – the proposition this chapter will end on.

Amazon is the love child of the logistics revolution and the reorganisation of the world according to its logics, as the first three chapters ultimately hope to communicate. They provide a theoretical exploration into the forces of what Anna Tsing (2009) terms 'supply-chain capitalism' to describe the new regimes of profitability that link "ostensibly independent entrepreneurs" and thus make "it possible for commodity processes to span the globe" (2009: 149). If the factory was the bedrock of industrialism in the twentieth century, then territories of distribution like 'fulfilment centres' are the deindustrialised, late capitalist equivalent in today's era of platform monopoly dominance. Demystifying these spaces is key to decoding logistical power in the age of Amazon, who occupy a growing physical presence in nineteen different countries but do so in a manner that has to date been able to evade critical attention. To truly reckon with the impact of the company on our everyday lives, we must reject the idea of Amazon as spaceless and placeless, for this only serves to reinforce a neatly crafted view of digital platforms as not being tied to the same sovereignty and accountability that others in the space economy are subject to. Research into Amazon ought therefore to amplify the spatial and geographical rationale behind its platform ubiquity.

With this in mind and with the appropriate theoretical and historical foundations laid, chapter four shall begin to mount a critical engagement with how Amazon spatially clusters its operations in specific local regions with their own histories. It shall do so by offering a place-based insight into the urban morphology of the North East of England through the years, arguing how, being suspended between multiple industrialisms, it has become the optimal locality for Amazon thanks to its spatial composition. After a nuanced, non-essentialist analysis of how Teesside in the North East has grappled with the diminishment of industry and the spatial impact of deindustrialisation on its geographies, this chapter shall turn its attention to a geographical phenomenon that has emerged in their wake. Namely, it will explore Shoard's (2003) work on 'edgelands'– a peri-urban geography that surfaced in the post-industrial periphery. It shall make the case that the characteristics of this particular spatiality, having once been overlooked by planners and architects, now presents itself as prime real estate for logistical landscapes as a new paradigm for urban growth is imagined around the principles of mobility. To construct this argument, and to further cement the idea that there is a strong possibility that the future of Tees Valley belongs to Amazon, this chapter shall embark on an unconventional thought experiment that imagines what role this part of the North East would play in a polycentric linear urbanism. Building on Martin's (2010) critical analysis of architect Will Alsop's idea for a supercity in the North of England – a linear-based urban superstructure consisting of interconnected cities bound by contemporary logistics – it shall argue that we make the same mistake when envisaging such projects as we do when shopping from Amazon: assuming a certain *weightlessness* to the post-industrial, digital world that fails to account for the gravity of the operations that sustain it. This gravity, taking the form of hard logistics infrastructure, must embed itself in landscape. But where will this infrastructure slot in to the post-industrial utopia? In demonstrating how Tees Valley complicates the idea that all Northern towns and cities necessarily follow the same evolutionary path through industrialism into service-based economies, it will be possible to point to why the industrial activities of logistics (still integral to a polycentric linear urbanism) are magnetised to the present-day composition of Teesside. This would not exactly signal a future necessarily favoured by local communities burdened with fulfilment architecture, prompting this chapter to end by theorising how somewhere like Teesside is at risk of becoming a subaltern region within the British mainland. This should open the door for the final chapter of the research: a systematic appraisal of Amazon's recent exploits in the market town of

Darlington that provides a case study into how such infrastructural projects get off the ground.

Chapter five will map the trajectory that brought Amazon to Darlington's eastern periphery in 2018 specifically, detailing the development of this plot of land from an agricultural holding owned by Durham Cathedral into one hosting a 542,000 square feet distribution centre that cost £120m to build. It shall consider the key spatial, geographical, political, and economic factors that transform this process from a blueprint into a concrete reality. Starting with an analysis of the existing logistics framework in the UK, it will frame Amazon's diversification into the North East of England as a solution to the recent congestion and saturation of logistics infrastructure in Britain's 'Golden Triangle', with the requirements of B2C logistics compelling platforms like Amazon to scatter their supply-chain regionally across the country's rurban peripheries. Over the last five years, Darlington in Tees Valley has been earmarked as one such region. Since the fulfilment centre (and the few that have been built nearby) marks a new dawn for the economy of Tees Valley, this chapter will catalogue the decisions that were made and the economic actors who made them, locating it within a global economic context that delivered unintended consequences for local regions. Insomuch as this will lay bare the strategy taken up by Amazon when sounding out new geographies for fulfilment, it shall also point towards the central tenet of such a strategy: to infrastructuralise space for its own purposes, or, to produce *customised infrastructural space* (Peck, 1996). For Amazon to achieve the ontology set out earlier, where it exists at the level of interface but anything beyond that and it begins to wither into invisibility, it must do more than establish a physical presence that churns away in the urban blind spot: it must also become an immovable part of infrastructure that obtains its imperceptibility through the way it justifies itself to its surroundings. That way it evades the scrutiny of national sovereignty and locks itself into a future it has a significant stake in. More broadly, this chapter will speak to how the material world is formed around us as we retreat further into digital impunity, allowing for the logical continuation of an enquiry into how private capital hegemonises space for its own reproduction, sculpting the built environment to advance pathways, *regimes of flow*, that narrow the circuits that transform money into commodities and then back into money.

Amazon, after all, is only as strong as its *geographies of fulfilment*. To be the 'everything store' that matches the infinite shelf space of the web to a mass inventory of tangible commodities circulating through space takes infrastructural power and a certain capacity

to *think through* spatial and territorial scales across regional, national and transnational boundaries. Specifically, it demands the division of spaces into instrumental, interdependent functions. Zoning went hand in hand with nineteenth century industrial revolutions in spatial thinking, and consequently takes on all the more importance to the platform urbanism that Amazon leverage today. 'Clusters' of logistical activity in urban peripheries behave as spatial concentrations of growth, 'growth poles' that allow formerly overlooked areas to partake in the fruits of mobility-led economic activity – particularly as a location's spatial proximity to natural resources loses its significance. These urban assemblages form part of capitalism's 'second nature', owing to its impulsion to eliminate spatial barriers by producing geographical landscapes of fixed physical infrastructure appropriate to its own dynamic of accumulation at a particular moment of history (Harvey, 2000: 19). In the modern economy of just-in-time production, lean distribution and ever-accelerating turnover times in the circulation of capital, a geographically organised resource structure that facilitates the unfettered movement of people and things is not just sought after: it is a necessity. Landscape has indeed been found decisive in remediating, redeeming and reintegrating the subsequent forms of development that have attempted to address the urban redundancy of industrialism, what Waldheim (2016) classes as the emergence of a *landscape urbanism,* or a "structural relationship between landscape as a medium of design and transformations in the industrial economies that underpin the processes of urbanisation" (2016: 69). The question of geography is critical to logistics precisely because space is not produced in a vacuum, but rather in a world of ephemeral and uneven capitalist development still in many regions managing the conditions left by deindustrialisation. Planners involved in the development of new logistics facilities must therefore begin by taking into account the historical composition of the land (and its diverse, often contradictory properties) where new landed capital seeks to sink itself. To be one step ahead of geography is to leverage its power.

This research intends to elevate the value of geographical materialism as a theoretical device capable of interpreting the rise of Amazon and its platform power. It addresses a spatial gap in the literature with a predominant focus on digital platforms that capture users through the intermediary infrastructures they assemble whilst also serving a separate function of detailing how corporate consolidation in the age of supply-chain capitalism seeps into every orifice of urban life, not least inside regional scales of local development that have their own histories to tell. Like the cities that are humorously rebranded as giant car parks with urban communities attached to them because of the

pre-eminence of the automobile and the disorder of urban sprawl, places that open their doors to Amazon's monopoly can look forward to similarly glib pronouncements that they are in fact gigantic warehouses surreptitiously posing as townships. This is what we call *Amazon country*, where certain geographical regions, for reasons that will be explored throughout, get locked into the infrastructural conquests of the platform. More seriously, this research sets out to achieve what it argues is an important contribution to existing debates in the literature around Amazon and platform capitalism: registering both their value and impact at the level of space and place. It asks that we consider the spatiality of capitalism as experienced on the local level, with regions such as Teesside seeing some of the physical transformations to landscape that, in no small part, are the product of the historical emergence of platform logistics. If we want to come to grips with Amazon beyond what we know about its ubiquity, then we ought to lend a focus to the post-sovereign infrastructural regime that makes that ubiquity an actuality. The principal contribution of this research rests on doing just that. Beginning with an analysis of global political economy and ending with a case study into a single warehouse on the eastern outskirts of a market town in the North East, it provides a comprehensive theoretical inquisition into a neglected aspect of the sociological study of Amazon: Amazon as a space-making machine.

Chapter One | Logistical Solutions to The Crisis of Overaccumulation

As the introduction to this research made clear, Amazon is above all else a *logistics platform* (Hill, 2019); a rent extracting interface between producer and consumer that must 'infrastructuralise' (Plantin et al., 2016: 295; Hill, 2019: 4; Langlois and Elmer, 2019) both digital and physical space in order to control the distribution of all our daily products, encourage the cyclical consumption of those products, and deliver them to our doors at rapid speeds. With logistical power driving Amazon's expansion into places like Darlington, where chapter five will finish at, our journey into the platform starts by probing the political and economic conditions that brought logistics infrastructuralisation to the forefront of capitalist reproduction.

Recent literature on this history (Bologna, 2016; Bernes, 2018; Danyluk, 2018; Chua, 2019) has pointed to a distinct characteristic of capitalist development that functions as the basis through which to understand all other developments: *the eternal search for surplus value*. It is impossible to conceive of capitalism in fact without the centrality of the value form. Since a firm's profits are contingent on the creation of surplus value across the spheres of circulation governing the capitalist mode of production, and these dynamic processes are themselves plagued by the internal contradictions that the capitalist system encounters when a society's material productive forces clash with its existing relations of production, the search for new modes of value-creation where old methods break down acts as the driving force behind economic development. The foundations of Amazon's economic model go back to experimentation with the value form, in which logistics (the movement of goods and people) became a value-producing industry for capital as it looked to overcome its tendency towards market saturation and overaccumulation. As producers reached the limits of surplus value creation via Fordist production methods, they looked for other realms that would assist the accumulation process. Profits were soon pinned on the *circulation* of commodities rather than their *production*. By enabling the acceleration of the circulation of commodities and thus reducing the turnover cycle of capital as it travels through its various forms (money, labour, commodity), supply-chains emerged as key sites in the spatial reproduction of capital.

Amazon is illustrative of this historical turn. The platform has nearly 200 fulfilment centres (a modern form of distribution warehouse) worldwide and hundreds of thousands of full-time, agency and 'seasonal' workers labouring within them. It is the movement of

commodities rapidly turning over in these spaces – amounting to the fulfilment of 2.5 billion packages each year – that explains Amazon's desire to *terraform* economic geographies like the North East of England, i.e. build on top of the existing composability of the physical earth as both figure and ground, mark and canvas (Bratton, 2015: 85). In order to understand how logistical sites like Amazon's distribution warehouse in Darlington materialise, we must treat them as historical spaces of value production that have emerged as an outcome of capital's spatio-temporal fixes to its late twentieth century accumulation problems. They are linear evidence of the Marxist theory of how production increasingly comes to rest on exchange (Marx, 1973: 524), and how distribution becomes an independent source of surplus value in the accumulation process. This evidence first appears in capitalism's 'long downturn' in the 1960s and the well-documented global restructuring thereafter that triggered huge investments in new logistical infrastructures and technologies.

In the following analysis, our point of departure begins after the Second World War during the so-called 'golden age' of capitalism; recognised as the most successful period in history for industrial capitalist development. It will be argued that the very same forces that brought prosperity to North America and Western Europe in the mid-twentieth century triggered their eventual downfall, owing to a systematic *overaccumulation* of capital that resulted in a crisis in the realisation of value amongst firms in leading productive industries and evidenced by falling rates of profit and stagnant productivity growth. By deep diving into twentieth century value form theory and drawing on neo-Marxist political economy from crisis theorists such as David Harvey (1989; 2017; 2018), Ernest Mandel (1978; 1996), Robert Brenner (2006) and Erik Olin Wright (1978), this chapter first seeks to demonstrate how the contradictions sewed into the capitalist mode of production became the engine driving its future development. It then goes on to position global advancements in logistics as an outcome of capitalism's long downturn towards the end of the 1960s, asserting that the string of investments and innovations in the 1970s constituted capital's attempt at a *logistical fix* (Danyluk, 2018) to a blockage in its internal spheres of circulation across which value must travel. These experiments – of the counterrevolutionary moment of neoliberalism – formed part of a broader global restructuring in the latter stages of the twentieth century rooted in a desire to wean capital off its dependence on surplus value creation in the realm of production. One by one, this chapter shall document these transformations, before arguing that what gets overlooked in academic research into the

history of neoliberalism is a critical evaluation of the role and evolution of logistics. By accelerating the turnover time of capital, logistics became a vehicle by which to speed up the realisation of value (Chua, 2019) and thus offer one solution to the tendency towards overproduction blighting capitalist development that sparked the neoliberal turn in the capitalist West.

The idea of prioritising investment in the sphere of circulation over investment in the traditional sphere of production goes a long way in explaining Amazon's 'platform logic' (Bratton, 2016: 189; Hill, 2020: 523), which takes this formula and integrates it within a digital framework. Amazon's logistical spaces are typical of development and innovation under a new system of *supply-chain capitalism* (Tsing, 2009); a complex socio-technical network of networks prided on hyper-mobile commodities circulating across disparate geographies at vast quantities and rapid speeds. By framing the modern capacity of platform logistics as a branch of capital's endless, almost neurotic search for value, this chapter ultimately looks to create the space in this research for further analyses that might help to enrich our material appreciation of fulfilment centres like the one in Darlington. We begin by couching our theoretical understanding of the *theory of value* within a Marxist interpretation of the 'post-War boom' to help identify the forces moving the flow of capital away from production and towards distribution.

1.1 The Post-War Boom: a Marxist Interpretation

The period stretching from towards the end of the 1940s to the mid-1960s known as the 'post-War boom' or 'post-World War II economic expansion' represented a defining moment: a 'golden age' for capitalism (Marglin and Schor, 1991). Put simply, with the help of state welfare and Keynesian full-employment initiatives, enough of the high and sustained economic growth (a higher rate of capital accumulation because of a higher rate of profit) in the industrialised North throughout these years was captured by labour for it to lead to rising living standards in Western Europe and North America. This growth, as outlined by Marxist economist Ernest Mandel in *Late Capitalism (1978)* and *Long Waves of Capitalist Development (1995)*, was the product of several *extraeconomic* factors triggering an upsurge in the average rate of profit registered by firms during that period.

The leading extraeconomic factor was the historical defeats suffered by the working class not only in imperial nations like Germany and Japan, but internationally during the Second

World War. This was indeed a 'general trend', evidenced by falling real wages in other developed economies like Italy, France, and Spain over that time (Wright, 1978: 162-65). In Mandel's (1995: 18) analysis, the scale of these defeats, culminating in a global cheapening of labour-power, enabled the capitalist class to impose a significant increase in the rate of surplus value in the years thereafter. Surplus value is defined here as the difference between the new value produced by living labour in the production process and the cost of reproducing labour-power most notably in the form of wages (Mandel, 1978: 598). With labour in low demand, unable to effectively organise against the boundless demands of capitalist production and downward pressure on wages, conditions were ripe for capital accumulation in that profitability hinges on the ability of capitalists to produce *absolute surplus value* out of labour in the realm of production.

Nowhere was this more pronounced than in industrial manufacturing, amplified by the mass production techniques of the Fordist assembly line and the subjection of labour to the philosophy of Taylorist scientific management, said to have peaked in the post-War decades of American dominance (Antonio and Bonnano, 2000). The implementation of the moving assembly line and the scientific system of management to control the role of labour within that assembly line revolutionised the *flow* of production, allowing for unprecedented savings in time for the capitalist class of owners and producers (Schoenberger, 1994: 53). Combined with ever more efficient means of production, such methods enabled players in the advanced capitalist world to develop their productive forces (means of production and labour) on an unprecedented scale (Brenner, 2006: 28). The profitability of this export-led growth was attained as firms deployed these methods to keep the physical productivity of labour rising at a rate higher than the rise in the real wages of the labourer. For capital to accumulate, it is essential that the magnitude of the value created by workers be greater than the costs of reproducing the working class (Wright, 1978: 119); the wage of the worker must be less than the total value they produce (Hardt and Negri, 2001: 222). Understanding the industrial 'boom' of the post-War years begins by recognising how economic growth is a product of the rising rate of profit, itself contingent on the creation of surplus value in manufacturing by exploiting labour for more than it is worth.

If the exploitation of labour power was the mechanism prompting the post-War boom, it was American imperialism that established the global conditions for capital to expand. According to Mandel (1995: 23-24), the economic history of imperialism demonstrates

that “under conditions of private property and competition for profit, only a high degree of international concentration of economic and political-military power” can bring capitalism on a global scale into a state of ‘equilibrium’. With the help of cheap access to Middle Eastern oil, the United States – now the leading force in post-War reconstruction after the decimation of Japan and Germany – rolled out the implementation of the liberal reformist ‘Marshall Plan’ and oversaw the imposition of the ‘Bretton Woods’ agreement that would replace gold with the US dollar as the official reserve asset. The Bretton Woods agreement would act as the ‘supranational authority’ for protecting national governments (Sassen, 2006: 152). The establishment of currency convertibility in the advanced capitalist world accelerated the growth of international exports (Brenner, 2006: 109). After decades of turmoil culiminating in disruption of trade and a regression in material production, American imperialism – the new global hegemon – paved the way for the first modern multinational corporations (Blakeley, 2019: 42). Whereas throughout the Second World War large segments of the productive capacity of advanced economies were earmarked for the armaments sector, post-War manufacturing focused on producing industrial goods that could be exported as commodities for exchange on the international market. International trade was especially important to this period of development given that prior wage suppression and austere fiscal policy left domestic demand for manufactured goods inadequate.

With periodic increases in the rate of surplus value in the global economy’s most productive and labour-intensive sector, the average rate of profit saw an aggregate upturn and wages rose accordingly (although still significantly below productivity). These extraeconomic factors are said to have unleashed “dynamic processes [that can be] explained by the inner logic of the capitalist laws of motion” (Mandel, 1995: 18-19). They accelerated the accumulation process in bringing forward an extraordinary period of economic expansion in the image of American imperialism and mass consumerism. They explain Japan’s ‘high-speed growth’ and Germany’s ‘*Wirtschaftswunder’* (economic miracle). The very notion of the ‘golden era of capitalism’ is, in effect, a reflection of these historical forces. Yet, as we turn our attention to the *laws of motion* governing the capitalist mode of production, we find that no upturns, not even the post-War boom, are eternal.

The following analysis will address how the post-War, export-led growth of world leaders in high-end technological and industrial development like Japan and Germany would consequently have an extremely negative impact on levels of value-realisation in the global

sector for manufactured goods, culminating in the end of the post-War boom and triggering what Marxists identify as capitalism's profitability crisis or 'long downturn'. We ponder what Marx (1970: 21) said occurs repeatedly when "the material productive forces of society come into conflict with the existing relations of production". That is, what happens when capitalism encounters internal contradictions of the kind that plunge it into crisis. This particular line of enquiry is classed as being of critical interest to this research given that it was the breakdown in capitalist development that would ultimately compel capital to seek out new areas for surplus value creation. The rise of logistical power, wherein value added in circulation takes precedence over that in industrial production, is an outcome of capitalism's transformation after the decline of post-war Keynesianism. It provides us with the conceptual basis through which to appreciate infrastructuralisation and platform logistics at Amazon. Exploring the historical pivot in the material forces of production in turn allows us to better understand the impact of these processes at the level of *landscape*.

1.2 Capitalism's Long Downturn: The End of the Post-War Boom

Applying a Marxist understanding of capital accumulation to economic upsurges, then, we find that they originate in the production of commodities, the value and surplus value that production creates, and the realisation of that same value once it has travelled through the necessary phases of circulation in time and space. This by definition means that Marxists look for evidence of expansive 'long wave' periods of capitalist development in material signifiers like industrial output and statistics of world exports, rather than the less tangible movement of money and prices, which is merely a reflection of these activities (Mandel, 1995: 8). In short, an economic boom must first be traced back to a society's productive sectors. In the mid twentieth century this was its highly productive and heavily export orientated manufacturing base. Profits in manufacturing had an aggregate impact on the total economy because money capital corresponds and indeed has its origins in the real value of productive labour time reflected in the entirety of commodities in circulation and the speed at which they are exchanged. What is more, by pegging currencies to the US dollar, the Bretton Woods agreement only tightened the link between money and the *real* economy.

By the same measure, 'downturns' that trigger economic recessions stem from slow capital accumulation in the productive sector – typically as a consequence of falling rates

of profit in the production and consumption of commodities. Many Marxists (Wright, 1978; Mandel, 1995; Brenner, 2006) use the decline of the post-War boom as confirmation of this, pointing to how average profits in the global sector for manufactured goods started to fall quite dramatically in the late 1960s. Robert Brenner offers valuable empirical evidence of this in *The Economics of Global Turbulence* (2006: 108), drawing our attention to profit rates from the private non-manufacturing sector at the time, which fell at barely half the rate than of manufacturing profits. Clearly, any interpretation of the decline of the post-War boom must first accept that the profitability of manufacturing – rooted as it is in the material production of commodities – played a quintessential role. This raises the question, what brought about such a rapid fall in the rate of profit in the global manufacturing sector to begin with? To answer this necessitates exploring multiple interpretations of the root causes of capitalist crises.

1.3 Profit-Squeeze: A Disputed Theory of Crises

It is in the realm of capitalist *crisis* and not within the more straightforward macroeconomics of the 'business cycle' or 'boom and bust cycle' that we must focus our attention. This is because the turbulence felt by the global economy in the late 1960s was not tempered by cyclical renewal; the stagnation was not periodic in nature. Erik Olin Wright differentiates between these two theoretical ends in *Class, Crisis and the State* (1978: 125), noting

> a crisis implies that in order for accumulation to continue some sort of restructuring of the accumulation process is necessary; a cycle merely implies that there has been some sort of disturbance in accumulation which can be alleviated without any basic structural changes.

As the likes of Wright, Mandel, Brenner and David Harvey (2018) lay out, what occurred towards the end of the twentieth century was not the resumption of an economic cycle but the makings of one of the biggest global restructurings that has ever taken place in the history of industrial civilisation.

Acknowledging this basic principle leads to a rather uniform rejection of what is often referred to as the *neo-Ricardian* hypothesis of capitalist crisis that places overt emphasis on the relationship between profits and wages (Harvey, 2018: 52; Wright, 1978: 150). Known as the theory of 'profit-squeeze' or 'wage-squeeze', this argument essentially

borrows from the logic behind the aforementioned period of high capital accumulation and inverts it. That is, if the previous period was characterised by an initially subordinated and low-waged labour force allowing capitalists to profit by keeping productivity rising at a rate significantly higher than wages, then problems with the following period of accumulation can be understood as belonging simply to a shift in the power relation between capital and organised labour, amounting to rising real wages and diminished profits. This occurs, according to champions of the theory, because of the failure of wage growth to fall in line with declining productivity growth (Brenner, 2006: 15); a skewed capital to labour ratio that undermines the process of capital accumulation as wage rates rise so far above the value of labour power that scarcely anything is left over for accumulation (Harvey, 2018: 159). In short, this is the theory that a crisis in productivity joined with wage inflexibility leads to profits being squeezed and accumulation slowing down (until stagnation sets in).

The issue with this theory, when understood in the context of *actually existing capitalism,* is it implies that reconstituting this delicate balance will return the status of capitalist development, in cyclical fashion, to equilibrium. As Harvey (2018: 52) writes,

> Capital's response is to create (either by conscious design or because there is no choice) a severe recession (such as that of 1973-4), which has the effect of disciplining labour, reducing real wages and re-establishing the conditions for the revival of profits and, hence, of accumulation.

Later stages of this chapter demonstrate how this theory proved to be an extremely dogmatic component of the neoliberal counter-revolution in mainstream economics that followed. For now, we must simply make clear that the concerted effort to force labour to adhere to the new demands of capital after the decline of the post-War boom – although unparalleled in terms of breaking organised labour – *had no such effect of stabilising capital accumulation*. As Brenner (2006: 18) makes clear, even though the offensive did force up unemployment by way of reducing demand, the curbing of wage growth over the course of the 1970s, '80s and beyond did not correlate with a successful process of adjustment and recovery of profitability. Add to this that such a theory fails to account for the vast differences in the size and strength of a given national economy and its adjacent labour movement, and the idea of a worldwide 'squeeze' on profits in the global economy seems even less convincing.

Built into this 'supply-side' thesis of capitalist crisis is a broad acceptance of *Say's Law* (Sowell, 1972). In its simplest form, Say's Law is the idea that the supply of commodities necessarily creates its own demand, since the income of suppliers (wages, profits, rents etc.) must equal the total price of goods produced for consumption (Harvey, 2018: 75). Such a proposition leads its proponents to overlook some of the more internal dynamics of capitalist development when studying crises, insisting that the general laws governing the capitalist market will ensure it is never far from equilibrising or correcting itself. But this viewpoint seems not to appreciate that the different phases that capital must circulate through (money – commodity – labour) are inescapably separated across both time and space. Therefore, since capital is essentially value 'in motion' (Harvey, 2018: 83), we ought to look not only at potential barriers to value realisation that occur *within* each phase of circulation (like the effects of full employment on the power relation between capital and labour), but those that manifest *between* the different phases as well. As Brenner (2006: 25) puts it, supply-side theorists "focus too exclusively upon the 'vertical' (market and socio-political) power between capitalists and workers", meaning they "underplay not only the productive benefits, but also the economic contradictions that arise from the 'horizontal' competition among firms that constitutes the capitalist system's economic mainspring". In other words, profit-squeeze theorists, working off the conceptual framework of Say's Law, make light of the inherent contradictions haunting the laws of motion that reign over the capitalist mode of production. The following stages of analysis hope to emphasise that *supply does not necessarily create its own demand* (Harvey, 2018: 194), that there is in fact no general unity between supply and demand, in so doing promoting an alternative theory of the crisis that occurred in the late 1970s orientated around inter-capitalist competition and its interaction with the different phases in the circulation of capital separated across time and space.

1.4 Competition as the Key Word

"Control over time allows for an unusual form of control over space", writes Erica Schoenberger in the essay 'Competition, Time, and Space in Industrial Change' (1994: 56*).* What Schoenberger is referring to here is the stability that oligopolistic market conditions and the absence of a competitive environment bring to the accumulation process. Prior to the economic upheaval of the 1960s, competition amongst capitalists in key industries existed for the most part in a limited capacity. With so few players in industries with typically high levels of entry, capitalists were by and large insulated from

price competition and product proliferation. This arrangement favoured existing firms given it afforded “gradualism in the renovation and expansion of product lines” (Schoenberger, 1994: 57).

Take the automobile industry, for example. Schoenberger (1994: 54-55) notes that the preservation of oligopoly in the US automobile sector enabled the ‘Big Three’ of General Motors (GM), Ford and Chrysler to register steady growth, since protection against uncontrolled price competition and rapid new product development “allowed them to pursue a strategy of incremental product change and gradual obsolescence of their fixed capital stock”. The key here is how the lack of competition gave breathing space for the prior investments of capitalists to be *realised* or *valorised* across capital’s spheres of circulation. For the Big Three, the process of bringing a product to market scarcely encountered a race against time or in turn, a race to the bottom (a compulsion to reduce costs) because the competitive environment could be managed to avoid this. Investments in fixed capital were therefore relatively sturdy, and any technical or mechanical equipment that was deemed antiquated or obsolete could be swapped out in a controlled manner without fear of losing heavily on ROI. This made for a ‘smoothness of flow’ in throughput across capital’s various spheres of circulation, helping to establish the conditions for the steady internationalisation of the automobile industry (Schoenberger, 1994: 53). Hence, control over time allowed for an unusual form of control over the spaces of production and distribution – the factories, warehouses, etc.

Looking at a crisis of capital accumulation through this lens necessitates unpacking what happens when intensified inter-capitalist competition renders this control over time no more. To be more specific, we must learn how changes in the competitive nature of the capitalist market for manufactured goods hurled the accumulation process into disarray by destabilising capital’s spheres of circulation. The downturn owes to the coercive dynamics of competition and the structural imperatives of the accumulation process (Danyluk, 2018: 634).

Operating under oligopolistic conditions, American manufacturers had previously managed to stave off the aforementioned tendencies inherent to the logic of competition. But the introduction of high-end Japanese and German product lines onto the international goods market ripped up the old order of things, ushering in a period of intense inter-capitalist competition. The gradual proliferation of product lines from Japanese and

German manufacturers over this period skewed market conditions away from the Americans, threatening their concentrated market share and putting an end to the time-space settlement responsible for the extraordinary dominance of American products in domestic and foreign markets for roughly two decades (Schoenberger, 1994: 56). Indeed, the 'long downturn' rests on the interaction between the older blocs like the once impenetrable US market, and later-developing blocs like Japan and Germany (Brenner, 2006: 37).

With this, capitalists could no longer seek 'gradualism' in the renovation and expansion of product lines, instead having to get new products to market as fast as possible by organising spatial production in such a way as to be "capable of rapidly and smoothly adjusting to continually changing product configurations" that the market created (Schoenberger, 1994: 58). Industry had become susceptible to a time sensitivity that triggered downward pressure on prices. The return to competition destabilised the temporalities of circulation, placing a profound emphasis on speed and tempo in production and moving firms to compress time in order to stay competitive. Time had become part of the firm's competitive strategy in the market and production in space was soon redesigned to accommodate this (Schoenberger, 1994: 58).

Of course, crisis does not set-in the minute serious competition is introduced into a capitalist market. Rather it is the *limits* to the necessary process of readjustment that delineate the real reasons behind the profitability crisis in the 1970s. Put another way, if competition unleashes new temporal dimensions onto the capitalist market previously unseen, forcing a transformation of the capitalist mode of production driven by the need to get new or renovated products to the market as fast as possible in order to seek out competitive advantage, the question then becomes, what steps must a firm take to acclimatise to these conditions and what contradictions could this potentially lay bare? The impediments the accumulation process faced in this stage of capitalist development explain why the post-war economic upturn descended quite naturally into crisis over the course of the 1970s. The long downturn was not the result of an exogenous nor extraeconomic interference to the accumulation process. On the contrary, it was generated by the accumulation process itself.

1.5 The Falling Rate of Profit and Overaccumulation

In *The Limits to Capital* (2018: 120), David Harvey, paraphrasing Marx, notes how competition impels capitalists to compete with each other over *relative surplus value* in the realm of exchange, which necessarily moves the system towards perpetual revolutions in the productive forces since individual capitalists must frequently alter their own production process for them to become more efficient than the social average. Indeed, the new temporal dimension competition brings to the capitalist market pushes producers to periodically adopt advanced technologies to increase labour productivity and overcome price disparities in an attempt to capture increased market share. Industrial production and the associated constant revolutionising of technology makes for more efficient and cheaper production (Giddens, 1991: 61). As Marx (1938: 640) originally argued in *Capital,* "[t]he battle of competition is fought by cheapening of commodities" which itself is contingent on "the productiveness of labour, and this again on the scale of production". The more competitive a market, the more firms race to leap-frog each other in the adoption of new technologies and new organisational structures independent of the will of any particular entrepreneur (Harvey, 2018: 121). Mechanisation – which serves not only as a substitute for labour but as the enabler and enforcer of its intensification (Moody, 2018: 18) – remains unchallenged as the conduit through which such a demand for speed in production can be pursued. Marxists have long noted that in times of intense competition amongst capitalists, the *organic composition of capital* (the 'dead' labour of machines relative to the 'living' labour of workers) tends to rise, and firms become more capital intensive as a result (Wright, 1978: 126-136; Mandel, 1995: 70-75: Harvey, 2018: 189). This alone has the potential to frustrate the rate of profit in the long run, since only the 'living labour' embodied in variable capital represents *value added* in production by way of the exploitation of productive labour time, and not the constant capital, or 'dead labour' of machines. Technological innovation destroys the temporal stability that allows for a balanced ratio, putting the reproduction of the capitalist class as a whole in jeopardy (Harvey, 2018: 188).

These dynamic forces were unleashed on the capitalist market when Japanese and German multinationals began to surpass the productive capacity of the United States in the decades after the War. Japanese auto companies in particular were renowned for investing in advanced technologies during the 1960s and 70s like the *Unimate*: an industrial robot that could significantly reduce human input (thereby cheapening labour)

and improve productivity (Holusha, 1983). The process of *ephemeralisation* (producing more with less) meant that firms could increase the output and reduce the price of their exports even further. But with the world market now aflood with producers exchanging similar commodities, a race to the bottom was set in motion and those producers who continued to burden the same production costs as before the insurrection of lower-cost competitors were about to encounter first-hand what opposition between the productive forces of society and the relations of production really entailed. Many US firms now had to face up to the reality of a deep flaw in the fabric of capitalist development that had previously escaped them: the innate pressure to constantly revolutionise the productive forces coming up against the need to realise the value of previous investments caught up in non-liquid capital and thus the constant exposure to new, more advanced production methods with lower overheads. Profitability in manufacturing began a downward trajectory from 1965 that would not bottom out until the early 1980s (*see Figure 1)*. As Brenner (2006: 102) argues, this was because "producers were unable to mark up prices over costs sufficiently to maintain their established rates of return". Existing commodities on the market had to be dramatically revalued in relation to the newly achieved productivity of labour. American manufacturers were on the sharp end of this contradiction since the amount of value they had held up in fixed capital meant they were unable to redirect their investments into new production lines nor scale back production so as to bring supply back into line with demand. This was especially unforgiving given that post-War production derived from heavy industry (steel, automobile factories, chemical plants and the like) where initial investments needed years to be valorised.

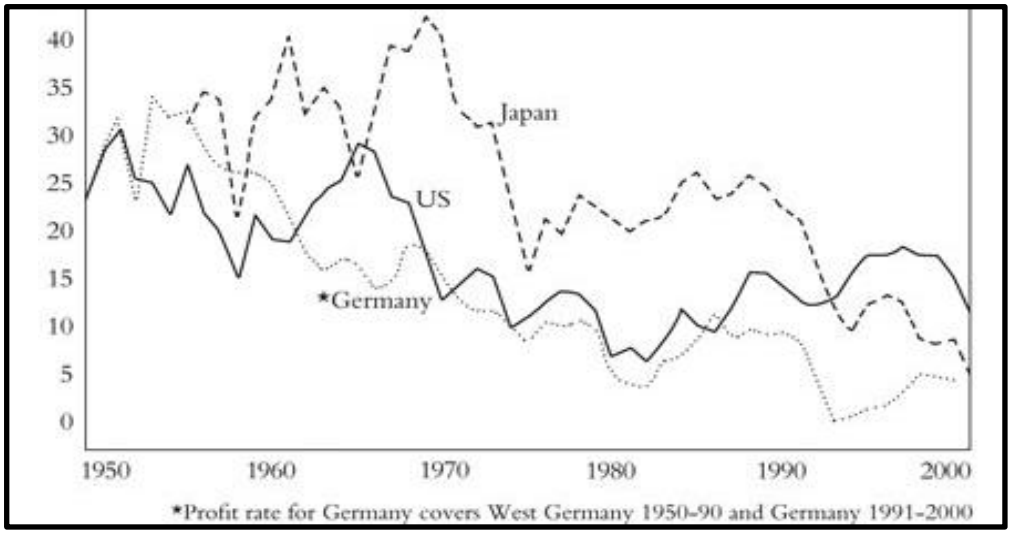


Figure 1 *The falling rate of profit: US, German and Japanese manufacturing net profit rates.* (Brenner, 2006: 7)

All of a sudden, the firm's breathing room in time and space had disappeared. In order to retain their market share, manufacturers had to accept their fixed capital costs in the form of reduced profits. The result was chronic *overcapacity* in international markets for manufactured goods since these problems would eventually catch up with rivals of the US as American manufacturers updated their lines and the US administration forced a devaluation of the dollar (Brenner, 2006: 100). To understand overcapacity as a cause of crisis, or what Harvey calls 'overaccumulation', we need not look further than his writings on Marx in *Capital* volume three*:*

> Capital, in the course of its circulation, undergoes a series of 'metamorphoses' from money into material commodities into production processes into commodities, etc. Since capital is value *in motion,* value can remain only by keeping in motion. This allows Marx to provide a purely technical definition of devaluation as value that is 'at rest' in any particular state for more than a moment … No permanent ill effects derive from devaluation provided capital can complete its circulation through all phases within a particular time. (Harvey, 2018: 194)

Harvey's interpretation outlines Marx's principal rejection of the idea that supply necessarily creates its own demand, since Say's Law neglects how capital faces multiple barriers across its own spheres of circulation before it can be valorised. Distance in time and space, "separation within the unity of production and consumption", inevitably creates the potentiality for crises; "all crises are crises of realisation" (Harvey, 2018: 194, 85). The decision by major players in the advanced capitalist world to attempt to navigate the crisis by speeding up production lines *clogged the flow of circulation* for all parties. Demand simply was not there for all the value in motion to be realised; the economy could no longer keep up with the boom. This was exacerbated by the tendency for advanced technology to displace labour, for it had the effect of depriving the working class of the wages necessary to consume the influx of commodities being produced. With capitalists habitually out to reduce their own wage bills thus restricting the development of effective demand (Wright, 1978: 140), productive capacity outgrew the rise in purchasing power of the final consumers (Mandel, 1995: 70). That capitalist production tends to produce without regard to the limits of the market led in this case to a 'general glut' of commodities (Harvey, 2018: 76). A systematic overaccumulation of capital took the appearance of *overproduction*; a build-up of inventory waiting to be exchanged. Vast amounts of value were essentially frozen in circulation, like rotting fruit waiting to be eaten. The only way to return the laws

of motion to a harmonious state, that is, to resume the accumulation process, was to enact a major *devaluation* of capital by way of selling off held up commodities at a loss. This dilemma as a whole – constituting a fundamental contradiction in the laws of motion – sent the rate of profit plummeting, severely harming output growth and provoking a system-wide crisis (since manufacturing represented a majority portion of GDP) that eliminated inefficient firms and led to significant commercial bankruptcies. It serves as the conceptual backing required to make sense of why and how firms were pressed to move capital away from industrial production and into new territories. This chapter identifies investment in the sphere of circulation as the historical contingency of Amazon's present day platform dominance as an e-commerce and logistics provider ever since logistical processes served as a spatio-temporal attempt to solve capital's *realisation* problems.

Thus far, we have seen how the export-led growth nation states were able to undertake after the Second World War became the linchpin for post-War economic expansion in the industrialised West. But the progress of Japan and Germany in high-end technological and industrial development transformed the international market from oligopoly into one of intense inter-capitalist competition. Capitalist development, thrown into disarray by the spatio-temporalities of competition, began to encounter internal contradictions of the kind that brought barriers to the accumulation process. Compounded by the oil crisis and chronic trade deficits of the 1970s, the post-War boom was over and the Keynesian economics that underpinned it thrown out. In what follows, we shall address the steps that were taken by advanced capitalist nations to wean capital off its dependence on surplus value creation in the realm of production.

1.6 The Neoliberal Counter-Revolution: From Structural Unemployment to Globalisation

"Capitalism can always escape into the future precisely because it harbours permanent and inherent contradictions", writes Byung-Chul Han in *Psychopolitics* (2017: 5), as he describes the mutation of industrial capitalism into *neoliberalism*: a counterrevolutionary political philosophy orientated around state commitment to free enterprise and market logic. The turn towards neoliberalism can be understood first and foremost as an attempt to address capital's accumulation problems. Yet this turn should be seen not as a bid to *eliminate* the aforementioned contradiction between the productive forces and the relations of production, which would require a complete systems change of the kind that

Marx had advocated for a century earlier. Instead it seeks to *mitigate* them by baking such tendencies into of a new capitalist settlement and expanding the search for value beyond industrial production. Indeed, the global restructuring and expansion that began in the 1970s starts by accepting as a given that the productive forces (means of production and labour) should adapt to the emerging relations of production (intensified competition) rather than addressing the *mode* of production (production for profit) in and of itself. The following analysis, then, looks to unpack the measures taken by the capitalist class to revive the rate of profit behind the previous successful period of capitalist development *in spite* of its internal contradictions, paying specific attention to the value adding activities to be found in the realm of circulation.

This chapter identifies the following avenues as key territories of the neoliberal counter-revolution in the search for value, emphasising their interaction with one another as combative tools to address the structural problems of realisation and advance new modes of value creation. These new realms all combine to explain capital's flow into logistics – this missing component of academic research into the history of neoliberalism. Supply-chains emerged as key sites in the spatial reproduction of capitalism as production increasingly lent itself to distribution.

Wage suppression and structural unemployment: Neoliberalism is in effect a form of *anti-Keynesianism*; a backlash against full employment initiatives. As Mandel (1995: 77-78) argues, this adverse reaction was not so much a belated recognition by the capitalist class of the long-term threats of full employment on inflation, but rather a signal of their waning strength in the historical class struggle. Here we point to the weight of the *profit squeeze* theory of crises, wherein the capitalist class deem the power of organised labour (evidenced by the relative share of national income going to workers) to be a hindrance to profits. If Keynesian economics had initially facilitated this settlement, then it had to be rejected and reversed. Attacks on organised labour (delegitimisation of trade unions, promotion of individualism, flexibilisation, etc.) throughout this period represented the ideological expression of a basic switch in class struggle priorities of the capitalist class (Mandel, 1995: 78). Reductions in real wages and mass layoffs were hence an attempt to increase the amount of relative surplus value in the sphere of production. That is not to say that the ambitions behind this structural readjustment stopped simply at bringing wage growth back into line with productivity growth. On the contrary, research from the Economic Policy Institute (Bivens et al., 2014) shows that, in the US for example, productivity has

grown 6.0x more than pay since 1979. According to OECD data (Schwellnus et al., 2017), Europe too has suffered what economists regard as a systematic decoupling of wages from productivity, though not quite as severe. It would be more accurate, therefore, to understand the eroding collective bargaining power of workers as part of a political project to reassert the authority of capital irrespective of the inequality it might create. This is born out in empirical evidence that shows how the share of income going to the top 10% has been inversely proportional to trade union membership for a near century (Gordan and Eisenbrey, 2012).

Financialisation: In *Stolen: How to Save the World from Financialisation* (2019), Grace Blakeley describes how the post-War fallout induced a move away from a monetary system predicated on a tight link between money and the real economy of commodity things (now struggling to produce value) and towards fiat and credit money. With the Bretton Woods agreement verging on obsolete, capital was finally released from its shackles as rigid monetary policies were loosened, financial institutions were deregulated, and private corporations were able to spend on a nation state's behalf. Finance became the catalyst for growth in a number of advanced economies. Put simply, financialisation and its various material forms (sovereign debt, corporate bonds, consumer credit etc.) represented an expansionist device through which to increase the money supply and in so doing collapse the future into the present. Known by Harvey (2017) as 'anti-value' or 'fictitious capital' by Marx (1938), the credit system – by reaching into the future so as to issue debt in the present – seeks to stimulate the extra demand required for the realisation of surplus value and thus the survival of the accumulation process itself. Debt, then, is nothing but a claim on future value. Between 1970 and 2007, the UK's financial sector grew 1.5% faster than the economy as a whole each year (Blakeley, 2019: 12).

Automation: Another discourse that has received a great deal of attention over the last few decades, particularly as technological progress moved forth into the computerised age, is automation. Beginning in heavy industry like automobile manufacturing, mechanisation soon began to encompass other parts of the economy as well. Highlighted earlier, investing in labour-saving technologies becomes an imperative for capitalists as they adapt to the spatio-temporalities of competition. Automation functions as an arm of wage suppression and structural unemployment as employers confront the limits of exploitable labour power in search of higher levels of productivity. As Mandel (1995: 65) asks, "what is semiautomation all about if not labor-saving-biased technical progress?".

This echoes Marx (1938: 435), who held that machinery "is the most powerful weapon for repressing strikes, those periodical revolts of the working class against the autocracy of capital". Technologically induced unemployment, Harvey (2018: 160) adds, exerts downward pressure on wages and provides a reserve pool of labour power to facilitate the conversion of surplus value into new variable capital. Such an interpretation of technological innovation has led to the popularisation of what Aaron Benanav (2019: 5-41) calls 'automation theorists', who hold technological unemployment responsible for the chronically low demand for labour since the 1970s. Yet Benanav takes issue with the extent to which this supposition can be extrapolated from the data. Examining statistics from the likes of the OECD, WTO, and the ILC (International Labor Comparisons), he argues that the manufacturing-productivity growth associated with high levels of automation appears rapid "only because the yardstick of output growth, against which it is measured, is shrinking" (2019: 25). This leads him to conclude that the global decline in the demand for labour is not a consequence of an "unprecedented leap in technological innovation" (2019:15), but rather the aforementioned overcapacity affecting output growth that manifested in mass *under*-employment.

Immaterialisation: Accompanying the late twentieth century proliferation of labour-saving technologies was a newfound emphasis on what Michael Hardt and Antonio Negri (2001: 290) term *immaterial labour*. Part of the rise of 'cognitive capitalism' (Boutang, 2012), 'communicative capitalism (Dean, 2012; Hill, 2015), or 'semiocapitalism' (Berardi, 2011), the recognition that traditional methods of production were inefficient at creating value spurred an expansion of the sphere of circulation *outside* of existing realms and boundaries. As Harvey (1989: 285) wrote, "[i]f there are limits to the accumulation and turnover of physical goods [...] then it makes sense for capitalists to turn to the provision of very ephemeral services in consumption". With automation expelling human labour from production, the global economy saw a mass migration from industry to *service jobs* (labour that produces an immaterial good). In *Empire* (2001: 293), Hardt and Negri distinguish three types of immaterial labour that "drive the service sector at the top of the informational economy". The first is a reconstitution of industrial production along the lines of *Toyotism*: the idea that manufacturing itself should be seen as a 'flexible' service, producers must 'listen' to the market and production decisions should come after and in reaction to market decisions rather than being executed blindly. Such is the primary basis of jobs in *product conception and design* and *research and development.* The second is

the immaterial labour of analytic and symbolic tasks such as the financial services that manage capital and come to dominate all other services. During the 1980s, 'high-end' services in finance were the fastest growing (Sassen, 1991: 11). Lastly is the immaterial labour embedded in the "production and manipulation of affect" (Hardt and Negri, 2001: 292). Originating in the social reproductive work of women, *affective labour,* known elsewhere as *emotional labour* (Hoschchild, 1983: 7), rests on the ability of capitalists to commodify human interaction and conversation. As Maurizio Lazzarato (1996: 136) recognised, this new disposition sought "to involve even the worker's personality and subjectivity within the production of value". Service employment soon surpassed that in goods production as services became recognised as an increasingly significant part of the process of capital accumulation (Rabach and Kim, 1994: 125). According to Kim Moody (2017: 20), from 1990 to 2010, service sector jobs grew by 14.2 million. Given the nature of this work however, with its relatively stagnant productivity in relation to industrial toil, there were strong pressures from the outset to 'rationalise' services in order to transform them into profitable ventures (Mandel, 1995: 85). The best route to profitability once again became a question of intensifying work whilst keeping wages low. As women entered the work force en masse, the number of waged hours they worked rose dramatically: from a median of 925 hours per year in 1979 to 1,664 in 2012 (Moody, 2017: 20). Wage suppression has been no less severe – as service workers have grown as a proportion of the workforce, 43% of private-sector jobs have fallen below the US Bureau of Labor Statistics' definition of 'low wage' (Moody, 2017: 21).

Hyper-consumerism: Given that production is rendered entirely redundant without consumption, necessary to any capitalist expansion of value is the expansion of what Harvey (2018b) calls 'human wants, needs and desires'. Advertising and mass media – which are nothing but 'sign systems and imagery' – thus assumed a much greater role in the growth dynamics of accumulation as they accelerated consumption through the manipulation of desires and the promotion of new lifestyles (Harvey, 1989: 287). Advanced by the credit system and the market-conscious service sector, consumerism constituted a strategic attempt to increase the rate of *unproductive demand* so as to mitigate the problems of realisation (Wright, 1978: 144). These new dimensions were altogether aligned with the self-maximising logic of neoliberalism, as personal development is pursued through the symbolic agency of what Marx (1938) termed 'commodity fetishism'. With the widespread emergence of *conspicuous consumption*,

advertising and marketing soon came to dominate the cultural reproduction of capitalism. By the 1990s, corporate mergers had resulted in advertising 'mega-agencies' that operated in the international arena (O'Barr, 2005). The industry would later underpin the expansion of the data economy whose revenues to this day depend (up to a point) on the sale of advertising space.

Globalisation: Crucial to several of the aforementioned attempts to relieve capital of its realisation problems is what Rosa Luxemburg identified in *The Accumulation of Capital* (2003) as the 'non-capitalist outside'. By the turn of the nineteenth century, it was clear to Luxemburg (2003: 365) that capitalism, unable to exist by itself, must constantly look beyond its margins and bring the outside within its reach of exploitation. This critical *outside* encapsulates the historical relationship between the accumulation of capital and the geographical expansion of capitalism through colonial and imperial means (Harvey, 2018: 93). For Luxemburg, capitalism was an integrated global system that ransacks all corners of the earth in search of surplus value. This colonisation manifested in several ways, all of which constituted the late twentieth century endeavour to widen or 'globalise' the spheres of circulation governing the capitalist mode of production beyond the 'global North'. First is the move to bring more final consumers into the capitalist market so as to increase effective demand and thus confront circulatory issues amounting in overproduction in a conceptually straightforward way. Second is the natural resource seeking dimension of foreign direct investment in locations determined by climate and geology, or what Benjamin Bratton (2015: 75-108) calls the 'earth layer' of our planetary-scale megastructure. Last is the global labour arbitrage to low-wage countries that do not burden the same production costs as the industrialised North – otherwise known as *offshoring* but better understood as the *international division of labour* (IDL). A branch of wage suppression and an (often cheaper) alternative to automation, in the IDL was a strategic *change in location* that sought to arrest the decline of the rate of profit now in freefall in the 'advanced' world by outsourcing on a global scale to corners of the earth where there is significantly more value to be exploited out of labour power. Neil Brenner (1998: 475) calls this *denationalisation,* since the circulation of capital can longer be conceived with reference to the image of a world economy made up of national actors operating in parcelled national-territorial spaces. In turn, rather than 'developing countries' (historically devasted by colonialism) passing through the same stages of industrial development as Europe and North America, the neo-colonial spread of globalisation, by

keeping wages low, exporting product back to Western markets, and promoting the predatory finance initiatives of transnational banks, continues to ensure the resource-rich nations of the 'global South' remain mute, unable to reach their full potential since becoming part of the racial hierarchy of the 'global labour market' (Ness and Cope, 2016: 1017) as industrial clock time extends to the entire globe. These discourses have come to represent what is known in scholarly work as *globalisation studies* (Castells, 1996; Rupert, 2000; Hardt and Negri, 2001; Zhang, 2006) or *theories of uneven development* (Harvey, 2006; Massey, 1995) that critically examine the super-exploitation of living labour in the South by multinational and transnational corporations (MNCs and TNCs). By 1971, there were over 300 such corporations, which had come to control up to 80 per cent of world trade (discounting centrally planned economies) and of which one-third had assets of above one billion dollars (Greer and Singh, 2000). Back then, half of the world's industrial workforce lived in low-wage countries. That share has since risen to 80 per cent (Ness and Cope, 2016: 1017). Industrial capitalism's value crisis in the second half of the twentieth century can thus be said to have had a profound impact both on working populations of underdeveloped countries in the global South who became entangled in what Marx (1973: 407) saw as capital's territorialising and de-territorialising tendency to tear down spatial barriers in creating a stratified world market, and in the advanced world where the process of *deindustrialisation* would soon render the industrial capacity of a nation state obsolete. The failure of Western strategy to respond adequately to urban decay would later leave former industrial strongholds and their populace exposed to the hyper-exploitative operations of employers like Amazon – explored specifically in chapters four and five of this research.

Together, the aforementioned sources of surplus value paved the way for the contemporary logistical structures we take for granted today. Wage suppression created a reserve army of cheap logistics labourers ready to be enlisted and exploited by capital around the world each day anew, as automation pushed people out of production and into distribution, all the while dramatically improving efficiency (thus increasing the rate of exploitation). Immaterialisation and the emphasis on manufacturing as a *service* turned 'push' production – the strategy of producing first and selling later – on its head, and thus required a physical supply-chain to facilitate the new flexibilities of 'pull' production, wherein gradualism is jettisoned and manufacturing responds quickly to consumer change. The ramping up of consumer culture unfolded in tandem with this rise of 'flexible

accumulation' (Harvey, 1989: 147), further emphasising the need for a logistics network capable of moving cheap consumer goods around the world at rapid speeds. Finally, bankrolled by global financial markets, logistics helped to enact a global expansion of capital's circuits of value, bringing new labour and new markets into the equation.

1.7 Logistical Solutions to Overaccumulation

Merely expanding the reach of the market beyond its already established boundaries does not necessarily guarantee an end to the disparities between supply and demand that breed overcapacity in and of itself. Marx (1993: 285) himself was all too aware of these limits, making clear that an expansion of value (in the geographical sense) "only transfers the contradictions to a wider sphere and gives them greater latitude". As Harvey (2001: 249) puts it, greater fixed capital investments might in fact hasten the fall in the rate of profit in the long run because the resulting higher rate of accumulation only resurfaces the same issues surrounding overaccumulation on a larger scale. In short, new surpluses still need to be absorbed without devaluation. A spatial fix in the present will come to haunt future accumulation sooner or later, somewhere, somehow. With that being so, and in the absence of any fundamental structural change to the capitalist mode of production, there still remained one realm left untapped for capital to offset its overaccumulation problems.

Logistics – what Sergio Bologna. (2016: 30) describes as the process of "reorganising flows of people and goods at global and local levels, speeding up production and distribution, and enlarging [capital's] fields of operation" – had quickly become the material basis of a globalisation project that required a physical distribution network across which the international division of labour could be effectuated. On the one hand, there were specific technologies of circulation underpinning the globalisation of trade such as the standard shipping container – afforded more detail in chapter three. On the other hand were new structural formulas and systems of circulation for organising supply-chains on a planetary scale, known by some scholars as *global commodity chains* (GCCs). Global commodity chains are defined as the "coordination of a production system that links the economic activities of firms to technological and organisational networks that permit companies to develop, manufacture, and distribute specific commodities" (Gereffi, 1994: 96). GCCs account for the spatial dispersion and organisational scope of global production arrangements connected along a chain-like structure. Sowers et al, (2018: 24) argue for a *lengthened GCC model* that focuses on the "transport and communications technologies

that link the multiple nodes of the chain, from its raw material sources through industrial processing to consumption and eventually waste disposal". Such materialist methodology reflects a broader interest in World-Systems Theory (WST), which emphasises the extreme interconnectivity between a myriad of material processes all operating and cooperating at different planetary levels to promote global economic development. GCCs provide the material groundwork for the critical appraisal of 'big buyer' retailers in the West, who deploy commercial capital to buy goods that they themselves do not produce, but rather export from developing countries (Gereffi, 1994: 95). Big buyers seem to accept the limits of value creation in Fordist production, instead leveraging the power of global commodity chains to turn distribution into a profitable venture. This leaves the question, what was it about logistics that attracted the interest of investors?

Before overproduction began to blight capitalist development and harm the rate of profit, logistics was by and large seen as a *means to an end;* a necessary evil between production and consumption where no value could be added (Newsome, 2010: 191). But experimentation with the value form in the latter stages of the twentieth century signalled an irreversible change to that settlement. As Deborah Cowen (2014: 24) identified, the "shift from cost minimisation *after production* to value added *across circulatory systems* entailed the ascent of logistics to a strategic role within the firm". This new settlement has its origins in a conceptual shift in the relationship between production and distribution couched inside the logic of accumulation itself. Martin Arboleda (2020: 115) provides us with one jumping off point to understand this shift in *Planetary Mine: Territories of Extraction under Late Capitalism* by evaluating the true meaning behind the so-called 'logistics revolution' of the 1970s:

> Although circulation has been a matter of necessity for the reproduction of capital since its genesis, the qualitative difference in the present cycle of accumulation is that the logistics revolution – in the interest of speed – has deliberately and decisively blurred the boundaries between making and moving – production and distribution.

In other words, given that the production process is *contained within* the act of movement itself (Danyluk, 2019: 636), and the value of labour embodied in a commodity only 'realised' when it is exchanged for money capital upon being sold in the market, production not only comes to depend on distribution, but is actively shaped by it (to the extent that

the latter should colonise the former). Distribution can at once guarantee value and add to it, pinning a great deal of weight on logistics, especially in a time of crisis in production. Harvey (2018: 131) again explicitly directs us to *Capital* volumes two and three along with the *Grundrisse* here in order to gauge the fluctuating role of production, which Marx treated as a 'moment' in a circulation process; part of a *flow*, one instance in a continuous, Heraclitean flux (Bernes, 2013: 7). For Marx (1973: 524), the more production comes to rest on the mechanisms of exchange, the more important logistics becomes for the costs of circulation and thus the value of commodities themselves.

Assuming that overproduction represents a blockage in this flow, a 'general glut' of commodities, considerable pressure emerges for logistical processes to increase the mobility of capital and accelerate the velocity of its circulation. These pressures derive from what Marx (1993: 163) distinguished as *the turnover time of capital*, or the time it takes for capital to travel through its various forms*:* "The shorter the period of turnover, the smaller this idle portion of capital as compared with the whole, and the larger, therefore, the appropriated surplus-value, provided other conditions remain the same". Incessantly speeding up circulation, that is, reducing the turnover time of capital, minimises the barriers to realisation, releasing resources for further accumulation (Harvey, 2018: 86). Chua (2019: 14) terms this the act of *speeding the realisation of value* in the marketplace, wherein logistical processes seek to control the temporalities of accumulation. For Danyluk (2018: 636), it would constitute a spatio-temporal *logistical fix* to the problems that finished goods held in inventory pose to the accumulation process. Given that capital is *value in motion*, which necessarily demands that storage time is dead time (Moody, 2017: 63), or a prison of value (Danyluk, 2018: 636), transportation and warehousing function as key sites in minimising idle inventory by ensuring the smooth and rapid flow of commodities working off 'pull' production techniques. Therefore, as profit-taking through investment in the productive apparatus (new plant and machinery) began to vanish (Bernes, 2013: 8), logistics offered up a solution to future investors inasmuch as it enabled them to effectively pin their profits on product turnover, freeing capital from a narrow focus on surplus value creation in industrial production. As Staab and Nachtwey (2016: 464) argue, these new structures allowed the private accumulation process to continue regardless of the fallout of familiar market set-ups orientated around the optimisation of existing products. Capitalists were thus flung into a competitive struggle to

reduce turnover, since those with shorter than necessary turnover could generate excess profits.

The exact processes via which this acceleration is achieved form the rationale of the next chapter's exploration into the spatio-temporalities of logistics. There we can begin to reckon with the material basis of Amazon's lean logistics platform and how logistical sites like its distribution warehouse in Darlington spatially reproduce themselves. The purpose of this chapter has been to conceptualise why and how surplus value is appropriated from logistics, so as to establish the historical and theoretical framework we are feeding into when it comes to Amazon's growing 'fulfilment network'. To this we arrive at the comparatively simple evaluation that logistics workers – those who labour in the spaces or 'hubs' commodities must travel through to reach their point of consumption – themselves produce value for capital. As Danyluk (2018: 636) observes, a "railroad engineer is exploited in precisely the same manner as an assembly-line operative: by generating more value for her employer than she is paid in wages". Much like how the Fordist worker is pushed to produce more output in a shorter timeframe than their wage packet accounts for, the productivity of logistics personnel is jacked up such that commodities can be redirected from point of production to retailer or consumer as quickly as is physically possible without these efficiency gains being reflected in the worker's pay. This is what makes transportation a privileged site for adding value to commodities. As Marx (1993: 226) wrote, "productive capital invested in this industry thus adds value to the products transported, partly through the value carried over from the means of transport, partly through the value added by the work of transport". Shortening the turnover time of capital so as to speed up the realisation of the value it holds to avoid devaluation resulting from overproduction is above all else dependent on the exploitation of labour in logistical space – an independent source of surplus value.

Such theoretical ends offer good indication of why the logistics industry in the United States today employs over 3.2 million workers (Moody, 2017: 63) who labour across ten billion square feet of warehouse and distribution space (Mazareanu, 2020). These major economic territories only really began to gain traction in the 1970s when state actors actively subsidised the construction of strategic logistics hubs and growth poles located away from the heartlands of industrial development. Those years mark the decline of Fordism. Nowadays, the warehouse has effectively replaced the factory as the critical space for surplus value creation: the global reproductive arena of capitalism. What started

as a logistical solution to falling rates of profit in manufacturing became the vanguard of late capitalist development as it looked to revolutionise the turnover time of capital in the interests of profitability. Amazon, the largest retailer in the world, owes its entire existence to these historical forces.

1.8 Concluding Remarks to Chapter One

If market actors in the 1950s would look to General Motors on questions of future economic development, today they look in Amazon's direction. Amazon's market dominance is materially reproduced by its global nexus of warehouse and supply-chain centres. The platform infrastructure is Amazon's central nervous system (Hill, 2019: 5); what Bratton (2015: 111) calls a "shadow network of itinerant packages and only slightly less itinerant labourers". This network, which is responsible for the fulfilment of 2.5 billion packages each year worldwide, borrows from an economic model that grew out of the fallout of post-War Keynesianism. In order to grasp what triggered this outgrowth and thus the rationale behind platform logistics itself, this chapter paid close theoretical attention to the crisis of capital accumulation in manufacturing that brought the post-War boom to an end. Rather than being elicited by a 'squeeze' on profits, the crisis emerged off the back of the contradictory tendency for the material productive forces of society to come into conflict with the existing relations of production, specifically intense inter-capitalist competition between advanced economies rendering gradualism in production no longer viable. This culminated in a crisis in the realisation of capital and a devaluation that brought the average rate of profit below capitalism's required rate of growth. This chapter framed the neoliberal counterrevolution as an attempt to extend the flow of capital beyond its already established boundaries, overhauling an array of technologies, industries, geographies, and populaces into value-adding operations that could lessen capital's dependence on surplus value creation in the realm of production. Manufacturing was fundamentally restructured; part automated, part divided out to labour in undeveloped countries, all the while being *pulled* in the service of a global demand for new wants, needs and desires and paid for with value borrowed from the future. Yet globalisation (a spatial fix) alone could not guarantee an end to capital's realisation problems, and the more production in the global South came to rest on exchange, the more the temporal remedies of logistics (themselves played out through new spatial environments) proved to be of significance to the global reproduction of capitalism, even if they are often neglected in

academic research into neoliberalism. Capital, after all, can only be understood as a "unity between production and realisation" (Marx, 1973: 407). The crucial discovery of this chapter was that, by reducing the turnover time of capital, and thus speeding up the realisation of value as it circulates through its various forms in accordance with the laws of motion, the realm of logistics attracted the interest of investors as an independent source of surplus value: the exploitation of logistical labour. Industrial spaces were 'left behind' as capital flew first into the City and then into growth hubs in post-industrial geographies. These major reorganisations of fixed capital acted as 'safety-valves' for capitalism's crisis tendencies, spatio-temporal fixes that buy time through the construction of space (Castree, 2009: 52).

These geographies are what have attracted the attention of this research. The recent construction of a distribution warehouse in Darlington in the North of England – providing employment for over 1000 'fulfilment associates' in the region – belongs to several decades worth of effort to terraform urban spaces in the image of mobility. This chapter specifically showcased the political and economic framework these sorts of logistical landscapes manoeuvre in. Thus far we have determined how surplus value creation – played out through turnover time – drives the expansion of logistical spaces of operation. The next chapter looks to examine precisely how different logistical formulas are leveraged to enact a shortening of the turnover time of capital, deploying twentieth century theories of critical spatiality and temporality to explore how spatial production and reorganisation helped firms to speed up the circulation of commodities from point of production to their destination of consumption. These models are embodied in Amazon's 'platform logic', in which a host of physical and digital infrastructures (Bratton, 2016: 189; Hill, 2019: 3) are integrated within a megastructural network to generate value by controlling the distribution of all our daily products, encouraging the cyclical consumption of those products, and delivering them to us at rapid speeds. Now that orthodox Marxist theory has established the structural precedent for this logic, we can turn our attention their operational basis by opening up the conversation to neo-Marxist theories of spatio-temporality.

Chapter Two | The Spatio-Temporal Compression of Logistics

On a global scale, Amazon are producing logistical space to match the monopoly dominance of their e-commerce platform with a physical distribution infrastructure; a 'fulfilment network' spanning nearly sixty countries worldwide. In the UK alone, Amazon operate in nearly 20 different sites, amongst them warehouses in Bolton, Rugeley and Doncaster. Their ambitious efforts to conquer the spatial environment appears far from finished, evidenced by the company's most recent construction projects in Darlington and Stockton in the North East of England. This research endeavours to call these spaces into question in arguing that any serious attempt to analyse the gravity of Amazon in social and historical terms must first reckon with the platform's physical infrastructure, for without engineered spatialities accommodating advanced robotics and overstretched, underpaid labourers toiling around the clock, there would be no such thing as what is known in corporate circles as the 'Amazon Way' (Rossman, 2014; Stone, 2013), let alone the ultra-convenience of Prime same-day delivery.

This chapter proceeds from the viewpoint that the *dialectical materialist* way of researching Amazon's infrastructural activities is to explore in material terms the planetary-scale logistical geographies underpinning supply-chain capitalism (Tsing, 2009) as historically conditioned by their *production, enactment, reorganisation, inversion, decontextualisation, liquefaction* and *compression*. After the long downturn in the second half of the twentieth century (showcased in the previous chapter), the capitalist class of producers and owners turned their attention to the distributive framework that was to prove increasingly integral to the reproduction of the accumulation process. What followed were coordinated attempts to reduce socially necessary turnover time that ultimately culminated in a 'revolution' in logistics in the 1970s; a revolution in the mobility of capital and the spatio-temporalities of circulation. The *spaces of distribution* underpinning the capitalist mode of production had fresh clout as production began to lend itself to the mechanisms of exchange and transportation and communication pathways advanced dramatically. The following analysis seeks to ground these material developments within several theoretical traditions that mushroomed in the twentieth century to account for the spatial and temporal structures of what Fredric Jameson (1991) described as 'late capitalism', or a capitalism so entrenched in its own contradictory tendencies that it knows only one speed and direction: constant acceleration towards disaster.

By deploying the critical spatialities of Lefebvre's *production of space* (1991), Smith's *uneven development* (1984), Soja's *postmodern geographies* (1989), as well similarly dialectical conceptions of temporality such as Harvey's *time-space compression* (1989), Virilio's *dromology* (1999), and Urry's *instantaneous time* (2009), this chapter hopes to capture the spatio-temporalities that form the basis of modern logistics – the very same managerial and technological framework that Amazon operate today. These theoretical ends allow us to mount a scholarly reading of the structural and calculative framework of the logistical worlds that Amazon leverage by providing insight into the spatial and temporal properties that have historically propelled the logistics economy forward. This chapter will demonstrate how Amazon routinely produce space (Lefebvre, 1991) to manipulate the temporal flow of its operations in the interests of speeding up the circulation of the goods it shifts. As a global conglomerate, they follow the pattern of uneven development under capitalism (Smith, 1984) by concentrating their capital around favourable spatialities that in turn decentralise industrial production and accelerate deindustrialisation (Soja, 1989). These spatial arrangements annihilate the distance between production and consumption (Harvey, 1989) and invite a cult of speed into society (Virilio, 1999) that ruptures linear models of time (Urry, 2009). What we also find is that these developments bring certain dialectical tensions that play out at the level of logistical space. Specifically, the endless rescaling and reorganisation of space (Brenner, 1998) in the image of logistics. Ultimately, this chapter will attempt to pull twentieth century spatial and temporal theory closer towards logistics so as to equip this research with the tools necessary to grapple with the tech behemoth that is Amazon, specifically the localities of its ever-expanding physical distribution network. Put bluntly, the historical period in question and the social theory that sprouted around it tell us more about the pattern and trajectory of the platform's current material development than any profiles of the entrepreneurialism and visionary wisdom of founder and CEO Jeff Bezos we might find in popular perceptions of Amazon in the news media.

2.1 Spatial Turns: The Production of Space, Uneven Development, and Postmodern Geographies

Chapter one already began to chart the knock-on effects of the 'long downturn' after the breakdown of the post-War consensus and the intensification of international competition on the world market. It began to explore capitalism's spatial expansion into 'developing countries' in the global South and was quick to recognise the role of neo-imperialism in

forging a new spatial division of labour emerging from the global mobility of capital, crystallised through global commodity chains. To properly grasp logistics as an organising economic principle with Amazon as the contemporary exemplar necessitates bringing spatial theory centre stage, specifically of the kind that gained traction in the social sciences and humanities in late twentieth century Marxist circles. The popularity of this academic work did not spontaneously come into being but again reflected the radical unsettling of the state-centric geographical foundations of the post-War era (Brenner, 1998: 460). Suddenly, conceptualisations of *scale* that treated space as a pregiven, asocial container within which socio-ecological processes operate seemed far out of their depth (Castree, 2009: 32). This 'Newtonian' ontology proved entirely inadequate at keeping pace with the dynamic spatial structures and patterns unfolding in the likes of Western Europe and the US. A new intellectual custom was therefore blossoming around the study of 'critical geography' or 'Marxist geography', starting from the viewpoint that space – its production and properties – are inherently political and must be treated as such. We thus focus our attention on three key tenets of this tradition: the *production of space*, *uneven geographical development*, and the notion of *postmodern geographies*. Captured across these three conceptual tools are a rich analysis of the contemporary spaces of capital through which we can mount a more spatially conscious exposition of logistics at Amazon.

The Production of Space: Henri Lefebvre's 1991 *La production de l'espace* (*The Production of Space)* is an instrumental component of neo-Marxist spatiality. Extending dialectical materialism to the spatial form, Lefebvre was an early scholar of an urban sociology concerned with how everyday spaces are produced. Key to his understanding is one simple dialectical pull: each living body *is* space and *has* space: it produces itself in space and it also produces that space (Lefebvre, 1991: 170). In other words, space is both a medium of social relations and a material product that can affect social relations; every mode of social organisation produces an environment that is a consequence of the social relations it possesses (Gottdiener, 2014: 132). Just as the production of the commodity consists of 'embodied labour' of previous activities, space is itself the outcome of past actions, permitting fresh actions to occur whilst prohibiting others (Lefebvre, 1991: 73).

Nestled within this dialectical relationship is a fundamental antagonism between what Lefebvre distinguished as *conceived representations of space* and *lived representational space*. Conceived space is broadly conveyed as a "place for the practices of social and

political power" (Lefebvre, 1991: 222) where the logic of accumulation shapes and moulds the physical infrastructure to serve its own ends. Lived space on the other hand entails the passive experience of inhabitants who live out their existence within that space; where social life gets reproduced. These spaces, according to Lefebvre (1991: 362), are representative of the subjective, everyday activities of users. But social space inevitably becomes subject to commodification as "the private realm asserts itself […], always in a conflictual way, against the public one" (Lefebvre, 1991: 362). Lefebvre interpreted this as the *dominance of conceived over lived space*, as if to say that dominant interests shape physical spaces and instrumentalise them in the service of capital accumulation. Social spaces are via the logic of capitalism periodically turned into abstract, dominated, instrumental spaces (Fuchs, 2018: 11). The production of space is thus contested socially amidst its frequent operationalisation by the capitalist class of owners and producers as it looks to reproduce its dominance and tighten its stranglehold, not least in a time of social and economic crisis. Contested space, then, reflects the conflict between the conceived and the lived as capital invades the physical landscape for its own reproductive purposes with the power of the neoliberal state behind it. To offer just one example, throughout the late 1960s and 70s in Japan, farmers, students and local residents in the agricultural community of Sanrizuka organised against the takeover of their land by the Japanese Government to make way for the Narita International Airport. An anti-airport union was formed to resist construction, mobilising nearly 20,000 people in opposition to what was deemed as an early marker of the new era of globalisation in Japan. During the struggle, the union built makeshift towers reaching 200 ft that were to obstruct flight tests – a radical contestation of a globalising world, as lived space resisted its conceived representation by way of what Lefebvre might have called *spatial practice* (1991: 38).

Uneven Development: Lefebvre's interest in space in the abstract and instrumental sense reflected a broader 'spatial turn' within critical theory as industrial capitalism reached its limits and forced a major restructuring and expansion of its internal value circuits. Capital was shaping the built environment like never before and asking several questions of social theorists keen to prove that Marxism was not the dead horse liberal theorists insisted it was. Neil Smith's *Uneven Development: Nature, Capital and the Production of Space* (1984) is a classic attempt to posit a fully functioning theory of 'uneven geographical development' in the emerging field of critical geography. Heavily influenced by Lefebvre, Smith saw space as not the least bit neutral in its outcomes, preferring to treat the

arrangement of the spatial as belonging to a rickety relationship between different needs of the capitalist mode of production according to the laws of motion.

Prominent in his analysis is the recurrent use of a distinction between *absolute* and *relative* space. For Smith, absolute space, which in the Newtonian sense is treated as universal and container-like, increasingly becomes the measure for relative space, or space that is host to material events and always subject to material change. This distinction effectively looks to achieve what Lefebvre set out with his distinction between nature (as it is traditionally conceived) and 'second nature' – the socially concretised spatiality arising from the application of human labour (Soja, 1989: 80). That is, to call in to question the idea that space can be thought of as an empty vessel that manifests in accordance with the cycles of nature, a simple agglomeration of people and things. Such a way of seeing, Smith (1984: 199) argues, is not up to the job of examining the geographical spaces of global capitalism, wherein development takes the form of the continual transformation of inherited absolute space into produced relative space. He thus challenged what are the absolutist assertions of commercial geographers that economic development is still by and large determined by *natural geographic conditions* such as physical accessibility or the proximity of natural resources. Put another way, he rejects an explanation of *geographies by geographies*: a geographical analysis "turned in on itself" (Soja, 1989: 38) where patterns of agricultural and industrial production are explained only on the basis of different natural endowments (Smith, 1984: 137). For Smith, because of revolutions in the productive forces and means of transportation, critical geography should not be constrained by a location's natural advantages since they are no longer what leads the attraction of economic activity. Rather, the concentration and centralisation of capital in the built environment "proceeds according to the *social* logic inherent in the process of capital accumulation" (Smith, 1984: 141). In other words, the territorial division of labour, emancipated from its physical roots through sociomaterial revolutions in the means of production and distribution, develops according to the increasingly abstract and *unnatural* dictates of the capitalist mode of production, which again functions on the basis of what will maximise surplus value for the individual capitalist. Since the demands of capital (staving off crisis) and not the natural composition of the land are the driving force behind outlays in the built-environment, development occurs much more unevenly, erratically so, devastating some regions and endowing others.

A key contention of Smith's (1984: 202) is that this process of uneven development translates into contradictory tendencies between *differentiation* and *equalisation*. The international division of labour, for example, is one of equalisation (what Lefebvre identified as one the homogenising effects of capitalism), where more and more of the world's population are thrown into the global labour market; a 'universalising' or 'levelling up' of the laws of value. But just as the exploitation of labour power reached its limits in the industrialised West, so too do different locations of production and divisions of labour get periodically deserted as surplus value dries up in one place and is drawn to another. As Darling (2012: 5) writes, this differentiation drives a "compulsion to up-sticks to greener pastures when the rent on somewhere becomes too dear to make a worthwhile buck: the defeat of place propelling it inevitably across space". With capital more mobile and fluid than ever, the effects of differentiation and equalisation cut across each other at multiple levels of intersection and overlap, amounting in an erratic tendency for capital to constantly 'seesaw' between developed and underdeveloped areas (Smith, 1984: 198) with an agency all of its own. This manifests spatially through endless construction and abandonment of material places of production and distribution. Communities adapt and readapt to the spatial environment around them, forever in resistance to the domination of conceived space over lived space. There is perhaps no better example we can visually communicate than the abandoned warehouse or factory, frozen in time and space as capital ups and leaves. This is the formula of ruination (Tsing, 2016). Deindustrialisation leaves a trail of devastation in its wake, as entire regions are 'left behind' and places of industry that once formed the basis of community employment are forsaken, nothing but shells of their former selves.

The attention Smith pays to the spaces of capital properly signalled a spatial turn in Marxian dialectics since in disputing the neutral conception of space as it develops over time (that is, to politicise it) he was one of the first critical geographers to systematically integrate capitalism's undoings – its perpetual instability, unevenness, and inequality – into a working theory of spatiality. His work parallels Doreen Massey's (1995; 2005) in conceptualising geography and geographical organisation in terms of how the relations of production are structured over space; a geography of employment that reflects the *spatial structures of production* emerging out of the breakdown of the Fordist model. Locational change and changes in production process were part and parcel of each other during this

period as the long downturn saw the re-emergence of the 'regional problem' as a political issue (Massey, 1995: 234-5).

Postmodern Geographies: Along with Smith and Massey, both indebted to Lefebvre, Edward Soja's contributions to critical human geography in the late twentieth century seldom went unnoticed by scholars attentive to the dynamic spatialities of global capitalism as it plunged into a state of perpetual crisis management in the 1970s. In *Postmodern Geographies: The Reassertion of Space in Critical Theory* (1989), Soja shifts the dial on 'Western Marxism' away from what he considers as *a-spatial* analyses of the laws of value and the social relations of production and towards a Marxist geography that reconnects the spatial form with social process. That is, to weld human geography with class analysis; to rework historical materialism into *historico-geographical materialism.* Soja, like Foucault and Lefebvre before him, was critical of how far spatiality had fallen in the priorities of social theorists, not least their blinkered insistence on *history* as most demanding of thought. He traces the neglect of spatiality in Western Marxism back to its 'anti-Hegelian' roots. If Hegelianism subordinated time to space, then Marxism's need to restore historicity (or 'revolutionary temporality') to primacy makes for a kind of 'anti-spatialism' (Soja, 1989: 86). Geography seemed by default only to be an empirical matter for Marxists (Castree, 2009: 31), with Western Marxism all too willing to downplay the potentialities that exist for resistance in everyday life, refraining from characterising clearly the way in which cultural forms intersect with political action (Macdonald, 1995: 104-6).

With the changing conditions of capitalist exploitation that engulfed its development of the time of writing (highlighted in the previous chapter), Soja (1989: 23) argued that it was no longer tenable to depend on a storyline unfolding sequentially, since "it is space not time that hides consequences from us". He therefore called for the 'spatialisation of history' and the emancipation of Marxism from its encasement in historicism (Soja, 1989: 19) by following Lefebvre in more closely recognising space and what 'takes place' there. This firmly placed the *socio-spatial dialectic* – a conceptualisation of the social relations of production that contends they are both fundamentally space-forming and space-contingent, 'dialectically inseparable' – back on the agenda (Soja, 1989: 43). In other words, the social is inextricably spatial and the spatial impossible to divorce from its social construction and content (Massey, 1995: 65). Using this dialectical framework to spatialise history inevitably discredits 'idealised evolutionary schemata', or the idea that change just seems to happen over time, because it nullifies the totalising effects of

historicism that equate historical change with linear 'progress' (Soja, 1989: 159). Massey would join Soja here in disputing meta-narratives that entail the unfolding of a story whose "course is already known" (1995: 303). (A more place-specific critique of this sort of evolutionist thinking will be presented in chapter four with regard to theories of post-industrialism in the North East of England.) None of this is to reject meta-narratives outright, but merely to suggest that capitalism is 'progress' and its opposite at one and the same time.

This specifically postmodern, spatial turn is most evident in Soja's chapter on the territorial landscape of Los Angeles in the mid-1980s. Inundated with colourful lyricism, the essay offers a different way of seeing LA, a sort of 'cognitive mapping' (Jameson, 1991) that reveals how the city's distinctly postmodern character purposefully conceals its industrial and militarial core from sight. Los Angeles is host to an industrialised outer metropolis; a transitory urban periphery that has turned the industrial city inside out (Soja, 1989: 233) (see Figure 2 below). Soja (1989: 230) described new peripheral regions forming on the outskirts, a geographical mix of productive territories and "accessible enclaves and ghettoes which provide dependable flows of the cheapest labour power to the bottom bulge of the bimodal labour market" and stand in stark contrast to the wealthy gated communities or 'mini-citadels' emerging on the distant metropolitan frontier (Davis, 1995). In altering our experience of place, the industrialisation of the metropolitan periphery obscures the spatiality of its social class relations, generating a mystified perception of a 'world city' that denies its true composition: a 'militarised desert', in the words of the late Mike Davis (1990: 2).

Postmodern geographies call for the selective abandonment of the inner urban core and trigger new outlays in the built environment of outer urban regions, in turn obscuring the ideology of the capitalist city through a new spatial division of labour. The decentralisation of industrial production tells us a great deal about the twentieth century spatial reproduction of capitalism as it desperately endeavoured to fight off its deepening contradictory tendencies and offload its overcapacity to new territories – an accelerated recycling of regions moving through various stages of development and decline (Soja, 1989: 72). Soja's work emphasised how capitalism remakes its own geography and history relentlessly and concurrently (Castree, 2009: 29). Competitive struggles over time after the long downturn were borne out through the intensification of competitive struggles to control the forces which shape and reshape material life. The hyper-mobility of capital

prompted the 'restructuring' of capitalist spatiality towards a new configuration of social, economic, and political life in the image of flexible accumulation (Soja, 1989: 159). For Marxists at least, the idea was first to demystify these new spaces of capital, and then contest them.

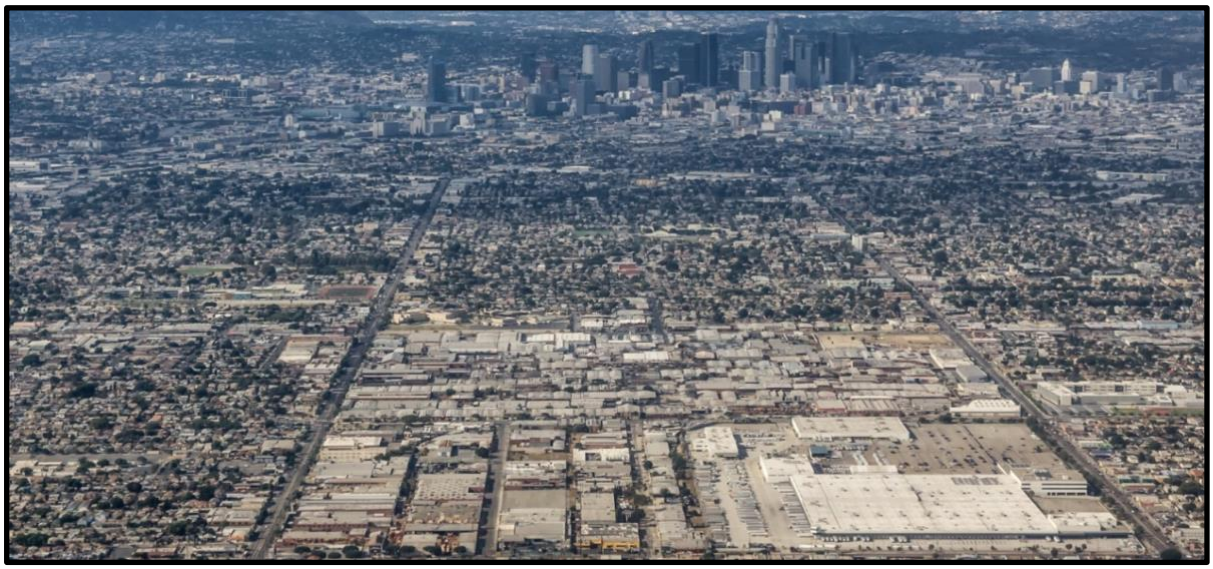


Figure 2 *Aerial view of the city of Los Angeles (2013)*. Photograph by Tuxyso. Licensed under the Creative Commons Attribution-Share Alike 3.0 Unported. Available at: https://commons.wikimedia.org/wiki/File:Los_Angeles_Aerial_view_2013.jpg

Soja's criticism of Western Marxism's 'spatial blindness' did not necessitate that time be ditched from critical theory, hence his insistence on dialectical historico-geographical materialism; on the vertical and the horizontal. Yet the way he rather narrowly equates temporality with history leaves us with a limited account of time that fails to appreciate some of its more immeasurable qualities. Similarly, as Soja has himself recognised, the spatial turn towards critical human geography veers dangerously close to a 'spatial fetishism' that instinctively reduces any and all ancillary social theory to its spatial understructure. Temporality seems largely absent from this dialectic mode of thinking in any meaningful capacity. As Noel Castree (2009: 29) suggested in *The Spatio-temporality of Capitalism*, there has been no consensus about the nature of time nor the precise way in which it is important beyond the clock time measuring socially necessary labour in production. What of contemporary temporal theory then? In what kind of ways can we enrich our appreciation of space with a similarly critical appraisal of its socially constructed temporal properties? To respond to this we must centre our evaluation of critical temporality around the dialectic of *time-space compression,* a theory that has a significant

role to play in what will become our spatio-temporal reading of the history of logistics from the so-called 'revolution' in the 1970s to Amazon's present-day platform model.

To recap, a close reading of critical spatial theory has been presented to situate the reader within the transformative environment that engulfed the West during the late twentieth century when industrial capitalism began to fracture and falter. Lefebvre invites us to put space back on the agenda by recognising the contested territory under which space was being produced and whose interests it was intended to serve. Smith advanced this approach by emphasising the absence of neutrality, naturality and evenness in the production of space under late capitalism, providing us with more of an insight into the process of deindustrialisation in the global North. Finally, Soja reaffirms the need to bring space to the foreground of sociological analysis by highlighting how the gradual restructuring of major urban spaces along the lines of flexible accumulation is remaking entire regions from the inside out under our very noses. This is the contemporary spatial terrain of post-industrial capitalism and the one in which the modern logistical economy operates.

Amazon produce state-of-the-art facilities on the urban peripheries of deindustrialised areas where investment is low and demand for employment is high. Rather than investing in the factories of yesteryear, they shape and reshape entire regions in the image of logistics by building infrastructure to assist the frictionless mobility of commodities travelling across distinct spatialities: warehouses, distribution facilities or 'fulfilment centres' that fundamentally transform the built environment we live in. To yield a richer appreciation of these landscapes in the context of the long downturn, the next section aims to bring social theory concerned with *temporality* into the picture. Specifically, three conceptions of the new temporalities of capitalism: time-space compression, dromology, and the notion of instantaneous time. Only after weaving critical theories of space and time together can we gather a full picture of the dynamics of modern logistics that characterise Amazon. As we shall see, space and time are mutually dependent in Amazon's platform dynamic.

2.2 New Temporalities: Time-Space Compression, Dromology and Instantaneous Time

Evidently, a-spatial notions of time that are too encased in events, processes and social relations crumble under the weight of that which they neglect. Likewise, 'spatial

separatism' (Castree, 2009: 32) struggles to withstand the test of time nor accurately account for the significance of speed, acceleration and instantaneity to contemporary capitalist societies. The impetus to reject this dualism is most apparent when coming to terms with capitalism's late twentieth century downturn. The existential crisis of capitalist production unleashed a plethora of spatial and temporal pressures on the capitalist world market that dictate we conceive of space and time as in fact belonging to a non-dualistic, dialectical relationship – both a consequence and a cause. As Berger (2019) writes, "they [time and space] each penetrate one another on each level, even call one another into being". Time and space are mutually coordinate, neither is more fundamental than the other (Harvey, 1996: 252).

With that so, there comes a need to make visible what the 'spatial turn' neglects in subordinating time to space by identifying sociological theory in which space might conceivably become subordinate to time. Temporality was already hardwired into chapter one's interrogation of the end of the post-War boom and the overproduction crisis that brought about the long downturn. We saw in particular how capitalist production propels the undying reduction of socially necessary labour and turnover times as mediated through class struggle and inter-capitalist competition. Marx's theory of the laws of motion therefore starts at the point of recognising the temporal pressures placed upon them. This is what led Bob Jessop (2009: 141-3) to argue that the *inner* determinations of capital accumulation are primarily temporal, even if the time of abstract labour central to exchange exists only in and through concrete, particular labours performed in specific times and places. Time *drives* the social world that space concretises. Rosa (2015: 168) refers to this simply as the 'economic motor' where accumulation depends on the acquisition and exploitation of time advantages: "the economics of time in the competitive logic of capitalist economic activity is indisputably a primary and direct driver of technical and technological acceleration". Speed in this context is the outcome of the pursuit of the maximisation of profit (Tomlinson, 2007: 26). Behind the progression of technological development that characterises industrial society is the totalising logic of clock-time. For Castells (1996: 432), the dominance of clock time over space and society was indicative of 'modernity' more generally.

Time-Space Compression: To more systematically reckon with what are capitalism's temporal determinations, sociological theory has looked in the direction of 'technological accelerations' (Rosa, 2015: 72) in production, transportation and communication,

specifically how these changes have modified our experience of modernity over several capitalist epochs since its presumed beginnings around the Renaissance period. David Harvey's familiar concept of *time-space compression*, theorised in the 1989 book *The Condition of Postmodernity,* offers an early attempt to develop such a dialectical, 'aesthetic' theory of capitalist *space-time* – to sew time and space together, so to speak. As a conceptual tool, time-space compression seeks to metaphorically communicate how time and space are locked into one another on a mutually contracting basis over different periods of social and technological development under capitalism (See Figure 3 below). Its origins can be traced back to Marx. For Marx (1973: 524), capital by its very nature drives beyond every spatial barrier such that the creation of the physical conditions of exchange – *the annihilation of space by time* – becomes an extraordinary necessity for it. Revolutionary upheavals in the means of transportation (spatial at their core) thus function as a critical component in the protraction and acceleration of the accumulation process.

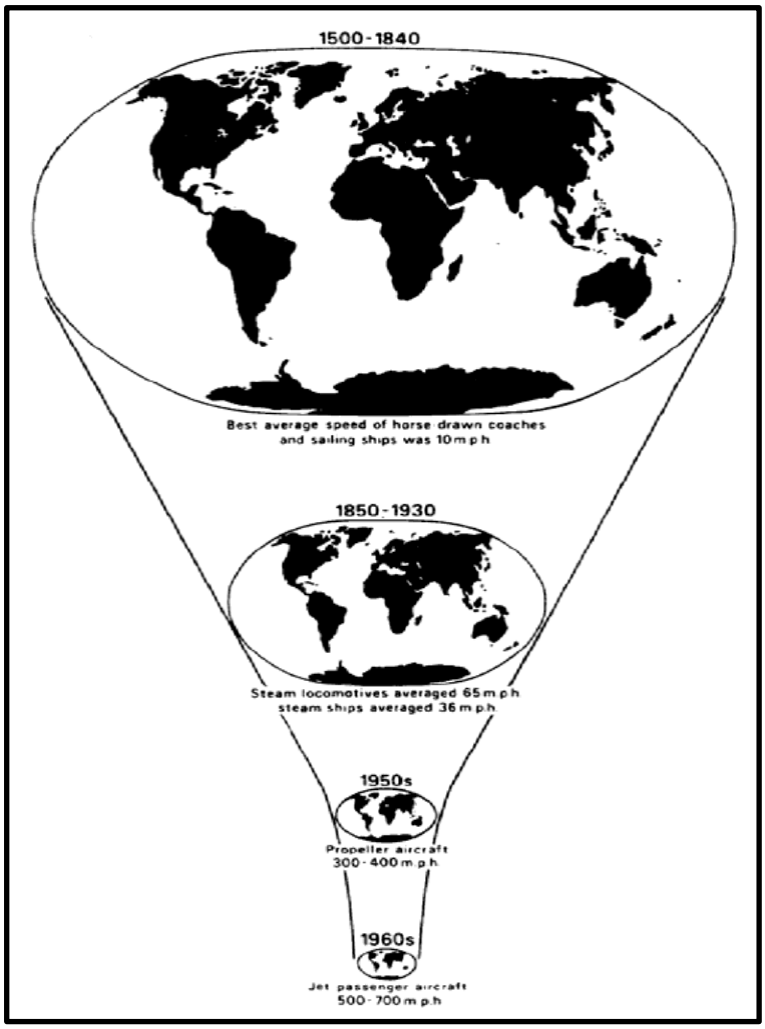


Figure 3 *The shrinking map of the world through innovations in transport which 'annihilate space through time'*. (Harvey, 1989: 241)

What Harvey and social theorists like Virilio (see for example 1997; 1999; 2005; 2006; 2012) and Rosa (2009; 2015) have accomplished in more recent history by charting the compression of various space-time processes is to demarcate the different ways in which the *temporalisation* of space throughout modernity has led to its consequent 'annihilation' throughout the course of history. Harvey notes that at least since the industrial revolution increases in the speed of transportation have consistently altered the spatial composition of the planet in such a way as to 'shrink' it by accelerating the movement of bodies and things across space. At the beginning of the seventieth century, owing to the condition of the roads and the means of transportation of commodities, the estimated journey time between Durham and Darlington was 16 hours (Flynn, 1987: 37) – today that journey would take 15 minutes. Once obstinate spatial obstacles were overcome by accelerations that liberated commodity things from the friction of distance. As French philosopher Michel Serres declared, "our space is no longer a Euclidean or Cartesian space, but a space without distance" (Bologna, 2016: 26).

Dromology: Similarly, talking in terms of 'dromology' (*dromos* being the Greek word for race), Paul Virilio (1999) differentiates between three defining revolutions spanning the history of modernity, each (*dromocratic*, *transmission*, and *transplantation*) of which is characterised by new accelerations and compressions. Virilio (2006: 69) argued in *Speed and Politics* that there was in fact no 'industrial revolution', only a 'dromocratic revolution': a revolution in the speed of transportation and communication. Trains, cars, and airplanes dramatically reconfigured once ironclad distances across space. What is more, as transportation links expanded and intensified across land, sea and air, relentlessly readjusting the time it took to transcend spatialities, our experience of space inevitably pivoted towards its constitution through time. Rosa (2015: 72) explains this best in describing how, in layman's terms, space is now to a great extent a function of the length of time it takes to transverse it: "How far is it from Berlin to Paris?" – "10 hours by car or one hour by plane". Virilio similarly described how France could be reduced to a *square one and a half hours across* via Airbus (1997: 9). This would no doubt be complicated by a Bergsonian reading of time, which essentially holds that the bulk of our perceptions of time are, in the first place, nothing but a function of the perception of space. Nonetheless, on a purely metaphorical level, it is straightforward enough to see how the priority of space has been all but inverted into a priority of time as movement is accelerated, distance loses

its significance, speed reigns supreme, and the world appears to have shrunk as a result (Rosa, 2015: 72).

The notion of the shrinking world is again visible in the second revolution of Virilio's (1997: 11) narrative of historical acceleration – the twentieth century 'transmission revolution' in telecommunications. Rather than overcoming the 'tyranny of distance' (Virilio, 2011: 33) by way of the speeding-up of physical movement, the rapid electronic transmissions of the telegraph, telephone, radio, computer and satellite instead worked to collapse space into the "simultaneity of an instant in universal public time" (Harvey, 1989: 266). The introduction of information and communication technologies marked a new space-time regime in which no spatial barrier could conceivably restrict information from being in more than one place at the same time. Our mediated experience of news and media, for example, reflects what Virilio (2012: 38) called the 'cult of speed' at the heart of twenty-first century info-culture, when distant events speedily and dramatically intrude on our everyday consciousness (Urry, 2009: 190). In this sense, the transmission revolution has inverted the direction of movement of the prior revolution in transportation, bringing forth a 'sedentary speed' (Tomlinson, 2007: 3). As Rosa (2015: 101) writes, whereas the latter's dynamising achievement was moving people and things in larger numbers at increasing speeds over broader distances, the former's primary achievement is the reduplicating of places and goods through virtualisation so as to make them accessible from anywhere in a stationary fashion: "the transport revolution brought human beings to the world, whereas the transmission revolution (virtually) brings the world to human beings". Virilio's (1997: 51) third stage of revolution, 'transplantation', which describes how miniaturisation and micro-processing will create a transhumanism, promises to shake up this relationship further – although such discussions are beyond the scope of this research.

Evident here is the theoretical advancement of a postmodern conception of time-space as flat, desynchronised, and instantaneous. Harking back to Marshall McLuhan's idea of the 'global village' (McLuhan and Powers, 1989), Harvey (1989: 301) went so far as to argue that "it is now possible to experience the world's geography vicariously, as a simulacrum" – a kind of placeless space. Manual Castells' (1996: 376-429) *space of flows* is a prime example. Like Soja's work on postmodern geographies, Castells (1996: 386) wrote of how industrial production had been fragmented and dispersed to urban peripheral regions, made possible by the technological and organisational ability to separate the production process in different locations while reintegrating its unity through "telecommunications

linkages, and microelectronics-based precision and flexibility in the fabrication of components". This made for spaces of *process* rather than of *place*, since what proved important to the post-industrial global capitalist economy was not geographical location so much as the flexibility and versatility of the 'network' itself and the flow of information through its multiple links and nodes. The direction of movement had been inverted such that the whole becomes greater than the sum of its parts.

Instantaneous Time: Information and communication revolutions and the rise of the 'global city' not only lead to an altered meaning and experience of space but also changed the form and perception of social time (Rosa, 2015: 102). With the totalising effects of the information age rendering geographical location subsidiary to the flow of information emerged what Castells described as a 'network society' that perturbs and flattens-out industrial clock-time's unilinear, measurable, predictable qualities by installing a temporal regime made up of electronically networked information that functions in real-time; a *timeless time* or 'telepresence' that replaces the temporal separation of cause and effect with the compression-like instantaneity of real-time teletechnologies (Castells, 1996: 433; Virilio, 1997: 10). Central to this new regime is the capacity for computers to make decisions in nanoseconds (*computer time*) along with the underlying economic motive to speed up transactions. In financial markets, for example, capital can operate instantaneously on a global scale resulting in the devaluation of spatial delimitations (Zaera Polo, 1994: 26). In the network society, the accelerating speed of ICT annihilates time such that all time is collapsed into the present.

John Urry's (2009) *instantaneous time* is theoretically cut from this same cloth. Borrowing from quantum mechanics and holography, Urry metaphorically captures the socially destructive properties of our new 'networked time' as it aims towards the instantaneous. He charts fourteen characteristics of instantaneous time, including the increasing availability and disposability of products in all corners of the earth (itself the result of accelerating labour and turnover times), technological and organisational changes that shatter traditional work structures (the focus of Jonathan Crary's important intervention, *24/7: Late Capitalism and the End of Sleep [2013]*), and the growth of the 'just-in-time' workforce in which the workload is not prescribed to the clock but the object itself (Urry, 2009: 192-193). What instantaneous time ultimately translates into, as is also evident from *timeless time* and the *space of flows*, is the overarching *decontextualisation* of time and space from lived events, in which cause and effect are largely temporally and/or

spatially separated from events themselves (Rosa, 2015: 216). Virilio (2005: 38) would call this the 'desertification' of lived embodied experience as the accelerated speeds of real-time technologies leads to a loss of immediate presence (Samani et al., 2018: 4). The compression of time and space leads to its total abstraction – a timeless, placeless network consisting of rapid trajectories and flows that normalise immediacy and a demand for speed whilst simultaneously giving the impression that the 'pace of life' is going too fast.

That the logic of speed and acceleration becomes increasingly more central to capitalism as it develops over time ultimately led Harvey (1989: 37) to declare that "the meaning of space and the impulse to create new spatial configurations of human affairs can only be understood in relation to such temporal requirements". The temporal pressures of post-Fordist flexible accumulation, for example, were fundamentally different than that which came before it, owing to a fresh need to rapidly speed-up circulation in the name of shorter turnover times. For Harvey to first privilege space, only to later concede that time plays an immutable role in his analysis that is worthy of its own privileging, brings home the need to put time on an equal footing with space, and hence the appeal of a theory like time-space compression in detailing the space-time regime of capitalism's twentieth century long downturn.

Reading critical theories surrounding the temporalities of late capitalism fortifies the need not to pit time against space, but rather interpret spatiality and temporality as feeding off one another under a new capitalist settlement of flexible relations. Harvey shows us how speed has become increasingly more important to the logic of accumulation, facilitated through transportation revolutions that collapse spatial tyranny. Similarly, Virilio (1996: 132) describes how the transmission revolution has created a state of 'generalised arrival' in which humans occupy a more static role in a world dominated by the hyper-mobility of speed-light technologies. Urry complements the theoretical progression of Virilio by producing the metaphor of instantaneity to better encapsulate the abstract and non-linear nature of real-time technologies. Together they generate a powerful image of the dynamic spatio-temporalities of post-industrial capitalism, one in which a logistics platform like Amazon – with its slick online interface and express delivery service – can take centre stage.

Amazon represents the highest point of the transmission revolution, having succeeded in shrinking time and space by bringing customers closer to the commodities they consume routinely. The platform oozes the speed and leanness characteristic of the network society. Their endeavour to provide same-day delivery to Prime members, to annihilate the distance between sales and consumption, brings us one step closer to the ultimate vision of a synchronous existence, where goods arrive without seemingly having ever left (Virilio, 1998: 16; Hill 2019: 10). Amazon is the everything store and the anywhere store, the posterchild of the high-speed society depicted by the temporal theorists. However, as the following section makes clear, the metaphorical picture of time-space compression painted here is incomplete and needs a fresh agent to liberate it. Namely, it requires a closer reading of logistics to demystify its materiality.

2.3 Dialectical Space-Time: The Case for Logistics

If there is one obvious issue with the conceptual approach laid out above, it is that excessive metaphorising of time and space reveals little to no detail about the *material* processes through which such metaphors are cemented. None of these theoretical positions would deny that there is still an awful amount of human toil in material spaces that occurs to facilitate the distribution of commodities implicated in the circulation of capital. Yet, as Scott Kirsch (1995: 533) once argued, 'compression', as impressive and stylistic as it may sound, might in fact obscure the significance of globalisation as a material project by implying that space has somehow lost its significance. This echoes Smith (1984: 224-225), who held that metaphorical appropriations of space, whilst containing the power to reveal the fragmented unity of the contemporary world, can often work to reinforce the deadness of space and undo the theoretical progression away from Newtonian space. Moreover, talking in ontological terms of 'networked time' could have the effect of rendering invisible the tangible human and social dimensions of everyday life (Wajcman, 2015: 18).

To fortify capitalism's spatio-temporalities in the relative absence of actually existing concretisations, then, this chapter looks to advance said theoretical ends by grounding them within a critical evaluation of modern logistics as one such material signifier of dialectical space-time. Time-space compression proves to be an extremely useful theoretical tool to understand the end goal of logistical processes. Logistical costs no longer tend to be measured via distance in space (a fixed entity) but by the reducible virtue

of time (Bologna, 2016: 25). Particularly since the beginnings of globalisation, supply-chains have looked to leverage speed to collapse the spatial link between production and sales wherever possible – the annihilation of space by time. Amazon's fixation on speed and efficiency exemplifies this, with profits pinned on turnover time in delivery. Yet, as the following analysis seeks to make clear, contrary to the implication that it is somehow less significant, space has in fact become *more* integral to recent logistical struggles to annihilate distance. Amazon is again testament to this, producing and reorganising space to manipulate the temporal flow of its operations in the interests of speeding up the circulation of the goods it shifts routinely; physical spaces of distribution that deploy lean organisational structures to reduce storage time. These spaces form the physical underbelly of the platform that has enabled Amazon to position themselves as the leading distributer of all the world's commodities. Moving forward then, the spatio-temporalities of capitalism during the long downturn will be explored through the history of logistics. The idea being that, given neither time nor space can be assigned objective meanings independently of material processes, only through investigation of the latter can we begin to ground our understanding of the former (Harvey, 1989: 204). The remainder of this chapter proposes to illustrate the value of a spatio-temporal theory of capitalism by pegging it to the modern art of logistics.

To pull this back into alignment with our critical narrative of modern logistics, chapter one showed how inter-capitalist competition accelerates the tendency towards overaccumulation and devaluation. Post-war competition pushed firms to invest in new technologies and organisational structures in order to increase productivity so as to redetermine and ultimately reduce their socially necessary labour time relative to other firms. This temporal pressure meant that fixed capital investments with long turnover periods no longer had the breathing space they necessarily required to valorise; firms with excessive non-liquid capital were exposed to more advanced production methods with lower overheads. New producers were able to bring products to market quicker and price them lower. Consequently, the profits of existing firms took a hit since producers were unable to mark up prices over costs sufficiently to maintain the established rates of return needed to valorise fixed capital investments. With an end to gradualism, sector-wide speed up of production led to a general glut of commodities frozen in circulation, unable to be realised by way of insufficient effective demand and thus vulnerable to devaluation. The neoliberal counterrevolution constituted an attempt to locate new sources of surplus value

that might mitigate capitalism's internal contradictions and stave off crisis. Neoliberal globalisation represented a spatial arm of crisis management against increasing temporal pressures, specifically a geographical accumulation strategy to promote and regulate industrial restructuring within the non-capitalist *outside*. Yet a globalised geographical fix alone could never alleviate capital's overaccumulation problems inasmuch as they really only extend them to other parts of the world. This effectively necessitated that the search for surplus value must not only *span* territories but *scale* them too; extensification must be accompanied by intensification (Chua, 2019: 14). The areas required for capitalist growth are produced not through territorial expansion so much as through increasing mobility of resources and capital, and the implosion of transport and communications (Zaera Polo, 1994: 25). These foundations gave ground for the beginnings of a theoretical account of logistics as a source of surplus value for capital as production increasingly lends itself to distribution and value is increased not by *extraction* but by *acceleration* (Dyer-Witherford, 2015: 82).

The next phase of this development is to move beyond simply *why* logistics became a valuable industry for capital and probe precisely *how* these processes materially transpire by emphasising their spatial and temporal basis; from a structural analysis to an operational one. Where the last chapter was predominantly focused on how value theory and the social relations of production inform modern logistics, this chapter and the next are concerned with the politics of space-time in the logistical economy. The remainder of this chapter will tell a tale of logistics as less of a harmony between space and time than excessively metaphorical takes tend to project, and more of a dialectical contradiction that wreaks a compulsion to double down on the domination of space in order to curtail time. At the core of Amazon's platform retail model lies this very contradiction, which compels the periodic production of engineered logistical spaces in order to collapse the time between order and delivery.

2.4 Logistical Space-Time: Between Production and Compression

In order to wield capitalism's spatial turn and new temporalities inside a critical history of logistics, the following section turns to Neil Brenner in *Between Fixity and Motion: Accumulation, Territorial Organisation and the Historical Geography of Spatial Scales* (1998). As Brenner (1998: 470) sets out, once the global geographical extension of capitalism is completed, and the possibility for scale-expanding strategies of crisis-

displacement is then exhausted, capital is increasingly forced to recolonise, reterritorialise, and redifferentiate social space of subglobal scales *within* the second nature of territorial organisation it has already produced in search of surplus value. Modern logistical infrastructures, characterised as time-space technologies that supervise and expedite production routines and global supply routes in order to optimise operational flow and cut costs (Lyster, 2018), provide us with a tangible example of this.

Via logistical processes, capital's tendency towards devaluation is effectively s*lowed down* through what Brenner (1998: 471) sees as major configurations and re-scalings of state territorial organisation. As we found in the last chapter, slowing down the devaluation tendency requires a specific *speedup* – namely the speeding up of circulation so as to reduce the socially necessary turnover time of capital. But the critical claim here is that the associated temporal pursuit *can only play out through the formation of new spatial organisations and immobilisations* – what Brenner (1988: 477) calls a 'scalar restructuring' or 'scalar fix'. This is because the circulation of value requires a *physical* circulation of the material objects in which value is embodied (Smith, 1984: 126), state of the art spatial formations that link up economic geographies and reduce the friction naturally created by distance. As Wajcman (2015: 20) puts it, the ultrafast reaction time actually increases the importance of spatial distance. Evidently, space is more, not less important to post-industrial capitalism, since the production of logistical space accelerates the socially necessary turnover time that tears down the spatial barriers to accumulation (Castree, 2009: 49). The inter-capitalist competition of the post-1960s in fact coerced capitalists into paying significantly *more* attention to relative locational advantages in an attempt to diminish spatial barriers for strategic advantage (Harvey, 1989: 294). Smith (1984: 117-118) described this as the emergence of geographical space as a means of production, where space is produced according to the spatial properties of the productive forces and the distance between origin and destination becomes a means of production in and of itself: "The greater the development of the means of transportation and communications, the more geographical space is drawn into the economy as a means of production". By deploying scalar structures to gain greater temporal control over accumulation, time can be *compressed* to promote accelerating turnover periods and in turn *denied* by slowing down the tendency for capital to over-accumulate and devaluate (Adam, 2003: 69). In an attempt to annihilate space with time*,* then, capitalism can *buy*

time for itself out of the space it conquers (Harvey, 1985: 156). The contradictions of capitalism ultimately increase the necessity for socially engineered space over time.

Brenner's fundamental contention is that this dialectical relationship – the need to produce space to transcend it – creates an inescapable tension between *fixity* and *motion* that arises amidst the circulation of capital, what we might describe as a confliction between *time-space compression* and the *production of space*. To elaborate, we know that for space to be compressed, an acceleration must occur. But a prerequisite of any speed-up is the production of fixed spatial configurations themselves. In other words, we arrive at a critical paradox that any analysis of dialectical space-time must wrestle with: that the ability to overcome space is predicated on the production of space (Harvey, 1985: 149), that enhanced mobility of productive capital derives from the immobilisation of space in the form of fixed infrastructural costs, and therefore that productive capital must be 'spatially immobilised' over the course of capitalist development. For Brenner (1998), this exposes a dialectical tension between capital's *deterritorialising* tendency to seek to overcome geographical barriers by constantly rescaling them and the static *territorial* infrastructures that this pursuit necessarily rests upon. Soja (1989: 158) saw it as the point at which capital first tries to "annihilate with temporal efficiency the intransigent social physics of space only to turn around again to buy time to survive from the very spatiality that it seeks to transcend". Similarly, Harvey (1985: 150) considered it to be a geographical contradiction "between the rising power to overcome space and the immobile spatial structures required for such a purpose". Space must ultimately be *built-up* to unlock new accelerations in the circulation of capital and *discarded of* in the process of its own compression. Yet, as Smith (1984: 115) made clear, equally important to this equation is that "emancipation from natural space seems only to heighten the necessity of producing relative space".

What this theoretical paradox amounts to in practice is the relentless deterritorialisation and re-territorialisation of existing regions and the never-ending reorganisation of *already produced space*. As Harvey (1985: 150) argued, capitalism "perpetually strives [...] to create social and physical landscapes in its own image [...] only just as certainly to undermine, disrupt and even destroy that landscape at a later point in time". Here we find the ultimate extension of what Joseph Schumpeter (1962) termed 'creative destruction' beyond just the productive forces to the emptying out of space itself; destroy, rebuild, destroy. With destructive creativity, space relations are continuously subject to

transformation and a therefore chronic instability that no amount of interventionism can resolve. Instead, the peoples and powers that command such spaces vie for attention from investors by entering into a deregulatory race to the bottom – what Robert Goodman (1979) termed the 'regional wars for jobs and dollars'.

Harvey's (1985: 133) decades of work on the geographical contradiction of destructive creativity have tended to favour the contemporary *city* as the central site. The *capitalist city*, a form of urban space*,* rests on a spatial differentiation between the place of work and place of residence; between the space of production and the space of reproduction (Smith, 1984: 182). It has therefore been identified as a decisive spatiality of late capitalism, what Virilio (1997) would call a 'critical space'. Soja's (1989: 240) aforementioned contributions have similarly gravitated towards the capitalist city and the rise of the 'postmodern city', in which the industrialisation of the urban periphery "turns the space economy of the region inside-out". A great deal of attention has hence been afforded to how finance capital, state officials, property developers and the like work together to transform entire cities. In *Rebel Cities* for instance, Harvey (2012: 23) offers up the example of 2010 New York City, where billionaire Mayor Michael Bloomberg attempted to reshape the city "along lines favourable to the developers, to Wall Street and transnational capitalist elements, while continuing to sell the city as the optimal location for high-value businesses and a fantastic destination for tourists". The ephemeral nature of the contemporary city owes to this contradiction.

The much less observed aspect of destructive creativity running alongside the capitalist city is the spatial contradiction between fixity and motion that has been playing out at the level of logistics over the last several decades. Specifically, the rescaling of spatialities into logistical 'spaces of exception' (Chua, 2019: 9) and the subjection of local and regional populace to the 'world-making enterprise' of logistics (Lecavalier, 2012: 90). Modern logistical spaces of distribution are principally the outcome of the dismantling and restructuring of nationally scaled configurations of fixed capital, industrial infrastructure and institutional organisation inherited from the Fordist-Keynesian round of capitalist growth (Brenner, 1998: 476). Driven by the desire to speed up circulation, logistical routes are subject to endless configuration and reconfiguration, extensification and intensification, in a bid to facilitate greater mobility across circulatory systems.

Amazon's reterritorialisation of post-Fordist geographies into spaces of habitual circulation serves as the material evidence of this – a form of spatial organisation that seeks to accelerate the turnover time of capital in its commodity-exchange stage. The platform's cluster of fulfilment centres in the former industrial stronghold of the North East of England is a contested infrastructural region emblematic of such developments in 'logisticalisation' (Cuppini, 2017: 502). It evidences what Smith (1984: 198) recognised as the seesaw movement of capital, where investment flows "from a developed area to an underdeveloped area, then at a later point back to the first area which is by now underdeveloped, and so forth". Explored in greater detail in chapters four and five of this research, post-industrial Tees Valley in the North East is identified as one such area. Once home of booming industry now in a state of urban decline, it is part of a relatively recent geographical history to recast urban peripheries in the image of logistics, or more explicitly, the demand and logic of logistical space-time. Before reaching that point, however, we must first frame the spatio-temporalities of logistics through the so-called 'logistics revolution' – the task of the chapter to follow.

2.5 Concluding Remarks to Chapter Two

When profit rates began to plummet in the industrialised West in the face of intensified inter-capitalist competition and a rising organic composition of capital, capitalism underwent a dramatic metamorphosis. All that was solid melted into post-industrial air. In social theory, a similar race was unfolding around the need to reintroduce the spatial form as a critical site in the accumulation process. Where Western Marxists overextended historicism, a fresh tradition of human geography was mushrooming to spatialise history and critique the ways that capital was terraforming the physical terrain, including, but not limited to, the politics of spatial production, the turbulent nature of uneven development on the built environment, and developmental patterns of postmodern geographies in the age of flexible production.

When one dialectically weaves this spatial turn with a critical appraisal of the new temporalities of late modernity, (including, but not limited to, the annihilation of space by time, the invasion of speed, and the emptying out of the qualities of time that make it linear), it provides a habitable framework through which to learn more about contemporary logistical worlds. Modern logistics represents time-space compression in its most applicable form – constant acceleration towards instantaneous consumption. That the

devaluation of capital is offset by reducing the time commodities spend in transit necessitates that firms find ways to speed up circulation, to annihilate space with time. But this necessity only highlights the value of socially produced space, space that needs producing as much as it needs transcending. Engineered spatialities of 'pure logistics' (Bratton, 2006: 9) demand the total domination of conceived space over lived space and the complete transformation of industrial geographies into logistical geographies to serve the needs of just-in-time distribution. Far from being a lost cause for Marxists, space, supplemented with a rich appreciation of time, is key to understanding logistical power in the age of Amazon.

In advancing this argument further, the next chapter seeks to demonstrate in more concrete terms how globally integrated production networks have materially relied on the transformation of economic geographies into urban 'hubs' or 'growth poles' where commodities circulate on a just-in-time basis. As the critical space (Virilio, 1997) for value-production in post-Fordist capitalism, the warehouse, the production of warehouse territory and the organisation of warehouse space in accordance with the principles of lean philosophy works to maximise efficiency and minimise the friction of flow in distribution (Harvey, 1989: 266). Commodities are shifted quicker through larger territories of circulatory space with shorter turnover times so that greater proportions of relative surplus value can be realised at the end of the working day. These spatio-temporal growth strategies have been prolific ever since the 'logistics revolution' in the 1970s – a revolution in the calculation and organisation of economic space (Cowen, 2014: 23). The remaking of the geographies of capitalist production and distribution on a glocal scale in accordance with the advanced capitalist regime of flexible accumulation owes in large part to these seemingly revolutionary developments – our next port of call. With the structural and operational basis of the modern logistics economy accounted for, our theoretical journey into Amazon's economic model now turns to the technological and managerial maturity that makes it possible.

Chapter Three | The Revolution in Logistical Modernity

Two chapters into this research, we have attempted to construct a critical history of logistics in the context of post-industrial capitalism, both from the point of view of Marxian political economy, and on the part of neo-Marxist theories of spatio-temporality. The justification underlying these two separate approaches inform the later ambitions of this work. They establish a conceptual frontier capable of engaging with the present-day economic activities of Amazon on a local scale and advance a theoretical arsenal that can inform our understanding of precisely why Amazon choose to build warehouse space where they do. North East England is a case in point. The North East was hard hit by deindustrialisation due to the makeup of its economic geographies, which were highly exposed once stagnation set in. Many of its industrial spaces were laid to waste as a lasting consequence of the new regime of inter-capitalist competition and flexible accumulation that replaced the post-War Keynesian consensus in a state of irreversible decline. As industry disappears, that economic vacuum has been steadily filled by Amazon, who hire up to 2000 people in Symmetry Park in Darlington and another 3000 in Stockton.

Logistics companies have been a growing force in the global economy ever since the long downturn in the twentieth century, and the way Amazon have integrated logistics into the digital platform economy suggests the future will be one of supply-chain dominance also. This research aims to situate Amazon's advances in the North East of England within the broader context of what Benjamin Bratton (2015: 231) terms 'logistical modernity' to describe how contemporary logistics "disembeds production of things from particular sites and scatters it according to the synchronisation and global variance in labour price and resource access". To do so has thus far required leaning into value theory and spatio-temporal theory, specifically how modern logistics adopts the pretence of a source of value for flexible capitalism and how different spatio-temporal formulas are leveraged to launch this into operation – logistics-in-action. The final task of the first stage of this project is to explore how these spatio-temporal growth strategies have transpired, beginning with the logistics revolution that took place over the course of the 1970s. Baked into this analysis will be a geographical formula to carry over to platform logistics at Amazon and their strategic enactment of geographies of distribution. The analysis will be structured as follows:

Firstly, any account of the twentieth century revolution in logistics is incomplete without identifying the role of war and militarisation in shaping the dynamic competencies of supply-chain capitalism. The chapter will therefore open with an interpretation of the logistics of warfare as ascertained and historically conditioned through the politics of speed (Virilio, 2006). This will provide us with a jumping off point to delve into the infrastructural technologies driving the revolution. We refer specifically here to the process of *containerisation* (Levinson, 2006) that enhanced the mobility of commodities travelling across disparate spatialities. Containerisation transformed the material landscape for logistics and proved indispensable to the establishment of globally networked commodity chains. It accelerated the need for a systematic approach to managing global flows of cargo, with cost minimisation (Cowen, 2014), or *supply-chain compression* (Bratton, 2015), weaved into its very design. Once the management framework of modern logistics has been established, the next stage of this chapter is to engage with the networked technologies coordinating supply-chains and facilitating the decentralisation of production (Castells, 1996; Dyer-Witherford, 2015). This will allow us to get a theoretical run on how logistics transforms transportation and storage into a *vector of flow* (Lyster, 2018) that works to liquefy rigid spatial structures (Bernes, 2013) and enable the total inversion from push to pull production required of flexible modes of accumulation.

Following that, an intervention of sorts will be presented to push back against the notion that contemporary cargomobilities make for an entirely frictionless world. Instead, it will be argued that logistics starts from a place of disorder in attempting to stitch together local and global flows, looking to offload friction onto unsuspecting actors who sit at the bottom of the supply-chain like the truckers who turn a space of capital into a space of habitation (Gregson et al., 2017; Gregson, 2017; Gregson, 2018). The very existence of friction across the supply-chain that creates dead-time in transit amplifies the need for engineered and optimised places of pure logistics (Bratton, 2006; Waidheim and Alan Berger, 2008). The final section of this chapter then will be devoted to scoping the logistical geographies of supply-chain capitalism. These spaces are the clearest indication yet of logistical modernity, evidenced by ‘growth poles’ that swallow up communities of mobile labour to assist global flows of capital. They embody ‘critical spaces’ (Virilio, 1997), spaces that deceive and decontextualise in the image of the ideal logistical city of habitual circulation (Hepworth, 2014). This chapter will be concluded by mapping these ideas onto the current

terrain of Amazon's platform logistics, setting up the discussion for the final two chapters of this research that chart the platform's activities in Tees Valley in the North East.

3.1 Militarisation

The so-called 'logistics revolution' describes a series of strategically targeted alterations in the form and function of planetary scale supply-chains during the latter stages of the twentieth century, increasing the circulatory speed of commodities by immobilising dynamic spatial structures of distribution. We could not conceive of these historical developments if it were not for two important conjunctures: military technologies and capital. Namely, how the latter has co-opted the former so as to transform logistics from a military art into a science of circulation.

The genesis of logistics, Deborah Cowen (2014: 24) writes in *The Deadly Life of Logistics: Mapping Violence in Global Trade*, was "not a civilian science but rather a military art". Indeed, *logistics* itself refers to a system of military governance that, from any distance *within space*, could provide an army in the field with a continuous supply of both the means of living and the means of effectively waging war (Bonacich and Wilson, 2008: 3). As safety valves in the fight against overproduction, modern logistical processes are themselves the product of the material forces of a history dominated by military struggle over time and space, or what historian James Huston (1966: 424) described as the "application of time and space factors to war". The Napoleonic Wars provide one jumping off point here. Only during this period did logistics begin to refer to the systematic management of supply-chains when in 1838 military strategist Antoine-Henri Jomini popularised the concept of *logistique* to describe the work of deploying 'men and material' to the front lines. One of the three 'arts of war' (Cowen, 2014: 27), logistics underpinned the degree to which an army could reproduce itself and thus, as Paul Virilio (2016: 73) put it, "exert its will in a ground war of rapid penetration, of short and decisive battles".

Modern industrial warfare, particularly of the kind that gained traction during the Second World War, crops up time and again in the mapping of this revolution. Accelerated by the speed and mobility petrol, oil and lubricants (POL) had unlocked, industrial military conflict signalled a turning point for logistics planning, having "gone from being the *practical afterthought* to the *calculative practice that defines thought"* (Cowen, 2014: 30). *Speed in war* pressed military powers to zero in on their own supply lines, and thus the capacity

of these lines to facilitate the movement of huge volumes of supplies in shorter timeframes from the rear to the front line in tandem with fast-moving mobile combat operations. Benjamin Bratton (2006: 8-9) calls this the "inevitable technological vitalism" through which "projectiles [...] mutually prostheticize each other in a pursuit of the competitive advantage of speed". Churchill, Stalin and Hitler would all stress the invaluable, if not defining role of logistics in determining the outcome of war at different stages in their lives (Cowen, 2014: 29), as whoever could deploy industrial technologies to speed up the reproduction of organised violence would reap the rewards of time-sensibility in combat. The pace at which the Nazis initially stormed across Europe was evidence of this, so too the final major offensive by the Soviets in Berlin in 1945. Mirroring the historical trajectory of the internet, today's logistical 'modernity' (Bratton, 2015: 232-3) derives principally from military experimentation, namely American development of technologies and calculative practices capable of managing trans-colonial 'highways' of distribution during the Second World War (Attewell, 2020: 3).

3.2 Containerisation

By far the most important technological innovation to the revolution in logistics to come out of the Second World War was the shipping container. Military conflict the world over drove experimentation with a steel container that could be transferred across different modes of transportation as a means to reduce time and labour involved in transporting military supplies to the front (Cowen, 2014: 31). Harking back to the previous chapter, the shipping container constitutes a form of *technological acceleration* (Rosa, 2015: 72) that designates the faster movement of military projectiles across the earth. Materially underpinning industrial warfare were 8ft by 8.5ft by 20ft welded steel boxes that enabled truck trailers to be filled and shipped without their contents ever having to be handled between point of origin and point of destination (Bonacich and Wilson, 2008: 51). As Marc Levinson (2006: 1-2) wrote in *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger,* the value of this 'utilitarian object' lies not in the *thing* itself, but in how it is used. In times of war, it could be calculably utilised to improve how bodies and materiel circulate in offensive action so as to preserve an army on the ground. During the early build-up of the Vietnam War for example, the American military leveraged container shipping and infrastructural support such as 'land-bridging' (landmass that links maritime transport) to manage massive supply-chains (Cowen, 2014: 41) and

solve the 'frictional' supply problems that plagued the trans-Pacific war effort (Attewell, 2021: 1330). Modern logistics supported the speed and magnitude of the escalation of US combat troop deployments in the face of low levels of industrialisation in the Vietnam Republic that made for an absence of logistics facilities in the occupied South. These infrastructures also sought to provide the material pathways for potential Vietnamese integration into the global capitalist economy in the event of a peacetime transition toward liberal, capitalist futures (Attewell, 2021: 1330-2). Early frontier imageries of a logistical *terra nullius* ('nobody's land'), it seems, were first projected onto South Vietnam (Attewell, 2021: 1331).

It was how the container was deployed by *capital* as a product of what Virilio (1990) called *endo-colonialism* – where a war economy is carried over into peacetime, turned in on itself (Alliez and Lazzarato, 2019) – during the second half of the twentieth century that truly marks its reputation as a revolutionary technology. Indeed, the industrial system that materially reproduces modern capitalism is both bound up with and a product of military mobilisation and deployment, which Virilio argued provides its origins and impetus (Kellner, 1999: 10). These were the foundations of his work on *dromology* (Virilio, 1999), where more and more social energy is given over to logistical demands (Waddington, 2020:47). The acceleration of speed and technology to create more lethal and effective instruments for war in turn creates a dynamic industrial system that obliterates distances in time and space through the development of technologies of transportation, communication and information (Kellner, 1999: 106). To demonstrate this, one only has to look at the state of the global capitalist economy before the shipping container arrived on the scene. Prior to the first experimentations with commercial containers in 1956, international shipping proved arduous and expensive. For some commodities, the freight might have been as much as 25 per cent of the cost of the product, largely thanks to the labour intensive process of shifting cargo from land transport to ship at the port of departure and moving it back to truck or train at the other end of the ocean voyage (Levinson, 2006: 9-10). In eliminating piecemeal freight handling between logistical nodes – that is, humans physically shifting ton after ton of cargo on foot and by hand to load, reload, etc. – *containerisation* emancipated the commodity from its restricted mobility and significantly reduced the cost of shipping internationally. As Waidheim and Berger (2008: 223) distinguish, "the backbreaking work of longshoremen and stevedores, the so-called break bulk method of cargo transfer, was replaced with an internationally standardised

transfer by crane from the hold of a ship to a tractor trailer in a fraction of the time". This, for Levinson (2006: 11), was the material driver of a vast increase in international commerce in manufactured goods even as national economies were struggling financially under the weight of oil shocks and low domestic demand. Levinson thus identifies what is absent in Robert Brenner's (2006: 38) analysis of this historical period in *The Economics of Global Turbulence* (last discussed in chapter one) when Brenner notes that the dramatic reduction of trade barriers at the end of the 1950s spawned an unexpected but nonetheless spectacular acceleration in the growth of trade in the 1960s and an increased focus on exports. This spectacular acceleration would not have been possible if not for the steel boxes transporting commodities in cardboard boxes sitting on top of pallets across the earth's breadth. The pallet – a wooden support structure used in bulk shipping – also became an elevated technology during the Second World War and now serves to transform objects into 'unit loads' that are ideally suited to being scooped up by forklifts, allowing goods to be whisked through supply-chains with great efficiency. It too has been regarded as the most important materials-handling innovation of the twentieth century (Hodes, 2014). In this sense, logistical processes like containerisation and palletisation were as much a part of the causes of the twentieth century crisis of overproduction as they were an indispensable component of the potential solution.

3.3 Supply-Chain Compression

As freight costs lost their significance, so too did the economic geographies that had previously been central to the international maritime trade (itself a product of British Imperial conquest overseas) lose their locational leverage and value. Several key port cities like San Francisco, Hamburg and Liverpool (see Figure 4 below), the infrastructural territories of maritime commerce for centuries, were suddenly surplus to the requirements of the shipping container, abandoned in search of more appropriate and mobile spaces it could flow through. As places of abandonment and decline they were showcasing Neil Smith's (1984) classic thesis of uneven development. In the previous chapter, we looked at how erratic movement, or 'seesawing' of capital between places of its own choosing is reflected in the built environment, wherein the prospect of cheap labour usurps the natural advantages of the land in the localities of economic geographies thanks to technological development (Smith, 1984: 198). The movement of ports *inland* demonstrates this first-

hand. Truck transport and the developing system of highways enabled commercial enterprise to *disperse* from the immediate confines of the city (Wall, 1994: 10).

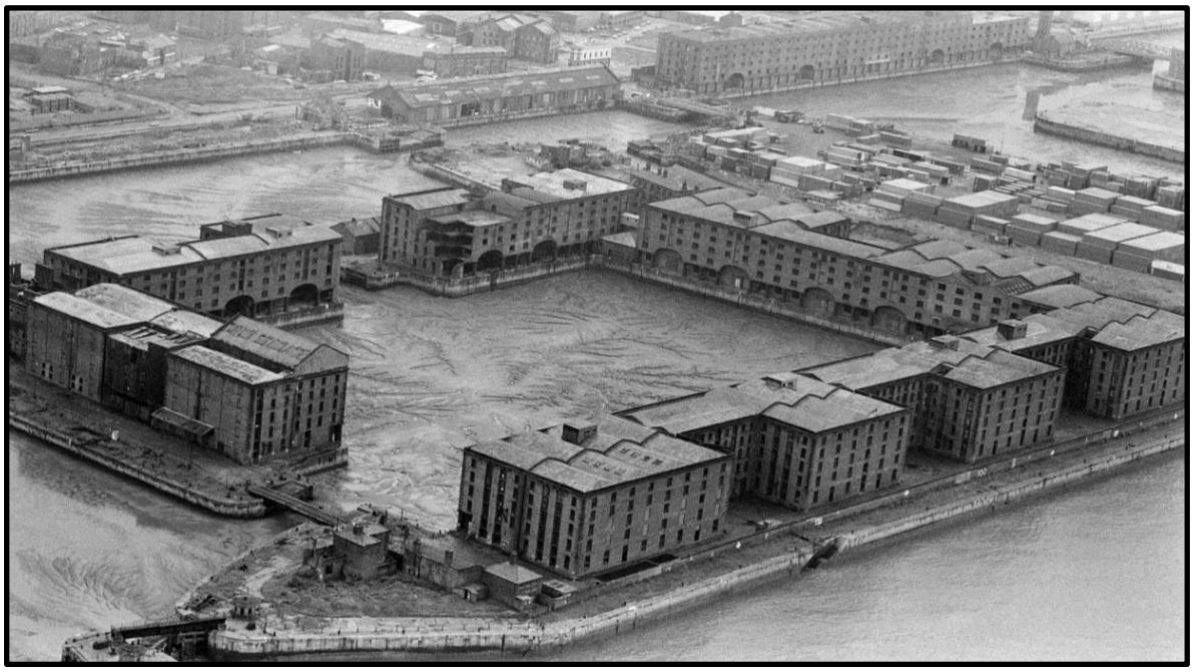


Figure 4 *Aerial view of declining Albert Dock, Liverpool (17th August 1980).* Published 2015. Photograph by Mike Price, via Liverpool Echo: *Liverpool's iconic Albert Dock through the years*. Available at: https://www.liverpoolecho.co.uk/news/nostalgia/gallery/liverpools-iconic-albert-dock-through-10018293

The capacity for the shipping container to undermine space and hasten the redundancy of port regions also feeds back into the *postmodern geography* (Soja, 1989) explored in chapter two, since the huge industrial complexes that were mushrooming in places like Los Angeles were only possible because the cost of bringing raw materials in and sending established goods out had "dropped like a stone" (Levinson, 2006: 2). These logistical costs were measured in time travelled rather than distance covered, and thus became subject to the time-space compression tendencies of late modernity. Here Levinson describes how containerisation has compressed time and space so as to create a 'seamless' system for shipping freight around the world irrespective of mode:

> A 25-ton container of coffeemakers can leave a factory in Malaysia, be loaded aboard a ship, and cover the 9,000 miles to Los Angeles in 16 days. A day later, the container is on a unit train to Chicago, where it is transferred immediately to a truck headed for Cincinnati. The 11,000-mile trip from the factory gate to the Ohio warehouse can take as little as 22 days, a rate of 500 miles per day, at a cost lower than that of a single first-class air ticket. More than likely, no one has touched the contents, or even opened the container, along the way. (Levinson, 2006: 7)

Commodity projectiles moving through these routes are connected to a global consumer base and boast extremely short turnover times thanks in large part to the systematic attempt to eliminate idle inventory time ('dead time') in distribution. The annihilation of space by time (Harvey, 1989) works here to accelerate the circulation of value across the global supply-chain – what we shall call from here on in *supply-chain compression* (Bratton, 2015: 131).

The ability to deploy capital to compress entire supply-chains transformed the organisational infrastructure of global capitalism and turned logistics into a value-driven, profit-seeking industry; an end in itself. As more and more economic planning was being thrown out under the whim of neoliberal 'free-market' globalisation, supply-chains (the actual material base of global trade) were conversely becoming increasingly planned (Phillips and Rozworski, 2019). This marked the rise of 'business logistics' as an economic *science of circulation* (Cowen, 2014: 30), where companies compete on the basis of the distribution of goods and services rather than merely the products themselves, such that competition shifts from the firm level to the supply-chain level (Bonacich and Wilson, 2008: 5). As Chua et al. (2018: 619) write, the shift signalled a turning point in logistics from what were the narrow concerns of 'physical distribution management' with transportation, to a 'supply-chain management' in which a range of activities that had previously been handled in isolation were brought together in the same calculative frame. As production increasingly lent itself to exchange, and logistics moved from being characterised by cost minimisation to *value added across circulatory systems,* the newfound emphasis on supply-chain compression demanded a 'systems perspective' that treated production and distribution as one and the same (Cowen, 2014: 34-35).

This systems approach entailed a comprehensive account of logistical costs throughout the supply-chain; a 'total cost analysis' that aimed to account for the actual costs of distribution embedded across all activities of the firm including inventory carrying and obsolescence, warehousing, transportation, production alternatives, communications and data processing, customer service, alternative facilities use, channels of distribution, and cost concessions (Cowen, 2014: 36). Various compressions at the individual level work to shrink the planetary scale supply-chain as a whole, making for a free-flowing system of habitual circulation that is designed to *slowdown* the tendency towards overproduction by annihilating dead time in distribution; increasing value through acceleration; and improving turnaround time to reduce turnover time. Modern logistics experts thus operate

on the principle that capital not in motion ceases to be capital, and that the flow from sale to ordering to production to shipping and to the next sale ought to occur in one smooth motion (Bonacich and Wilson, 2008: 15).

Computerisation

Beyond the obvious necessity for transportation and storage, the frictionless motion of commodities passing through disparate spatialities across global supply routes requires coordination. Towards the end of the twentieth century in the age of globalisation this became the function of telecommunications and ICT systems. Techno-scientific research created the possibility to form distributed networks managed by central bureaucracies that leverage computationally rationalised logistics systems (Ström, 2022). Information technology now supports a global network of logistics that coordinates the movement of tens of millions of goods from factories to warehouses to stores and homes (Head, 2013: 35). Just as Nick Dyer-Witheford (2015: 83) argued, modern supply-chains are forged from detailed cybernetic tracking, as vast strides in computing power, transmission capacities and software pushed supply-chain partners to engage in enhanced communication and data exchange via electronic means. Prior to its arrival at a port, for example, a container will send a computerised stowage plan to the terminal operator depicting the positions and serial numbers of that which needs to be unloaded (Hepworth, 2014: 1124). Core technologies like GPS, Universal Product Codes (UPS) and Radio Frequency Identification (RFID), as well as more recent info-industrial technologies like algorithms, smart tags and hand-held tracking devices, are all crucial components of this calculative framework. Together they create a cybernetic system in which sensor-instrumented goods electronically 'speak' with one another and their owners about their location, destination and price – an early 'internet of things' in logistics (Dyer-Witheford: 84-85). Systematic inventory planning via computer technologies enabled companies to master the structure and control of material flows (Sharman, 1984: 79). As a distributer of information, it is considered a 'virtual supply-chain': a chain of transmitted symbolic representations that flows opposite to the physical movement of commodities (Bernes, 2013: 9). When objects can be abstracted into the digital realm and converted into electronic representations, they enter into an advanced form of organisational capacity where commands in databases turn into the traffic of real goods, disembedding the production of things from particular

sites and scattering them across the globe according to the synchronisation and global variance in labour price and resource access (Bratton, 2015: 111, 231).

These telecommunications linkages fostered *spaces of flows* (Castells, 1996: 376), since their cheapness, reliability and widespread availability meant that it became increasingly economical to geographically fragment manufacturing stages – to unbundle factories towards a 'flexible' division of labour (Dyer-Witherford: 2015: 83) and push material and inventory *up* the supply-chain (Waidheim and Berger, 2008: 227). It reflects a 'space-time fragmentation' (Hesse, 2008: 36), a reconfigured relationship between fragmented production and consolidated organisation where what matters most is flow between sites. Under this arrangement, space is divided up such that productive activity is separated from the reproduction of social relations (Stewart, 1995: 614) and logistics workers, in being secluded from an understanding of the overall productive process (Goldman and Van Houten, 1997: 116), struggle to organise against the ongoing intensification of their labour. Computerised logistics essentially allow for separate spatial nodes to be virtually connected across the world inside a mega-structural network that feeds back information flows on commodities in real-time to be tracked and traced from departure to arrival. Clare Lyster (2018) talks to this end of logistics storage as a *vector of flow,* as the desire to eliminate dead time from inventories reframes storage from a "depository of artefacts gathering dust" to a dynamic, temporal system in which storage does not accumulate in one single place but rather flows. Storage flows, an amalgamation of physical and virtual space, attempt to conquer the spatio-temporal gap between supply and demand that generates overproduction by maximising efficiency and collapsing supply and distribution into one seamless, total cost system (Lyster, 2018). This marks the shift from warehouses to 'distribution centres' that do not exist only within four walls but rather represent a *distributed place* that exists over multiple sites (Cidell, 2015).

Logistics serves as the technologically savvy coordinator of global flows that arrive just in time (Hepworth, 2013: 1120), *valves* or *hubs* of flow rather than reservoirs that capture it (LeCavalier, 2010). The mobility and transport of logistics as coordinated through information and communication technologies deliver a 'flow society' (Jespersen and Drewes Nielson, 2004: 7) in which consumers become increasingly more static as the commodity comes to them rather than them to it (Rosa, 2015: 101). The image of the flow society reflected a broader interest in social theory with the 'mobilities paradigm', an approach that sought to take seriously the politics of movement and to prioritise the

fleeting activity *between* the points where we are located (Anim-Addo et al., 2014: 340; Steinberg, 2015: 36). Storage flows prompt the inversion of the old model of distribution in which manufacturers would 'push' goods downstream, towards a demand-driven network of production where retailers track consumer behaviour in real-time and use this information to 'pull' new stock from suppliers (Danyluk, 2018: 636). In other words, the final product is ordered *only* when sold to the customer, with the components of the final assembly scattered further up the supply-chain awaiting integration (Waidheim and Berger, 2008: 222). Here we discover the defining characteristic of neoliberalism and one unimaginable without the logistics revolution: as a society we have moved from produce now, sell later, to effectively its opposite. In industry, the Fordist ideal was swapped out in favour of 'Toyotism', otherwise known as 'lean production' or 'flexible specialisation' (Dyer-Witherford, 2015: 49), where inventory is tentatively held on a *just-in-time* (JIT) basis rather than stockpiled on the grounds of *just-in-case*. Phoebe Moore (2018: 63) describes the Toyota Production System (TPS), developed between 1948–1975 and originating in the Japanese automobile industry, as one that allows for constant change in demand and technology, and tries to anticipate requirements as they develop. Toyotism demands careful time calculations with respect to the costs generated from the time that goods are stored, the time materials spend in warehouses before they are used, the time goods spend in transit, and the time products lie on the shelves before they are sold (Adam, 2003: 67). This idea again was inherited from the logistics of warfare, with Attewell (2021: 1336) noting how logistics infrastructures in South Vietnam were guided by the philosophy of 'inventory in motion', in which US counterinsurgents would use cutting-edge data management and real-time visualisation to provide troops with *just the right* amount of supplies required at a given time. Just-in-time production is an extension of 'just-in-time imperialism'; war waged on a just-in-time basis (Attewell, 2021: 1336).

In compressing space by maintaining an ephemeral inventory with a constant flux of small batches, lean models brought down corporate overhead costs and added value by reducing the time that goods languished in warehouses along the supply-chain. Moreover, information technologies increase the scope over which the JIT system operates via the integration of what Dyer-Witheford (2015: 53) calls "information on fluctuation in inventories capacities and markets with cybernetic data banks and networks" that fundamentally re-define the worker as just one sensor component of a mechanical goal-orientated process. JIT preparation and delivery have to this end ruptured the traditional

course of working time as established by the nine-to-five by replacing the clock time of industrial production with real-time performance measurements and metrics (Hepworth, 2014: 1130). Lean philosophy induces spatial and temporal *deregulation*, as the workload returns to the seemingly premodern status of no longer being defined by the clock but by the equally totalising *object* inscribed in tasks and events (Rosa, 2015: 168-9). Time pressure is offloaded onto the piecemeal, just-in-time workforce that must bend and shrink to the will of capital and be as *agile* as possible in the service of info-industrial technologies. By keeping commodities in a continuous motion, preventing build-up, and eliminating idle capital, the spatial reconfiguration accompanying the logistics revolution represented the most direct attempt to mitigate the possibility of a 'general glut' in capital's spheres of circulation (Harvey, 2018: 194).

Evidently, logistics organisation and the network economy are inseparable entities in the space-time regime of late capitalism as the politics of time replaces the politics of territory marked by state borders, and flow takes precedence. Capitalism's ability to utilise communications technologies to revolutionise the way we engage in market exchanges is equally a revolution in how we store and move the commodities attached to those exchanges. The more expansive and efficient the physical infrastructure, the greater the totality of the digital infrastructure in modulating our consumption. With providers in an arms race to compress their supply-chains and diminish circulation time, computer systems prove extremely useful for depicting and processing these locational flows in real-time. What is 'same-day-delivery' other than the total synchronisation of production and consumption, supply and demand, driven by the network logic of *instantaneous time*? (Urry, 2009). Virilio (1996: 132) termed this the state of 'generalised arrival', when goods arrive without seemingly having ever left (Virilio, 1998: 16; Hill 2019: 10). When a sale is made via the web, the data guiding its material trajectory from warehouse to front door is crunched into motion as software directs human labour at various points across the supply-chain with almost no regard for the traditional hours of the working day. As Bratton (2006: 13) notes, today's 'fleets-in-being' are the exabytes and gigatons of component inventories in permanent transit. Commodities and storage are indeed as virtual as they are physical, which inevitably leads the latter to be governed by the spectacular speeds of the former – by the timelessness of *computer time.* Flows induce timeless time (Castells, 1996: 465). With the greater hold of information technology on society comes the greater dominance of speed, its inseparable accompaniment (Lechte, 2018: 358) as data is

exchanged faster than the speed of the ship (Hepworth, 2014: 1124). Constant acceleration of material flows is the logical outcome of a logistics network whose speed is largely computational (Bratton, 2006: 13) and therefore always in search of ways to make human labour more malleable to the mobility of machines. Today's warehouse and supply-chain centres constitute little more than a shadow network of itinerant packages and only slightly less itinerant labourers that turn commands in databases into the traffic of real goods (Bratton, 2015: 111). If capital is value in motion, then computerised logistics aims to transmute all fixed capital to circulating capital and treat the movement of discrete elements as if they were an oil pipeline *flowing* continuously at precisely adjustable pressures (Bernes, 2018); the 'liquefaction' of rigid spatial structures (Zaera Polo, 1994: 25).

3.5 Friction and Overflow

Modern logistics, then, sets out to provide the operational basis for a near total distinction collapse between production, distribution and consumption in bringing discreet processes closer together under the banner of global frictionless trade. By the end of the twentieth century, it was considered common practice to produce goods in one corner of the world, handle their distribution elsewhere, and exchange them in markets in another place entirely with no more than a few weeks in-between. No city on the earth has or indeed needs more than three days' worth of food supplies, with the average food item travelling 2,500 and 4,000 food miles (Iles, 2005: 170).

Yet the inescapable reality that these processes are separated across time and space invites the possibility that 'seam space', or the interruption of logistical flows through various congestions and stoppages, poses serious problems for both the practice and representation of so-called 'frictionless' mobility. Indeed, the well-noted criticisms of metaphorising space-time in the previous chapter can once again be identified in the theoretical depiction of logistics in social theory. Just as in the previous chapter we addressed how time-space compression has been scrutinised for obscuring the materiality of globalisation, so too has the 'eroticism' of cargomobilities (Hill, 2022) as a singular homogenising flow of *pure* movement been accused of reinforcing an image of an apparently labour-free, abstract space of seamless flows that denies how friction and *overflow* are as much a part of logistics as their opposites (Anim-Addo et al, 2014; Steinberg, 2015; Gregson et al., 2017). For this reason, it is important to stress that

representing containerisation and computerisation as tools of standardised compression that coordinate global flows of commodities should not detract from what remains to be the relentless toil of logistics workers, for whom day-to-day life on the road, at sea, or in the warehouse can feel the least bit lacking in friction. Friction, in fact, is hardwired into their work as a repeated consequence of the uneven development of the built environment (infrastructural imbalances and the like) and the inherent messiness of the natural world. The ocean, for example, far from being the picture of flatness and passivity implied by the imagined spatiality of the 'shrinking world' analogy of perfect unity, is, as a space of depths, vertical displacements, particle movements and hydrodynamic forces, anything but flat for seafarers and longshoremen (see Figure 5 below) (Anim-Addo et al., 2014; Steinberg, 2015: 36). So where work like Bratton's The *Stack: On Software and Sovereignty* (2015) captures the synchroneity of modern logistics networks, it deprives us of the full picture of logistics-in-action.

Figure 5 *Conclusion of search for the disabled and drifting sailboat Happy Ending* (Sekula, 1995: 63).

Seam spaces are most apparent as cargo fluctuates between states of *consolidation* and *deconsolidation* in the course of its circulation, where the movement of labour in time and geographical space in assisting regional or local flows is essential to patching together global flows of goods moving across a global production network. As Gregson et al. (2017: 383) note, at different stages the shipping container has to be consolidated as commodities are 'unitised' into freight to enable their physical mobility through freight

movement, and in other parts unloaded or deconsolidated so that cargo can be made available for the retailer, wholesaler or manufacturer. Along the way are multiple instances where infrastructural space can breakdown and flow can be disrupted. The reason these spaces have become the topic of much of the recent interest in 'mobilities studies' is because seam spaces are not only central to logistics but critical to rethinking logistical power in the age of Amazon (Gregson et al., 2017).

Gregson's (2015; 2018) accounts of truck drivers in the UK provide one avenue through which to come to terms with the realities of friction on the ground in potential seam spaces. What she calls the 'dark side of logistics' – the isolated and monotonous toil of truckers transporting containers across land – marks the very real presence of friction in total-cost supply-chains, or "where the [downward] pressures exerted by logistics purchasers on logistics providers to cost minimisation and efficiency are most keenly felt" (2015: 345). Owing in part to the historic liberalisation of truck traffic in Europe via assistance from international institutions like the European Economic Commission in the late 1940s and bilateral agreements like the 1957 foundation of the European Economic Community (Vahrenkamp, 2016: 7-8), the heavily deregulated UK trucking sector, never strongly unionised from the outset, has been awash with self-employed 'owner-drivers' since the opening of the UK market to EU competition. Much as delivery work in the modern 'gig economy' is structurally configured so that individual riders harbour the indirect costs of labour at the benefit of their tech employers, retail power in logistics handles the friction of deconsolidation by *exerting downward pressure* on road haulage firms who offer piece meal work to 'independent contractors' (Gregson, 2015: 348; Gregson et al., 2017: 389). In other words, the costs of friction, both financial and physical, are offloaded onto owner-truckers who sit at the very bottom of the supply-chain, acting as what Belzer (2000) describes as 'sweatshops on wheels'.

The workhorses of land-based logistics in the UK (Gregson, 2015: 346), truck drivers in modern Britain somewhat complicate the narrative of the 'acceleration society' through the nature of their work. Firstly, truckers cover nearly twenty billion kilometres on over 400,000 km of paved roads that make up the UK's road network, but do so at regulated speeds of no more than 56mph as they lumber 170 billion tonnes worth of commodities ranging from food items to crude petroleum in the 'slow lanes' of Britain's motorways every year (Gallucci, 2017). For reasons pertaining predominantly to fuel efficiency, driving a

truck requires steady slow mobility, standing in stark contrast to the image of hyper-speed embodied in the car (Gregson, 2015: 346), and demonstrating how high-speed societies have an underbelly of *deceleration* in their very design. Fuel economics (which falls solely on the shoulders of owner-drivers whose fuel consumption comes in at around 8.5mpg) in fact pervades the day-to-day graft of truck drivers in more ways than one when it comes into contact with the spatio-temporalities of supply-chain compression. As Gregson (2015: 356) explains, truckers regularly make strategic decisions on when to *hit the road* and when to park-up – sometimes hours before their appointed delivery slot. The thinking behind this is clear: the demands of just-in-time distribution from players further up the supply-chain mean that (15-60 minute) time windows to pick-up or drop-off containers are set in stone and cannot be missed without the prospect of a financial penalty. Drivers are forced to balance these temporal demands with the frictions created by infrastructural breakdown, often choosing to beat traffic by setting off early to sit patiently in their 'cab' in the 'yard' rather than leaving *on-time* only to risk motorway congestion where fuel costs pile up. Truckers, then, in facilitating the annihilation of space by time, attempt to *stretch time* by utilising waiting tactics (Gregson, 2015: 356). As the congestion of out-port flows of deconsolidated containers is displaced from distributors onto the road network and the road haulage industry (Gregson et al., 2017: 393), truckers pick up the slack by adapting their working lives *around* the temporalities of lean logistics, amounting in anti-social working hours and poor work-life balance. Since this necessarily requires long periods of time spent waiting, trucks become not just a driving space in circulation but a separate lived space (Lefebvre, 1991) where drivers dwell when movement is stilled. Gregson (2018: 298) describes how the trucker's 'cab' is regarded as a transitional site between a space of capital and a space of habitation, evidenced not only by how drivers use their cab to eat, sleep, read, watch television etc., but how they treat them as a place for comfort and identity. Truck congestion results in habitation in cargomobilities and creates a precarious class of nomadic dwellers who patch together cargo flows for just-in-time capital (Gregson, 2018: 301). They find themselves at the sharp end of the friction and tension that is as often intentional as it is unintended but inevitable in supply-chain capitalism when efficiency gains made in one place create overflow for actors in another (Gregson et al., 2017: 384-5).

Trucking and its challenges provide a concrete example of where the need for motion in logistics collides with some of the inherent limitations of the built environment. It illustrates

how competing logistics providers leverage their power to dump dead time further down the chain onto those who actually deliver goods or handle their deconsolidation. Seam spaces like this ultimately draw attention to how critical infrastructure has become to the turnover time of capital, from inland ports to roadways to storage facilities. For every day goods are in transit, it is estimated that their final cost increases by 0.8 per cent (Hesse and Rodrigue, 2004). Much of the infrastructural development of the last five decades concentrated in the global economy has been steered by this reality, especially given that the friction absorbed by truckers has a small ceiling. We are therefore left with the most essential prerequisite of supply-chains that aim towards the speedy and frictionless motion of commodities: logistical geographies and the immobilisation of space itself. In order for supply-chain compression to take hold, an extremely particular kind of space needs to be produced.

To recap, this chapter has so far laid out the path towards logistical modernity – the epochal transformation of logistics into a science of circulation that underpins how we move things across the earth and thus how we organise and divide up the relations of production. It brought the logistics of warfare into the mix by highlighting the historical convergence of military technologies and organisational practices with the expansionary and annihilating logic of capital. Progression from there invited us to examine containerisation as a compression-like sequence that transformed the ground game of the global economy. Experimentation with new types of management and info-technologies created the structural capacity to *pull* commodities from their point of production by elevating their flow across circulatory systems. But a flow society does not make for a flat society, hence our engagement with the trucking profession as an example of where flow breaks down and precisely who picks up the slack. The final job of this chapter is to reckon with the geographies that embody, as was noted in the previous chapter, what Lefebvre (1991: 222) described in the previous chapter as *conceived space*. That is, the critical spatialities whose primary function is to enhance and accelerate the movement of commodities.

3.6 Logistical Landscapes

As Charles Waidheim and Alan Berger (2008: 226) make clear, the logistical spaces emerging towards the end of the twentieth century were not the unconscious by-product of economic development or the unchecked remnants of preceding inhabitation but rather

were classed as belonging “among the most engineered and optimised of places”. They typify Lefebvrian notions of space as being politically and economically charged, having spatialised the total-cost-benefit analysis of business logistics that places the cold cost of calculation at the centre of the production of space (Cowen, 2010: 612). These spaces do not materialise inconsequently so much as they are the direct outcome of government intervention and the actions of the firm in the face of the collapse of the Fordist model in the early 1970s when urban topographies entered a period of radical restructuring that characterises the production of space to the present day (Zaera Polo, 1994: 25). Waidheim and Berger (2008: 222) differentiate between three post-Fordist zones for economic activity that characterise distinct *logistics landscapes* in which more land area is given over to accommodate the shipment, staging and delivery of commodities: spatialities of distribution and delivery, consumption and convenience, and accommodation and disposal. Our focus here is on the first: the distribution and delivery landscapes that denote the core infrastructural space and organisational ideology of global supply-chains (Waidheim and Berger, 2018: 226). These landscapes are often credited with addressing the vacancy and toxicity of abandoned industrial brownfield sites (Waidheim and Berger, 2018: 226), rescaling them in accordance with an amalgamation of different ‘infrastructural technologies’ (Easterling, 2016: 15-16) as infrastructural space and its elements get overhauled and redesigned around the shipping containers’ dimensions so as to cater to the needs of international intermodalism (Danyluk, 2018: 640). Logistical geographies, Kate Hepworth (2014: 1129) writes, arise as geographies of adjustment and optimisation that intervene in the urban configuration of leftover industrial cities through the construction of new motorways, rail lines, warehouses and distribution centres, as well as concomitant environs like parking lots, streetlights, traffic lanes, drainage systems, sidewalks and the like (LeCavalier, 2010). In encountering the disorderly nature of the de-territorialised, no-longer-industrial city, logistics appropriates and re-territorialises space, *enacting* [existing] *geographies* (Hepworth, 2014: 1121) to produce vast infrastructural assemblages that integrate calculative modes of spatial reasoning into the built environment (Chua et al., 2018: 622). As Virilio (2011: 20) wrote, after the transformation of dockyards into industrial wasteland, “it is no longer the architecture of the warehouse that is feeling the impact of bulk carriers and their logistics [...] It is now the urbanism of cities on the horizontal coastline of loading and unloading zones”. Contemporary urbanisation projects *logistical futures* onto cities insofar as their

development is prized on idealised concepts of logistical spaces (Hepworth, 2014) of pure movement where the city becomes based on logistics rather than the other way round.

Last discussed in chapter two, the commercial geographers Neil Smith took to task in *The Production of Space (1984)* would no doubt be at odds to explain the developmental patterns of late-capitalist logistical landscapes, since the natural geographical advantages of locations do not matter nearly as much as the cheap labour that services the land. Locations for investment are in practice more likely to be determined by corporate growth strategies (LeCavalier, 2010) that have at their core an interest in the production of relative surplus value in distribution. As Yossi Sheffi (2012: 85) writes in *Logistics Clusters: Delivering Value and Driving Growth,* a region's natural attributes might make an area more attractive for logistics operations, but the specific town, county or country that takes the lead in logistics is not preordained. Rather, logistics companies spatially concentrate their (often identical) activities and invest their capital *around one another* to consolidate their operations in creating their own natural advantages. Hubs designed to process material flows soon manifest into fully-fledged 'clusters' that behave as positive feedback loops feeding off increased activity and reduced overheads (Sheffi, 2012: 87-121). Logistical economies of scale, known in contemporary terms as 'growth poles' of attraction for labour and surplus, constitute an "amorphous agglomeration of companies and facilities with logistics-intensive operations with fuzzy borders and no central management" (Zaera Polo, 1994: 26, 81). Growth poles therefore command the production of space *beyond territory* (Cowen, 2010: 1132) by guiding intervention in the built environment beyond the urban (Hepworth, 2014: 1132).

These homogenising, equalising spaces exploit differences in labour conditions and wage-relations in the image of the ideal logistical city, prompting capital to seesaw between developed and underdeveloped areas (Smith, 1984: 198). They evidence what Lefebvre (1991: 362) described as the *domination of conceived space over lived space*, precisely because urban configurations that were planned with other purposes in mind resist their redeployment within these newly imagined logistical geographies (Hepworth, 2014: 1121). No longer attached to the industrial strongholds of the Fordist era, the social, economic, and environmental costs of these networks have been shifted on to communities that live close to logistics complexes and transportation corridors that sustain the functioning of the metropolitan area (Vormann, 2014: 4). With the crucial backing of the neoliberal state, the inevitable domination of logistical space in the image of the ideal logistical city

fundamentally shapes social life for the inhabitants of the megalopolis, leveraging new and existing racial hierarchies of labour to create self-contained 'logistics valleys' in peripheral spaces. Benvegnu and Cuppini's (2018: 232) interviews with migrant warehouse workers in communities of the *Interporto,* a logistics complex in Northern Italy (see Figure 6 below), best showcase this: "everything is a warehouse, [or] a small town near a warehouse", a Senegalese worker said of Italy, where he had spent the last twenty years. "I arrived in Italy in 2009, and I didn't know anything. For years I didn't realise where the city centre was", admitted one worker from Morocco. These logistical labourers are implicitly illustrating the rise of the postmodern logistical city, in which the industrialisation of the urban periphery turns the space economy of the region inside-out, creating dependable flows of cheap labour and in the process obscuring the spatiality of social class relations (Soja, 1989: 240). A new precarious class of invisible labourers has emerged to assist the circulatory flow of commodities, an 'army of the underground' ready to be enlisted by capital, every day and every night (Benvegnu and Cuppini, 2018: 233). Regions and localities have been absorbed by capital under the impulse of their governments and business elites, integrated into international networks that link up their most dynamic sectors (Castells, 2009: 412).

Figure 6 *Interporto 'Area Logistica' in Bologna, Italy.* Published 2019, via AREA LOGISTICA: Real estate and logistics area experts. Available at: https://www.arealogistica.it/property/area-logistica-interporto-bologna/

3.7 Critical Space

The way the *decentralisation of the urban form* (Waidheim and Berger, 2008: 220) renders the spaces of labour invisible from plain sight explains a great deal about our perception of logistical geographies – or rather, our critical lack of one. Virilio (1997) argued that contemporary spatialities, what he called 'critical space', had become increasingly disconnected from the 'real' as a result of the invasion of teletechnologies and the abstraction of space-time configurations that change the way we see and encounter the world. Industrial reorganisation had disorganised the urban environment to the point of causing the permanent decay and degradation of neighbourhoods (Armitage, 2015: 45). Previous configurations of lived experience were dissolving under the impact of telecommunications and mass transportation, decentring lived space and producing an increasingly fragmented, discontinuous and transhistorical mode of experience (Kellner, 1999: 108).

Over the last several decades, as urban development has catered for the growing requirements of globalisation, critical space has become ubiquitous, with international trade tripling since the mid-1970s and over twenty million shipping containers scattered globally. Yet these spaces are not etched in the psyche in the way the Fordist factory was. They are not transparent to the naked eye despite representing the central global reproductive arena of neoliberal capitalism. Infrastructural logistics space has instead been relegated to a hidden role outside of public sensibility and from integration with the wider local economy. In that sense postmodern geographies adhere to the very same logic that the global infrastructure of the internet does in appearing *immaterial* even in the face of the immense amount of land taken up by server farms situated in remote locations. Much like how the digital economy has successfully managed to disconnect itself from the very physical roots of the internet, the continued focus on the financialisation of the economy has led urbanists to neglect the very material side of urbanisation.

This is what Boris Vormann (2014: 4-10) argued in *Global Port Cities in North America: Urbanisation Processes and Global Production Network*s, noting how the abandoned port docks of the Fordist era have been recast as metaphorical utopian spaces of the post-industrial world, dressed in the language of 'revitalisation' and 'regeneration' as a means of attracting investment and tourism; the domination of conceived space over lived space (Lefebvre, 1991). These post-industrial 'utopias' sustain themselves through universal

myths, romantic images and cultural cliches about the industrial ports of yesteryear that make it possible to develop a city's identity and its tourist pull (Kowaleski, 2018: 2-5). The Albert docks in Liverpool for example (*see* Figure 7 below), once at the heart of international maritime trade (and the transatlantic slave trade), was subject to an urban renewal project in the late 1990s that transformed the site from a disadvantaged waterfront into a commercialised space that serves an ideological function as a symbol of power (Kowaleski, 2018: 3). The post-industrial character of an inner-city waterfront like this in fact depends on what is absent from it; the unseen off-site operations occurring within corporeal landscapes located on the urban periphery (Vormann, 2014: 4). These logistical zones are hardly recognisable as city forms yet supply the material base for the economic activity that supports contemporary urban development (Waidheim and Berger, 2008: 226). As critical spaces, they are the single most important development of the regime of flexible accumulation where overaccumulation problems are solved through mechanisms of spatial and temporal displacement (Zearo Polo, 1994: 25). The story of Amazon belongs to this very same formula that the logistics revolution unleashed on the urban environment. It has allowed for a relational separation between the various stages of capital accumulation, characterised as it increasingly is by spatio-temporal fixes.

Figure 7 *General view of Liverpool's regenerated Albert Dock at night (2013).* Published 2015. Photograph by Mike Price, via Liverpool Echo: *Liverpool's iconic Albert Dock through the years*. Available at: https://www.liverpoolecho.co.uk/news/nostalgia/gallery/liverpools-iconic-albert-dock-through-10018293

The logistics revolution, then, is a spatio-temporal revolution, inasmuch as the containerisation of commodity circuits that revolutionised the speed and cost of global trade required an equally transformative network of material spaces of distribution through which the container could circulate. As Vormann (2017) writes, commodities ranging from cars to orange juice to modular homes shipped from their point of production to point of sale pass through and depend on "urban hubs and bottlenecks of international trade that over time reshape the physical layout and the multiscalar governance logics of global and mega-cities". This reshaping involved considerable creative destruction as factories and ports from the Fordist ideal were de-territorialised and abandoned as capital upped sticks to greener, more exploitable pastures clustered in growth poles on the urban periphery. Logistical landscapes emerged as key terrains in the spatio-temporal reproduction of late capitalism – critical space that decentres lived experience in the image of the ideal logistical city.

3.8 Concluding Remarks to Chapter Three

Where the logistics of delivery meets the digital platform economy, we find Amazon: an e-commerce provider that brings sellers and buyers together under a totemic vision of frictionless fulfilment. This chapter set out to cement the argument that Amazon is the material product of the logistics revolution that swept the world in the late twentieth century, an outgrowth of a historic pivot from production to distribution, a fluctuation in the space-time regime of capitalism, and a military dynamism that came home to roost. In the decades prior to the Amazon empire we know today, the capitalist class of producers and rentiers had been engaged in a concerted effort to deregulate the transport sector, evade corporate responsibilities (Vuillemey, 2020) and redirect state infrastructural power towards new outlays in the built environment. The actions of the capitalist firm were elevated by the technologies and calculations of the logistics of contemporary warfare and crystalised by the new modes of capital accumulation. Directed by the total-cost logic of supply-chain management and reorganised according to the Toyotist tendency of lean production, the practice of business logistics devised an *economic science of circulation* to manage global storage flows. Supply-chains became overlaid with cybernetic systems to coordinate these flows and ensure they arrive *at the right moment*. The ability for goods to electronically communicate with one another made for instantaneous, timeless interactions across the supply-chain and amplified the need for a just-in-time workforce of

logistical labourers toiling day and night in neo-feudal valleys at machine speeds. When these systems are in combined operation with transportation and storage facilities, they annihilate the space of separation between production and consumption, compressing time and space to collapse the distinction between the two. Supply-chain compression reweaves production, distribution and consumption into increasingly complex spatial configurations that dramatically recast the relationship between *making and moving* (Chua et al., 2018: 621; Cowen, 2014: 103). All that is solid melts into liquid, as a planetary-scale computerised logistics infrastructure perpetuated and accelerated the flow of cheap throwaway consumer goods around the world. The motivation behind these planetary developments is clear: the crisis of overproduction demanded that profits be pinned on increased product turnover rather than the cost/price dynamic. By facilitating a regime of flexible accumulation (Harvey, 1989: 147), the logistics revolution enabled this shift and *temporised* capitalism's crisis tendencies, banishing them to the future by *slowing them down.*

Given that there is no such thing as total frictionless motion, however, with circulation always met by seams, a recurrent trend this chapter also found with *logistics futures* is that the process of supply-chain compression is effectively endless. The dialectical antagonism between fixity and motion theorised in the previous chapter (Brenner, 1998: 470), between production and compression, dictates that logistical space be produced almost as habitually as it is circumvented. Facilitating capital mobility takes capital *fixity* only found in state-of-the-art environments (Sassen, 2006: 344). Hence the competitive struggle to reduce turnover time forged a growing dependence upon a socially produced geographical infrastructure to accelerate the circulation process; a geographical form of crisis-induced restructuring (Brenner, 1998: 473). In this sense, logistics creates an 'orderly disorder' (Birtchnell et al., 2015: 1). When you invent the ship you also invent the *shipwreck* (Virilio, 1999: 89). *Slowdowns* are an unintended consequence of acceleration and dynamisation (Rosa, 2009: 94), best exemplified by the traffic jam and delays caused by infrastructural breakdowns such as bottlenecks or road congestion (Hepworth, 2014: 1129) that place downward pressure on those at the bottom of the supply-chain like truckers to hold together logistical worlds (Gregson et al., 2017) and keep the image of frictionless unity alive. The rescaling of territory and production of new logistical nodes, hubs and gateways is therefore invariably on the horizon with enhanced mobility of

productive capital unlocked most effectively through fresh spatial immobilisations as more surplus labour is drawn into the logistical economy.

When we think of Amazon, we sometimes think of the digital infrastructure that gives us slick e-commerce, television on-demand, and cloud computing. But digital infrastructures are nothing without their material counterparts – buildings, cables, generators, trucks and the like. Where server farms prop up digital interfaces like Prime Video and Amazon Web Services (AWS), material spaces of distribution like warehouses and distribution centres enable effortless online shopping experiences. These spaces do not naturally develop so much as they are continuously engineered as part of a broader project to collapse spatial barriers in bringing the different stages that encompass the laws of motion guiding the accumulation process closer together. If the logistics revolution marked the beginning of this project, then Amazon's platform logistics model represents its highest stage. This chapter looked to systematically capture the technological and managerial components of the logistics revolution that mark it as the historical contingency that gave way to Amazon.

Out of a Seattle suburb in 1994, when Wall Street expatriate Jeff Bezos set out his long-term vision for short term profits, Amazon was born. The technological utopian vision, now a firm reality, was one of a harmonious coordination between users, objects and information, aiming at the total organisation of the world's physical commodities (Hill, 2019: 4), what Bratton calls Amazon's 'platform logic' (2015: 186). Amazon is not a digital service so much as it is a *logistics platform*, one that positions itself between sellers and buyers by synchronising online retail with a physical distribution network that handles commodities ranging from Dyson hoovers to dog poo bags. Matching consumers and their data with products that can be fulfilled without delay is no easy feat. It requires a digital infrastructure that brings together customers, advertisers, service providers, producers, and suppliers (Srnicek, 2017: 43). More than that, it necessitates that the physical environment around us be tailored towards certain ends. Those ends were the topic of the first three chapters of this research, which endeavoured to mount a critical engagement with the material spaces of distribution that underpin Amazon's platform dominance.

Bezos' ambitions have well escaped the four walls of his West Bellevue garage, now extending to regions as seemingly inconsequential as Darlington in the North East of England. It is important to emphasize *seemingly* here, since Darlington is in fact *precisely* the geographical economic terrain on which Amazon have been able to mount their spatial

offensive. Where capital and labour would have previously mushroomed around Fordist scales of centralised industrial infrastructure and institutional organisation, they are now more likely to gravitate and orient around decentralised corridors on the periphery of cities – logistical landscapes. This pattern of development is constitutive of the broader economic trends that swept the world economy not long after the Second World War. After the Keynesian-instigated boom expanded the productive capacity of manufacturers in the West, and the adoption of the shipping container facilitated mass exports between national economies, the overcapacity caused by inter-capitalist competition obliterated the post-War industrial consensus and set in motion capitalism's famous twentieth century downturn. The crisis of the capitalist mode of production commenced a planetary-scale compression of space and time that reached its crescendo with a revolution in logistics in the 1970s and was driven by a desire to scatter production towards an international division of labour and a flexible mode of accumulation. Rather than pinning their profits on production, which was squeezed of value the more it became automated or outsourced, the capitalist firm turned its attention to the dispersal of value across the supply-chain. Investment and development in the logistical economy was treated as a potential return on investment given the emergent tendency of tele-technologies, lean organisational structures and exploitable labour surplus to create spaces of flows that speed up the realisation of value. But the more production lent itself to exchange, the more important the physical conditions of exchange became for the costs of circulation (Marx, 1973: 524). Under these pretences, geographical space must itself be treated as a means of production (Smith, 1984), since only engineered spatialities of growth can conquer the friction of distance; only through producing logistical space can space be overcome; only through immobilising capital can the liquification of capital – which alleviates the issue of overaccumulation – be achieved. The legacy of the logistics revolution then is the continued enactment of former industrial geographies and rescaling of territories into critical space that is *conceived* in the image of the ideal logistical city of generalised arrival (Virilio, 1996: 132), one that echoes Jeff Bezos' dream of a consumer paradise. In practice, what this often means for the peoples who populate and replenish these supply-chains is their total subordination to the stipulations of logistical space-time; the domination of conceived spaces of pure logistics over lived space (Lefebvre, 1991: 362). The places we live in are shaped and reshaped by these practices.

Thus, when capital began to seesaw out of industrial regions, it was creating the conditions upon which it could one day return in another form. Amazon's fulfilment centres, such as those in growth poles on the edge of the Northern towns like Bolton, Doncaster, and Rugeley (shown in Figures 8, 9 and 10 below), mark one small fragment of that return. Geographies of the industrial revolution that were central to the production of cotton and coal are now geographical products of the transmission revolution (Virilio, 1997; 2006) that materially serve Amazon's ambition to bring headphones and electric toothbrushes to consumers with the click of a button. Once folded into their mega-structural network, they become critical logistical nodes of the platform's dynamic fulfilment network as it strives to be the sole provider of the commodity things we consume with impunity.

Amazon are by all accounts terraforming the logistical terrain of tomorrow. The platform has been engaged in a systematic effort to inherit geographies it can *infrastructuralise* (Plantin et al., 2016: 295; Hill, 2020: 524; Langlois and Elmer, 2019) in the service of its fulfilment operations. As their network effects grow in stature, and increased amounts of users opt for the convenience of Prime Delivery over other providers, the more the need to *dominate space* becomes an absolute necessity. Amazon's tentacles have already been sunk, having so far invested over £18 billion in its UK operations in distribution-related facilities. One of their most recent infrastructural projects – an 'advanced robotics' warehouse in Symmetry Industrial and Distribution Park in Darlington, Tees Valley– reveals the materiality of a platform otherwise obscured by the ontology of the digital economy in its rawest, most visually striking form. The next chapter seek to divulge more about this particular socially engineered space by interrogating the specific historical and economic geographies of this part of the North East that make it ideal Amazon country. The rationale for such a place-based, regional analysis of the logistical activities of Amazon should hopefully be clearer three chapters the way through this research. Using examples like the 'militarised desert' in Los Angeles from chapter two, and the Albert Docks in Liverpool and the Interporto in Bologna in this chapter, this research has already begun to illustrate some of the urban effects of the spatio-temporal compression of the logistics revolution on place. All these places share something in common, being instances of when deindustrialisation has forced new urban configurations into being at the expense of older ones. New ways of moving goods and people trigger new territorial organisation of the built environment. Given that these processes are still ongoing, with Amazon the new masters of space, we turn our attention to a part of England that has seen its fair share of infrastructural activity

in the last decade. In the North East we discover a region to practically apply a theory of platform logistics to a local setting where these theories find concrete form.

Figure 8 *358,000 sq. ft Amazon warehouse in 'Logistics North', a logistics facility in Bolton, Greater Manchester.* Published 2020, via Logistics North: R-evolution at Logistics North. Available at: https://www.logisticsnorth.com/r-evolution/

Figure 9 *1.1 million sq. ft & 215,000 sq. ft Amazon warehouses in 'iPort', an Inland Port intermodal rail terminal in Doncaster, South Yorkshire.* Published 2020, via iPort: Overview. Available at: https://iportuk.com/overview/

Figure 10 *700,000 sq. ft Amazon warehouse in Tower Business Park next to cooling towers that have since been demolished. Rugeley, Staffordshire.* Published 2020, via the Financial Times: Amazon unpacked. Available at: https://www.ft.com/content/ed6a985c-70bd-11e2-85d0-00144feab49a

Chapter Four | The 'Half-Life' of Deindustrialisation and its Urban Peripheries

> Men can see nothing around them that is not their own image; everything speaks to them of themselves. Their very landscape is alive.
>
> Attributed to Karl Marx by Guy Debord in *Theory of a Derive (1958)*

Over the last three chapters, this research has attempted to construct a theoretical and historical narrative capable of explaining the multitude of conditions – be they social, spatial, technological, political – that give rise to platform logistics and Amazon's specific brand of monopoly capitalism. A large component of this story belonged to detailing that critical period in the twentieth century when the economics and urbanism of Fordism were on borrowed time and a new system of organisation and governance arose to take its place – otherwise known as *deindustrialisation*. Urban centres were turned inside out (Soja, 1989: 223), with formal spatial arrangements abandoned almost as quickly as the capital that once shaped them seesaws out of them (Smith, 1984: 198). The dialectical nature of these tectonic transformations ultimately renders their effects open-ended, meaning they can never be appreciated in their entirety. The limitations of quantitative research such as industrial relations data or national employment statistics in painting the entire, lucid picture of these transmutations mean an alternative approach is required to grasp the severity of deindustrialisation and its properties. One suggestion is to turn to *landscape*, to cultivate an awareness of change through 'reading place' (Kitchens, 2009: 252). The reasoning here owes much to how deindustrialisation has collided with the contemporary dictates of what Tsing (2016) terms *supply-chain capitalism* to emphasise how accumulation increasingly takes on a networked form of linkages and value chains played out across spatial scales. How decline interlocks with the new geographies of supply-chain capitalism is felt most viscerally at the level of the built environment and not simply statistics on falling rates of profit and unemployment, which are limited to eliciting comparisons and are temporally static. In the words of Lenin, this is a concrete analysis of concrete conditions (Lukács, 1971: 82). It is accounting for the very materiality of tarmac and concrete, shrubs and weeds, shapes and signs that we can begin to search for the rationale in and of post-industrial spatialities. These characteristics are fossilisations of a history in flux; a fleshy arrangement of historical processes that tell us how macro social and economic forces dialectically map on to the physical world on a micro-level. Our

landscape, to quote Marx, is very much alive. That is to say, landscapes – being historically bound up in, and shaped by, economic processes (Waldheim, 2016: 69) – solidify their past in the now, such that to capture a place in a moment is to take to space with a hot flannel and draw out the history suspended there.

Thus far this research has charted in some detail how decline was baked-in to the very fabric of industrialism because of the conflict between the social relations of production and the fragility of fixed capital formations that could not, despite or in many instances *because of* government intervention, stand the test of time. This was a materialist method of analysing the historic pivot of capital investment away from traditional methods of production towards lean distribution as a means of documenting the emergence of logistics as an organising principle in *no-longer-industrial* spaces adjacent to developing a theory of the rise of e-commerce and platform logistics provider Amazon. A significant part of this endeavour was to explore the *peripheralisation* of economic geographies as deindustrialisation resulted in a staggering growth of obsolete industrial spaces (Krivý, 2013: 104) and centralised economic configurations once orientated around industrial towns and cities fell out of favour. Moving beyond discussing these developments at the level of abstraction, a question already flirted with is here addressed: what transformations and oscillations has industrial decline had on the ways that we experience space? This is particularly important given how a lot of these areas are assessed (particularly in terms of land use) by local authorities and planners. In post-structuralist terms, what does this mean for *space when it becomes a practiced place* – when static collides with movement? (de Certeau, 1984: 177). To be more specific, how do we evaluate those spaces that seem to escape the interest of everyday inhabitants (invoking the so-called 'death of place' [Gospodini, 2006: 316]), only to emerge as critical sites of mega-structural logistics networks and the firms that leverage them? Or, to work Amazon into the mix, what can the built environment in these areas, in all its mundaneness and sterility, tell us about the makeup of post-industrial areas in the age of platform capitalism? The emergence of Amazon's nexus of physical storage facilities in our towns and cities must be treated as manifestations of a new economic paradigm that spawned out of the conditions left by the previous. They compel us to ask, why are the urban fringes of former industrial spaces prime localities for the productive activities of the new liquid forms of capital modern economies have given way to?

To address these questions in a localised setting, attention is afforded to the North East of England. At least since the 1960s, the North East has grappled, adjusted, and continually readjusted to the inescapable decline of its manufacturing power and obsolescence of its industrial base. Deindustrialisation wrought modes of uncertainty amongst its populace (Anderson et al., 2019), compounded by neoliberalism's slow motion social dislocation (Telford and Wistow, 2019) and political fragmentation (Skelton, 2019) as the region continues to search for ontological meaning and a new economic character (Gospodini, 2006). Branded part of the UK's 'rustbelt' inasmuch as it has experienced similar industrial and economic decline, population loss and urban decay as the American Midwest, the current composition of much of the North Eastern landscape invites us to consider how deindustrialisation and geography combine to create the conditions for new pathways for economic growth that attract the interest of Amazon. Identified earlier on in this research as central to the work, Amazon's recently constructed 'fulfilment centre' in Darlington typifies the impression ephemeral capitalist development has on regional scales, seesawing between areas according to how valuable a given plot of land is to emergent networks of accumulation.

Firstly, it shall provide a diagnosis of deindustrialisation in the North East of England and Teesside in particular. In attempting to *spatialise* this reading, it will explore deindustrialisation through the prism of its consequences on the built environment in a bid to emphasise how the legacy of yesterday shapes the objective conditions of tomorrow. Next, it will open up the discussion to the distinct geography that appears to be enticing online retailers like Amazon: the urban periphery. Working off the themes expounded in the previous two chapters surrounding the decentralisation of economic geographies and the spatiotemporal demands of logistics, it will observe the urban fringes of the no-longer-industrial city as localities for the logistics economy that absorb the shocks of unprecedented economic restructuring. Chiefly, it shall unpack the characteristics and temporalities of the so-called 'edgelands' (Farley and Symmons Roberts, 2011; Shoard, 2017) of post-industrial geographies in such detail that their logistical expediency will fall into place. Along the way it will position the deindustrialised 'half-life' (Linkon, 2018) of these landscapes alongside a narrative of Teesside that tells a story of a region caught in a flux between two socioeconomic states of being. This will follow the likes of Warren (2018) and Holmes (2020) in constructing a non-essentialist version of industrial development and decline in the North East, and how it is precisely Teesside's complicated

and non-evolutionary relationship to industrialism that has made it prone to *Amazonification*.

The remainder of the chapter will then offer a thought experiment that should foster an engagement with how Tees Valley specifically shapes up as a logistical landscape. It will advance Martin's (2010) analysis of Will Alsop's 'supercity' that was conceptualised in the early 2000s in order to align the determinations of *polycentric linear urbanism* with those of a logistics platform like Amazon as they build out their fulfilment network into new territories that take advantage of urban corridors and mobility nodes. It will ultimately argue that so long as contemporary urban planning stems from imagining towns and cities together as interconnected post-industrial networks that facilitate capital mobility, the binding of these networks must assert themselves as hard infrastructure in our lands. To do so, they must colonise specific regions where logistics clusters can thrive, locking these regions into a permanent subaltern urbanism of quasi-industrial relations. In thinking through this scenario, this chapter will argue that we make the same mistake when envisaging post-industrial urban growth models as we do when shopping from Amazon: assuming a certain *weightlessness* to the modern world that fails to account for the gravity of the operations that sustain it.

The ambitions of this chapter rest on advancing modern scholarly work on logistics and space like that of Lyster's (2016), LeCavalier's (2016) and Orenstein's (2019) through local landscapes. These are global currents of tectonic magnitude that have a ripple effect on local regions, particularly those in communities in the North East of England, still managing the fallout of deindustrialisation and globalisation. As Anna Tsing (2015: 205-6) writes, "[g]lobal history is at play–but sometimes with unexpected results … [t]o know what progress has left to us, we must track shifting patches of ruination". This research explained that logistics presents capitalism with a new *fix* to the structural problem of overaccumulation (Danyluk 2018), wherein distribution supersedes production as the primary value-creator for capital, and the post-industrial geography becomes a key axis for it. Though regions like the North East of England were ransacked by the cessation of the Fordist model and the flight of capital away from industrial areas, the way deindustrialisation has altered the urban morphology of these landscapes paradoxically nurtures the conditions for them to become lucrative localities for transportation and warehousing in the new circulatory regime of capital; the 'seesawing' of capital (Smith, 1984: 198) from a developed area to an underdeveloped area, then at a later point back

to the first area which is by now underdeveloped. The following analysis can help explain a pattern gripping former industrial towns like Darlington where a once thriving central market square is replaced by a 12-acre steel and concrete box on the town's outskirts as its main source of economic activity and employment. A warehouse town that slots into a polycentric network.

4.1 Deindustrialisation in the North East of England

Few places across Britain have experienced such dramatic restructurings and transformations in their regional economic make up as the North East of England over the past two centuries, having previously occupied a pivotal position in the global capitalist accumulation process and since rendered marginal to its main currents (Hudson, 1986: 170). Traditionally the bedrock of industrialism, boasting everything from the manufacturing of iron, steel, and petrochemicals to engineering and shipbuilding, the North East has encountered a rupture to the material configurations of its *raison d'être* (Telford and Lloyd, 2020: 595) since industrial production felt the full force of international inter-capitalist competition, overcapacity, advanced production methods and increased capital mobility resulting in its global flight. Applying the concept of *overaccumulation* explored in chapter one of this research to the North East specifically demonstrates how global economic shocks have spatially localised effects. For example, Teesside in the North East had a strong petrochemicals industry assisting the war efforts of the First and Second World War. It developed over that period into the region with the single biggest concentration of chemical plants in the world led by the evolution of the Imperial Chemical Industries (ICI) company on the North Bank of the Tees (Warren, 2018: 16). The North East, then, was an important geographical component of the 'petrochemical empire' within the geo-politics of fossil-fuelled production (Hanieh, 2021), and thus was one such region vulnerable to global revolutions in production and permutations in prices. As Adam Hanieh (2021) writes, thanks to the development of synthetic materials and the use of thermoplastics in commodity-production, the cost of manufacturing in a whole range of industries was reduced dramatically and the speed at which commodities could be produced increased output even more so. This contributed significantly to the chronic levels of overproduction that instigated the crisis of capitalism in the late 1960s and 1970s, since the "huge quantities of new and easily reproducible synthetic goods displaced natural materials", thus coming up against the "obstacles of limited market size

and the restricted needs of the post-war consumer" that producers faced (Hanieh, 2020: 46). Nowhere was this more profound than Teesside, whose steel and chemical production took significant hits in terms of decline of employment (see Figure 11 below).

Elsewhere, in the coal industry, because revolutions in transportation undermined the North of England's proximal access to coal deposits and no longer provided a cost benefit over other regions on account of manufacturers' distance from major sources of supply, the locational advantage binding industry to the pit-head villages and colliery settlements of the North East faded into insignificance (Hazeldine, 2020: 46-8). These structural weaknesses and imbalances became violently apparent during the unravelling of the Fordist model of production, exacerbated as it was by widespread denationalisation of industry and disinvestment of private capital that led to a fundamental cutting back of industrial capacity (Hudson, 1986: 178). With a high concentration of fixed capital in the form of factories, mills, chemical plants and the like, the North East was ravaged by the structurally-induced unemployment that encroached the economy during the backend of the twentieth century (see Figure 12 below).

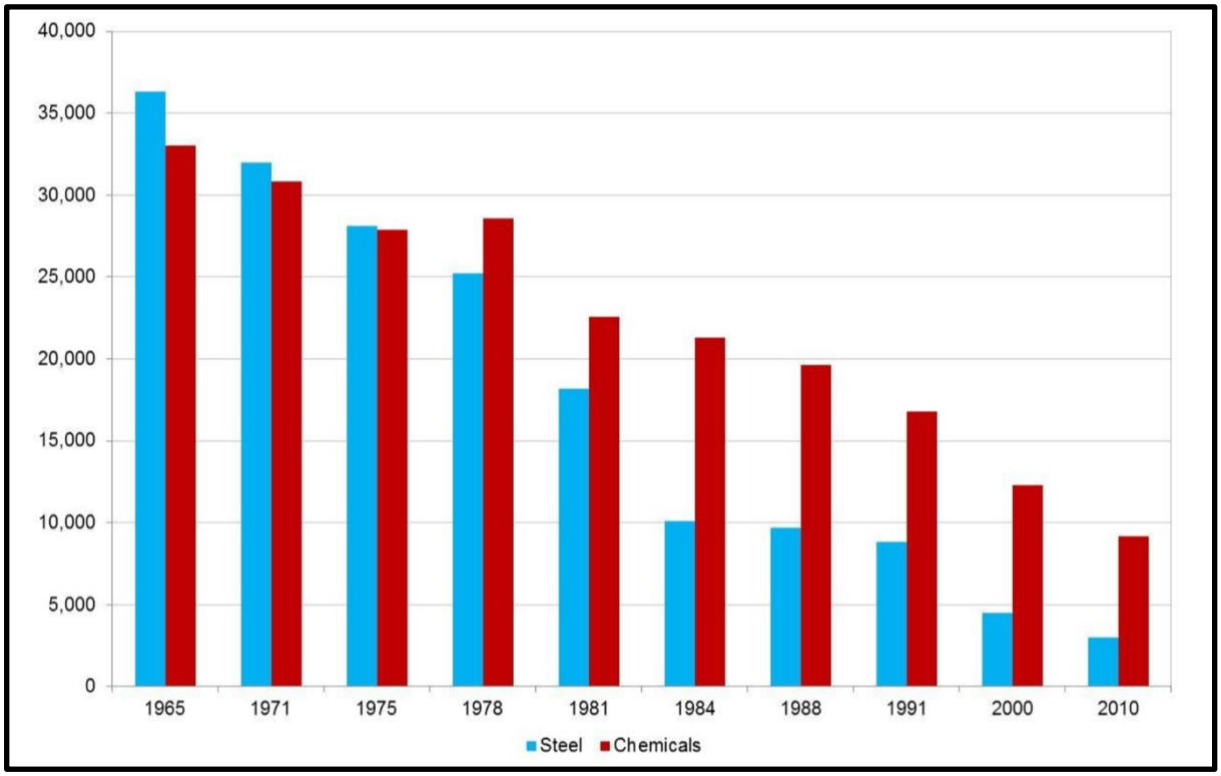


Figure 11 Decline of steel and chemical industry employment in Teesside 1956-2021 (Evenhuis, 2016: 201).

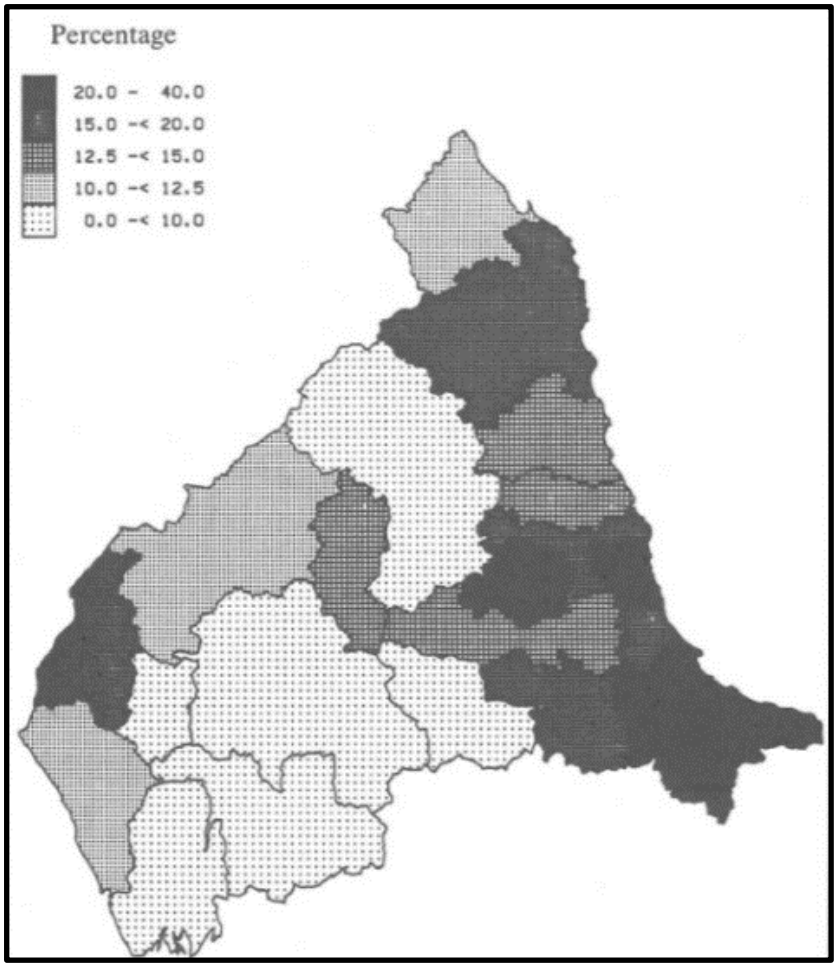


Figure 12 Unemployment Rates in the Northern Region - May 1984 (by Travel-to-Work Areas) - Department of Employment (Hudson, 1986: 178).

In Teesside, the area once considered the 'Ironopolis' of the North (Telford and Lloyd, 2020), the reduction of trade saw the loss of some 100,000 manufacturing and industrial jobs between 1971 and 2008 that was historically tempered by emerging employment opportunities in the service sector of the 'cognitive' economy (Shildrick et al., 2012). In this new cognitive regime, labour produces an immaterial good rather than a tangible commodity, an 'affect' or fragment of knowledge (Hardt and Negri, 2001) that is elevated over the material output of the hands and body. As a substitute base for economic output, this type of labour has proven an inadequate substitute in regions like the North East in terms of both quantity and quality. This is down to the fact that, as a mode of value production, it pales in comparison to industrial toil – only transformed into a profitable venture when 'rationalised' by intensifying work and suppressing wages (Mandel, 1995: 85).

The results of this creative destruction have been rapid deurbanisation, the entrenchment of 'deep poverty' (Martin, 2017: 7) and a profound loss of belonging and identity that once

cemented the region. This is showcased through rising levels of depopulation, deprivation, low geographic growth, political relegation, unemployment and underemployment, and a deep intraregional sociospatial inequality that cuts across lines increasingly shaped by age (itself a modality of class) (Hudson, 2005: 582; Telford and Lloyd, 2020: 599). The North East continues to be amongst the worst affected by economic upheaval and glocal catastrophes, suffering more than any other region from the upshot of the 2008 financial crisis, disproportionately bearing the brunt of cuts to local government as part of the austerity agenda of successive Conservative administrations over the course of the 2010s (Skelton, 2019: 46; Shaw and Robinson, 2018), torn asunder by political and cultural divisions over Brexit, and recently being placed in a heightened position of vulnerability to the regional inequalities exposed by the coronavirus pandemic. Far from being a positive story in the current 'levelling up' agenda, disposable real incomes have barely risen in the North East since Boris Johnson was elected in December 2019, still remaining the lowest on average across the UK. In fact, the regional gap in income across regions that the agenda sought to rectify has since widened (Caddock and Stirling, 2021). The North East has fared much worse than any other region in terms of changes to median total household wealth since 2006 (see Figure 13 below), seeing the greatest cuts to services for children and young people and the largest reduction in spending per person. These factors have reduced life expectancy in its most deprived communities and increased child poverty by 46% (Buchanan, 2022). To make matters worse, of the 10 communities in England with the highest rates of antidepressants prescriptions per 1,000 inhabitants, 7 of them are in the North East (Clark and Wenham, 2022: 21)

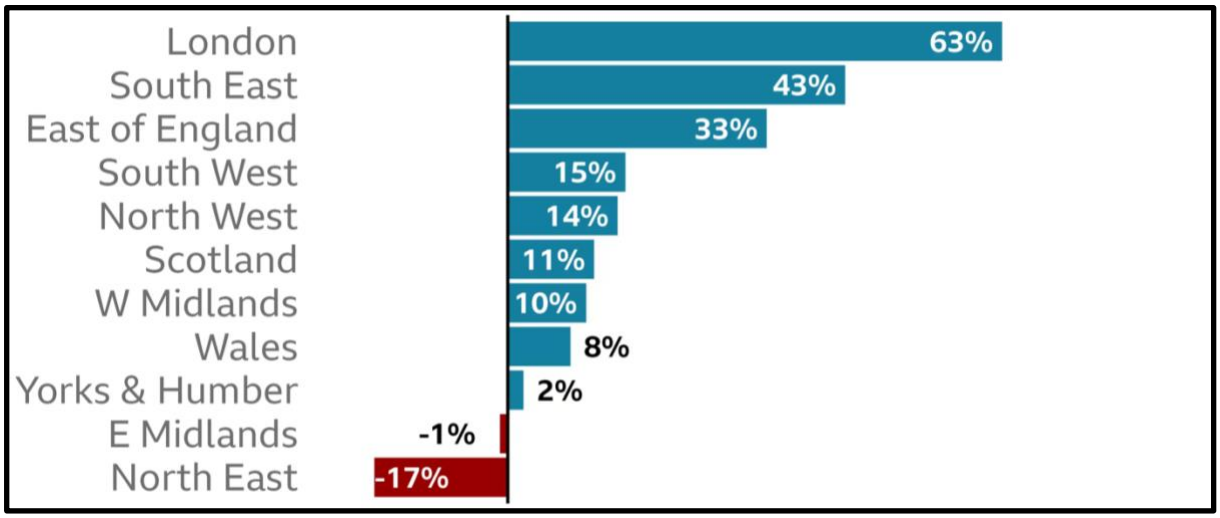


Figure 13 Average wealth has fallen in the North East Change in median total household wealth by GB region, July 2006 to March 2020. Adjusted for inflation to 2018 - 2020 prices using CPI. *Source: ONS.* Available at: https://www.bbc.co.uk/news/uk-63625510

There are several reasons that Teesside and the North East more broadly continue to be on the sharp-end of the turbulence and instability of late capitalism. Unlike other former industrial Northern powerhouses (principally across the North West), the North East has not seen the same historical trajectory *through* deindustrialisation, in many ways still trapped within it. The region has not been able to lean into the sorts of 'temporal tourism' (Roberts, 2011: 309) that are commonplace in the likes of Liverpool, Sheffield and Manchester today, which refocus investment onto urban heritage and aesthetics (Gospodini, 2006: 314) and elevate the 'place reflexivity' (Urry, 2007: 266; Martin, 2010: 71) of the so-called 'culture industries' (Gospodini, 2006: 316). Where parts of the 'North' were historically constructed in the image and political frameworks of the British Empire (Hudson, 2005: 583), the North East today more accurately reflects some of the fallouts and patch work of contemporary globalisation, having never convincingly recovered from the destruction and pillaging of its former economic settlement and still centring its character on a sense of industry that can never be restored. Its lack of renewed identity in the post-industrial age puts it at odds with the politics of neoliberal 'modernisation' and thus continues to fall outside of the masterplans of successive administrations despite their numerous empty promises. A 'problem region', Martin (2017: 4-12) in fact argues that the view from Westminster is that Northern districts like the North East are treated more as internal colonies of the British Isles; a 'foreign country within' that is both a place with problems and a *problem unto itself*. These predicaments are altogether compounded by what Hudson (2005) brands a form of 'cognitive lock-in' or an 'institutional thickness' that paradoxically render long standing social and cultural ties and rooted traditions economic obstacles that need to be broken with for sustained growth to return. The North East, it seems, is flanked by two contradicting histories, trapped between them in a state of limbo.

4.2 Spatialising Deindustrialisation

What the above exploration of deindustrialisation leaves us with is a bleak but underdeveloped understanding of the region of Teesside. That is to say, it reveals little about the *urban morphology* of the North East and the present composition of the urban environment as a material manifestation of deindustrialisation. And thus, beyond rates of joblessness which need reducing and that will have local authorities desperate for inward investment, it does not offer a great deal of insight into why Amazon has begun to focus

its energies on the region. To respond, this chapter calls into question how the social and economic changes that have ransacked the region over the last fifty years have played out in and through space by investigating the *spatial stories and characteristics* (de Certeau, 1984) of post-industrial landscapes. That is, to narrate space through stories that reveal more about a place than its limitations. It seeks to spatialise an understanding of our post-industrial ways of living and what the built environment communicates about them, so as to generate a comprehensive and critical awareness of the types of places that a logistics platform like Amazon routinely find themselves terraforming.

To begin with a supplementary, but not perfect example, take the Head Wrightson Ironworks in Teesdale on the banks of the river Tees in the south of Stockton. Head, Wrightson and Co. was one of the first heavy engineering firms to emerge out of the intense period of industrialisation in Western Europe in the mid-1800s, totalling employment of nearly six-thousand workers at its Stockton site in the 1950s and 1960s. The company's spatial impact on the region over the course of the nineteenth and twentieth century was immense (see Figure 14 below). Manufacturing critical materials like cast iron, wrought iron, steel castings, fractional distillation columns and the like, it had to be.

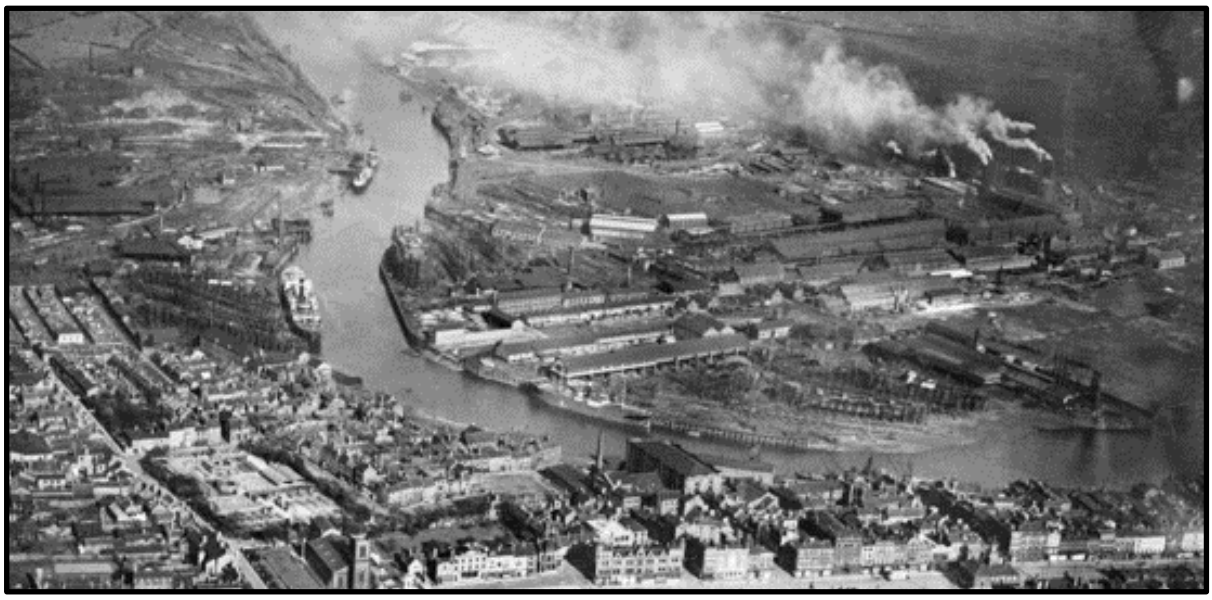


Figure 14 Head, Wrightson & Co Teesdale Iron Works, the River Tees and environs, Thornaby-on-Tees, 1948. (© Historic England [2014]). Available at: https://www.britainfromabove.org.uk/en/image/EPW010286

Head Wrightson's fall from grace was no less devastating on the landscape, having accrued over 70 acres of industrial infrastructure by the mid-twentieth century. As the logistics revolution and the economics (and politics) of neoliberal globalisation worked

against the currents of British manufacturing, sites like the one in Thornaby-on-Tees succumbed to the forces of deindustrialisation in the 1980s after a tumultuous past decade or so of decline. The reverberations over the built environment were encapsulated several years later by footage of Margaret Thatcher standing amidst the barren lands of the no longer operational site. The footage has since become somewhat of a symbolic and allusive image of the Conservative-lead industrial ruination of the North East of England (see Figure 15 below). The riotous, overgrown shrubbery encircling Thatcher, most likely rye grass, goat willow, and mugwort, exhibits the unruly return of the post-natural environment following the death of industrial hegemony. The fact that the diversity of this plant life seems typical of what might have been found during the late-glacial period indicates the extreme conditions of the derelict wastelands of post-industrial worlds (Farley and Symmons Roberts, 2012: 140). This was an image that was more than an image; a temporal parallax poignantly referred to as Thatcher's 'walk in the wilderness' (Reeve, 2013) – a victory lap for the prime minister after years of industrial unrest where space became a potentiality to be conceived according to the dominant hegemony of that time (Lefebvre, 1991). It was, in archaeological terms, a *material metaphor* that marked a key historical juncture at which a series of abstract concepts, associations, and social relations were made 'concrete' (Ray, 2018: 3). The image of Thatcher below captures the fugacious existence of industrialism as it surrendered after years of contradiction, unrest and struggle to neoliberal globalisation and waved goodbye once and for all to the project of modernity – the slow cancellation of the future.

Figure 15 Prime Minister Margaret Thatcher pictured in front of what remained of the Head Wrightson, 12th September 1987. Available at: https://www.ft.com/content/bfa74204-2d9b-11e2-9b88-00144feabdc0

Thatcher's photo-op was to promote the launch of an ideological ambition of hers: the *Teesside Development Corporation* (TCC) that would fund and manage regeneration projects in the North East over its short-lived existence as part of the broader neoliberal vision to break with the industrial past and embrace financialised capitalism. The TCC was singled out for its near total absence of democratic accountability and tendency to prioritise dealings with private investors over local government. When it disbanded in 1998, it had left unaccounted debts of £40 million (TeessideLive, 2002). Its commitment to remain flexible for private capital led many to deem the project fundamentally hostile to planning. Moreover, it was criticised by locals for narrowly developing fragments of Teesside that were physically detached and did little to nothing for existing communities (Robinson et al., 1999: 146-157). The project was nonetheless instrumental in overhauling territories like the old ironworks in Stockton, transforming the site from a post-industrial jungle into a series of red-brick office blocks that are now host to financial services, mortgage centres, housing associations, accountancy firms and insurance companies, Barclays and Serco amongst them (see Figure 16 below). Beckett (2014) described it as resembling a 'US-style landscape of corporate lawns, car parks and low office blocks'. It was dubbed a 'year zero' approach to planning on an historically sterile land that demonstrates little acknowledgment of a once thriving, prosperous Teesside (TeessidePyschogeography, 2017). Where Thatcher once proudly stood now sits a car park – the personification of the obstinate mobilities of supermodernity (Auge, 1995).

Figure 16 Teesdale Business Park, Thornaby, 2017. Taken from the blog, *The Smell of Water*. Available at: https://teessidepsychogeography.wordpress.com/category/head-wrightson/

The fleetingness of the Stockton landscape reiterates how the urban morphology of the North East is a dialectical product of certain contestations played out across spatial scales. It reveals that space can tell us as much about the social and economic terrain as they can tell us about space. The necessity of a spatial investigation such as this is brought home upon reflection that, in more recent times, post-industrial landscapes in the more *peripheral* zones of the North East that intersect with major transport networks have become petri dishes for the contemporary logistical geographies that furnish the material infrastructure of globalised supply-chains. These spatialities represent a contemporary arm of urban development and constitute a significant part of the reason the region is returning to a position of economic inspection – albeit one with significantly fewer opportunities for its inhabitants than in the days of 'infant Hercules' (Lloyd, 2013; Telford and Lloyd, 2020). Like the old Head Wrighton site, they too are spatial manifestations of ephemeral capitalist development, and as such demand extended sociological enquiry. The point here is that a logistics provider like Amazon did not arbitrarily decide one day that, of all places, the furthest part east of Darlington would be the site for its next distribution warehouse. Rather, this specific locality reflects a broader interest with transforming the urban fringes of post-industrial spatialities into logistical growth poles that assist global flows of commodities for business-to-consumer (B2C) e-commerce and logistics firms. With that established, there exists a need to clarify precisely what is intended by our framing of the 'urban periphery', how these spaces can be assessed in the context of deindustrialisation, and what their function could be in light of emerging forms of urban development. Locating these landscapes is the first step on the road towards developing a geographical theory of Amazon's distribution network, including the *whys, wheres and hows* of Amazon's spatial expansion into new territories.

4.3 Locating the Post-Industrial Periphery: Edgelands and their Condensed Temporalities

As the former sites that made up the epicentres of the industrial age like the Head Wrightson Ironworks were one by one, brick by brick, de-territorialised and abandoned in search of greener pastures, so too have the outskirts of the no-longer-industrial city been reimagined, subject to emergent economic pressures that reflect the newfound emphasis on spaces of flow and mobility in the age of supply-chain capitalism (Tsing, 2009). Seeking to unearth these postmodern geographies (Soja, 1989) of diffused urbanity, Gospodini (2006: 321) describes the periphery, or what she calls the urban 'fringe', as follows:

> The fringe may be conceived as a transitional or interfacing spatial zone between the dense built-up space of cities and the surrounding rural space … [it] may be divided in turn (inner and outer fringes), and is a transitional space between the city and countryside; it often accommodates agricultural areas, scattered small communities with less than 10,000 population, essential but un-neighbourly functions such as waste disposal, sewage treatment and cemeteries; space-demanding functions such as sports facilities, educational institutions, warehouses and suburban uses such as commerce and services … The landscape is heterogeneous and unruly, characterised by rubbish tips and warehouses, superstores and derelict industrial plants, office parks and sports courts, allotments and farmland (Gallent et al., 2004).

The periphery then, is a liminal space of *exurban* character that functions as the shock absorber for urban sprawl and scattered development. It is often deemed a space that exists outside and between lived experience, but nonetheless remains integral to it. Dominated by concrete and steel, depth and flatness, the chances are that you know of these spaces and their unsightly characteristics, but not to any degree of certainty or with much of a point of reference. They are, put bluntly, awash with unremarkable attributes and only slightly less forgettable customs, provoking comparisons to Ian Nairn's (1955) neologism of the characterless 'subtopia' that was neither town nor city. That is not to say that their abstractness has not gone without interest, however. As Shoard (2002: 119) wrote, they are not universally loved, looked on as repositories for functions we prefer not to think about, but they enjoy a place in our world view and their function is respected.

In fact, since the industrial city splintered and fragmented towards the end of the twentieth century, growing amounts of attention were afforded to this new geographical phenomenon in the academy. Indeed, they crop up in modern anthropological studies with the notion of the 'non-place' drawn up by Marc Auge (2008) in *Non-places: Introduction to an Anthropology of Supermodernity* to describe the austere aesthetic of modern mobilities-based urban planning. *Non-places* speak of spaces emptied out of their conventional socio-historic properties such that they cease to be places at all (see Figure 17 below). These are depthless and empty terrains that serve an instrumental function, a *means to an end,* rather than environments that have any recourse to organic sociality or common humanity (Seliger, 2010). In this sense and because non-places almost exclusively serve exchange, their poverty of design embodies Lefebvre's (1991) concept

of conceived space in its purest form. Their naked functionalism is amongst the most inflexible, totalising, and non-communicative kinds of contemporary urban spatialities, proving hostile to any passer-by who might choose to use that space in a manner that does not reflect its primary function.

Figure 17 Street view of Turbine Way approaching Turbine Industrial Park in the outskirts of Sunderland (Map data: Google © [2021])

Whilst the term non-place only came to the fore in the mid-90s, the existence of a conceptual framework that captures these overlooked, transient peripheries can be found in JG Ballard's (1973) part novel, part cautionary tale *Crash,* which depicts through fiction the "extreme behavioural responses provoked by the new suburban hinterland of motorways and retail parks" (Coverley, 2006: 28). If Crash, or other Ballard disaster novels that capture landscapes of perpetual alienation like *Cocaine Nights* (1997) and *Super-Cannes* (2000) tell us anything, it is that deindustrialisation and globalisation first and foremost take on a spatial form, one that tends to favour the 'negative spaces' *(*Krivý*,* 2013: 107) found disseminated across urban fringe belts.

There are very real limits to the conceptual basis of the non-place in illustrating post-industrial peripheries in the manner desired here given the rather patent fact that, although the majority of urban peripheries can be classified as non-places, *not all non-places can be characterised as being peripheral*. Parking lots, for example, are defined less by their locality and more by their instrumentality – not being bound to any single spatial environment. In other words, non-places can scale a number of different geographies. Landscapes that belong to the *hinterlands* of a given region, where towns and cities are erroneously assumed to sit cheek by jowl with the countryside, have therefore been afforded separate attention by geographers. They have been branded

'edgelands' by Marion Shoard (2002; 2017) as a means of making visible that which does not palpably make itself known, of putting a name to a netherworld (see Figure 18 below). Interest in chronicling these environments has been picking up momentum over the last several decades. In *Edgelands: Journeys into England's True Wilderness*, Farley and Symmons Roberts (2011: 5-6) articulate what they see as the uncharted geographies and indistinct borderlands that are neither city nor countryside, whose existence sits in a tentative flux between the end of one industrial era and potential future development; a future suspended within the present:

> … edgelands, by and large, are not meant to be seen, except perhaps as a blur from a car window, or as a backdrop to our most routine and mundane activities. Edgelands are part of the gravitational field of all our larger urban areas, a texture we build up speed to escape as we hurry towards the countryside, the distant wilderness. The trouble is, if we can't see the edgelands, we can't imagine them, or allow them any kind of imaginative life. And so they don't really exist. The smaller identities of things in the edgelands have remained invisible to most of us … Everyone knows – after a sentence or two of explanation – their local version of the territories defined by this word 'edgelands'. But few people know them well, let alone appreciate them.

Figure 18 An example of an edgeland near an industrial estate on the outskirts of Middlesbrough. *Taken from the blog, Charles Walk (Charles Walk* © [2018]*). Available at: https://www.charleswalk.com/journey-so-far/2017/9/1/day-001-tower-bridge-to-erith-mamm5-xl49w*

In producing and politicising a vivid illustration of spaces defined as much by what is absent from them as by any visible common thread running through them, Farley and Symmons Roberts unearth on a microcosmic scale how globalisation's 'everydayness' (Flusty, 2004: 6) plays out through untranslated landscapes of *terra incognita* – dissonant spaces ambivalent and unsympathetic to the urban *flâneur.* To borrow from Flusty's

(1994) characterisation of interdictory space, they are at once *stealthy, slippery, prickly, crusty* and *jittery* spaces. Stealthy because they are undistinguished with no public easement. Slippery in the sense that they are difficult to reach (at least by foot). Prickly since the lack of social amenities and unkemptness mean they are not comfortably occupied. Crusty for the security barriers that forbid access to nearby industrial sites. Finally, they are jittery because these industrial patches also demand surveillance technologies that make the space a space that cannot be utilised unobserved (Flusty, 1994: 19). Humphris and Rauws (2020: 591-2) list three more ways that spatial practice is made difficult in edgeland geographies in being *unseen* because they fall outside conventional binaries between urban and rural; *unregulated* because they do not possess social surveillance mechanisms that bring about self-regulation; and *unplanned* because their fuzzy boundaries make for zoning confusion between different combined authorities. Farley and Symmons Roberts thus have an uphill battle on their hands communicating the socio-spatial intricacies of such eclectic spatialities.

By mentally mapping the edgelands, Farley and Symmons successfully manage to penetrate the subterfuge of the geographically ubiquitous and architecturally bland (Martin, 2008: 375) and peel back the underbelly of the frictionless flow of capital in the post-industrial terrain; putting a name to spaces that homogenise experience to liberate them from the paranoia of sameness (Flusty, 1994: 9). In doing so, they complicate a predominantly negative reading of these spaces, celebrating their dynamic properties by untangling them and situating their continued existence within a broader socio-geographic context. Insisting on the intrinsic value of these spaces puts edgelands in the same conceptual ballpark as Ignasi de Sola-Morales' (2012) notion of the 'terrain vague', which treats the non-productive spaces outside the cultural, social, and economic circuits of urban life as spaces of freedom that escape the logic of analysis systems of traditional urbanism.

Distinctive to late capitalist geographies, the diurnal character of these rurban areas is captured in the recent work of Maximo Park lead singer and local Stocktonite Paul Smith. Writing in The Guardian (Smith, 2021) of his journey on foot from South Bank station on the Tees Valley Line along the 'black path' to Redcar Sea front, Smith's part psychogeographic expedition, part 'sketch-crawl' attempts like Farley and Symmons do at a counterfactual to the conception of former industrial landscapes as nothing more than physical illustrations of decline. He instead emphasises how dormant post-industrial

landscapes like the old Dorman Long Tower harbour multiple converging temporalities (see Figure 19 below). They are at once historic monuments of 'hard graft' and visualisations of how 'man' dominates 'nature' only to later concede to nature when the inevitable contradictions of capitalist relations catch up.

Figure 19 Paul Smith sketching on the Black Path, Redcar Teesside. *(Francis Annett* © [2019]). *Available at: https://www.theguardian.com/travel/2021/feb/26/monument-to-hard-graft-a-post-industrial-walk-on-teessides-black-path*

Of particular interest to Smith is how these spill-over-worlds can be drawn out through the shrubbery on display. Accompanied by a team of artists, they sketch some of the plants found germinating the land and the historical trajectories buried within them, including the supremacy of the toxic crown vetch plant (seen in Figure 19 above and Figure 20 below). According to Smith (2021), this plant growth is born out of a very specific confluence of natural and industrial worlds that spawns an anthropocentric environment they thrive under:

> Grimy steel slag, a byproduct of steelmaking, was used for the foundations for the path, and, combined with the accumulation of industrial cinders underfoot, helped give it its name. The slag has helped to fertilise the earth around the path, allowing the pink-bloomed crown vetch, native to the Mediterranean, to thrive in this unlikely environment.

Much like the glacial-like mugwort teeming the Head Wrightson steelworks in Teesdale, the crown vetch in South Bank tells a similar story of the pre-modern conditions of the land brought about by industrial activities and their eventual wreckage. It follows Tsing's (2015) formula for ruination, where the simplification of place into a resource for investment produces ruins of abandonment when its singular asset can no longer be produced. These

places can nonetheless be “lively despite announcements of their death”, yielding new multispecies (Tsing, 2015: 6). The left-over remnants of steel slag found festering in the black path soil acts as an accelerant for the crown vetch which make it difficult to get rid of, dwarfing a space once occupied primarily by humans and machinery in the production of raw materials.

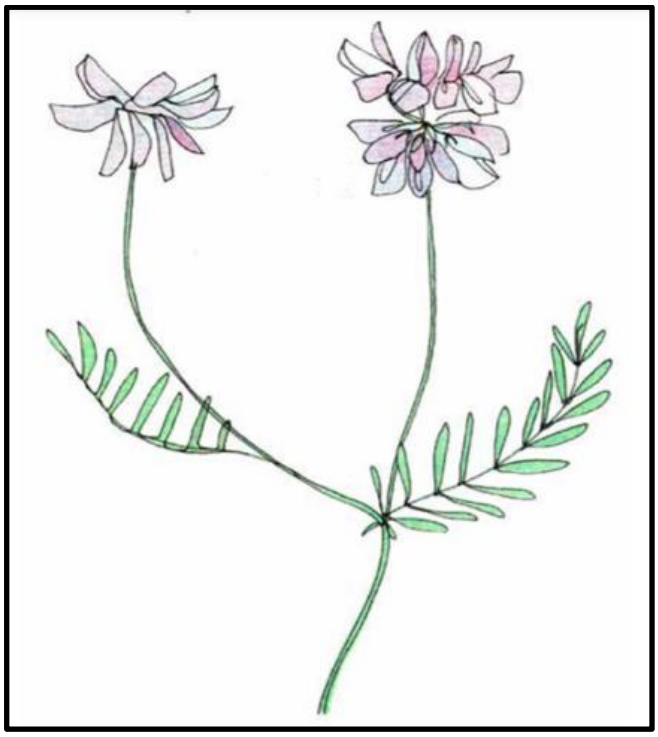


Figure 20 ‘Drawings of plants we found within a 200m walk from South Bank Train in July 2019’. *(Black Path Press* © [2019]). *Available at: https://foundationpress.org/wp-content/uploads/Plants.pdf*

In this plant life alone is a microcosm for how theory engages with post-industrial wastelands, often to conflicting ends. Smith describes the invasion of crown vetch as “nature reclaim[ing] its native territory”, almost as if deindustrialisation forms part of an instinctive and holistic sequence found in the Pagan fable of the Green Man that mythologised the birth-death-rebirth cycle. Yet Linkon (2018: 103) would argue that this is to make the mistake of overstating the existence of a ‘natural cycle’ that governs the logic of development, which she believes is a kind of ecological fallacy that works to obscure and neutralise the political forces of decline and naturalise the role of capital as the real agents of ruin:

> The seemingly natural landscape is not to be trusted. The economic losses of the past are inscribed on this landscape, not only in buildings that represent the city history of prosperity and decline but also in the trash and rot hidden among the

> weeds and shrubs. The past is present, lurking beneath the appealing but deceptive surface, even when it cannot be seen.

The ultimate goal of Linkon's intervention here is not to undermine a spatial appreciation of the post-industrial edgeland but rather to point to the perseverance of deindustrialisation plainly exhibited within it. If the redemptive 'return of nature' analogy implies some sort of linear end point, then her rejection of it is meant to stress the need to understand post-industrial landscapes as still very much an ongoing process of urban life; belonging to the past as much as they persevere and indeed affect present and future. Such is why – in keeping with how this chapter has previously attempted to underscore how the North East has a complicated and open-ended relationship to its past – Linkon chooses to treat deindustrialisation as accommodating a half-life that retains an influence over places and peoples. Jonathan Warren (2018) makes the same argument in his analysis of post-industrial societies in relation to Teesside. Using Kumar's (1978) work on the influence futurology on post-industrial theory, Warren (2018: 32) highlights how the propensity to overlook continuity in industrial society is presupposed in the 'sequence' thinking that characterises dominant theorisations of post-industrialism, often to the detriment and marginalisation of more complex perspectives that might opt for a non-linear, slipstream approach to temporality (Dillon, 2012: 3).

Viewed through a non-essentialist lens, it is quotidian spaces such as these, having fallen by the wayside as urban morphology moves at a pace too quick for the human observer to truly engage with, that act as allegories of an unspoken truth about deindustrialisation. They tell us that post-industrial peripheries are material manifestations of past appropriations of natural resources in the landscape (Martin, 2014: 1104), what Berger (2007) called 'drosscapes', and Macfarlane (2015: 231) the 'bastard countryside'. More important than this, the peripheral landscapes presented here are – for the very same reasons they are contested post-industrial spaces – being increasingly reserved for renewed urbanisation projects that seek out spatialities that can be converted into storage flows (Lyster, 2018). As Western countries pivoted away from state territorial organisations geared towards Fordist ideals of centralised industrial production, the edgelands of towns and cities felt the full impact of decentralisation and deurbanisation. Edgelands in this sense embody dialectical landscapes – pathways, corridors and zones created by linear cuts incised through the morphological continuity of the contemporary city by rail line and highways (Crisman, 2012: 115). Tailored as they are to prioritise the mobility of transit

over the mobility of bodies, peripheral zones display the manner in which contemporary urbanism is imbued with the temporalities of supply-chain capitalism as space becomes a derivative of movement (Sennett, 1977: 17), which is to say that they are designed to be passed through rather than to be used and thus become saturated of meaning. Nothing if not the product of the forces of history, these localities are fast emerging as privileged sites for integrated supply-chains and their sociospatial logics (Balakrishan and Blau, 2017).

To recap, this chapter has so far looked to engage with deindustrialisation as a fundamentally spatial phenomenon, one that incubates a range of divergent temporalities and historical pathways within its grasp. In a place like the North East, host to a plethora of brownfield and greenfield sites across its former industrial townscapes, these spaces take on a function all the more important in a social and economic epoch in which mobility, flow and access are sought after commodities. Edgelands represent a space in which the objectives of supply-chain capitalism can be realised. The following section therefore serves as a makeshift appraisal of urban fringes as contemporary logistical landscapes. Further, to follow in the pattern of making this analysis specific to the North East (where one of Amazon's most recent sites has been established and where our devotion ultimately belongs to) it will accompany this diagnosis with a thought experiment regarding how these landscapes might theoretically be utilised in a system prized on the unfettered movement of people and things. The intention behind this is to demonstrate the extent to which Amazon's spatial expansion into Darlington is a result of historical and geographical eventualities and not merely the luck of the draw. That is to say, the fertile ground had been laid for Amazon in the North East over several decades of industrial malaise.

4.4 Peripheries of Growth: A Spatial Checklist for Logistical Landscapes

In her original account of England's benign and interfacial spaces, Marion Shoard (2017) points out that edgelands were scarcely known to planners until sometime around the 1960s when, during a land utilisation survey, Professor Alice Coleman of King's College London uncovered the existence of what she called the 'rurban fringe' land that fell outside the neat land-use pattern of either farmscape or townscape and where the abandonment of space tends to occur. For Shoard (2017: 7), this was only the beginning of attempts by developers to legitimise the sanitation or otherwise neutering of edgelands up and down

the country in a political environment where Thatcherite contempt for planning regulation was picking up steam. The urban periphery was well and truly up for grabs.

Edgelands, being what they are, demand far lower standards of design than are required elsewhere and are afforded a degree of social and environmental consideration that is altogether less than what is expected of tasteful facades and all their aesthetically conventional urban niceties (Shoard, 2017: 7). They are malleable landscapes that are shaped by the short-term interests of capital rather than ad hoc public planning. Shoard (2002: 122) goes so far as to say that edgelands have become the lowest grade of landscape in UK conservation terms: "We do not expect the hypermarkets or giant factory sheds of the edgelands to blend in with local vernacular architecture…". For this reason the periphery is a prime locality for e-commerce and logistics companies, like Amazon, looking to expand their physical infrastructural networks.

In *Logistics Cities: A Spatial Requirement Framework* (2009), Sengpiehl et al. detail across four hypothetical layers what the conditions for logistics infrastructuralisation need actually be. Being a geographical concentration of logistical nodes and city constructs that folds into the wider network of a global trade gateway (Sengpiehl et al., 2009: 586), a 'growth pole', a logistics city seeks out landscapes that are able to become completely subordinate to its operational functionality; the sheer domination of conceived representations of space over lived representational space (Lefebvre, 1991: 222). A logistics city must be capacious enough to cater for the spatially intensive activities of freight storage and handling, including (but not limited to) break-bulk storage, parking zones for trucks and areas for warehousing. In addition to its scale, the centrality of spatial planning to these logistical geographies necessitates discrete characteristics of the land upon which they are terraformed. These include ownership, favourable zoning regulations and easy access to critical infrastructural amenities. More crucial yet is the physical connectivity of the region to existing gateways (be that seaports, airports, inland ports, etc.) and cybernetic layers of fibre optic cabling that consolidate them, where the spatiality of one kind of network is tied into another (Starosielski, 2016) – what Castells called the *spaces of flows* of our modern networked societies (1996: 376). That logistics cities be proximal to major road networks is perhaps self-evident, but less transparent is the availability of digital infrastructures of virtual supply-chains that transmit real-time symbolic representations of commodity flows (Bernes, 2013: 9). Running parallel to connectivity is *accessibility* – the uppermost layer of the spatial framework (Sengpiehl et

al., 2009: 590). Accessibility here denotes the distinctly social systems that must be in place for logistical cities to be concatenated. Under this banner falls public infrastructure, social knowledge (known by Marx in the Grundrisse (1973) as the 'general intellect'), and, in the case of an e-commerce provider like Amazon, local consumer markets of formidable stature. These systems provide the inputs and outputs for supply-chain growth hubs; labour power and effective demand that reproduce the space anew. Together, these four layers constitute the foundations of the engineered spatialities and optimised places of the *logistics landscapes* that the last chapter introduced (Waidheim and Berger, 2008: 226). As that chapter demonstrated, the function of these landscapes is to support urban growth from afar, being the supply-chain outposts that help the capitalist city reproduce itself.

The stubbornness of these spatial characteristics, let alone the regional inequalities they entail, eliminates the possibility of a whole range of localities in England becoming suitable sites for such landscapes. One of few certainties is that by design they will tend to mushroom across urban peripheries, since logistics cities must exploit different facets of both city and countryside without being circumscribed by either. Post-industrial hinterlands, with their exurban character and regulatory vacuousness, provide such an opening. As neglected spaces they are optimal territory for capital's latest attempt at a spatial fix now that the capitalist city has been exhausted (Harvey, 2018). It must be stressed that this only applies to the hinterlands of specifically historically contingent regions, however, since the equivalent in places like the South and East of England have gone through fundamentally different urban morphologies then the kind laid out above in Teesside, owing to the historical sorts of uneven development that Tom Hazeldine (2021) paints a vivid picture of in *The Northern Question: A History of a Divided Country*. Contrast the peri-urban in the home counties with those in the North East of England, and it is clear that these spaces take on all the more significance in the latter's case. With industry on a negative trajectory in this part of the country, the future economic relevance of many of its post-industrial towns and cities found anchoring motorways are more dependent than ever on the rubric of mobility (Martin, 2010: 71). The economic geographies of the post-industrial rurban fringe are awarded priority status under this new reality, swept up in regional calls to embrace the rapid and efficient movement of people and goods for the purpose of aiding economic development (Furundzic and Furundžić, 2012: 721). Mentioned once before, Teesside's inability to attract creative industries or monetise its

cultural heritage like other post-industrial cities in the North effectively render it an industrial area in a de-industrialised terrain, such that its struggle for purpose leaves it out of sync with the specialisms of neoliberal modernisation and cognitive capitalism. If leaning into the paradigm of mobility could overcome this, then the edgelands of this region are surely fundamental to it, since their geographical characteristics would be necessary to any 'linear' urbanism that might extend to the North East. Fundamental inasmuch as planning that was *mobilities-based* would need to capitalise on land availability and access to existing high-speed infrastructure in particular geographical locations. This puts Teesside, with its anachronistic ties to industrialism and need to construct a new economic settlement, in a position to be targeted by the modern industrialism of the logistics economy. Under these circumstances its rurban fringe would be front and centre of national and regional urban redevelopment. Edgelands would need to be transformed into logistics centres that absorb and coordinate the vast quantity of commodities that circulate across linear pathways between cities.

In order to properly illustrate how the industrial and ecological composition of Teesside's fringebelt detailed in the first half of this chapter makes for precisely the environment that logistics providers seek out in the age of Amazon, the remainder of this chapter will situate our discussion about logistics landscapes within the environment that mobilities-based urban assemblages are frequently imagined in. Since the nineteenth century, the idea of using logistical practices and processes to turbo-charge economic growth has been conceptualised according to a linear-based, superstructural urban paradigm where towns and cities cease to be treated as individual economic units and instead as belonging to a greater whole. The spatial production and organisation of this sort of urban conurbation mirrors the framework that Amazon have modelled their fulfilment network against. Thus, if we can imagine what role a region like Tees Valley would play in a linear urbanism, it might offer some insight into how and why it has become ideal Amazon country.

4.5 Logistical Landscapes of a Linear Urbanism: Thoughts on Alsop's Northern Supercity

The idea of what in effect would be a linear urban stack of interconnected cities bound by contemporary logistics infrastructure has previously been considered by Daryl Martin (2010) in his exploration of English architect Will Alsop's plan for a coast to coast 'supercity' across the North. The supercity, the story goes, would amplify interurban and polycentric scales of regional development to maximise economic co-operation, transport

links and cultural networks in a bid to remain attractive to the mobility of capital in a global neoliberal environment (Martin, 2010: 62). Supercities are themselves a 'postmodern' geographical phenomenon in the manner Edward Soja (1989) described several decades ago, since, as Alsop (YouTube, 2003) alludes to in his Channel 4 documentary on an imagined supercity in the North of England, "cities are no longer dependent on a particular point of geography". Their decentralised nature prompts a pivot from the former label 'megalopolis' to the 'polyopolis', because supercities generate resilience against the temperamental currents of global capital from cooperation with one another as multiple nodes of a larger network rather than as individualised economic units (Martin, 2010: 62; Martin 2017: 15).

The conceptual basis of the contemporary polyopolis as a remedy to the uneven development of neoliberal globalisation is captured best by Antyufeev and Antyufeev (2019: 1) in their summary of the nineteenth century origins of linear planning, noting that they were first proposed by urban theorists as means to "untie 'the Gordian knot' between the preservation of the historic city and values of its heritage architecture and town planning, and the need for growth of urban territories and public centers". Recognition of the so-called Gordian knot in urban planning is ever-present in Alsop's supercity, as he strives to find a way to weld together Northern cities to safeguard their historico-cultural properties: "I believe that this [historical sense of] identity can be reinvented by being part of a much larger entity; by belonging to the supercity" (YouTube, 2003).

The way the polyopolis is imagined as a whole greater than the sum of its parts is not dissimilar to how Virilio (2000) conceived of the *metacity:* a concept that sought to depict the actual and material extension of the city itself as nothing but a district or local suburb in an invisible global information-city whose "centre is everywhere and circumference nowhere" (Virilio, 2000: 11; James, 2007: 99). But where Virilio predicted 'average' cities would be swallowed up by the metacity, lost to its totalising network, Alsop more optimistically saw a place and role carved out for *all* cities in the supercity. Liverpool, for example, would retain its historical connection to the maritime trade as a port city, perhaps leaning on what Roberts (2016) identifies as the spatial anthropology of film-related tourism; Manchester its rich array of theatres, galleries and museums; Leeds its Victorian and gothic architecture that offers a temporal tourism (Roberts, 2011: 309) through the industrial revolution; Barnsley was pitched as a reimagined 'Tuscan hill town' (Martin, 2017: 14); Middlesbrough reinvigorated with a new riverside complex, and so on. Though

they would be distinct in their specialised appeal, each would be privy to and ultimately dependent on the populaces of one another through modern transport solutions and more collaborative forms of urban planning that integrated them into a shared formula of untapped economic growth.

Under such plans, the M62 motorway would act as the 'urban corridor' joining Merseyside and Humberside, creating a framework for urban growth along major transport routes that would seek to tame mass urban sprawl and the contemporary problems associated with the everyday movement of vast numbers of people and objects (Martin, 2010: 65) (see Figure 21 below). The criticality of this corridor is captured by Alsop (YouTube, 2003) in the documentary, who, driving along the M62, remarks "this piece of tarmac … is the backbone, the lifeblood, of the coast to coast". The vitality of the M62 confirms the shift from mega to poly, given the manner in which it cuts up the hilly landscape of the Pennines is at odds with the valley bottom transport routes that shaped the urbanisation of West Yorkshire prior to the construction of the motorway throughout the 1960s and 70s (Broad, 2020). The M62, as Lefebrve (1991: 165) would have put it, "brutalise[d] the countryside and the land, slicing through space like a great knife".

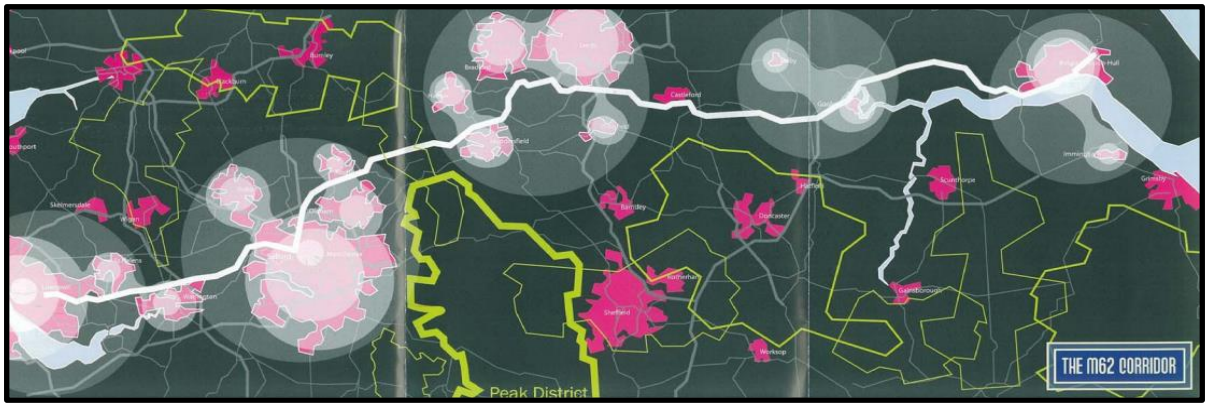


Figure 21 Map of the M62 corridor for the proposed supercity. Taken from the guide for the exhibition: *What if the North Became One City – supercity – Will Alsop's Vision For The Future Of The North (2007).* Available at: https://publik.tuwien.ac.at/files/pub-ar_8396.pdf

Naturally, using a motorway as an urban corridor would need to entail the strategic inclusion of logistical 'mobility nodes' (Martin, 2010: 69) where pathways intersect and are patched together. According to Hannam et. al., (2006: 12), it is these nodes that orchestrate the extended connections and intermittent movement sanctioned across long distances that is necessary to the organisation of the endless regimes of flow. In other words, the unfettered flow of people and things is dependent on its opposite: fixed physical sites of labour and means of distribution that choreograph movement. These nodes, short

of belonging to the development of existing plots of land, are likely to be found in the myriad of brownfield sites and greenbelt land situated in the hinterlands of Northern towns. Such is where the urban periphery, in its incubated and interfacial state of flux, comes into view, and where Tees Valley hypothetically enters the fold.

To clarify something here, *Tees Valley* has been the combined authority around the River Tees since 2015, the result of decades of bureaucratic back and forth after *Teesside* was abolished as an official County Borough in 1974. Tees Valley consists of five boroughs: Darlington, Hartlepool, Middlesbrough, Redcar & Cleveland and Stockton-on-Tees, making its boundaries wider than Teesside, which was always a hard-to-define area; a geographical and political shorthand for a conurbation of towns that have things in common but with no 'town centre' to speak of (Warren, 2018: 17). The inclusion of Darlington in this mix is not only convenient for this research's sake (because of the recent Amazon warehouse built there), but also benefits the conceptualisation of edgelands desired here, since Darlington is positioned at the furthest point west of the boundaries of Tees Valley.

Beknown only by those who seek them out, these edgelands would be imperative to a linear urbanism concerned with regenerating areas forsaken by globalisation. The following thought experiment, which imagines the Northern supercity on a superior scale to its original conception, hopes to clarify why. If Alsop's designs were a bold prophesy for urbanism in the North of England, a dialogue with a future that may or may not exist (Williamson, 2021), then the hypothesising below intends to pick up where Martin (2010) left off in serving as an illustration of how utopian thinking about hybrid networks and networked cities needs first to square the 'what if?' with the spatial and logistical demands of such a vast singular entity. Bringing the supercity to this level of abstraction urges one to reckon with the gravity of the project and, crucially, seeks to identify that which is absent from Alsop's account that necessarily needs to be accounted for. By throwing Tees Valley into the mix so as to think through the unaccounted material costs of Alsop's brainchild, the image of the supercity soon descends into something much hollower and more fragile: a shadowy subaltern urbanism in the service of the metacity. At that point we are presented with a scenario closer aligned with present-day reality, one that reminds us why the post-industrial peripheries of Tees Valley are prime real-estate for Amazon country – the actually existing presence of a linear urbanism in action.

4.6 Subaltern Urbanism: Hypercities and the Problem of Tees Valley

Let us assume for a moment that the Northern supercity conceptualised by Alsop (SuperCites, 2003) and fleshed out by Martin (2010) extends some way beyond the remit of the M62, and that it might even be beneficial to think of it as such. For Tom Broad (2020) in fact, Northern England is too vast a geography to cram a supercity between its two coasts and would be in a more advantageous position (not least environmentally speaking) to conceive of a network of polycentric supercities contained within a greenbelt; a *hypercity* (see Figure 22 below). Broad lays out his Northern *hypercity* – divided according to high speed rail links between polyopolises concentrated in Liverpool, Preston and Manchester; Leeds, Bradford and Sheffield; and Newcastle, Sunderland and Teesside – as follows:

> These supercities would allow an agglomeration to provide the cultural and economic opportunities on a par with that of London, but with space to breathe between and a more balanced environmental impact. Within each of these supercities, I would ensure that good transport provision linked the main centres together and other places within their hinterland; and beyond [...] I would have the supercities as the basis for governance of their hinterlands (essentially giving three regions in the north). Then each town and city within these polycentric cities would form a smaller hub in terms of transport and administration and have a role / USP to contribute to the culture and economy of the supercity. Each of these towns and cities would be made up of communities based on the concept of '15 minute neighbourhoods', with all key services being within 15 minutes walk.

Thinking through the consequences of this proposal triggers several lines of discussion. First, we might surmise that a hypercity of the North would seemingly achieve what the coalition government's 'Northern Powerhouse' promised but inevitably failed to deliver. As Martin (2017: 22) points out, George Osborne's vision was of a political fix rather than a spatial one, which ultimately left it hostage to the power of the City of London and the North vulnerable to *Londonisation* (favouring the big cities like Manchester over smaller cities and towns). Second, the imaginary set out above follows in the direction of Alsop some 15 years earlier by underscoring how each space as a practiced place would have its own role to play; each town or city would build on its own identity and strengths,

earmarking a *USP* that would contribute an individual agent of growth towards a collective project of resilience and rejuvenation.

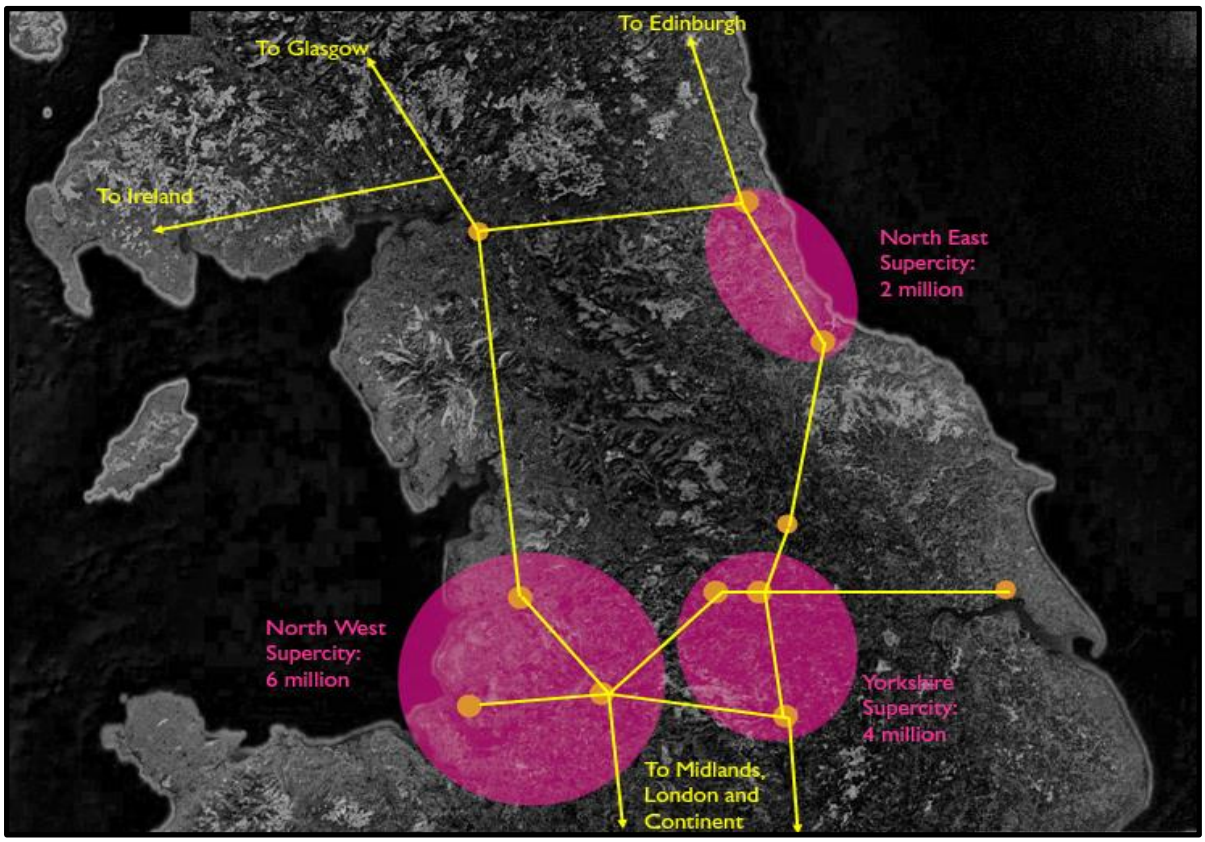


Figure 22 A rough approximation of Northern supercities and their superfast transport connections. *Taken from the blog, The Broad Hectures (Tom Broad © [2020]). Available at: https://broadhectares.wordpress.com/category/climate-emergency/*

With one eye on edging this discussion in the direction of chapter five's analysis of Amazon in Darlington, this invites the question, what role would Tees Valley occupy in a hypercities carve up? This chapter has previously attempted to thwart dominant narratives of the 'North' as a monolithic post-industrial bloc by presenting the North East as a counterfactual to the trend engrossing other regions in the North of swapping out their industrial capacities for service-heavy economies with a strong emphasis on the commodification of heritage. This problem proves particularly apparent in former industrial towns of the North because of historic trends of migration away from them towards larger cities that have, compounded by the challenges of reskilling amongst older generations, made the transition towards the service-sector economy all the more difficult. The deindustrial half-life (Linkon, 2018) of Tees Valley thus makes it tricky to siphon off where it would sit in a polycentric network of adjoined cities, since the point of a hypercity is to elevate individual regions according to a pattern of *mutually beneficial heterogeneity*. Offering up Middlesbrough as an example, Hannah Holmes (2020: 20) suggests that to

simply classify the area as a post-industrial town would be to overlook both its history and some of its key modern contributors to the local economy, pointing to the planned expansion of Teesside Advanced Manufacturing Park just outside of Middlehaven, which is set to contribute to the renewable energy industry as well as other engineering and manufacturing industries. Homes cites Beynon and Hudson's (1994: 3) *A Place Called Teesside: A Locality in a Global* Economy to push this point, who arrived at the conclusion that "whilst Teesside might be *in* the North, it was most certainly not *of* the North, and it would be dangerous and wrong to regard it as somehow typical of some Northern malaise". Likewise, recent developments at the polyethylene and ethylene producing Wilton International site in Redcar and Cleveland (known as the 'engine room' of Tees Valley) that was discussed earlier in this chapter complicates the idea that Teesside can be nimbly slotted into a post-industrial utopian complex and throws a spanner in the works of a unified North. In 2021, Saudi Arabian-owned petrochemical producer SABIC invested £850m to convert and restart the 'cracker' plant, utilising Teesport to import hydrogen as a feedstock (Warren, 2018: 40; Havery, 2021). Evidently, where Teesside is concerned, Warren (2018: 32) is right to criticise theorisations of industrial decline as being misguidedly evolutionist in seeking to create neatly defined lines of transition where no such lines exist.

It must be stressed, however, that the region's continuing industrialism hardly provides it with a 'USP', for whilst sections of it have endured the transition to post-Fordist flexibilisation, it continues periodically to diminish in size, stature and, consequently, employment opportunities. The last decade of developments in steel is testament to this, with one of the last relics of Teesside's industrial history succumbing to the currents of global capitalist competition. In 2015 the furnace at the SSI steelworks in Redcar was put out for the last time due to poor steel trading conditions internationally and a slump in steel prices, waving goodbye to half a century of steel production and leaving 2,000 people in search of new work (BBC News, 2015). Once the second largest blast furnace in Europe and even surviving the turbulent 1980s when British Steel's operations were downsized and reorganised (Warren, 2018: 36), it was demolished in the early hours of the morning on Wednesday 23rd November 2022 (see Figure 23 below) (Hughes, 2022). To some bewilderment, a 3D rendered model of the furnace is being created for the public to virtually access in the hope that it will temper the concerns of locals who fear their industrial heritage is being erased around them (Dodd, 2022). The demise of blast furnace

follows in the grim fate of several other buildings around the industrial zone of Teesworks, like the previously mentioned Dorman Long Tower. Granted Grade II listed status only for Conservative Culture Secretary Nadine Dorries to revoke it not even a week into the job, the iconic tower, built in the 1950s to store coal near the blast furnace, was demolished without any public consultation in an overnight explosion in September 2021 (see Figure 24 below) (BBC News, 2021). This would be a regrettable, if not fitting end to another of those historic monuments of 'hard graft' that Paul Smith encountered on his psychogeographic 'sketch crawl' detailed earlier in this chapter and pictured in the background of Figure 18. Just over a year later, the Basic Oxygen Steelmaking (BOS) Plant at the steelworks was brought down in what was purported to be one of the largest single explosive demolition operations in the UK in 75 years (BBC News, 2022a) (see Figure 25 below).

Figure 23 Teesside skyline being permanently altered as the SSI steelworks furnace at Redcar is brought down using 175kg of explosives. *The Northern Echo*. Available at: https://www.thenorthernecho.co.uk/news/23143694.redcar-blast-furnace-demolition-pictures-skyline-changes-ever/

Figure 24 The Dorman Long tower mid-fall during its demolition in September, 2021. *The Northern Echo*. Available at: https://www.thenorthernecho.co.uk/news/19593244.report-reveals-cost-repairing-dorman-long-tower/

Figure 25 The levelling of the BOS plant at Redcar steel plant in October, 2022. Up to 1.6 tonnes of explosives was used to level the 65m (213ft) structure, which contained an estimated 105,000 tonnes of steel. *BBC News.* Available at: https://www.bbc.co.uk/news/uk-england-tees-63077791

On the Tees, all that was solid is currently being levelled by explosives. Yet the story of decline is not always so black and white. British Steel at Lackerby, for example, reached insolvency in 2019 before it was bought out by a Chinese firm who pledged to save the remaining jobs (BBC News, 2020). Chinese steel has in fact played a significant role in the fate of Teesworks. Analysis of global crude steel production attributes the steel price slump to China's *dumping* in international steel markets (Greenwood and Hudson, 2017) – part of the country's domestic response to its *overcapacity* problems that have caught up with its mid-1990s-2008 economic boom (Harvey, 2020), itself a product of the growth of foreign exchange reserves that allowed Chinese state banks to expand local currency liquidity and debt-financed investment in fixed assets (Hung, 2021). As Greenwood and Hudson (2017) write, China's artificially low steel prices are not primarily because of its low production costs – which, although marginally lower than European producers, are outweighed by the import costs of raw materials in the production process (namely iron ore) – but rather the effect of China's debt bubble on the national steel industry that has resulted in unprofitable excess capacity and in turn priced out European competitors like those in the North East of England.

Despite foreign inward investment, the levelling of much of its industrial heritage does not exactly give the impression that industry in Tees Valley is a long-term surety there. This will not be news in the policy making circles of local authorities of course. As Holmes (2020: 20) highlights, recognition runs deep in Middlesbrough council that to 'keep up' with intensifying interurban competition and provide citizens with services (in a difficult political

climate where local authority budgets are continually tightened) it is necessary to diversify the local economy. Tees Valley Mayor Ben Houchen has promised that his partnership with South Tees Development Corporation will deliver a range of new industries for the region (BBC News, 2022). But if Thatcher's Teesside Development Corporation is anything to go by, then the political and ideological framework it operates under might risk a repeat of year zero. Moreover, redevelopment on this scale is at odds with the short term objectives and investment incentives of neoliberalism. Due to the nature of the pollution that a century of steelmaking at the SSI steelworks has produced for example, cleaning up the site will likely to be costly and timely, not least because of the complicated ownership of the steelworks, whose assets effectively belong to several Thai banks through repossession (Warren, 2018: 39). It thus continues to leave Teesside, at least at the level of the social imaginary, as carrying the ontological uncertainty of an industrial area belonging to a de-industrialised epoch, betwixt and between heavy industry and the service economy. As Warren (2018: 41) notes, the earlier permanence that provided the old certainties and securities for the region have been "replaced instead with a diminished version of the past that cannot offer certainty or security". This, then, is a quasi-industrial North East, half its size and capacity, and owned by banks in Saudi Arabia, China and Thailand.

It is an admission of this complex and non-essentialist social and economic arrangement, or lack thereof, that ultimately brings the efforts of this exercise in framing Tees Valley through the supercity abstraction to its peripheral landscapes and to the logistics economy. If one were to identify where industrial labour overlaps and intertwines with service work, logistical labour in the twenty-first century warehouse would be a recognisable place to start. Logistical labour showcases a hybrid in the labour process between retail and manufacturing, borrowing specific facets from both to generate what Hill (2020: 14) describes as warehouse work that has been recast as an extension of the service economy under the power of retailers. By switching from *push* to *pull* directives in which power within the supply-chain shifts from the capacity of producers to the demands of consumers (Wright and Lund, 2006: 61), the modern distribution centre gives the impression that it is a service like any other – so much so that Amazon warehouses are to be regarded as *fulfilment centres* rather than distribution centres, since a worker's role is to fulfil the needs and desires of the customer much like a customer support employee at a bank would. Each object is seemingly attached to a human life.

On the face of it, this sort of industrial-come-service work might not appear out of sorts in the economy of Teesside, itself angled between two modes of production. And yet, it would almost certainly represent a considerable downgrade in terms of the standard employment, not least because it involves the impoverishment of the creative capacity of each individual (Caldari, 2007: 66) inasmuch as algorithms render personalised evaluations unnecessary (Staab and Nachtwey, 2016: 469). In other words, modern logistics work, controlled as it is by algorithmic calculations, eliminates any possibility of exercising autonomy in the workplace that would (albeit sparingly) have been found in traditional industrial labour. Put bluntly, it prohibits that which might have allowed manufacturing to become part of a local and regional ethos whilst at the same time maintaining the components that most people would happily do without. It plugs a gap in the economy of Teesside but does so with inferior materials.

We have established the economic precedent for the logisticalisation of Tees Valley, then, particularly as a compromise to the more commonplace employment opportunities found in the North and in neighbouring cities, but what about the spatial and geographical element of linear urbanism? Assuming that the Northern hypercity or something resembling it could ever be actualised, there is one component in particular in Alsop's and Broad's visions in need of significantly more attention that might indicate where the North East could obtain notoriety. It is clear from each of their respective plans (the former's resources worlds apart from the latter's) that transportation systems are the single most important and redeeming feature of the supercity-hypercity carve up. Alsop for example talks of the need to rid the M62 of individual cars in favour of slick public transport and freight to nullify the problems associated with congestion, whilst Broad emphasises the centrality of High-Speed rail in connecting spatialities separated by vast distances; the annihilation of space by time (Harvey, 1989). Neither, however, reconcile with just how extensive and expansive an industrial logistical system would be required to achieve such a feat. There is little talk of how the cultural and creative centres of the supercity-hypercity would reproduce themselves each day anew, let alone the logistics of a '15-minute neighbourhood'. Like the many historic port cities discussed in the last chapter that have recast their waterfronts as glamorous metaphorical utopian frontiers of our post-industrial world, their character effectively hinging on the invisible off-site operations occurring within corporeal landscapes located on the urban periphery (Vornmann, 2014: 4), these post-industrial imaginaries obscure a necessary component of urban development that does

not have the same story to tell. The supercity, whose ‘modern’ immaterial disposition, muddied in the language and ontology of the digital economy, might indicate a new orthodoxy in which work is contingent and delocalisable and 'knowledge' is the only source of value, but in essence only denies a reality where material infrastructure, labour and transport processes, remain vital – albeit removed from the primary sites of technological consumption (Huws, 1999; Taffel, 2016; Hill, 2020). In other words, the supercity in its previous conceptual forms is yet to account for its own gravity. These logistical stretches might not be recognisable as city forms but produce and provide the base for the economic activity that supports contemporary urban development all the same (Waldheim, 2016: 78).

This chapter does not claim to have the answers to these hypotheticals, but rather will present Tees Valley as one such region that might be burdened with the contemporary logistical framework required for a project of linear urbanism like the supercity-hypercity. Under such a schema, the composition of Tees Valley – with its complex array of economic geographies sandwiched between socio-material paradigms – would represent the industrial and mobilities arms of a larger megastructural urban network; the logistical underbelly of an outwardly immaterial economy of services and cultural work in the North. Given that mobility nodes are a fundamental component of any urban network looking to untie ‘the Gordian knot’, hard infrastructure for logistics is a necessity for it, and must thus find a fixed gravity in the land. Without a distinctly commodified connection to its past, Teesside becomes prey to the broader needs and greater good of the polyopolis, suggesting that however hard one tries to design the utopian supercity, Virilio’s (2000) metacity still inevitably lurks around the corner. Rather than people flowing through its townscapes to partake in commerce with local tourist attractions, commodity *thing*s would circulate through Tees Valley on their way to other destinations in the hypercity for final consumption.

Far from having only one overwhelmingly positive outcome, then, a Northern project that promises regional safeguarding could in fact sacrifice lower-ranking towns and cities for the maintenance of others; a utopia in one place and dystopia at the next over the way, off the beaten track. In Gramscian terms, this part of England, being a ‘problemed’ region treated by Westminster as an internal colony, might be assigned *subaltern* status in succumbing to dominant political formations via passive affiliation and subordination to hierarchy (Gramsci, 1971: 52). If the North East is a ‘foreign country within’, suspended in

time between tradition and 'modernisation', its local history, culture and identity matters less than those spaces in the metacity which it is subordinate to and must materially support. It would thereby perform the function of patching together a circuit of consumption. Tees Valley would belong to what Ananya Roy (2011) saw as a *subaltern urbanism.* Asking, "[w]hat global city can function without relational dependence on seemingly distant economies of fossil fuels and cheap labor?" Roy (2011: 224) attempts to reveal the "limits, porosities and fragilities" of so-called 'global cities' that omit the subaltern 'megacity' laying in the 'constitutive outside' from their imaginaries. Roy similarly deploys theories of the urban periphery – what she describes as 'interstitial zones' disseminated between rural and urban that skirt the usual obligatory reference to world cities and exist in the hidden exclusions of 'urban shadows' (Roy 2011: 232; McFarlane, 2008) – to expand upon existing categorisations of subalternity that in so doing provide a use here. Hinterlands perform a subaltern role in urban networks because their geographical composition meets the spatial checklist for a vast array of logistics infrastructure tasked with supporting linear urbanism. Thus, in the event of a network of polycentric supercities in Northern England, Tees Valley might be permanently locked into a subaltern urbanism that materially furnishes cities that have successfully made the adjustment *through* deindustrialisation. Taking the concept of the Northern supercity to its logical end point dispels the incorporeal myth that it was built on, and with it much of the meshwork-like planning that defines mobilities-based urbanism. In the following chapter, we will be able to draw closer parallels between the prospects of Tees Valley in a supercity laid out above and its emerging role in Amazon's national fulfilment network, where the platform's expansion rests on its ability to pull more geographies into its magnetic field.

4.7 Concluding Remarks to Chapter Four

Warren (2018: 17) makes the interesting point that, difficult to pin down under the conventional notions of 'place', Teesside is arguably more visible the further away you are from it. Be on the road 50 miles away from Teesside, and you will see it signposted. The closer you get however, the less signs for 'Teesside' appear and the more do those of the individual towns that make up its constituent parts. The uncertainness of its whole – that which ultimately led to its abolition as an official County Borough in 1970s and the consequent naming of the combined authority of Tees Valley four decades later – encapsulates how this part of the country is less geographically unified than other places in the North of England, having far-reaching implications for its future. In a period captured

by post-industrial urban thinking where linearity and polycentricity take centre stage, these sorts of clarifications and definitions matter because they contribute towards how particular regions are politically and economically integrated into the broader visions of governments and local authorities. Questions like this take on all the more importance when factoring in how our economic geographies are increasingly organised by emerging modes of consumption, shaped as they are by retail platforms like Amazon.

Critically, the thought experiment laid out above urges one to reckon with what a 'regional specialisation' (Chapman, 2005) might look like in Tees Valley. By evaluating the likeliness of the edgelands around its former industrial towns being converted into terraformed logistics clusters that capitalise on their geographical proximity to consumer densities and the UK's major road network, it sets the stage to theorise Amazon's ingress into the North East. The idea here is that *thinking through* this conceptual apparatus offers the ideal theoretical ballpark to engage with how the eastern periphery of Darlington became a prime locality for the beginning of a spatial expansion of Amazon's 'fulfilment network' into the North East – the topic of the next chapter. The offer will be of interest to spatial sociologists and critical geographers searching for rationale behind what a contemporary logistics platform like Amazon *looks out for* when sounding out new spatialities of fulfilment, and how the seesawing of capital from and to regions transpires as situated in its proper context. Ultimately, the above thought experiment serves to demonstrate how and for what ends the modern economy of platform logistics is able to anchor itself to specific regions owing to their urban morphology, laying the foundations for the remainder of this research to understand Amazon and logistics in Teesside as it actually exists.

To recap, this chapter has sought to delineate the emergence of the post-industrial periphery as a contemporary phenomenon of supply-chain capitalism by investigating its spatial form. In the post-Fordist economic era, peripheral landscapes have been found uniquely useful in addressing the vacancy and toxicity of former industrial sites abandoned as production moves offshore (Waldheim, 2016: 78). It promised to diversify purely technical readings of these newfound logistical geographies by engaging with their material basis, rejecting conceptions of these landscapes that depict them as historically vague, container-like spaces. By rubbing shoulders with deindustrialisation in the North East, it looked to frame hinterlands as favourable localities for the redevelopment of former industrial territories into linear cities that advance the mobilities paradigm orientated around spatial concentrations of growth in networked structures. It then sought

to pitch the exurban characteristics of edgelands alongside the spatial dimensions of logistics facilities, which are suited to one another like bees to honey. Edgelands have very particular properties that only a spatialised account of deindustrialisation can extort. They showcase the *half-life* of deindustrialisation, as industrial pasts continue to live in and through landscapes of ruination. The sterility and hostility attributed to these environments might suggest that they would be overlooked by urban planners and local councils. Yet, as this chapter endeavoured to demonstrate, large stretches of abandoned territory that are geographically and socially connected to the appropriate infrastructure are a prerequisite of a post-Fordist economic system that privileges the sociospatial logics of integrated supply-chains. Through a hypothetical inquisition of what a polycentric network of inter-connected supercities would look like in the North, this chapter aimed specifically to weigh up the probability of Tees Valley exemplifying this precondition. With the half-life of deindustrialisation very much a material reality in the North East as it continues to be a hostage to its industrial past (especially in the industrial towns where the transition to service-work has no clear path) the logistics economy of hubs, poles and nodes – a form of industrial retail work that finds haven in the urban periphery – might well be what lies ahead. It finished by arguing that this sort of urban arrangement would be far from the North East's saving grace. The utopian vision of the Northern supercity is, as it stands, just that: unworkable in the current political climate. The Ancient Greeks, of course, had another meaning for utopia beyond the 'good place', also translating to 'no place' or 'nowhere'. The new urban periphery – a subaltern urbanism that keeps the dream of industrialism alive but can never in fact deliver it – is that nowhere: a non-place that, in attempting to nurture utopia elsewhere, breeds a negative space that quickly plunges into subtopia. As Kenneth Frampton (1995: 89) once wrote, the "dystopia of the megalopolis is already an irreversible historical fact: it has long since installed a new way of life, not to say a new nature".

Alsop will be pleased to know that, at the time of writing this chapter, the M62 *has* seen some urban activity – the commencement of the construction of what appears to be an Amazon warehouse on a 57-acre site in Spen Valley between Whitehall Road and Whitechapel Road. The 'extensive earthworks' to level the site have been criticised by locals who say they received no prior information about the proposals (Earnshaw and Abbit, 2021). Developments like this signal that the much more likely outcome for regions like Tees Valley is that they will succumb to Amazonification (Kaminska, 2017; Merchant,

2020). Marion Shoard, whose work this research is indebted to, has been sounding the alarm about this very scenario for over a decade. In her review of Farley and Symmons Roberts' book *Edgelands: Journeys into England's True Wilderness* (2011), Shoard (2011) warns that the nostalgic current running throughout the analysis risks weakening the book as an investigative piece of work into an important geographical phenomenon:

> The edgelands now need something beyond a merely subjective celebration of their identity. Far more than our towns and countryside, they are being subjected to ceaseless change. Wild space is being prettified at the expense of its character and creatures. Industrial ruins are being cleared away. We could be in the process of losing this landscape just as we are discovering its charms. Should we be trying to conserve it, as we conserve the best of rural environments? Or would any attempt to regulate this space destroy the wildness that makes it special? It is time for us to consider what relationship we want to see in the long term between our activity in the edgelands, their epic infrastructure, their unique wildlife and industrial archaeology and their peculiar place in our imagination.

Edgelands have fragile futures and require a level of spatial contestation that can intervene in the seesawing process of capital. To repeat a line from the previous chapter, when capital flees, it also creates the conditions upon which it could one day return in another form. Shoard is pointing out that edgelands are one such area where this phenomenon is transpiring, owing to their spatial and geographical composition and the lack of political will to produce what Lefebvre would term *differential* space: urbanism that has the possibility to manifest new desires and passions unmoored to capital (Macdonald, 1995: 101; Wilson, 2013: 369).

Earlier, this chapter compared the North East to the American 'rustbelt' in the Midwest. If one were to inspect the spatial distribution of Amazon's US fulfilment network, they would find that a significant proportion of their facilities, over 20 (existing or in the pipeline) in fact, are clustered in rustbelt territory. In many American rustbelt towns Amazon provide one of few or in some cases the only means of employment. There workers will travel to gigantic warehouses off the beaten track where commodities arrive each day to be arranged and redirected to their final destination and point of consumption in the urban metropolis. While no such comparison is perfect, Darlington's recent embrace of Amazon has several of the hallmarks of a rustbelt town reaching for revival in a 'regional war for

jobs and dollars' (Goodman, 1979). But rustbeltification and Amazonification only go hand in hand once we appreciate the geographical forces tying them together. Thus, it is not only the fact that they both necessarily entail high rates of poverty and unemployment, but also the sociospatial composition of rustbelt towns that tend to be highly desirable to logistics development companies. With this in mind, the final chapter will propose a geographical explanation to Amazon's latest distribution warehouse in Symmetry Park in Darlington by paying specific attention to the cartographic contours of the town and the logistical gateways it interlocks with. Amazon's territorial conquest offers a blueprint for the logisticalisation of rurban fringes. The present land use patterns of B2C e-commerce and logistics, supplemented by the context of a high street in decline, indicate the future direction of urban morphology in the North East and speak to recent historical development in the region.

Chapter Five | Supply-Chain Architecture as Infrastructure: A Case Study of Amazon in Darlington

> I see articles about Amazon building here and Amazon building there. I'm not sure any of us really fully understand the implications because it's happening so so fast.
>
> A resident in Worcester, Massachusetts, where Amazon is building a distribution center on the site of a former mall. (Miranda, 2018)

In his interview with Paul Rabinow, Michel Foucault discusses the waning influence of architects on the spatial environment from around the turn of the nineteenth century. For Foucault, modernity presented new spatial configurations and problems that extended far beyond the domain of rudimentary urbanism and architecture, such that older ways of thinking about space as predominantly territory in need of policing did not retain the same clout. Instead, Foucault (Foucault and Rabinow, 1984: 244) talks of the new masters of space, the "engineers and builders of bridges, road, viaducts, railways, as well as the polytechnicians – those are the people who thought out space … the technicians or engineers of the three great variables–territory, communication and speed". In this back-and-forth Foucault inadvertently underscores the rise of logistics as an organising principle of the urban environment, one that is concerned less with space as the realm of pure aesthetics and more a fundamentally instrumental terrain to foster spatio-temporal flows of people and things that advance existing social relations and economic processes. Rabinow then asks Foucault whether, speaking at the time of their sit down in the 1980s, we are witnessing any change in the relations between the true technicians of space, to which Foucault effectively responds, "no".

If anything, the relationship to space that Foucault sets out in the aforementioned interview has intensified, with communication and speed demanding even more authority over how we organise our surroundings. The ascendancy of the railroads in shaping urban development has been usurped by an even greater force: containerised commodity flows that are elastic enough to take to any number of spatial environments in which humans can exercise control. In choreographing the flow of material, data and people, modern time-space networks sculpt space and its implications like never before. Today, logistical systems are integrated into the built environment as infrastructure as a matter of 'good economics'. As Clare Lyster (2016: 1) argues in *Learning from Logistics: How Networks*

Change our Cites, “we can no longer afford to read the city solely in terms of the architectural object … if designers are to stay relevant in urban matters, we must shift to engage the city from the perspective of its operational systems and procedural flows”. She continues: “[you would] be forgiven for concluding that in the space of flows, at best, infrastructural systems dominate, and architecture takes a backseat” (Lyster, 2016: 149). This chapter will offer more of an insight into this phenomenon of *architecture as infrastructure*, using Amazon as a case in point.

Glancing at Amazon, one begins to uncover the extent to which Lyster’s claims ring true. That is, the idea that contemporary urbanisation is organised through flows in the name of hypermobility, and that logistics first and foremost produces a reading of space as an infrastructural environment, rather than an architectural one (Lyster, 2016: 150). For one thing, there is little aesthetic value to be found in Amazon’s standardised designs, resembling the ‘big-box’ architecture of ‘Ikea urbanism’ on the edge city (Lewis, 2005; Martin, 2008). Moreover, the physical size of the majority of the warehouses in Amazon’s fulfilment portfolio exceeds what we might consider as coming under the traditional field of architecture. Because their dimensionality is calculated in acres, they more accurately reflect the properties of *landscape* (Lyster, 2016: 153-4). Their largest in the UK, located in Dunfermline, Scotland, measures a colossal 23 acres wide (the equivalent of the length of 14 football pitches) where a package is processed every 64 seconds. The reason why these distribution centres run enormously wide rather than enormously high is twofold.

The first pertains largely to the challenges of constructing such vast logistical shells ‘in situ’. As Lyster (2016: 155) details, a significant proportion of modern warehousing is erected in a manner not too dissimilar to how American settlers constructed barns: horizontally from tilt-up panel structures hoisted into position on pre-prepared foundations. Panels are manufactured industrially and transported by road to site, meaning they tend to be no larger than 40 feet high. The precise processes by which this construction takes place will be afforded more attention towards the end of this chapter. For now we can add that, tilt-up structures, being cheap to build, also leave warehouses highly exposed to adverse weather conditions, as demonstrated in devastating fashion by a fulfilment centre in Edwardsville, Illinois, whose roof buckled under the force of a series of powerful tornados that left a trail of destruction that stretched more than 200 miles (see Figure 26 below).

Figure 26 The site of a roof collapse at an Amazon.com distribution centre a day after a series of tornadoes dealt a blow to several US states, in Edwardsville, Illinois, US December 11, 2021. REUTERS/Drone Base. Available at: https://www.reuters.com/markets/commodities/amazon-driver-died-bathroom-sheltering-tornado-with-colleagues-2021-12-12/

The second and more evident rationality (given that Amazon do not always use tilt-up builds, particularly in places vulnerable to unstable weather) for the unapologetic width of Amazon's facilities can be theorised under the so-called 'mobilities paradigm' or 'mobilities turn' in sociology, transport studies and spatial science, which together have incorporated new ways of theorising the politics of movement (Sheller and Urry, 2006; Anim-Addo et al., 2014; Steinberg, 2015). Insofar as engineers are motivated by developing innovative ways to move people and things freely around the earth's continental and oceanic crusts, horizontality proves its worth in advancing what is known in logistics research as 'regimes of flow' (Hannam et. al., 2006; Delfmann et al., 2010). In an Amazon warehouse, an infrastructure that generates linear pathways for commodities to move from one stage (picking) to the next (packing) is vital to a fast and repetitive flow of objects and is achieved through technologies that utilise the *ground*. Kiva robots whiz across the floor in an orchestral symphony, whilst humans respond to algorithmic signs and signals by shifting their feet between stations. In addition, fulfilment centres must be wide enough to accommodate the constant stream of trucks replenishing inventories, with rolling steel doors keeping the flow of products and materials moving in an efficient manner. The necessity of the horizontal in Amazon warehouses somewhat challenges the assumption of Paul Virilio (2010) in *The Futurism of the Instant* that the next phase in the evolution of the city belongs to endless verticality, since modern logistics rejuvenates the value of the ground not only as a surface for flow but also in terms of the production of space: "ground

is the first built surface of a logistical site and the base from which the rest of the interior is fabricated" (Lyster, 2016: 157). Whatever the case, it is clear we have moved from architecture *and* infrastructure to architecture *as* infrastructure. That e-commerce activity has more than doubled in the last decade – with one in five developments in Britain shoehorned for web-based distribution and 40 million square feet of new warehouse space in developments larger than 50,000 square feet scheduled for completion in 2021 (Knight Frank, 2021) – suggests understanding how infrastructure has colonised architecture is critical.

Where the previous chapter fleshed out the *post-industrial periphery* to paint a picture of Tees Valley slowly morphing into an incubator for the new geographies of supply-chain capitalism up and to the point of attracting the interest of Amazon, this chapter unpacks the post-architectural spirit of these landscapes in demonstrating how towns succumb to the logic of infrastructure space. It shall do so through one familiar spatiality in particular: the recently constructed fulfilment centre in Darlington. Building on the previous theoretical work in this research, if the overcoming of space is contingent on the production of space (Smith, 1984; Harvey, 1985; Brenner, 1988; Castree, 2009), then infrastructuralisation is its end game. Amazon must infrastructuralise space (Plantin et al., 2016: 295; Hill, 2020: 4; Langlois and Elmer, 2019) to control the flow of commodities that exists therein, using logistics – as constituted through a composition of nodes of localised physical sites and lines of logistical routes (Cuppini, 2017: 502) – as an organising principle (Easterling, 2004). Logistics in this sense allows for the modelling of the world as a 'series of economically valued objects and relationships' (Neilson, 2012: 332). Such infrastructures produce their own spatial form in transforming towns and cities into terminals of logistical activity, allowing platforms like Amazon to execute their dominant conception of space (Lefebvre, 1991) in local environments and extend their logic far beyond the warehouse. Developments in Darlington can help us generate a deeper understanding of this sociospatial trend in a local context, where architecture has surrendered to infrastructural power. Unpacking the critical points where logistics, infrastructure and geography collide in a regional setting, this chapter will map the forces binding them together in order to deliver a materialist analysis of Amazon's conquest into the North East of England.

The first step on this journey will be to assess Amazon's existing arrangement in the British economy, pointing to the spatial concentration of distribution centres that makes up its so-

called national ‘fulfilment network’ in the UK. It will frame Amazon’s decade-long growth as an expansionary fix to the problems of saturation and congestion that inundate the ‘Golden Triangle’ of industrial logistics in the East Midlands. It will explore Amazon’s arrival in the North East predominantly through its geographical lure of untapped potential, first telling the story of the ownership of the plot of land in Darlington that is today host to a fulfilment centre, the fragile history it has experienced at the helm of the Dean and Chapter Durham, and the alternate trajectory it very nearly could have taken. Engaging with the cartographies of Darlington head on, it will then chart how the edgelands (a geographical form explored in the previous chapter) around its outer ring road make for pristine Amazon country by highlighting the area’s proximity to highway infrastructure (the arteries and veins of Amazon’s hypermobile delivery system) and consumer densities. Next, it will shed light on the business of logistics by documenting the economic arrangements brokered by multiple actors that propelled the development into motion. Partnering this is a probe of the planning documents for the development using the Freedom of Information Act 2000 that indicate the landscape has historical precedent and political interest spanning decades. The most eastern point of Darlington, it seems, had been sounded out as a mobility node since the 1980s, destined to be folded into England’s transport network. And yet, the fact that these infrastructural plans did not materialise until March of 2018 suggests a historical *lag* where multiscalar forces need to be aligned before a shovel can even be put in the ground. It is why this chapter will also consider the global currents determining the historical trajectory of the site over the years. Crucially, it will weigh up oscillations of global significance that have local ripples such as the rise of e-commerce and its consequences on Darlington high-street. It will recognise Amazon as the ultimate beneficiaries of recent economic and political turmoil by investigating how platform power allowed them to ride out the tide of crises in becoming providers of last-mile delivery services. Finally, once the various scales of governance that need to be leveraged for the space-making to occur have been established, this chapter will finish by returning to the town of Darlington to grapple with the construction process Amazon’s fulfilment centre followed from 2018 up until its eventual launch in 2020. It shall apply Peck’s (1996) notion of *customised infrastructural space* and the way that private capital supplants public authority in the delivery of infrastructure. This will foster one last opportunity to critically evaluate Amazon’s project in the North East as belonging to part of a much larger infrastructural project suitable for a megastructural network of logistical and digital geographies, to which Darlington is just the start.

In the end, the remaining chapter will hope to have stressed that Amazon is both a global phenomenon and a local reality for people who must put up with the platform's infrastructure in their backyard, on their residential street, or on their way to work. Increasingly, Amazon is an entity you will encounter on the Internet *and* in the flesh; through online protocols *and* through physical arrangements of roads and buildings that instruct more and more space. That is because infrastructuralisation – what Amazon are ultimately invested in – does not occur in a vacuum, but rather plays out through spatial scales that travel far and wide and have lasting impacts on local settings. This is why it is important to note that while users of the platform might attest to their experience of Amazon not being a fundamentally spatial one, Amazon nonetheless have a prolonged and targeted interest in space: its zonification, domination, and infrastructuralisation. In fact, in order for Amazon to achieve its phenomenology as a service that exudes the same *everydayness* as the air we breathe, it must embowel itself in the landscape. It must command the localities it annexes, convincing locals that the space it takes up in their area, however much of an eyesore the big box lingering next to them might be, represents unrepentant progress in the name of ease in consumption. In so doing, its physicality falls into the milieu of infrastructure, leaving Amazon to be swept up in the digital ontology of platform capitalism. Viewed predominantly as a 'tech' company and not a logistics platform, it succeeds in avoiding and evading the scrutiny of national sovereignty by becoming a service integral to our everyday lives.

5.1 Spatial Distribution of Amazon's Fulfilment Network in the UK: From the Golden Triangle to the North East

Amazon's status in the UK as the market leader in e-commerce and Europe's second largest logistics and fulfilment presence has been decades in the making, having first established itself in the country in the late 1990s through the acquisition of prominent online bookstore Bookpages (The New York Times, 1998). The Seattle-based e-commerce provider historically made headway into European markets amidst the peak years of the dot-com bubble, where Amazon followed a straightforward approach of entering into countries experiencing early advancements of e-commerce adoption as a percentage of total retail and using its platform status to vertically integrate into national economies and lock in customers. From there Amazon stacked up physical space to gradually unbundle its platform power on the material world. Twenty-three years on, Amazon's evolution from an online retailer for books to the 'everything store' (Stone, 2013) that aims at the total

organisation of all the worlds commodities (Bratton, 2015: 198) is exemplified in the British mainland.

Beyond the fact that nine in every ten shoppers in Britain have used Amazon (70% of which do so at least once a month) (Carrol, 2019), the extent to which the platform has become a ubiquitous part of British society is felt most viscerally in the landscape across its millions of square feet of logistics facilities. Amazon's UK fulfilment network boasts nearly 100 sites, ranging from sortable and non-sortable fulfilment centres, through delivery stations, to specialist facilities like Amazon Prime Hub centres – all of which are based on their physical proximity to populated areas that vary in density and perform specific supply-chain functions in the service of the incessant movement of goods. In Darlington for example, Amazon now runs what in its lexicon is known as a 'Small Sortable Centre' that over brick and tarmac covers 542,000 square feet on a 34 acre stretch of land. In this spatiality exists an intense arrangement of smart machines (known as 'Amazon Robotics') and super-agile workers (known as 'Fulfilment Associates') picking, packing and shipping small and medium sized customer orders as they receive them in real-time from cyberspace. Order through Prime in Newcastle, and there is a high chance in that moment you are leveraging the Darlington link of Amazon's sociotechnical web of decentralised, interconnected spatialities through which parcels are handled on an as-and-when basis by an itinerant workforce in the eastern periphery of the market town. The trajectory to this spatial distribution goes as follows.

According to a recent study by Kovida De Silva et al. (2019: 152), Amazon have largely pursued a polycentric pattern of urban development like the kind conceived of during the previous chapter. They have primarily done so by clustering facilities in the urban corridor between North West London to Manchester via Birmingham in a bid to enhance its regional delivery capability (see Figure 27 below). These facilities represent part of a number of revolutionary developments in the structure of supply-chains since the turn of the twentieth century, in which new sites designed to support e-commerce through functional specialisation trigger vast changes in land use patterns and real estate markets of cities (De Silva et al., 2019: 150). Targeted at medium-sized cities where the clustering of e-commerce related facilities of other firms can be promoted and the planning and zoning requirements of this type of logistics satisfied, De Silva et al. (2019: 156) deem Amazon to be an early mover in the geographical presence of the e-commerce sector, leaving a spatial footprint that may be of interest to other firms in the future. For example, Amazon's

distribution centre in Darlington (examined shortly) has prompted the council to submit plans for 24-acre industrial and distribution park neighbouring the fulfilment site (Dodd, 2022a). This sort of spatial concentration was explored in chapter three, where the concept of *clustering* into *growth poles* was introduced as a means by which logistics companies enter into positive feedback loops feeding off increased activity and reduced overheads (Sheffi, 2012: 87-121). Given the spatial intensity of this kind of land use, such clusters have a significant geographical impact.

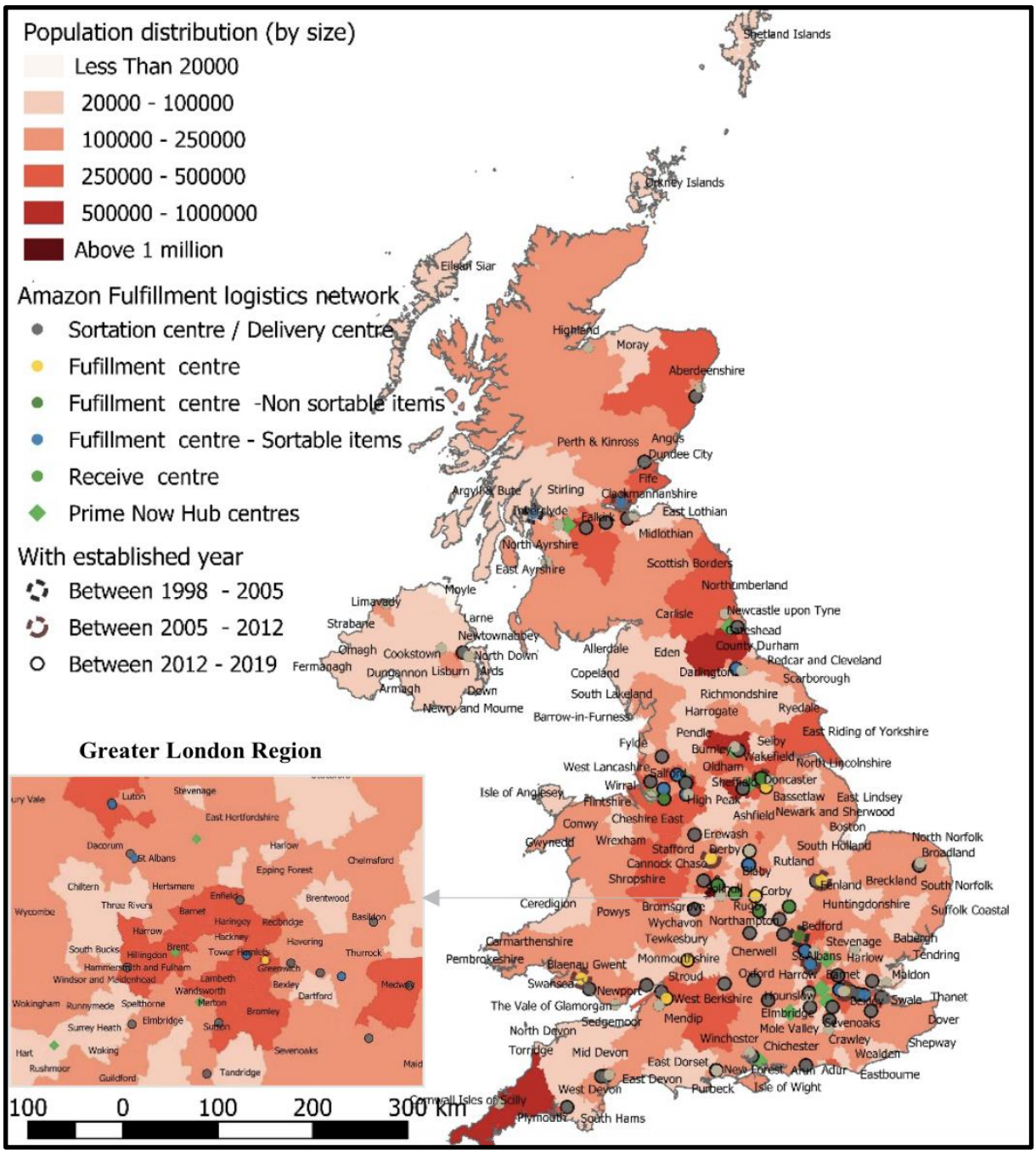


Figure 27 Spatial distribution of population and Amazon logistics facilities in UK, 2019 (De Silva et al., 2019: 152)

If one were to search for a sense of the material impact of Amazon that De Silva et al. call attention to, the cartographic growth of its labyrinth of distribution warehouses clustered across the Midlands of England would be a decent place to start. Here is where Castells (1996: 376) spaces of flows are exemplified in their crudest form, with operationally mobile spaces geographically fragmented over calculated distances, linked together through infrastructural arteries, cybernetic systems of wires and roads. In Rugeley, Tipton, Coventry and the rest, Amazon has successfully managed to spread its network effects by establishing a concrete foothold in a local market setting, a regional presence in a global online arena.

Naturally, a lot of Amazon's sites have mushroomed in and around what in the logistics industry is referred to as the 'Golden Triangle' (Lupton, 2018) to denote the vast area of prime real estate for high density distribution in the East Midlands located between the M1, M6 and M42 motorways, going as far west as Birmingham and stretching as far north as Nottingham (see Figure 28 below). Encompassing over 600 square miles, the Golden Triangle illustrates the spatial impact of the historical turn towards mobilities-based planning that reconfigures spatial scales to unlock new pathways for the distribution of capital. It has, unsurprisingly due to size requirements and lack of planning regulations, heavily targeted peripheral zones. For example, Amazon have fulfilment centres in the outskirts of Daventry, Kegworth, and Coalville (see Figure 29 below) – all within whisker of the M1.

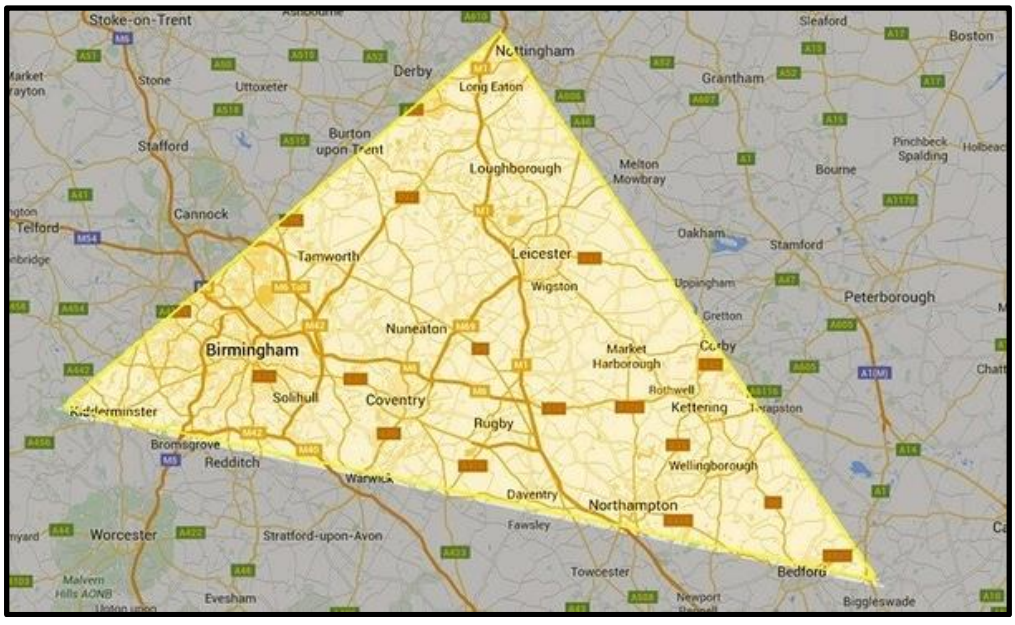


Figure 28 The Golden Triangle of Logistics. Available at: http://www.rcslogistics.co.uk/blog-and-news/golden-triangle/2935http://www.rcslogistics.co.uk/blog-and-news/golden-triangle/2935

Since the 1980s, the triangle has capitalised on the connectivity afforded by the intersection of Britain's major motorways and other logistical nodes that have enabled deliveries to reach over 90% of the UK population in four hours. All Amazon facilities, in fact, are on average within 8km from a motorway interchange and a mean distance of 20km from a domestic airport (De Silva et al., 2019: 153). The significance of the proximal relationship between fulfilment centres and airports is such that fulfilment centres are named and known by the airport code they neighbour. Amazon's new Darlington build is identified in operational terms as MME1, being no more than 10 minutes by road to Teesside International Airport. In the space of flows, these sites are reduced to the synthetic cartographies of longitudinal grids, what Bratton would class as being part of the *address layer* of the accidental megastructure of planetary-scale computation that assigns an address to every 'thing' that might be computed (2015: 191).

Figure 29 Satellite view of a large non-sortable fulfilment centre that Amazon opened inside the Golden Triangle in the outskirts of Coalville, Leicestershire in 2016. (Map data: Google © [2021])

Just as the Golden Triangle was in-part a concomitant to the scarcity of available property in London, it too has become saturated with spatially intensive activities that has been met with rising rents and generated an appetite for a spatial expansion beyond the confines of the Midlands (Lupton, 2018). Furthermore, it has been charted how the Midlands' access to international gateways like ports and airports harbour significant 'masked' costs and overheads through the risk of late delivery that becomes apparent during roundtrip journeys that exceed allowable costs (inventory charges and late fees) (Tenekeci, 2020: 1-4). Congestion and saturation suggest that the future of logistics as a spatial phenomenon exists outside the Golden Triangle. This would run in tandem with the geographical demands and functional requirements of the 'pull' models of distribution

associated with B2C e-commerce and inbound logistics, which are more spatially dynamic and seek out last mile distribution sites located peripherally to major population centres for same-day delivery. To execute rapid delivery, Amazon need to stack warehouse space near concentrations of Prime households. For a multinational platform with deep pockets and even deeper venture capital, state subsidies and the like lining those pockets, it was thus only a matter of time before Amazon were to break into new logistical territories of growth across relatively untested regions of the UK. According to a Watchdog report, there are 407 Amazon facilities in 13 countries "where evidence exists or there is reason to believe that Amazon has received public monies for its projects", although this information has not been officially disclosed (Kaori Gurley, 2022). Such is why, of the four million square feet worth of fulfilment floor space in the UK taken by Amazon in 2017, 82% was *outside* of the Golden Triangle (Savills, 2018). This includes the purchase of land in Bristol, the North West, and, crucially for this research, the North East of England.

As an incubator for contemporary logistical landscapes (see the previous chapter), the North East was virtually untouched by Amazon prior to 2018, when it was reported in the *Darlington & Stockton Times* (Gullon, 2018) that a 'major international retailer' was in talks with logistics developer DB Symmetry to forward-fund a £120.7m distribution centre in proposals for a new business park in the eastern outskirts of Darlington (see Figure 30 below). Most were immediately aware that this was code for Amazon, which soon became Darlington's 'worst kept secret' as the platform kept its plans firmly under wraps (Scott, 2020). The distribution centre was touted as the largest of its kind in the region, bringing significant attention to the market town.

A regional war for jobs and dollars (Goodman, 1979), it was described in the *Northern Echo* as a regional success story and a 'major coup' for an area haemorrhaged by under-employment (Hetherington, 2018). In the years since, further planning has been secured in Bowburn and Follingsby, and construction is near to completion in Wynyard off the A19 near Stockton, a little more than 15 miles from Darlington, of its latest 2.01 million ft fulfilment site (Scott, 2022). This opens up the North East to full blown *Amazonification* (Kaminska, 2017; Merchant, 2020). In the transmission age of just-in-time logistics and superfast delivery, it made economic sense for Amazon to diversify its operations and cluster new warehouse space around regions with gateway access to large population densities of potential Prime customers; to advance a *silver triangle of logistics* in the UK. And yet, the specific story of why Amazon chose to begin its endeavours in the North East

via the periphery of a former industrial town requires a deeper explanation, starting with the history of the land there and the question of ownership that has proven crucial to it. To reiterate the last chapter's findings, Amazon does not enter into spatial production in a vacuum, but rather as an outgrowth of distinct and geographically localised histories attached to place.

An artist's impression of how the new business park at Lingfield Point will look

Business park hailed as 'game changer' for town

THOUSANDS of jobs could be created at a planned new business park on the outskirts of Darlington.

Plans have been submitted for the venture, known as Symmetry Park, on land to the east of Lingfield Point, which Darlington Borough Council says has the potential to create up to 3,000 jobs.

It is understood a major international retailer is in talks with developer DB Symmetry to occupy the site, which could be ready for use as early as April 2019.

Darlington MP Jenny Chapman described the development as a "game changer" for the area, while Darlington Borough Council leader Bill Dixon said the announcement proved the town was "open for business".

By Nick Gullon

Staff Reporter

The business park, which will cover in excess of 94 acres, will feature more than 1.6 million sq ft of warehouse and office space – the equivalent of about 25 football pitches.

There will be enough space across the site to park 900 cars, 130 HGVs, 40 motorcycles and 100 bicycles.

Plans for a bus terminus, a 60-bed hotel and space for a pub and restaurant are also included for the business park, which will be accessed via an entrance point from the eastern transport corridor.

DB Symmetry confirmed the site is the largest it had worked on in the North East.

Cllr Dixon said the new development was "absolutely fantastic news" for Darlington.

"This is hugely significant for Darlington – the jobs created will be high value jobs," he said. "The jobs will go to local people – the size of the workforce means that is absolutely guaranteed.

"This development could have gone anywhere in the North East, but the council played to its strengths."

Ms Chapman added: "It is good to see investors recognise Darlington as a great location to set up their business.

"This is a substantial development on a vacant site that has the capacity of providing thousands of jobs for local people – it has the potential to be a game changer for Darlington.

"Darlington is brilliantly located on the A1 and East Coast main line. It is a fantastic place to live and work."

Planning documents submitted about the development state: "Fundamentally, the proposal will result in significant investment in Morton Park and encourage sustainable economic growth in Darlington.

"It is considered that the proposed development could act as a stimulus to the local economy, creating significant new employment and associated economic benefit."

Simon Dixon, development director at DB Symmetry, said: "There is a chronic shortage of high quality, strategically located storage and distribution schemes available in the North East."

Figure 30 'Business park hailed as 'game changer' for town'. *Darlington & Stockton Times,* 09.03.2018.

5.2 Land Ownership in Darlington East: Fragile Histories and Forgotten Futures

The plot of land at Morton Park now host to Amazon's MME1 distribution facility was, like great swathes of County Durham, previously owned by the *Corporate Body of the Cathedral Church of Christ, Blessed Mary the Virgin and St Cuthbert of Durham* before it was sold for redevelopment to DB Symmetry in partnership with Darlington Borough Council and Leeds based real estate firm PPG Land Ltd. For Massey (1980: 266-7), under the ownership of the Church this plot would have typified a *former landed property,* defined as form of landownership that is not a question simply of owning land as an economic asset (with in

this case acreage being more significant than asset-value). Rather what proves more important is owning specific tracts of land with which the owner has a historical connection and can partake in paternalistic tenancy relationships with the leaseholders on their estates– effectively an ownership structure left over from the feudal period. North Easterners will be familiar with Durham Cathedral's landholdings in the region, but perhaps not the extent of it. According to Guy Shrubsole (2019a), whose work in the book *Who Owns England? How We Lost our Land and How to Take it Back (2019)* and the blog *whoownsengland.org* represents one of the most audacious attempts to geomap England's land ownership in the twentieth century, we only know a fraction of what the Church own in and around Durham, which potentially totals as much as 30,000 acres. Identifying precisely who owns what in the British mainland can prove an impenetrable task, owing in-part to long held anxieties by the landed classes about the threat of land redistribution like the Peasants revolt of 1381 that promised a restoration of glebe land to the commons and installed a surreptitious attitude toward declaring land interests. As Massey (1980: 263) notes, "the degree of privacy and confidentiality of the subject is an indication of its political sensitivity". Examining planning documents of the Amazon development plot in the outskirts of Darlington using the Freedom of Information Act 2000, however, confirm that the greenfield site is indeed a historical dwelling of the Dean and Chapter of Durham Cathedral. Amongst the plans are Agricultural Holding Certificates which indicate that this particular field was an extension of Great Burdon farm just north of the site. It is one of many agricultural holdings the Church have to their name under its many parishes. Being an Anglo-Saxon settlement, Darlington occupies a favoured and strategic position in lower Tees Valley, its well-drained land, south-declining climate (thus avoiding north-easterly wind), boulder clay foundations, and productive soils attracting considerable attention from eighteenth century agriculturalists, even showing signs in the east of the town around Morton Palms (close to where Amazon now occupy) of prehistoric activity (Cookson, 2003: 3-5).

In 1868, when an Act forced the Chapter to surrender the majority of their estates over to the Ecclesiastical Church Commissioners (established some 35 years earlier by the Royal Commission to reform the Church of England and manage their estates) was passed, Durham Cathedral was left in possession of around 11,000 acres of agricultural land which produced an annual income of nearly £20,000 (Mussett and Woodward, 1988: 13-15). One such estate was the Great Burdon farm, part of the 600 acres of land that made

up the village of Great Burdon (its name meaning 'the great fortified hill on the manor'), which had been in the possession of the Church since 1541 when Henry VIII bequeathed it to the Prior and Covenant of Durham (known today as The Dean and Chapter of Durham). It holds Grade II listed status, along with Little Burdon farm that sits abandoned and derelict just 1,200 yards east (see Figure 31 below). By 1890, Great Burdon farm was yielding annual rents of £900 for the Chapter, a sizable reduction from decades prior owing to the British agricultural depression. It was on a leasehold at that time to one John Feetham, a Gent to the Dean and Chapter who, according to various accounts, was at once farmer, country councillor, director of a coal company, and justice of peace.

Figure 31 Abandoned Little Burdon Farm, Darlington, UK, with Amazon's MME1 fulfilment centre only barely in view in the background. Screenshot from the YouTube video 'Abandoned farm house little burdon Darlington' Copyright © 2021 Out With the Butler. Available at: https://www.youtube.com/watch?v=nKPEjWnxh5g&list=PL9t5JEwCZ5fkiBibAFjaJqMJ_h-Vdc6DJ&index=1

The Chapter held onto the farmland even through the turmoil of the turn of the century when British agriculture was in crisis and the Church of England more determined than ever to remove all estates from the Cathedral and place them under the control of the Ecclesiastical Commissioners. Only two cathedrals, Durham and Manchester, were able to retain their independence from the Commissioners when the National Assembly of the Church set up a Cathedrals Commission in 1931 to bring all Church land under their managerial and financial remit. Continued ill-management and costly renewals of their remaining estates in a period of agricultural depression would mean that it was not long before Durham Cathedral's independence again would come under question.

By 1947, when a Labour government had emerged from the ashes of the Second World War two years earlier, British land ownership would experience the most revolutionary of shakeups as post-War nationalisation was extended to development rights and agriculture. The Agricultural Act of 1947 brought forward by the Attlee government sought

to maintain high levels of agricultural production through a system of guaranteed prices negotiated annually by the Ministry of Agriculture and the National Farmers' Union. The Farmers' Union were personally instrumental in passing the Agricultural Holdings Act a year later. This Act provided tenant farmers – who had all but replaced the old system of demesne farming since around the 1400s (Halcrow, 1955) – with security of tenure for life (or handsome compensation in the event of a land sale). Also under the terms of the Act, the Ministry of Agriculture recommended that estates which had been particularly poorly managed were best served by being placed under government supervision, including the Cathedral's. The Act stated that continued failure to maintain good estate management or husbandry would result in a fine or dispossession of the land. Drawn up by Assistant General Secretary of the National Farmers' Union John F. Phillips (1948: 35), it imposed a Supervision Order where if Ministers were satisfied that an owner's management had not shown satisfactory improvement they could "purchase compulsorily the whole or any part of the land to which the Supervision Order relates". Ministers met with representatives of the Chapter at the beginning of December, 1953, where the Church only narrowly persuaded the Ministry Committee to delay the action of the Order (Mussett and Woodward, 1988: 17). They took this delay as the opportunity to form the Estates Committee, stuffed with professional advisers to ensure essential reforms were enacted immediately in order to stave off state sequestration of their agricultural land. Some farmland was sold off in haste, others were retained and improved with rents reviewed. In each case, the money was directed towards the Church Commissioners emerging investment portfolio which, also consisting of non-agricultural land, helped to transform the Church and 'God's acres' into an organisation that increasingly resembled a capitalist firm. This follows Shrubsole's assertion that since the mid-twentieth century the pressure to generate the investment income needed by the Church of England has resulted in a "fundamentally commercial attitude towards their land as property investments" (2019: 69). Thus, where Massey (1980) distinguishes concretely between three forms of ownership in *The Pattern of Landownership and Its Implication for Policy,* the Church formerly being fixed to the first (*former landed property)* under this framework, the financial activities of the Church Commissioners since the mid-twentieth century suggests a collapse in the boundaries between them. The Church now gradually fits the description and behaviours of the third form also: that being *financial landownership,* in the sense that it "operates completely within capitalist economic, profit maximising terms" (Massey, 1980: 268).

Even through political and economic upheaval and the financialisation of the Church's estates, Durham Cathedral withstood ownership of the agricultural fields of Great Burdon farm in the eastern edge of Darlington where Amazon now reside. By 1971 the Cathedral's agricultural portion, once the main part of the property, had been reduced to around 2,000 acres comprising of 8 fully equipped farms (Mussett and Woodward, 1988: 18). Nearly five decades later, after Britain's entry into the Common Market for agriculture, the remaining land was being leased out via Agricultural Holding Certificates across two farms, *D Hill & Son* and *S & J Dent & Son.* Both proprietors can be found in planning documents dating back to 2013, their signatures paramount to the land sale that would pave the way for Amazon's entrance in 2018. By then, the area soon to host the fulfilment site was far from the productive land it had once been. It was dry and unkempt, waiting to be terraformed, with only the adjacent fields on the other side of Tornado Way still designated for agricultural purposes (see Figure 32 below). Judging from the spoilage of the land, the chances are that no crops were cultivated or stock reared on this particular field at least for the last several decades, perhaps much longer. It was, to put it mildly, too valuable to remain agricultural, reflecting a broader trend spanning more than a century in which the percentage of total agricultural land which is farmed on a tenancy basis has been reduced by more than half (Massey, 1980: 263).

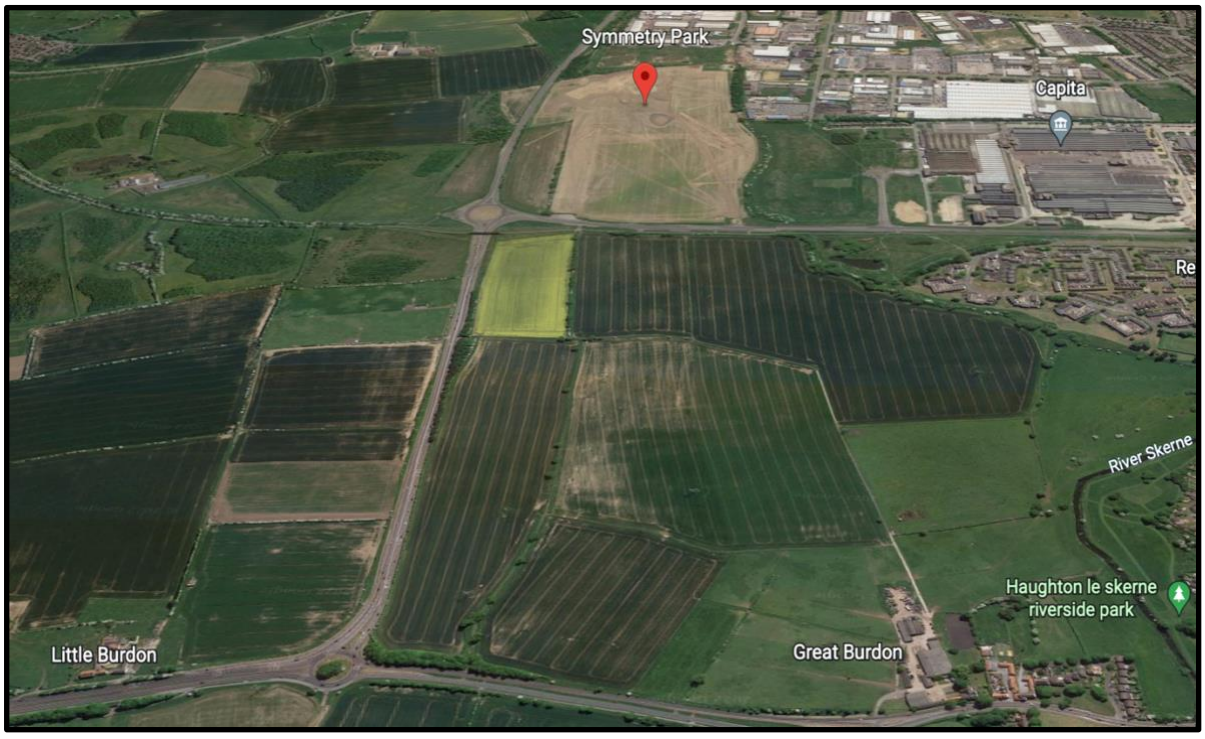


Figure 32 Earth view of eastern edge of Darlington, Great Burdon Farm (bottom right), Little Burdon Farm (bottom left), and Amazon's Symmetry Park fulfilment site (above). *Copyright © 2018 Google Earth.*

Coinciding with the rise of e-commerce, it would not take long into the twenty first century before this value would be realised. In their annual report for the financial year ending March 2019, Durham Cathedral acknowledge in their accounts that the property department has "progressed and completed a first land sale for 'Link 66' at Great Burdon, realising a significant sum for the continued upkeep of Durham Cathedral" (Durham Cathedral, 2019). The story of this type of sale is not new in itself. Over the past century, thousands of acres of glebe land have succumbed to the motorway age (Starkie, 2019), sold off to satisfy the spatial requirements of flexible capital mobility as geographical space becomes a means of production in and of itself (Smith, 1984: 117). In the age of B2C last-mile delivery, a similar trend is emerging wherein historic Church terrain like that in Darlington is picked off by platforms such as Amazon for supply-chain infrastructure. Land that is contained within link roads is gold dust to logistics providers, and thus presents an optimal opportunity in regions like the North East for the Church in their bid the raise cash for the purpose of their own survival. Under new ownership (more on this momentarily), the site would be transformed from its previous status as a *former landed property,* to the last of the three categories of land ownership to be mentioned that Massey (1980: 268) differentiates between: *industrial landownership,* wherein the "economic relation to landownership is dominated by considerations of the relevance of particular characteristics of land to the process of production". In Amazon's case, these characteristics pertain to its operational requirements in the process of *distribution*.

The fragility of the history of this land and its newfound function as a supply-chain portal speak to the power of platform logistics in (re)organising the built environment in its image. Even when multiple forces of political and economic pressure were stacked against them during the late nineteenth and early-mid twentieth century, the Dean and Chapter held onto their valuable agricultural land, only to surrender years later to a new set of political forces and economic actors that define the age of landscape urbanism we now live in. What a different story it might have been for this particular area of Darlington had Attlee's Labour been more forthright in its land dispossession in the 1950s, or the Church Commissioners more insistent on its management over all of the Church of England's assets. The potential of an alternate trajectory, of a forgotten future, might have left little probability for the future of this landscape to belong to the post-sovereignty of Amazon's fulfilment infrastructure.

5.3 Amazon in Darlington: Geographies of Flow

How, then, did this land fall into the hands of Amazon after centuries of unrepentant ownership by the Church? Why now, at this specific point in history? Here we can begin to connect with the geographical question that acts as the economic motor behind all new logistics developments. In other words, how does the infrastructuralisation of geographies into logistical landscapes take place? As the previous chapter sought to display, this question is a matter of historical conjunction in which a combination of circumstances produces a new set of socioeconomic realities that play out in the spatial realm.

As a point of entry, we can start by referring to a local development report drawn up by Darlington Borough Council (2016: 100) to target long-term investment and growth in the region, where a specific convergence of major roads, railways and airports was identified as a lever for economic attraction in the domain of transportation and infrastructure:

> Darlington is the gateway to the Tees Valley, and contains many key elements of the sub-regional transport network. Darlington is the point of arrival for those arriving by road via the A1(M) and A66, by air via Durham Tees Valley Airport and by rail from Darlington Station on the East Coast main line.

With mobility key to economic growth in supply-chain capitalism, councils ordinarily leverage local geographic advantages like this by offering up spaces in their boundaries as sub-regional nodes in larger networks of capital flow that in turn create objective conditions of engagement, creating their own fixed and standardised local actors within national and global supply-chains (Sassen, 2009: 317). For its part, Darlington is strategically positioned between the influx of freight coming from the South and large densities of consumers living in Tees Valley in Stockton-on-Tees (194,800 people), Middlesborough (139,500), Hartlepool (92,500) and Redcar & Cleveland (125,300) and not much further from Tyne and Wear, for which the population exceeds one million. It might also provide an inventory point *to* London, as well as Leeds, Newcastle-upon-Tyne and Edinburgh via the A1(M), given that items sold by certain vendors may only be stocked at a particular site, awaiting dispatch to any location.

Partnering this, the next indication that the area is rich in the attributes of a logistical landscape is displayed in its peripheral, rurban nature. Stationed in the furthest most east point of the town in the land north of Yarm Road between Lingfield Way and the A66

Bypass, it is proximal enough to enjoy the social infrastructure and amenities of Darlington while circumventing the congestion, high rents and higher regulations of the urban townscape (see Figure 33 below). It also sits within 15 miles of Teesport and not much further from another cargo port in Hartlepool, opening up the regime of flow to Europe and other parts of the world.

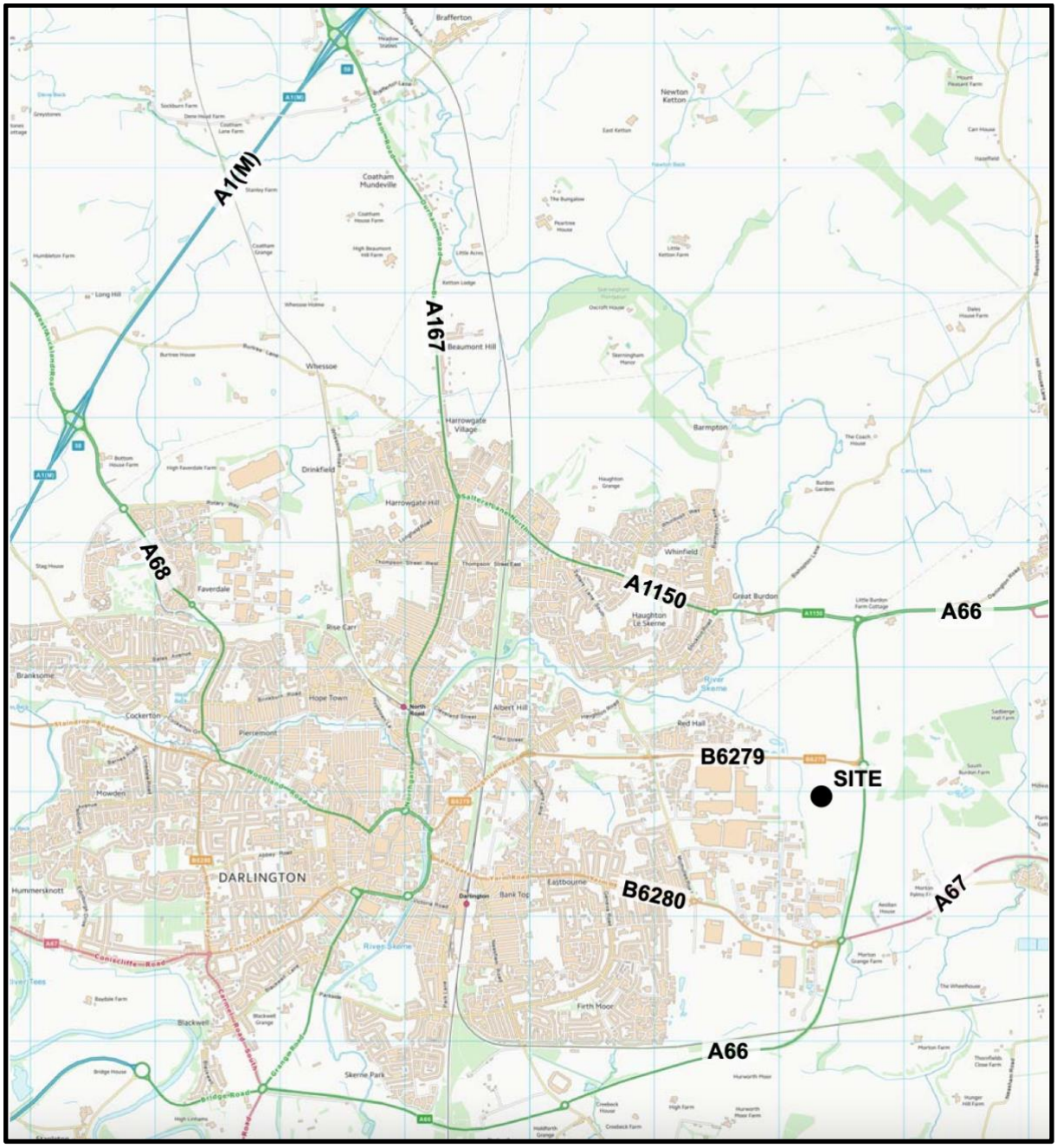


Figure 33 Amazon MME1, Darlington Travel Plan, January 2021. *Reproduced from the Ordnance Survey map with the permission of the controller of HMSO. © Crown Copyright licence no.100009597.*

This seemingly forgettable space in the Darlington hinterlands has allowed Amazon to create an engineered spatiality by leaning on the specific geographical advantages of the

post-industrial periphery. As the previous chapter demonstrated, the spatial arrangement of the peri-urban – not quite urban and not quite rural; within close enough range to enjoy city infrastructure (such as Darlington's railway station) and the spaciousness of the countryside; and with VIP access to the arteries and veins of Britain's transport network – makes for a terrain that is in keeping with the decentralised, postmodern geographies of a post-Fordist capitalism with its fixation on movement as growth and mobility as progress. The morphological composition of the outskirts of Darlington represent a *distributed place* (Cidell, 2015) where suppliers can arrange, organise and direct inbound commodity flows through a specially engineered logistical zone. Logisticalising these spaces follows a historical pattern of the industrialisation of the metropolitan periphery that has swept the West ever since the tide of deindustrialisation rendered the factory town a busted flush and triggered the selective abandonment of the urban inner core as a means to deal with its deepening contradictory tendencies (Soja, 1989: 72).

Soja's theory of postmodern geographies is exemplified in Darlington. In the eastern outskirts of the town around Eastbourne in the mid-1800s, growth was slow, particularly in new housing developments, because they were locationally inconvenient in their distance from major workplaces (Cookson, 2003: 79-80). Housing over that period was thus only built in piecemeal fashion, notwithstanding the cheaper land costs, since geographically it was a harder sell. As Gillian Cookson (2003: 81) details in *The Townscape of Darlington*, in spite of efforts on behalf of trustees to use these development schemes to sell plots cheaply so that industrious working-class men could become part of the propertied classes (and thus be eligible to vote), in reality what transpired was the land being purchased by poor law guardians as the designated site for the town's new workhouse that accommodated 250 inmates and 50 vagrants, opened in 1870. Fast forward to today, and the picture is quite different. Urban growth in the hinterlands of Darlington is burgeoning, owing to companies like Amazon who see its decentralised position as not a hinderance but inversely as advantageous to its nationally-scaled fulfilment network.

What looks to have all the trappings of a *growth pole*, the eastern fringes of Darlington are centred around 'Link 66' – a link road located at the junction of the A66 and A1150 that provides optimal motorway access to and from the town centre via junctions 57 and 58 of the A1 (M). Unsurprisingly, Link 66 was also one of the critical routes for new road and public transport links discussed in the aforementioned council report as an emerging

logistics location. The geographical significance of this urban corridor – a welding device in the *space of flows* – became apparent when it began to host the industrial business park known as Symmetry Park in 2018 and siphoned off specifically for the interests of the logistical economy looking for a spatial outlet. Whilst detailed plans for this commercial development (consisting of seven separate plots) were first drawn up in 2007 (see Figure 34 below), permission by the local planning authority of the Council of the Borough of Darlington via the Town and Country Planning Act of 1971 for the *erection of a mixed industrial, commercial, retail, warehousing, distribution development* can in fact be traced as far back as 1987 in planning documents, and is a frequent feature in annual proposals from there on in.

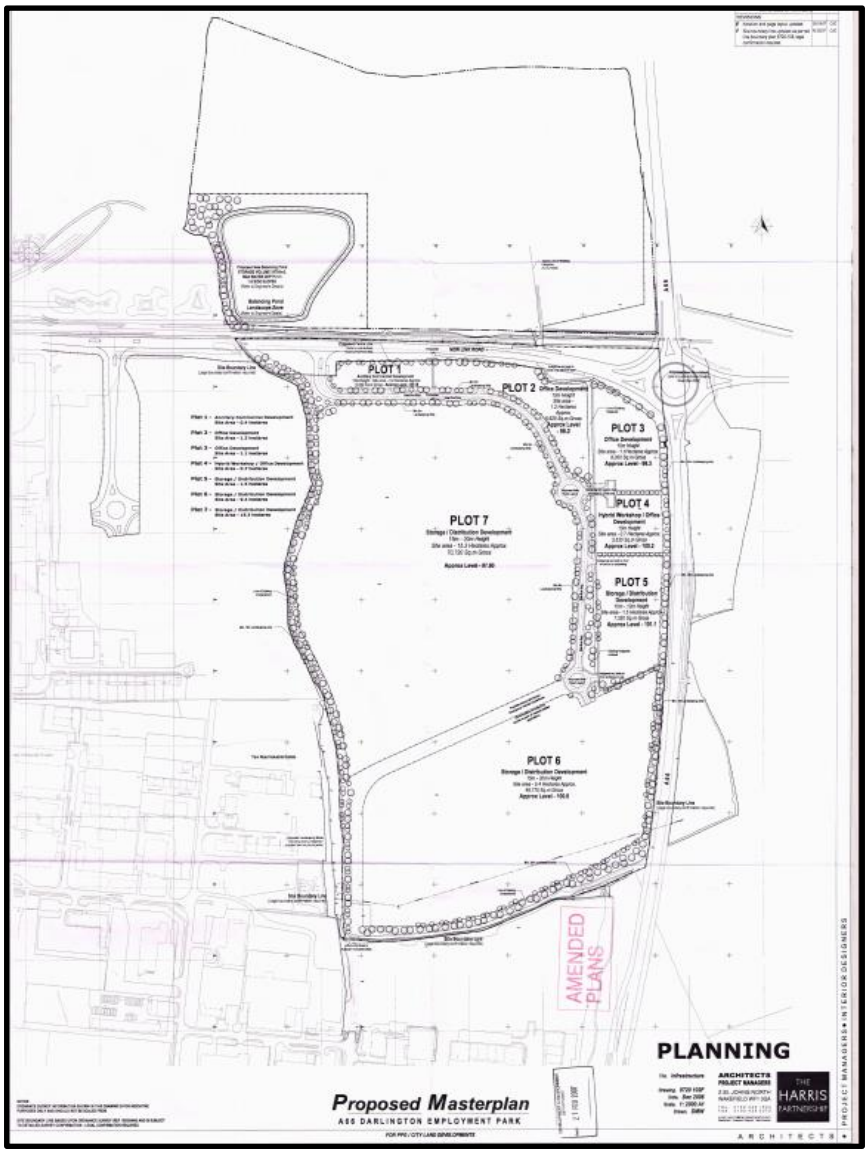


Figure 34 Outline application for development of B1/B2/B8 employment uses, ancillary commercial development, including Hotel, Pub/Restaurant & provision of access (amended plans received 21 February 2007 and 5 June 2007) | Dean & Chapter Land Adjoining Morton Park. *Darlington Borough Council.*

The timing of these planned developments, which would only materialise decades later, most likely coincided with the opening of the Link 66 road some two years prior in 1985. Link 66, referred to as a 'relief road' linking the A66 with the A1, had been the subject of much planning debate throughout the 1980s by Durham County council, the borough council, and the Department for Transport, the former of which had a different plan for its location and route than the latter two (Cookson, 2003: 138-145). An outer ring road, it was initially proposed as an adjunct to the inner ring road that had been constructed in the early 1970s as a solution to the congestion problems that the 'Great North Road' through the town centre had brought, especially on market days. Thus, originally a response to traffic problems in the town, Link 66 was also an opportunity for town planners representing the interests of a more mobile and fluid form of capital to attract new industrial and retail developments, notably the Lingfield estate which was first planned in 1990. Yet, in part due to the lack of significant features the outer ring road had up until the late 1990s, it was not until 2018 that the specific plot of land now known as 'Symmetry Park' would attract the material interest of investors and effectuate the long-held ambitions of Darlington council and policymakers. Let us next look at the specific processes by which this was achieved, and the business of logistics that must occur before Amazon can roll in to town.

In March of 2018 planning permission was granted by the council for the development company *DB Symmetry* to commence in the construction of one B8 storage and distribution warehouse alongside a new estate road with car and lorry parking just north of Morton Park. Having since become *Tritax Symmetry* following the £370m acquisition of an 87% stake in *DB Symmetry* by *Tritax Big Box REIT* in February 2019 (Insider Media, 2019), the logistics developer entered Darlington as an accomplished outfit, boasting over 4,000 acres of developable land capable of accommodating over 40 million square feet of logistics space strategically scattered across the UKs mobility belt. A significant amount of this is, unsurprisingly, concentrated around the main motorway arteries of the UK and primarily around the Golden Triangle. Tritax Symmetry's procurement with Amazon exists in an economic context of a booming industry for contractors employed in distribution centre development, with one in five purchases in Britain now web-based and the UK's online shoppers spending more per household than consumers anywhere in the world (Wilmore, 2018). Understood as the rentiers of warehouse capitalism, Tritax Symmetry develop land that is pre-let to online retailers like Amazon, enjoying the spoils of a world

crafted in the latter's image. For Tritax Symmetry, location is everything, because the basis of logistics is nothing if not the ground upon which it is geographically rendered from. To own fertile ground is to possess a future asset of a value chain. Browsing their website uncovers the extent to which developers and rentiers centre reputation around their stake in the economic geographies of the nation state (see Figures 35 and 36 below). In Darlington is an additional postcode that strengthens an already diverse property portfolio for them, and a fulfilment network for Amazon, both of which work in the service of capital as value in motion (Harvey, 2018).

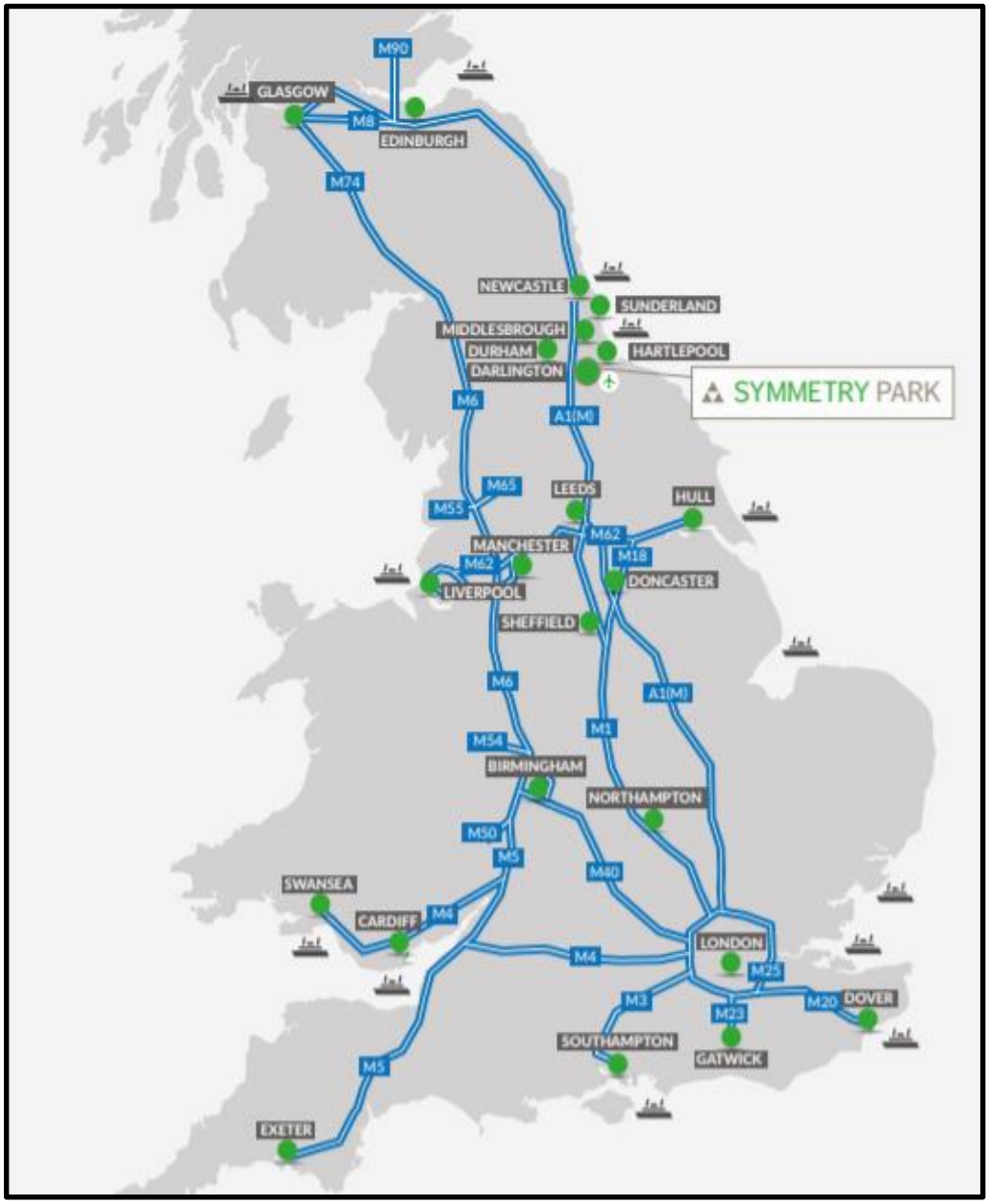


Figure 35 Location of Symmetry Park in Darlington and other Tritax Symmetry sites around the UK adjacent to major road networks and ports. Taken from Symmetry Park Darlington/A66 Brochure. (Tritax Symmetry © [2020]) Available at: https://tritaxsymmetry.com/projects/symmetry-park-darlington/

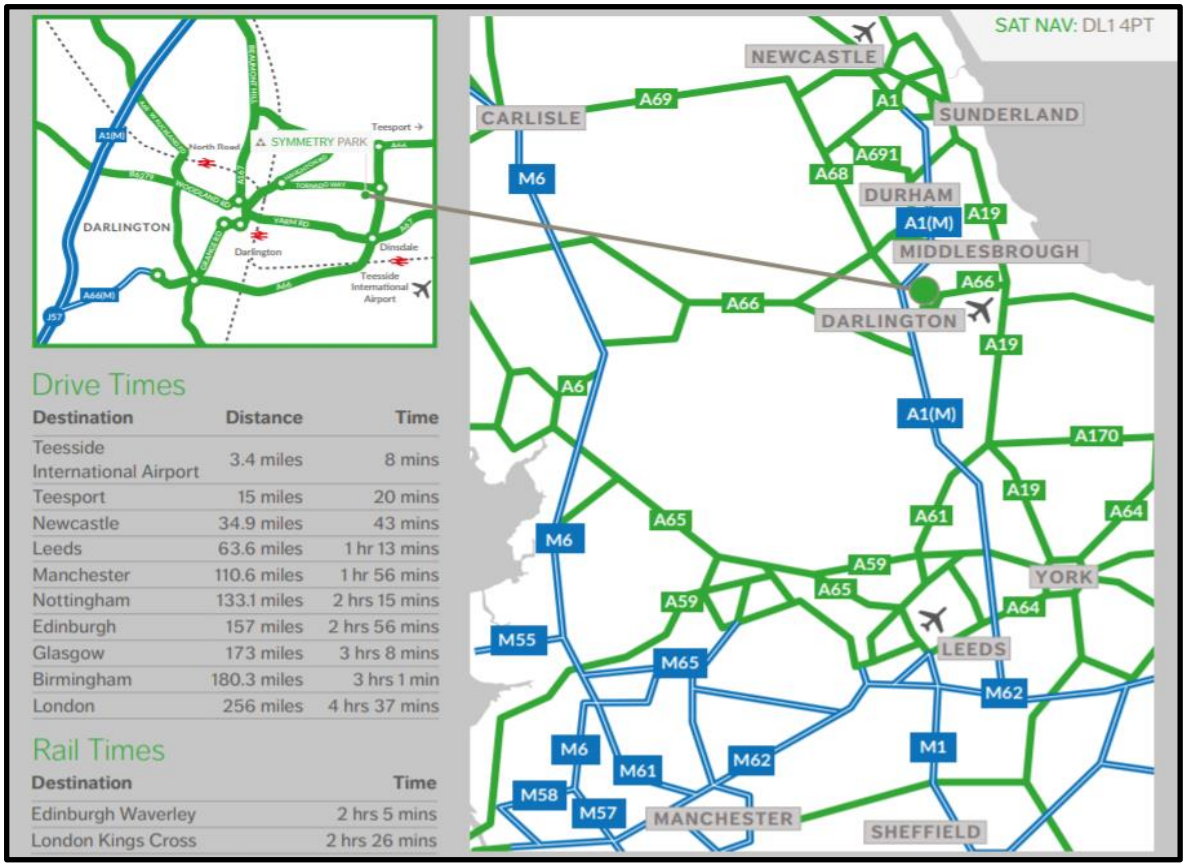


Figure 36 Location of Symmetry Park in Darlington and adjacent major road networks, airports and railways including drive times and rail times. Taken from Symmetry Park Darlington/A66 Brochure. (Tritax Symmetry © [2020]) Available at: https://tritaxsymmetry.com/projects/symmetry-park-darlington/

Amazon's spatial expansion into Tees Valley did not only hinge on Tritax Symmetry. It also involved several accompanying private economic actors like Lichfields, The Harris Partnership, JPG group, Cluttons LLP, and Hollis that provided consultancy advice on a range of matters pertaining to planning and development, architectural design, civil and structural engineering, chartered surveying, and development monitoring respectively. The entry into direct landowners of such agencies is a development that dates back to the early twentieth century (Massey, 1980: 263). This multifaceted approach reflects a growing recognition of the 'industrial amalgamation' process wherein a combination of intra-firm and interfirm relationships focuses on the operations of a dominant 'propulsive' firm (Chapman, 2005: 598). (Even if in the long run Amazon hope to vertically integrate into these very industries so to run the entire development and construction process inhouse.) Evidently, space-making is as much about the material forces of history as it is a collection of capitalist firms cultivating information-based relationships to execute a dominant conception of space in the *here and now.* Collective interests aside, it does nonetheless prompt the question of why, notwithstanding the slow pace of town planning, it took over

thirty years for this development to materialise. Especially given the seeming willingness of Darlington Council to capitalise on its geographical advantages at the precise stage in history when distribution was superseding production as the predominant means through which economic growth was to be pursued. There is no single explanation for this, but rather multiple areas of conjuncture that indicate why Darlington's eastern periphery was logisticalised in 2018 as part of a broader process of what has been regarded as the 'Amazon Effect' (Reese and Struna, 2018; Vollero et al., 2020). Assuming that Tritax Symmetry moved into the town in a consortium with Amazon, whereby developments are built to an institutional spec and let out accordingly, these areas then derive from the specific trajectory of the platform during those years. The following section seeks to approximate the point in which the global can be mapped onto the local. That is to say, it shall zoom out momentarily to assess the broader gravitational pull binding Amazon to the local economy of the North East of England towards the back end of the 2010s, identifying key features of political economy both globally and nationally that propelled its trajectory.

5.4 Amazonification: A Global Trend

There are a number of other factors of *extra-geographical* nature to be chewed over if we are to reckon with Amazon's 2018 entry into Darlington in the North East of England as part of broader decade of spatial expansion. Already accounting for the loss of manufacturing following historic deindustrialisation detailed in the last chapter, the most obvious starting point is to gauge how the economic decline following the 2008 financial crisis shaped the short-term trajectory thereafter. Not for the first time, hits to the global economy over this period proved gainful for Amazon, who jumped at the opportunity to move into regions recovering from recession and desperate to attract private investment (Semuels, 2018) in the wake of drastic budget cuts from central government in the so-called 'austerity years' (Shaw and Robinson, 2018).

The financial crash laid the foundations for an Amazon takeover by accelerating trends of high street decline and job losses in the retail sector. Exacerbated by rising property rents, steep business rates, and an inevitable drop off in effective demand, the recession gave way to a surge in vacant units in town centres, especially in the North East (see Figure 37 below). Darlington was chiefly amongst them, suffering most heavily of all the English regions, with household names like Toys "R" Us and Maplin going bust and chains such as Marks & Spencer, Debenhams, Wilko, and House of Fraser shedding a significant number

of brick-and-mortar stores (see Figure 38 below). Between 2011 and 2018, this downturn amounted to a net loss of 12,671 retail jobs in the North East (Wallace Stephens and Lockey, 2019). The death of the High Street signals an alarming turn for towns and cities, their future potentially belonging to what are described as 'dark stores' (Kushner and Lindsay, 2021) where traditional street commerce is replaced by a series of 'stealth micro-fulfilment outposts' that customers only ever interact with through an app: the recentralisation of the industrial city through platform logistics.

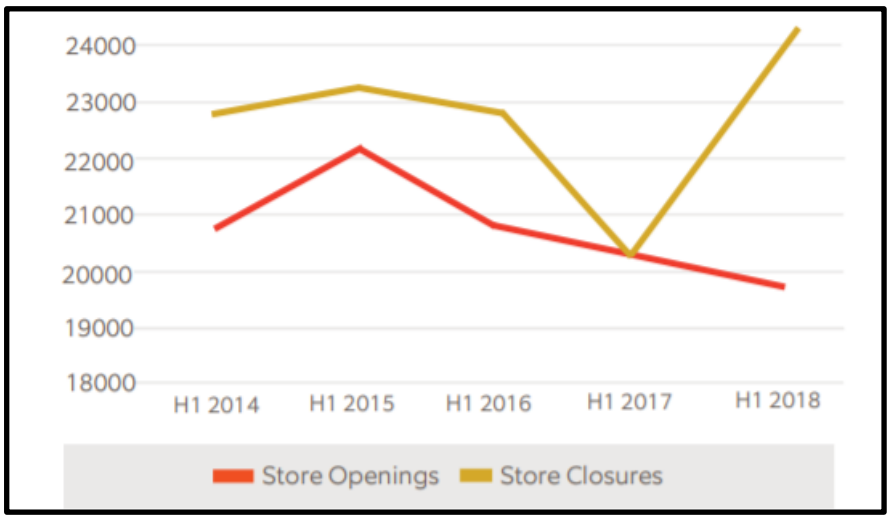
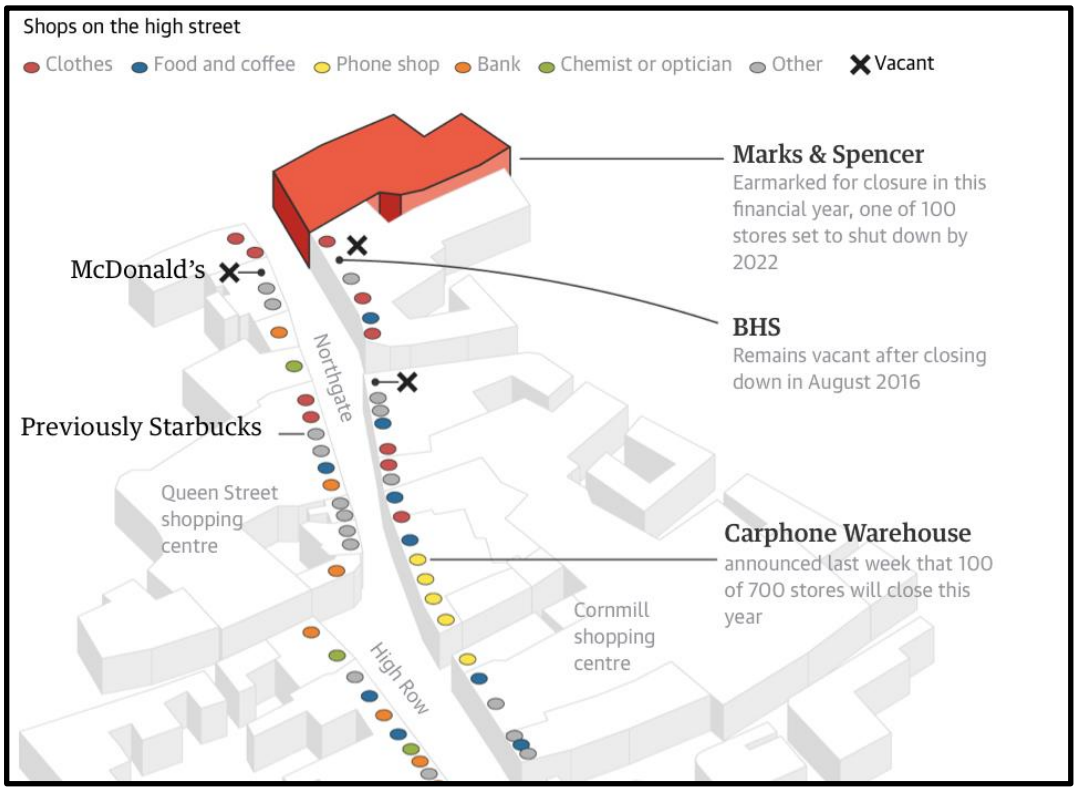


Figure 37 Number of UK Store Openings and Closers, 2014-2018. North East England Chamber of Commerce. Town Centres: Planning for the Future. Available at: https://lichfields.uk/media/4646/town-centres_planning-for-the-future_november-2018.pdf



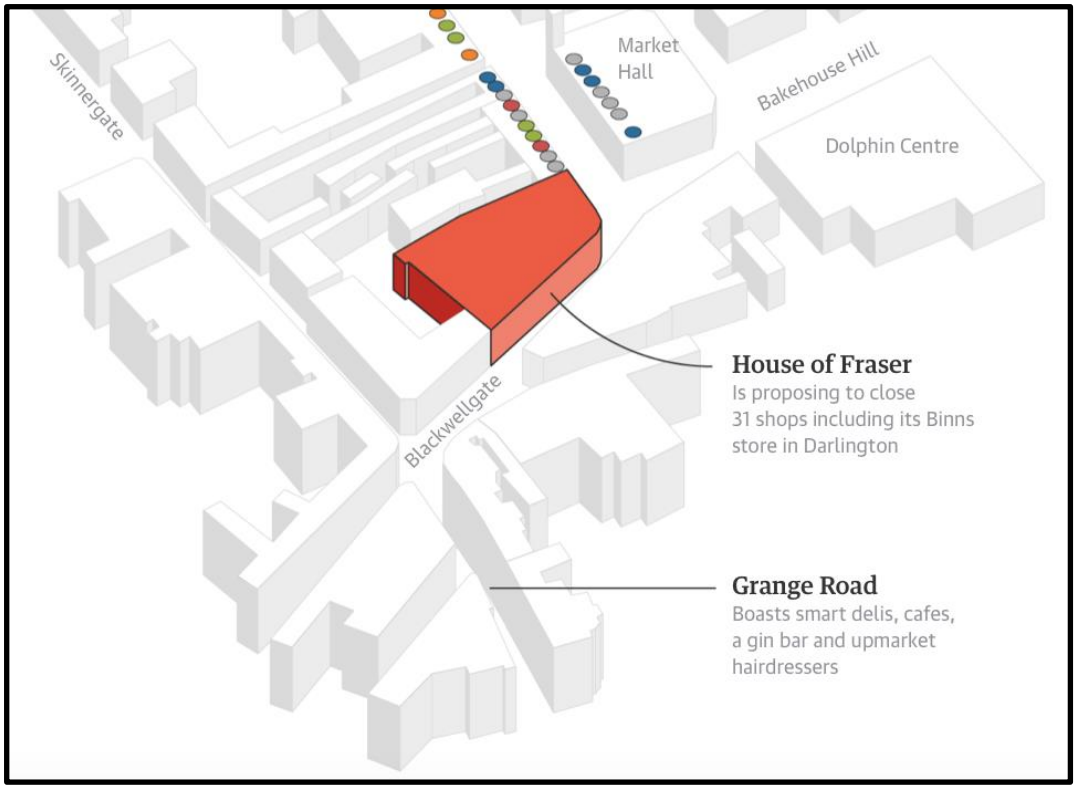


Figure 38 'Darlington's high street is losing its household names.' 2018. Guardian graphic. Source: © OpenStreetMap contributors. Available at: https://www.theguardian.com/business/2018/jun/09/high-street-crisis-darlington-stores-retailers

That the financial crisis hastened the decline of brick-and-mortar capitalism in the North East of England need clearly be appraised within the framework of the other dominant global current encompassing nationally scaled economies: the totalising presence of transnational online retail superstores. This descent in fact runs proportionate to the growing market share of B2C e-commerce and with it the number of Amazon facilities that cater for the uptake in online demand. Between 2011 and 2019, e-commerce activity more than doubled from 8% to 19% of all retail sales in the UK (ONS, 2021). Over the same period, Amazon's net sales grew by a staggering 228% from roughly 5 billion to 18 billion US dollars, making it the leading player in the UK e-commerce market (see Figure 39 below) and only second to Germany in terms of Amazon's European presence. The intensification of digital consumptive practices as the dominant retail paradigm in these critical years stimulated the demand for an increased physical infrastructure of warehouse space tasked with stocking online inventories, going half the way in explaining the dramatic but nonetheless unexpected growth in Amazon facilities across the globe (see Figure 40 below).

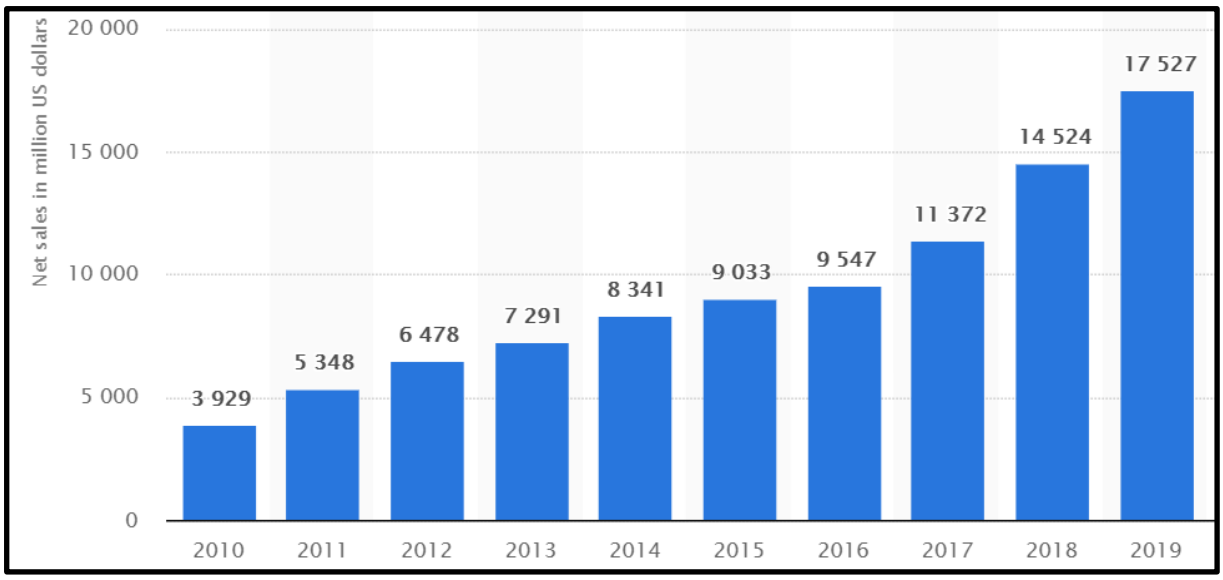


Figure 39 Amazon annual net sales in the United Kingdom (UK) from 2010 to 2020 (in million US dollars). Available at: https://www.statista.com/statistics/1035592/net-sales-amazon-united-kingdom-uk/

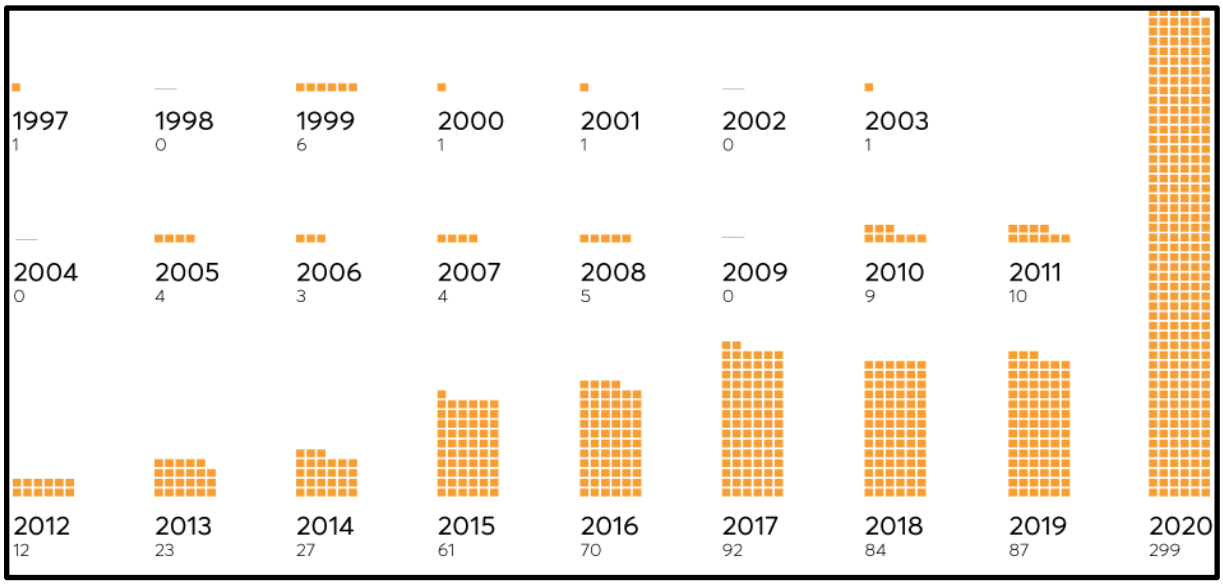


Figure 40 Number of Amazon facilities over time. MWPVL International. Available at: https://www.consumerreports.org/corporate-accountability/when-amazon-expands-these-communities-pay-the-price-a2554249208/

These trends denote the process of *Amazonification,* in which the Great Recession forced the focus of development away from retail, restaurants and office space and towards warehouse-based real estate. Indeed, the 2010s shall be known as the decade in which the economic tide turned in the direction of warehousing to the point in which it would surpass all other forms of non-residential construction. Between 2018 and 2019, the amount of warehouse space under construction increased by 20% from 299 million square feet to 358 million square feet, with Amazon claiming the largest stake (Vuocolo, 2021) – including the platform's newly established site in Darlington. It is important not to

understate here just how insurgent the growth of e-commerce industrialism was in the 2010s. As David Sleath, chief executive of property developer Segro recently remarked in a Guardian interview (Partridge, 2021):

> I'd love to be able to say that even in 2011, when we launched the strategy, we could see exactly what was going to happen to Amazon and how it was going to become a major driver of e-commerce and demand for warehousing space. But the truth of the matter is, while we had all probably bought some things on Amazon and were aware of them, as Segro we hadn't done much business with them, and didn't really see them as a major player in our core markets. At that point they were mostly building very big warehouses in quite remote locations where labour and land were cheap.

Segro has since been on an exponential trajectory all the way onto the FTSE 100, having started to 'bet big' on warehouse developing a decade ago and now owning 8.8m square metres of space (with another 1.1bn of land to develop) including facilities rented out by Amazon and Netflix. Thus, the explosion of the UK's e-commerce market and its rentier backers assumes a pivotal position in the course that took Amazon to Darlington in 2018.

To solidify what is a linear understanding of Amazon's arrival into Darlington, at this stage we might also ask, why England and why Amazon? Put another way, exactly what explains Amazon's diversification beyond its place of origin, the US, to select countries in Europe during a period when other firms were (often unsuccessfully) navigating their way out of a systematic crisis of financialised capitalism? Amazon's international outgrowth can be interpretated principally through the fact that the platform's *Prime* service has been reaching market saturation at home, where US household membership is at 65%; over 85 million members (Camhi and Pandolph, 2017). Although a 2015 study demonstrated that Prime might have initially struggled in terms of profitability because of the logistical challenges of getting orders to customers within 48 hours (Byrnes, 2016), it still represents Amazon's largest vehicle of revenue extraction and avenue for long term growth. This is made apparent with the knowledge that Prime customers spend more ($1,300 per year) than non-members ($700 per year) (Levin and Lowitz, 2017). Amazon's international strategy, then, has largely been to expand its Prime services in countries, like India, Singapore, Brazil and Mexico, that were experiencing rapid growth in terms of e-commerce adoption as a percentage of total retail (see Figure 41 below). In Mexico for example, Amazon have followed a long history of what Mike Davis (2000: 2) calls *Mexicanisation* by

constructing a distribution facility in a poor district in Tijuana (see Figure 42 below) that puts to use superexploited Mexican labour by moving goods across the border to San Diego to exploit a tax loophole on Chinese manufactured goods.

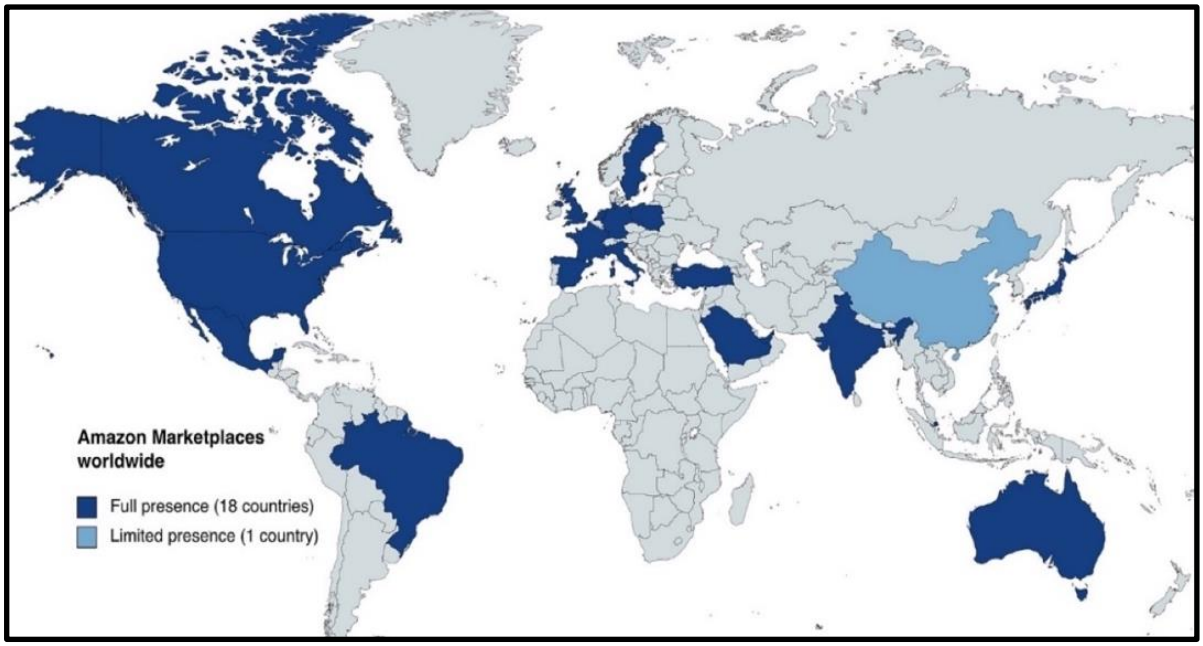


Figure 41 Map of Amazon Marketplaces Worldwide (LordParsifal © [2021]) Available at: https://en.wikipedia.org/wiki/Amazon_Marketplace#/media/File:Amazon_Marketplaces_worldwide_in_2021.jpg

Figure 42 Images of a newly assembled Amazon fulfilment centre in Tijuana, Mexico. The warehouse sits right on the border with California (where 30% of global freight travels), 25 minutes from Amazon's FC in San Diego County – the largest in the US. Available at: https://www.businessinsider.com/amazon-warehouse-tijuana-mexico-viral-photo-2021-9?r=US&IR=T

The platform's developmental trajectory in the UK has varied slightly in that Amazon's presence dates back several decades. Nonetheless, Amazon had only 7 physical sites in Britain prior to 2012, suggesting that it too was part of the platform's drive in the 2010s

when e-commerce was rising exponentially. Moreover, the UK – along with Germany, Japan and North America – is where 95% of Amazon's e-commerce revenues derive from, since only in these countries was the infrastructural capacity and sufficient scale established early doors so as to avoid playing 'catch up' with local competitors (Dawson, 2015). The ability for the platform to reach Prime customers by clustering facilities around major population densities was therefore critical to its short-term revenues. Owing to the politics of scale, the UK is one of few countries where Amazon have periodically generated revenues.

Critically, Amazon were able to achieve this feat and expand where other logistics providers might have fallen short because of the process of 'cross-subsidisation'. According to Nick Srnicek (2017: 64-65) in his book *Platform Capitalism*, this tactic is leveraged in such times where market concentration is the most crucial aspect to future growth by using one arm of the firm to subsidise the price of a service elsewhere. Cross-subsidisation – deriving predominantly from Amazon Web Services (AWS), where Amazon charge a digital rent in exchange for cloud computing space (for which it dominates that market thanks to a similarly impressive and intensive physical nexus of data farms) – allows Amazon to keep the cost of Prime low whilst it unfolds it platform power through infrastructuralisation and draws more users into its network. From there, the totalising advantages of *network effects* play out in full force, allowing for rapid growth and scaling up of territory. Given the capital-intensive nature of operating logistical spaces of distribution, the practice of cross-subsidisation was central to Amazon's North Eastern conquest in the penultimate years of the 2010s. As online sales increased exponentially, speculative development slowed, and we witnessed the return of prime rental growth particularly for mid-box units (Thame, 2020), such a strategy proved indispensable to the generation of revenue in the face of what can now be classified as a decade of stagnant growth in the British economy.

As a final note on this, the political and economic impacts of Britain's departure from the European Union need be evaluated in and amongst the global events laid out above, for Brexit materially alters the logistical ground game significantly for smaller online sellers in the UK in such a way that inevitably benefits Amazon. Outside the EU and the single market trading bloc, full customs declarations are required for imports and exports to and from existing EU member states. The withdrawal of freedom of movement for commodity flows thus generates supply-chain friction that will ultimately require British e-commerce providers to store more inventory in the mainland or face devaluation of their capital

(Meldner, 2020). With the aforementioned warehousing challenges that come with rising rents and land scarcity, many firms will have no other option but to store inventory in the countless Amazon fulfilment centres embedded in Britain's mobility belt. Stationed as third-party marketplace sellers who are dependent on Amazon's fulfilment network, the platform, as it was designed to do, can then extract rent and consumer data, in turn propagating its coverage and clout. In the North East – which voted overwhelmingly to leave due to what scholars have described as the product of post-industrial 'modes of uncertainty' (Anderson et al., 2019; Ringel, 2020) and neoliberalism's 'slow motion social dislocation' (Telford and Wistow, 2019) – research by the Chamber of Commerce found that 75% of respondents spoke of the logistical challenges of post-Brexit trade, with 66.7% confirming they had been impacted by port congestion, delays, and a shortage of hauliers since January (Simpson, 2021). In such a climate, Amazon's auspicious stature in the region as a last-mile distribution hub leaves them in a privileged position to mop up the competition and capture third-party sellers. Offering a service that few others can match, Amazon looks to be taking full advantage of 'Brexit Britain', a term that has become synonymous with the hollowing out of the British economy through 'supply-side reform'.

From the financial crisis, through Brexit, to the more recent oscillations of the coronavirus pandemic, Amazon – with their bottomless pockets and unyielding physical presence – come out on top. These global forces culminated in the conglomerate plonking their stakes in the overgrown shrubbery of the eastern periphery of Darlington in the spring of 2018, unveiling an additional string to their bow that dragged the North East into Amazon's fulfilment network and continued the pattern of Amazonification that had quickly been engulfing the United Kingdom throughout the 2010s. A dialectical pattern, the more frequented Amazons online services become the more they can build out their operations in the material world, in turn optimising the very same services that draw people to the platform. This pattern (or cycle), where more users beget more users, swallowing up space in the process, is a form of pseudo-monopolisation that outlines how platforms have a tendency towards monopolisation (Srnicek, 2017: 45). It is the physical presence of the company in peripheral regions like Darlington, a soffit of its mega-structural network, that solidify this, and ultimately indicate that there is "no end in sight … I mean it's years out…", as one real estate director put it, to the warehouse boom driven by Amazon's building spree (Vuocolo, 2021). The spatial dynamics of this spree are all that are left to be unpacked, chiefly through an analysis of the construction of infrastructure.

5.5 Priming for Prime: Customised Infrastructural Space and Amazon Under Construction

As this chapter has so far shown, it takes any number of different interdependent political and business agents working at various scales of governance in an economic climate bent in their favour to engage in the act of space-making before a shovel is even put in the ground. Returning to the local then, what about when the planning permission is granted, the pre-let is agreed, the engines turn on and the concrete and steel begin to be laid over the soil? Amazon are not unaccustomed to converting existing facilities into spaces of fulfilment, in the US going so far as to repurpose disused shopping centres (Miranda, 2021). Still, the long-term trajectory of the platform looks to belong to self-developed sites in which Amazon are gifted with a blank canvas on which to scale up intricately engineered structures designed specifically for package fulfilment in an increasingly automated environment (see Figures 43 and 44 below). The stretch of disused land Tritax Symmetry agreed with Durham Cathedral to develop for Amazon spans 90 acres in total, 34 acres of which consists of the fulfilment centre and its ancillary infrastructure (parking, internal roads etc.), with the remainder recently approved for an additional 630,000 square foot warehouse along with a neo-feudal style collection of neighbouring hotels, pubs, restaurants and cafes that altogether, at an anticipated development value of around £30m, would bring an additional 700 agency-procured jobs to the region on top of the 1000+ already created (Robson, 2020).

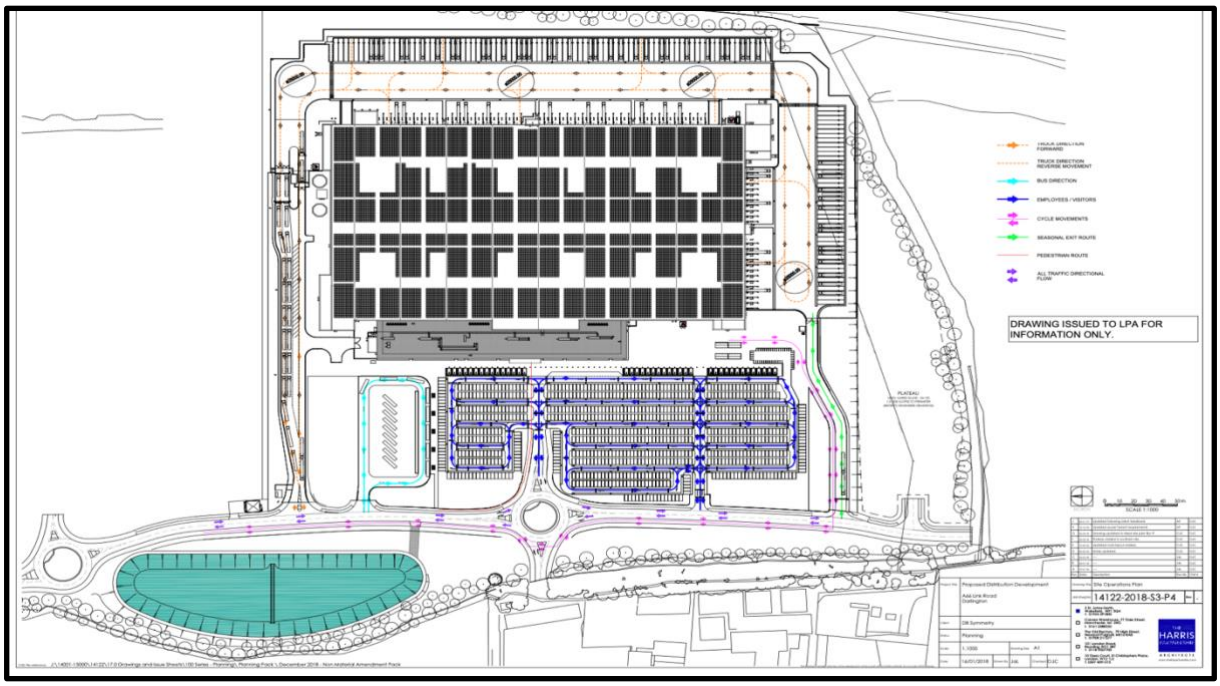


Figure 43 Site Operation Plan. Proposed Distribution Development. A66 Link Road, Darlington. *Darington Borough Council Planning. 18 Jan 2019.*

Figure 44 3D Warehouse Roof Plant Views. Proposed Distribution Development. A66 Link Road, Darlington. *Darington Borough Council Planning. 15 July 2019.*

This sort of construction has been the norm since the 1990s when the fragmentation and commercialisation of regional development created an entirely new way of delivering infrastructure. As Peck (1996) details in *Regional Development and the Production of Space: The Role of Infrastructure in the Attraction of New Inward Investment*, the relationship between the public and private sphere has been inverted when it comes to influence over infrastructural projects. Infrastructure is no longer planned by local authorities and then offered to private capital. Rather, infrastructural space is increasingly customised by private capital in the planning process, making for what Peck describes as *customised infrastructural space*. As space has grown more central to capital accumulation (as chapters 1-3 outline), large investors no longer make decisions based solely on the particularities of the local labour force it can deploy as a means to control the labour process, but on account of their ability to control the physical environment as well. When it comes to locality, land is the most important factor. Much like the shift from push to pull production that characterises flexible accumulation in the contemporary supply-chain, customised infrastructural space describes a demand-led approach to the production of space that attempts to match the specific requirements of the *end user* to broader regional development objectives (Peck, 1996: 331).

To the benefit of this research, since both are examples of inward infrastructural investment targeted at the North East, Peck offers Nissan's investment in the Sunderland in the 1980s and 90s to demonstrate this shift, when the Japanese firm built a car manufacturing plant on the site of the former RAF Usworth airfield near the A19 and A1231. A lot of this land was part of the 'unofficial green belt' (much like the edgelands discussed in the last chapter), now free of compulsory purchase orders and planning restrictions thanks to the maximum powers and subsidies leveraged by local and central government to support inward investment (Garrahan and Stewart, 1992: 41-2). Because of the size and complexity of its operations, the ability for Nissan to mould spaces of production in its own image became an integral part of the negotiation process with regional developers. The topic of these negotiations involved modifications to building

layout, reservicing of sites, and assurances about off-site developments including the construction of new transportation pathways (Peck, 1996: 333). The latter of these played out when Nissan decided to reroute their exports to the continent from port facilities on the River Tees to the River Tyne, striking a deal with The Port of Tyne Authority to infrastructuralise the south bank of the river for such purposes. Evidently, customised infrastructural space does not just command the total domination of conceived space over lived space (Lefebvre, 1991: 362) in terms of its sites of production, but also the streams of flow that support that production.

Additionally, inward investors also seek reassurances about the spaces in which their infrastructural regimes look to *expand into*. According to Garrahan and Stewart (1992: 40-1), when Nissan initially signed the development contract in March 1984, the local planning authority at the Borough of Sunderland accepted the stipulation that Nissan ought to have the option to buy a significant proportion of the land originally on offer – a total of 733 acres (a much larger area than one single manufacturing plant would normally require). There being near total secrecy surrounding these negotiations and limited media coverage, minimal public awareness about the land sale made for some tensions later down the line. Peck (1996: 337) highlights how Nissan expressed strong opposition to a proposal by Sunderland Football Club to locate a new sports complex on land immediately adjacent to the assembly plant, arguing that increased volumes of traffic in the area would impede the firm's just-in-time supply-chain model: "even a delay of 25 minutes, as predicted by their own consultants, could seriously impair their operations". The political power of the firm over local authorities in the regional war for jobs and cash was made evident when Sunderland FC were forced to withdraw their interest in the site, even after a heated period of 'open warfare' between Nissan and the Chairman of Sunderland, Bob Murray (Peck, 1996: 337). These developments show the leverage private capital possesses in supplanting the public authority as the effective planning and development agency for regional development projects. The degree of customisation to produce these specially engineered spaces only intensifies when we begin to inspect Amazon's infrastructural investments, as this chapter will finish with. Firstly, a word about the construction *process*.

Construction of an Amazon warehouse entails an intense ground operation that inevitably runs up against a variety of hurdles owing to time sensitivity, coordination interdependence and labour shortages. Developers synchronise multiple processes that

must happen all at once or in quick succession, factoring in time delays from contractors that are often as unpredictable as they are unavoidable. Ironically but certainly not surprisingly, building a distribution warehouse presents its own logistical challenges that demand the use of *just-in-time* construction logistics solutions of 'total-cost analysis' (Cowen, 2014: 34). As Janné (2018: iii) writes, because the end products of construction projects are produced at their place of consumption,

> a multitude of materials and resources need to be delivered to, and removed from, each construction site. This leads to new transport flows being created in urban areas … [which are] subjected to space limitations, environmental demands, accessibility demands and noise restrictions. This has led to a situation where material deliveries to construction sites needs to be coordinated and managed in ways that reduce their impact on the urban transport system and at the same time ensuring efficient construction projects.

Evidently, whilst a fundamentally global trend, the scaling up of architectural structures of fulfilment comes up against the friction embedded in local flows of materials and people, all too often demanding lengthy 'around the clock' working hours that give the Marxian theory of generating surplus value via the *extension of the working day* a second wind. Watching a time-lapse of the assembly of Amazon's Verdion iPort fulfilment centre in Doncaster in 2016 (YouTube, 2017), one accepts the degree to which construction pivots on a dynamic and uninterrupted flow of cranes, diggers, rollers, concrete mixer trucks, cherry pickers, lorries, vans, cars, tractors etc. in a choreographed symphony, all acting as separate entities yet dependent on one another in the service of a greater force. In Darlington, the lean arrangement of transport flowing to and from the Symmetry Park construction site (see Figure 45 below) along post-Brexit supply-chains would have enabled spatial planners and supply-chain managers to put Darlington's peripheral infrastructure to the test for the first time, with trucks carrying asphalt mimicking the inbound freight of pallet loads of consumer goods that would soon become a weekly reality. This came at a time when concerns had already been raised by Darlington residents over the impact of vehicles entering and leaving the site would have on the surrounding infrastructure, particularly around the southern bypass, prompting Darlington Borough Council to promote the somewhat farfetched and poorly judged 'Wheels for Work' scheme that would offer workers cheap loans for mopeds in a bid to reduce congestion (Gullon,

2019). Amazon made no indication of subsidising this scheme, which was described as a "drop in the ocean" for what was required (Northern Echo, 2019).

Figure 45 *The Amazon site while under construction at Symmetry Park. (Sarah Caldecott* © [2020]). Available at: https://www.thenorthernecho.co.uk/news/18440030.amazons-first-fulfilment-centre-north-east-officially-opens-darlington/

When it comes to the act of construction itself, the majority of developments will involve the use of diggers to move soil materials in preparation for rudimentary priming techniques like aggregate base coursing, concrete curbing, and hot mix paving. Even the preceding process of 'staking out' the land demands precision, like soil samples gathered for geological and environmental considerations or post-construction assessments to analyse for potential contamination. As the beginnings of this chapter emphasised, these practices remind us of the horizontal value of the ground to the production of spaces of flow. Lyster (2016, 157-67) makes clear that where conventional architecture has suppressed the ground as background fodder, the architectural shells of logistical spaces render 'ground thinking' as the de-facto space where developing conditions of urbanisation could play out; a catalyst hosting the critical systems of a city from drainage to hydrological and information flows. Nowhere is this more apparent than with the fulfilment centre. In so-called 'advanced robotic' sorting sites that are the norm for current and future developments, the ground is the dominant feature and the primary experience of space, supported by structural mezzanine floors. Cameras attached to Automated Guided Vehicles (AGVs), known formally as Kiva Systems and now Amazon Robotics after they

bought out the AGVs parent company, read barcodes disseminated on the warehouse floor, whisking the AGVs along the surface at a low centre of gravity via a navigational grid of magnetic strips. Even in sites where labour performs a slightly less subservient role (insofar as they are not decked out with the same levels of tech) walking up to ten miles a day to locate items from pods for picking, tracking software used by 'pickers' digitally fixes their position onto peel-and-stick barcodes layering the floor surface, feeding this information back to computers that map workers' position in real-time (Lyster, 2016: 158-62).

These critical operations around which the pursuit of mobility and flow balance stress the need for developers to see nature as an artificial product in conquering it (2016: 161); recognising the *ground as subject* in terraforming it. What these developments conceal over the course of their construction is an underground labyrinth of cables and utilities that connect a seemingly divorced space to a much larger infrastructural network. As Nicole Starosielski (2015: 2, 38) writes, cable infrastructures remain firmly tethered to the earth, anchored in a grid of material and cultural coordinates that are unaffected by atmospheric conditions and sunspot activity. When a Prime order is placed, information flows in real-time from a cloud server via fibre optics the width of garden hoses buried beneath the earth to a fulfilment site, where it is digitally conveyed through a computer interface that produces a series of abstract instructions in the form of physical directions and movements for a picker to follow. This, as Bridle (2018: 103) writes, is "where the great networks of digital technologies become steel and wire: where they become infrastructure". Once this process has passed through the packing stage and is nearing departure, the same plexus of cybernetic protocols feeds back the information through the network and corrects the system to represent its present trajectory in space, where it will either be refined again at a 'sortation centre' or be ready for couriering along Britain's networks of roads. Somewhere along the way, the digital and the physical mesh to the point that it proves difficult to determine where one ends and the other starts. As Bratton notes (2015: 132), "as each switch in the landscape of logistical infrastructures increases in its ability to route bits, it also increases the ability to route the real objects those bits represent". These processes might start with the click of a button, but they are made in horizontal structures of reinforced concrete and copper that take months, sometimes years to develop. Thus, whilst efforts to untangle the material from the informational in these settings might well be futile, logistical infrastructures nonetheless retain an

unrivalled impact on the spatial environment. Not least because, as much of the above analysis shows, they are seldom confined to the four walls of the distribution centre alone. Logistics infrastructuralisation implicates everything in its path, be that the building of surrounding roads and roundabouts as physical linkages, or the installation of optical fibres as digital chains. This was evidenced in 2019 when the development in Darlington was met by hostility from locals after an agreement was struck between Amazon and Virgin Media to dig up roads and pavements in the surrounding areas at a rate of knots to fit internet lines caused everyday disruption for several months (see Figure 46 below). The point is that logistics is *architecture as infrastructure*, and every so often infrastructuralisation involves literally plugging local spaces into larger mega-structural networks. When landscapes become integrated as modular components within much larger networks that are designed to serve functions that far surpass their regional and geographical proximity, transformations occur on levels that equally cannot be said to exist within the confines of the designs of those networks. This is why Bratton (2015: 367) conceptualises 'The Stack' – a design model for thinking about the vertically layered structure of computation that scales the planet – as being an *accidental* megastructure rather than a planetary system that is necessarily in control of its own existence and development.

Figure 46 '*NOT HAPPY: Bob Armstrong pictured on the ramp which has been put in place during electrical work on Hundens Lane. He says residents have struggled to get in and out.*' From the Northern Echo (2019). Available at: https://www.thenorthernecho.co.uk/business/17521954.cabling-work-darlingtons-new-amazon-site-preventing-residents-leaving-home/

As with Nissan in Sunderland, it becomes abundantly clear when examining the transport networks and link roads that surround Amazon's Darlington facility that infrastructuralisation is unremitting; its expansionary logic quickly demands more of the

built environment to cater for the uptake in freight traffic flowing to and from the site. Such is part of the impetus behind plans by Tees Valley Mayor Ben Houchen for a new 'Darlington Northern Link Road' outlined in November of 2020, a progression of the *Tees Valley Combined Authority Tees Valley Strategic Economic Plan (2016-2026).* The preferred route (one of three) proposes a single carriageway road beginning from a newly formed large roundabout at Little Burton off the A1150, running over the River Skeme before slicing north through greenfield like a knife (see Figure 47 below) via the north east of Brampton and Brafferton, eventually linking up with the A1(M) Junction 59 north of the river.

Figure 47 *Extract from visualisation of Darlington Northern Link Road*. Taken from Darlington Northern Link Road Brochure (Tees Valley Combined Authority and Tess Valley Mayor). Available at: https://teesvalley-ca.gov.uk/wp-content/uploads/2020/12/DNLR-Brochure-Design-Web-version-1.pdf

The *force majeure* of the proposal comes in relation to growing concerns about the limits of the A167 and A1150 in absorbing freight traffic travelling to and from the A1(M) to Teesport. The friction in these routes often necessitates the strategic use of so-called 'rat runs' as shortcuts that bypass congested roads to shave time off transit – a prerequisite in the pursuit of shorter turnover-times. Rat running, understood as an instrument of time-space compression (Harvey, 1989) that leverages local knowledge of transport routes, negatively impacts residential streets and country lanes not primarily intended for large volumes of traffic, particularly lorries that take up a significant proportion of usually narrow roads. The burden of *things in motion* always delivers unintended and unwanted

consequences for local areas and communities, and Amazon's Darlington conquest is no exception to that rule. Even before the platform's entrance into the town, the unclassified country lanes to the North of Darlington were often used as rat runs (not least in peak-time traffic flows) as a means to go north. With time-as-money and transport links as tools of compression, it is little wonder that the new link road promises to save up to 250,000 hours of delay per year (Tees Valley Combined Authority, 2020).

What these proposals indicate is that the catalyst driving the spatial development of local regions increasingly bends towards the infrastructures of contemporary B2C logistics, themselves a spatial phenomenon that arises in the wake of the collapse of the Fordist city. In the process, local areas become prisoners to greater economic networks of mobility, *spaces of flow* that dictate how we mould the physical world around us: logisticalise or die. Just as Nissan were the end-users of customised infrastructural space in the North East thirty years ago, Amazon are today the recipients of their own specific demands that hold little public accountability (Peck, 1996: 329). Their investment in the area hinges on the ability to ascend over the built environment, which knows no ends. At the time of writing, Amazon are busy solidifying their value chains in the North East. Encouraged by the Northern Link Road, the platform is in talks (along with several other companies) with the mayor of Tees Valley to convert 270 million acres of disused land on the southside of Teesside Airport into a business park that would include two million square feet of logistics, distribution and industrial buildings to link up commodity flows from other countries directly to the region. Adding an international pathway to its fulfilment network would grant Amazon the capacity to receive and send parcels from other countries directly through the North East. This will be accompanied by plans that are already underway for an access road between the airport and the A67, further strengthening Teesside's logistics network and enabling Houchen's ambitions to make Teesside Airport the "number one centre for cargo and freight in the North of England" (Scott, 2021). As we finish by returning to Darlington, we ought to recognise that the construction of a single warehouse is like nesting behaviour amongst bees: once they have firmly settled on a location, bees *build out* their colonies, using heat to cause the cell walls of combs to melt, thereby flattening them together to form hexagons that optimise space for the storage of honey. Distribution networks are not nearly as centralised, but nonetheless trigger a multiplier effect once a connection to a place has been established, fashioning link roads to fold the different nodes into one another in smoothing out space for faster circulation.

Expect this to only be the start of Amazon's fulfilment network in the North East as it gradually becomes England's equivalent to the Interporto (from chapter three) or Inland Empire (from the introduction).

5.6 Concluding Remarks to Chapter Five

Early in 2020, after month upon month of earthly domination, following years if not decades of spatial and economic planning, Amazon's Darlington project was finally unveiled (see Figure 48 below), hosting a structure that far surpasses the scale and stature of any buildings that came out of the industrial revolution. And yet, unlike many of the factories of yesteryear, the fulfilment centre in Darlington does not *loom* over the town but rather *lingers* in its periphery, not quite out of mind but not providing much of what Žižek (2009) meant by a 'parallactic' view (the apparent motion of an object gazed upon from multiple perspectives). Its horizontal nature behaves in a spectral way, persistently and disturbingly present yet falling outside of streams of consciousness. In this sense, it has achieved what it set out to do: become infrastructure. Where the wool manufacturers and steelworks of the Fordist city were spatially central structures that orbited communities around them, Amazon's centrality in the postmodern geographies of the no-longer-industrial city plays out in an entirely different form. That is, through existing as a service that is *mentally* embedded within the populace.

Figure 48 Aerial view of the newly opened Amazon fulfilment centre stretching over the eastern fringes of Darlington. (Tritax Symmetry © [2020]) Available at: https://tritaxsymmetry.com/latest-news/symmetry-park-darlington-welcomes-amazon-creating-1000-jobs/

Browsing the below the line comments of the aforementioned *Northern Echo* article covering the disruption caused by the cabling work on Darlington's Amazon site, this rings true. One from the user 'nikkiknackinoonoo' reads, "Amazon Prime can deliver anything you need to your home within 1 hour so anyone trapped need not panic … the miserable looking man in the photo (who has clearly managed to leave his house) wants to think [himself] lucky that he is benefitting from a gigantic [international] organisation on his doorstep". Another, this time from 'Itsfine', states, "These people think cables and pipes magically bury themselves. Too much time on their hands". 'Neastm39' adds, "Shock horror, road dug up briefly in the name of progress! quick someone be outraged.pmsl". These comments reflect growing attitudes towards Amazon not only as an 'olive branch' to regions forsaken by globalisation and post-industrial neglect, but an embrace of the future – a future in the conglomerate's image. Evidently, these sorts of infrastructural projects do not magically bury themselves. Nevertheless, they see no reason to conform to the sovereignty of the land-bounded nation-state (Bratton 2015: 4), what Keller Easterling (2014) has termed *extrastatecraft*. Amazon are the new masters of infrastructure space, the "epitome of contemporary logistical intelligence" (Lyster, 2016: 119), irreversibly altering the landscape right under our noses.

Not all local communities and indeed councils are so welcoming of the platform's activities, mind you. In Scotch Corner near Richmond in North Yorkshire in 2022, Middleton Tyas Council voiced their concerns to district planners about the one million square foot warehouse scheduled to be developed near the A1(M) and main A66 trans-Pennine route thought to belong to Amazon. They argued that the enormity of the development will inflict substantial harm on the environment, people and the surrounding area, its existence sacrificing 60 acres of productive agricultural land, bringing unwanted HGVs, and setting "an undesirable precedent for future development" (Gleeson, 2022). This research has registered an interest precisely with this precedent, using Darlington as a case study, in order to identify a spatial and geographical gap in the mounting literature on Amazon as its ubiquity in our everyday lives deepens.

Amazon is fast becoming a permanent part of our imaginary. It is relatively common today, amidst the endless *search for stuff*, to be met with the question "have you Amazoned it?" For Amazon to be so universal that it has managed to implant itself into the lexicon of our times, it must rule the roost over the landscape. As simple as it sounds, you cannot have the 'everything store' without storing everything, everywhere, all of the time. Far from being

an immaterial phenomenon as the ontology of the digital economy might let on, convenience of this magnitude comes at a cost that is as spatially intensive as it is intensive on waged labourers, therefore the quicker and slicker these supply-chains the more control they command over the built environment as well as human energy. Specially engineered spaces of distribution are the fulcrum of rapid delivery turnovers, and thus become the subject of much attention and speculation from planners and architects. Recall from chapter two that the *annihilation of space by time* (Harvey, 1989) is itself contingent on the *production of space* (Smith, 1984), executed via dominant *representations of space* (Lefebvre, 1991). The currents of deindustrialisation in the West brought space back on the agenda by shattering the spatial consensus that delivered industrialism (Soja, 1989), turning all that was solid into air. But they also pried open the possibility for the physical terrain to be reimagined by the intellectual capital, the technicians, and engineers (as Foucault pinpointed) of our age. As Marx (Marx and Engels, 1972: 63) wrote in *The Germany Ideology*, "ideas of the ruling class are in every epoch the ruling ideas". To achieve flexible accumulation (how the crisis of Fordism was imagined to be overcome), hegemony had to take to space like never before; to alter the environs in the name of *flow*. It may often feel as if towns and cities transform at a pace and will of no one individual, not least for those who reside there. But the purpose of transformation remains clear: capital, being value-in-motion, needs assistance at the level of infrastructure space to weld together value chains that guarantee its exceptionally fast realisation and reproduction.

In several decades' time, we may look at the scale of Amazon's physical territory around the globe as if it were part of the furniture, impenetrable infrastructure to any town, city or place connected to the planetary-scale computation (Bratton, 2015) of a modern, post-architectural world of landscape urbanism (Waldheim, 2016). Those looking back through history in search of answers would do well to reserve a spot for how Amazon's spatial expansion occurred on a local level. This chapter made an attempt at this through the lens of geographical materialism, endeavouring to produce a critical account of the logistical infrastructuralisation of Darlington as the economic tide of the region turns in the direction of mobilities-based growth. It is one thing to standardise design as is the case with the 'fulfilment centre', but to map these designs onto the disorganised landscapes of the world's unevenly developed geographies requires a whole other level of mastery of space. Beginning with an exploration of Amazon's UK fulfilment network, it registered the

geographical logic of distribution that amplified an urban corridor of logistics clusters in the East Midlands. In recognising the limitations of the Golden Triangle of logistics in terms of both its capacity and being at odds with the contemporary 'pull' pressures of B2C e-commerce logistics, it then conceived of the North East as part of Amazon's pursuit of the guarantee of instantaneous consumption – consumption made possible by last-mile infrastructuralisation. Here it engaged with the specifics that brought Amazon to Darlington, including the locational pull of Link 66 and its rurban character, the business actors involved and their interests, and the planning history of the land and its journey through time. Upon reflection of long-held recognition of the landscape's properties by local authorities, this chapter temporarily adjusted the lens to explain Amazon's exact emergence in Darlington as belonging to a convergence of historically significant events, processes and trends located predominantly in the realm of a post-Crash, post-Brexit economy. Superimposing the global onto the local allowed for an understanding of Amazon as a platform that can be responsible for both the future trajectory of the entire industry of e-commerce (and its many consequences) and the electrical work on Hudens Lane in Darlington. This paved the way for a final discussion of Amazon as a thoroughly material entity, one that seeks to sink itself into local areas so as to operate as customised infrastructural space that has monopoly rule over spatial production. It provided a means to demystify Amazon from its digital ontology by chronicling it through the elements – soil, concrete, copper, and the like. Amazon assumes a physical form when it seeks to stitch localities into its mega-structural network, deploying *just-in-time* construction logistics to dominate nature and exploit the ground in the pursuit of mobility. In establishing cybernetic connections to the local such as fibre optics burrowed beneath the surface, Amazon move one step to closer to infrastructural singularity. Amazon's mega-retail platform and flat commerce ontology of objects lays claim to even the most unlikely geographies as extensions of its architectural-urban footprint (Bratton, 2015a: 44). These, Bratton (2015a: 47-8) describes, are The Stack's 'megastructural theatres' or 'planetary super-surfaces' that, in being architectures *of and for things*, elevate the relative freedoms of physical objects above and beyond anything political citizenship has guaranteed its human subjects.

Living near an Amazon warehouse, one's senses are polluted in two ways: via noise and air pollution through the constant growl of moving engines and the fumes those engines emit, and, in the more profound sense, via the pollution of our perceptions as the

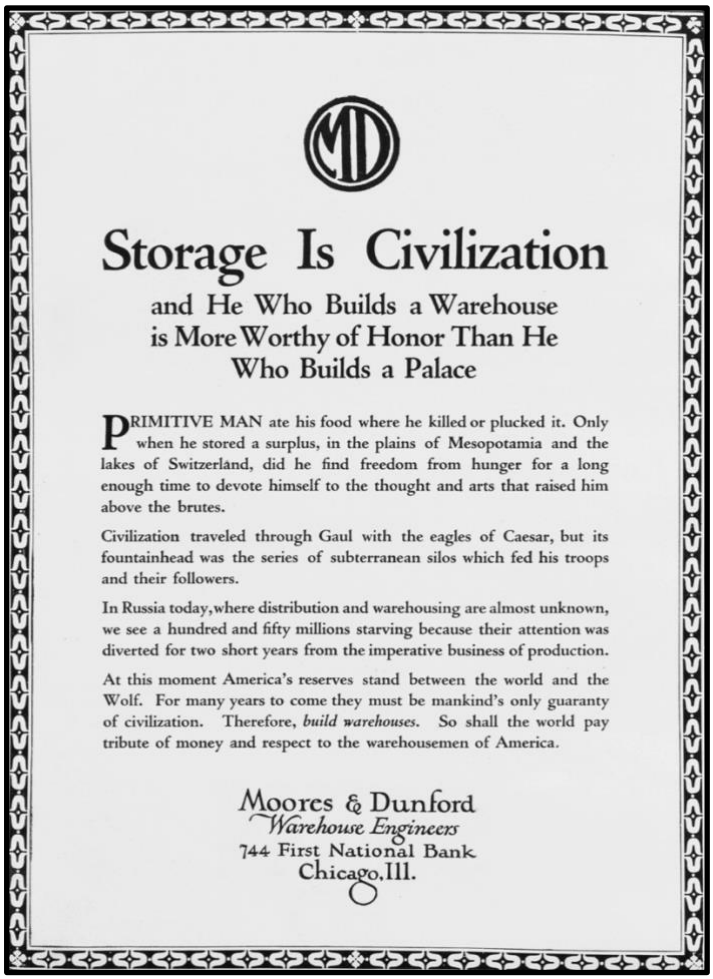
combination of digital and physical infrastructures render buying online insensible beyond the geography of the screen (Hill, 2020: 532). As an urban form, this is one of *architecture as infrastructure* and *infrastructure as service* (Kulkarni et al., 2012). The point of Amazon, or any platform for that matter, is to become an immovable part of our everyday lives. Companies and people engage in exchange to benefit from Amazon's advanced infrastructure; in turn the fees paid by these customers help to support the cost of that infrastructure (Cronin, 2014: 56). This is essentially what Sergo chief executive David Sleath meant when he said recently, responding to a question about what soulless big-box architecture does to the countryside, that "ultimately the consumer decides what gets built … what we are doing is trying to facilitate that: we're very thoughtful about what we build and where we build it" (Partridge, 2021). The consumer, compelled by the need to fulfil their desires through ubiquitous consumption, tacitly give the green light for new construction projects to facilitate it.

To return to the introduction then, infrastructure is about instrumentalism. Naked functionality is now the predominant method of spatial thinking. There is a comparison to be made here with digital space. As Cronin (2014: 49) highlights, Amazon's website in 1995 is a far cry from what we are familiar with today. Sellers had more autonomy to make their own design choices about how to illustrate products and "often such decisions were based on the aesthetic of the site designer". This all changed when developers acknowledged a need to engineer interfaces for specific ends like data mining, visitor engagement, and the best way to manage the checkout process so that customers do not abandon their online shopping carts. Albeit over a vastly superior stretch of time, much the same process has occurred in the realm of architectural space. The preoccupation with aesthetics was abandoned in favour of thinking through spatial design in a functional manner that prioritised the 'three great variables' of territory, communication and speed, as Foucault (Foucault and Rabinow, 1984: 244) put it. This elevated a new segment of the ruling class to advance the ruling ideas of the epoch. Today that epoch belongs to Amazon, who transcend nation sovereignty in shaping entire regions in the image of a society in which the world is brought to us rather than bringing us to the world (Rosa, 2015: 101). Creating a world in which there is no physical, mental or democratic buffer between a transnational corporation and a local community, no matter how remote, is the aim, and logisticalisation is the method. The more fingers Amazon have in the infrastructural pies of local terrains, the more it can enhance its competitive advantage through minimising

(or even diminishing) its reliance on third-party delivery companies, taking the platform one step closer to overseeing the total organisation of all the world's physical commodities (Hill, 2020: 4). In a decade or so's time, Amazon might well own the very equipment used by manufacturers who supply components for the construction of Amazon fulfilment centres – total-cost logistics taken to the extreme. This, according to a piece titled '*Amazon is coming for the construction industry'* (Powers, 2020), is because Amazon's data monitoring of the sales on its platform gives it the greatest possible insight as to which markets to vertically integrate in to. Vertical integration on this scale requires supply-chain power only found in companies with hefty capital investment in computing and logistics infrastructure. Amazon's Darlington ingress provides us with a look-in regarding how this process materially transpires on a provincial scale.

Conclusion | After The Unthinking of Amazon

In 2010 the American multinational UPS, specialising in shipping, receiving and supply-chain management, launched a publicity campaign called 'We <3 Logistics' to celebrate how its shipping and transport operations transverse a 'frictionless' globe to the delight of their customers. To the tune of Dean Martin's 'That's Amore', UPS adverts rang: "When technology knows, right where everything goes, that's logistics". This marketing gimmick encapsulates the theoretical positioning of logistics under capitalism. As Jesse LeCavalier (2012: 90) wrote, this was UPS's attempt to humanise, animate and personalise what is largely a technologically driven field, connecting what is often regarded as belonging solely to the domain of technocrats and engineers to the social world – its lifeblood. Logistics indeed has a long history of communicating its social value. In a 1922 advertisement for the publication *Distribution & Warehousing,* Warehouse Engineering company Moores & Dunford declared "storage is civilisation", underscoring the critical contribution of logistics for the freedom of society from the dark ages, or from the 'Wolf' (see Figure 49 below).



Storage Is Civilization

and He Who Builds a Warehouse is More Worthy of Honor Than He Who Builds a Palace

PRIMITIVE MAN ate his food where he killed or plucked it. Only when he stored a surplus, in the plains of Mesopotamia and the lakes of Switzerland, did he find freedom from hunger for a long enough time to devote himself to the thought and arts that raised him above the brutes.

Civilization traveled through Gaul with the eagles of Caesar, but its fountainhead was the series of subterranean silos which fed his troops and their followers.

In Russia today, where distribution and warehousing are almost unknown, we see a hundred and fifty millions starving because their attention was diverted for two short years from the imperative business of production.

At this moment America's reserves stand between the world and the Wolf. For many years to come they must be mankind's only guaranty of civilization. Therefore, *build warehouses.* So shall the world pay tribute of money and respect to the warehousemen of America.

Moores & Dunford
Warehouse Engineers
744 First National Bank
Chicago, Ill.

Figure 49 Advertisement from Distribution & Warehousing, April 1922. Taken from Orenstein (2019: 32).

Inadvertently, the acknowledgement in this twentieth century advert of how warehouses allowed for the creation of *surplus* is akin to a textbook historical materialist analysis of the evolution of the capitalist system as constituted through a change in the material relations of production. It draws a connection between the production of space and the development of mass society. The ad continues: "For many years to come [warehouses] must be mankind's only guaranty of civilisation. Therefore, *build warehouses"*. Evidently, this was more than just an accreditation – it was a call to arms.

In recent years, this attitude towards logistics as a world-making enterprise (LeCavalier, 2012: 91) has extended to Amazon, but in a manner all the more consistent with late capitalism in which freedom becomes synonymous with consumer desire, or rather *fulfilment.* In 2012 Amazon ran a televised ad with the tag line "Connecting your mouse to your front door was our moon landing", to emphasise the epochal embrace of retail logistics and the platform's place in the history books. Reflecting on its personal contribution to modern consumer society, Amazon is keen to stress the magnitude of its multiscalar socio-technical network. Contemplating this tag line, Hill (2020: 522) argues that the danger of mobilising the rhetoric of the space race to describe the machinations of online retail is that it reproduces the ontology of *weightlessness* that inundates dominant conceptions of the 'fourth industrial revolution': effectively talking up the technological side of superfast delivery without the material and human components that ratify it. It is not an exception but the rule that users are rendered oblivious to the extensive procedures involved in online delivery. In doing so, any critical engagement with Amazon as an infrastructural behemoth, one that is actively intervening in the territorial and architectural trajectories of the urban realm, is undermined. Whether or not logistics is 'world-making', it is undoubtably *space-making*.

As this research has argued, where once buildings were defined by prescribed, stable and discrete envelopes, Amazon are amongst the capitalist firms that have instigated the shift towards an architectural system rooted in the logic of network thinking, creating what LeCavalier (2012: 93) has described as a hybridity of configurable, fluid and connected interiors that together promote the 'restlessness of objects'. This restlessness – the constant and unremitting movement of commodities from their point of production to their point of consumption – is central to capitalism's hegemonic regime of flexible accumulation. Thus the declaration to *build warehouses* is as much an admission that logistics is the life support for civilisation as it is for the continued survival of the capitalist

way of life. The way that logistics emphasises awareness, foresight, and preparedness (LeCavalier, 2012: 91), itself an outgrowth of a military history, signifies how society has truly come to terms with the idea that capital is *value in motion* and that dead-time is the enemy of progress. If "all crises are crises of realisation" (Harvey, 2018: 194, 85), then a retail logistics system is a techno-spatial fix to the contradictions of the capitalist mode of production. Amazon's platform logistics model is thus one such expression of the post-Fordist distinction collapse between making and moving. Deploying a computationally rationalised logistics system that mediates exchanges between market actors confirms how rent-seeking *extraction* via platform infrastructures can guarantee a better source of revenue than the emphasis in the older Fordist model on profit from conventional forms of commodity production earlier in the cycle of the commodity's lifespan. Adding value to existing commodity flows derived from the global pool of value through adopting the network thinking of infrastructural intermediation – a set of feudal relations that have exploded inside the structural imperatives of the capitalist system – has proved, for Amazon at least, to be an extremely valuable mode of productive activity, setting a precedent that Ludwig Von Mises and Friedrich Hayek would be horrified to discover.

In the first chapter of this research, this theoretical calculation was worked through in detail. It used the post-War boom as the point of departure, challenging the predeterminations of Say's Law in order to argue that the best way to understand the mid-twentieth century crisis of capitalism was through an analysis of its value circuits and the disunity between production and realisation (Marx, 1973: 407). When inter-capitalist competition returned to the global economy after a period of oligopoly, the gradualism that stabilised the existing mode of production no longer guaranteed a return on investment from the point of production to its exchange in the market. A reorganisation of spatial production that reflected a market climate capable of rapidly and smoothly adjusting to continually changing product configurations initially led to systematic overproduction and falling rates of profit in the key industries of the global economy. As the neoliberal counter-revolution emerged to stave off the long downturn and harbour capitalism's inherent contradictions, logistics was unearthed as one of several answers to the search for surplus value. The development of advanced logistical processes allowed profits to be pinned on increased product turnover rather than the cost/price dynamic, with greater returns dependent on speeding up the realisation of value rather than simply pumping out more value in production. Chapter one's principal achievement was locating the precise reason

why logistics shifted from a process of cost minimisation after production to one of value added across circulatory systems (Cowen, 2014: 24).

The fact that this shift triggered vast and unpredictable reconfigurations and re-scalings of state territorial organisation (Brenner, 1998: 471) was the catalyst for a new wave of Marxist thought to thrive in sociological theory, and this was what chapter two devoted its analysis to. Applying dialectical materialism to the spatial form, spatial sociologists like Henri Lefebvre devised a theoretical framework for Marxists to critique the production of space as being bound in social and political contestations. If Lefebvre teaches us how space is produced, then Neil Smith gifts us an insight into the patterns of this production, oscillating as it does between geographical conditions that best serve capital accumulation. The scaling of global commodity chains that logistics establishes makes for a fluid but erratic version of capital, seesawing between regions in the uneven development of the geographical terrain. With uneven development inducing deindustrialisation, Edward Soja stresses how important spatial theory is when interpreting the rapid changes engulfing the capitalist West as the industrial city is turned inside out and the *periphery* enters the imagination of theorists. But if Soja offers a convincing argument for the spatialisation of history, this chapter argued that it should not come at the expense of a critical theory of temporality, particularly given how crucial temporal phenomena such as speed and rhythm are to modern logistics. Hence this chapter also explored David Harvey's time-space compression, Paul Virilio's dromology, and John Urry's instantaneous time as a means to understand why logistics enables a particular way of viewing territory based on time rather than physical distance (LeCavalier, 2012: 93). Welding spatial and temporal theory together laid bare the contradiction between fixity and motion that drives a constant compulsion to abandon and produce space in the image of logistics. In order to annihilate space with time so as to accelerate turnover, capital must be spatially immobilised in the form of infrastructure. This explains the cyclical manner that companies like Amazon develop according to, where building begets more building, and spaces of production are reterritorialised into spaces of distribution.

An invitation was therefore extended towards the end of the chapter for the reader to apply a spatio-temporal theory of compression to Amazon and its distribution network. But to bridge the gap between the relatively abstract theory constructed in the first two chapters and the consequent analysis of the practical impact of Amazon on a regional scale in the

final two chapters, chapter three established the technological and managerial apparatus of the logistics revolution and how this resulted in the creation of specialised zones for logistical activity. Virilio's (2006) writing on speed and war creates an opening here to conceive of modern logistical practices as being the dialectical product of the commercial application of military strategising – a war economy turned in on itself. The demand for speed in military transit soon became a demand for speed in commodity transit, satisfied through the co-option of technologies like the shipping container that revolutionised the mobility of physical commodities. Containerisation promoted supply-chain compression, as the capitalist firm began to take seriously the science of circulation to manage every component of the supply-chain for efficiency savings. What would enable this new emphasis on supply-chain management were the array of communication technologies that choreograph the vast quantity of goods travelling through disparate areas of the world. Between GPS, UPS and RFIDs, a virtual supply-chain put the 'flexible' in flexible accumulation. It helped to invert the supply-chain from a push to a pull model, using the Toyotist logic of just-in-time production to create a lean and agile system of production in which the possibility of capital devaluation is diminished by a network of flows (Castells, 1996). The more that liquidity and flow become sought after, however, the more heightened the sensitivity in the supply-chain to seam spaces that threaten computerised systems of frictionless trade. Hence critical players at the bottom of the supply-chain like truckers are expected to hold logistical worlds together by being the shock absorbers and workhorses of land-based logistics (Gregson, 2015: 346). But truckers are only temporary fixes to what are again problems between fixity and motion in capital's spatio-temporal circuits. The more assured remedy than making drivers stretch time by sleeping, eating and (less frequently) toileting in their trucks is to add new linkages in logistics networks that can integrate calculative modes of spatial reasoning into the built environment (Chua et al., 2018: 622). These logistical landscapes, the ultimate product of the dialectical tension between production and compression, are the critical space that we lose sight of in our post-industrial, technologically advanced societies. This research therefore promised to put them front and centre in the remaining two chapters.

It sought to do so in a way deemed most effective at communicating the transformative effects of these landscapes on the built environment. Chapter four intended to explore precisely where growth poles have a tendency to cluster. Hence it opted to carry the theoretical work of the first three chapters towards a regional-based analysis in the North

East of England, where Amazon now have four different distribution sites and even an airport in the works. All their warehouses are located in what Shoard (2002; 2011; 2017) termed edgelands. Edgelands, being trapped in a geographical and ecological state of limbo between urban and rural, industry and the supposed 'return of nature', contain a deindustrial half-life (Linkon, 2017) that is comparable to the paralysis that besets the local economy of Tees Valley, its industrial relics continuing to be flattened just as its redevelopment projects fail to ever get off the ground. Being an outlier in the broader urban morphology of the North of England, having not followed the same path towards immaterialisation, Tees Valley's peripheries have all the attributes of logistical landscapes, both in the practical geographical sense and in the political and economic sense. Thus, with a mobilities-based, linear urbanism in vogue to restructure the disarrayed territorial organisation left over from Fordism, Tees Valley might provide the logistical nodes (Martin, 2010: 69) to polycentric scales of regional development that encompass future urban development in the North of England as it continues to bridge the North-South divide. This would represent a subaltern urbanism (Roy, 2011) insomuch as it furnishes final consumption elsewhere in the metacity whilst remaining subordinate to it. Escaping the imaginary of the consumer in belonging to the constitutive outside, these parts of the country are precisely where Amazon builds out its distribution network. Darlington being one of them, the final chapter of this research promised a concrete understanding of why and how Amazon constructs fulfilment architecture where it does, in so doing emphasising that Amazon is both a global phenonomon and a local reality.

Chapter five offered a case study of a single Amazon site in a specific corner of Tees Valley, functioning as a crescendo at the end of a spatial-temporal rendition through the emergence, process and impact of platform logistics on the built environment. Michel Foucault reminds us that the new masters of space are not the architects but the engineers (Foucault and Rabinow, 1984: 244), and Clare Lyster (2016: 149) stresses the value in seeing urbanism as consisting of operational systems and procedural flows in which infrastructure governs rather than architecture. Using this as the pretext for an analysis of Amazon in Darlington, we discovered what the process of logistics infrastructuralisation entails. Firstly, there are the limitations of the existing infrastructure, these being the clusters of logistics facilities in the golden triangle in the East Midlands that reached spatial saturation. Then there are the geographical requirements of a spatial expansion into new territories, which this particular area of Darlington satisfies not only

because of its optimal access to national infrastructure but also its preferential land ownership status, being a former landed property that could be converted into an industrial landownership structure (Massey, 1980: 266-8). With an army of smaller economic agents ready to be enlisted by the propulsive firm, all that was required for Amazon's entrance in the North East were the global economic conditions that made it favourable. These were crystalised after the 2008 global financial crisis when the demise of brick-and-mortar retail in the Darlington high-street prompted local authorities and the Tees Valley Mayor to search for inward investment in the rapidly growing economy of e-commerce. Benefitting from its network effects and cross-subsidisation strategy (and very likely state subsidies also), Amazon answered the call, providing the spec for logistics developer Tritax Symmetry to deploy just-in-time construction to produce for them a customised infrastructural space (Peck, 1996). It became clear as the eastern outskirts of Darlington began to host a logistics landscape that seam spaces in the local area needed to be identified and eliminated. Hence why new link roads have been proposed so that truckers no longer have to rely on rat runs to weld together logistical flows. It was at this point we could confidently assert that Amazon has achieved its ambition to become infrastructure, successfully folding this area of England into its megastructural network prized on the uninterrupted movement of the goods that are exchanged on its platform. The fulfilment architecture then fades into the infrastructural milieu, barely even visible on the adjacent A66 dual carriageway road due to the bushy hedges that camouflage it (see Figure 50 below). This perfectly encapsulates Amazon's phenomenology: a monumental landscape with a considerable theoretical history that is hidden in plain sight.

Figure 50 Street view of Amazon's MME1 fulfilment centre in Darlington from the neighbouring A66 link road. (Map data: Google © [2022])

6.1 The Paradox of Amazon

This unique phenomenology spawns a number of branches of enquiry that could be taken up in the future in light of the foundations that this research has amassed. Amazon's construction drive is arguably unlike that of the activity of any single firm that has occurred in recent history insofar as this astronomical spatial expansion does not seem to have registered an impression on an equivalent scale on the *quotidian* level. Its digital imaginary is etched firmly in the everyday lives and experiences of a growing chunk of the world's consumer population, but its existence as concrete, steel and asphalt is much less moored to how we conjure up a mental image of the platform. Besides the fact that the post-industrial periphery is a liminal space that one only ever coasts past without more than a cursory glance of their surroundings (if the view is not impeded by the hedgerow it runs alongside), there is surely something else at play here. To come at this from another angle, consider the following paradoxical phenomenon.

As much as Amazon's phenomenology is evasive as far as its presence as a physical assemblage of fulfilment sites goes, scattered as they are in the blind spot of the consumers who leverage them daily, that is not to say that there has not been a significant and sustained amount of intervention from scholars, workers, trade unions, activists, (a select part of) the media, and (even more limited numbers of) politicians sounding the alarm over the platform's working conditions over the last half a decade or so. On the contrary, Amazon have struggled to keep on top of their own public relations management for some years now. 'TREATED LIKE SLAVES' read a headline from the *Daily Mirror* in 2019, for example – a story about exhausted workers inside Amazon's depot in Essex (see Figure 51) (Young, 2019). Similar stories were reported that year in publications like the *Guardian* (Sainato, 2019) and the *Sunday Times,* with testimony from workers painting a profoundly negative image of their work environment (Urwin, Ellis and Bryan, 2019). The platform have made headlines for the wrong reasons more times than they would care to admit. A year earlier, they were named as one of the most dangerous places to work in the US for avoidable workplace injuries (Sainato, 2018). Investigative reports have uncovered unsettling accounts of workers falling asleep on their feet at workstations (Selby, 2017), urinating in bottles due to lack of time to visit the toilet (Bloodworth, 2018), and nearly 200 ambulance call outs across 11 UK warehouses in 2018 alone for work-related injuries such as breaking bones, collapsing, and suffering serious falls (Urwin, Ellis and Bryan,

2019). It is little wonder that in recent years Amazon have pumped millions into advertising campaigns and promoted guided tours around its 'advanced robotics' warehouses.

These are all contributing factors for why Amazon employees in warehouses in Tilbury, Rugeley, Avonmouth, Rugby, Doncaster and Coventry all announced industrial action in 2022. In October of that year, staff from the platform's Lyon's Park centre site in Coventry secured support to strike for the first time in the UK, under the GMB union, after years of struggling for recognition (Stewart, 2022). GMB began attempts to unionise Amazon workers back in 2018 with the 'We are not robots' campaign, even building an online game that simulates working in a fulfilment centre, the aim being to pick items as the work gets quicker and more demanding until injury inevitably occurs (GMB Union, 2018).


AMAZON SCANDAL

TREATED LIKE SLAVES

OPERATION 2million sq ft Amazon depot in Essex

EXCLUSIVE

BY MATTHEW YOUNG

WORKERS at Amazon's biggest UK warehouse are accusing bosses at the £730billion giant of "modern slavery".

They claim they are pressured to hit steep targets while managers clock every minute they are away from their work stations – even when pregnant or injured.

Some who are trying to form a union claim they have been penalised for it. One worker said: "It's modern slavery in there."

FULL STORY: PAGE 5

Exhausted workers claim that gruelling targets leave them in a zombie state

Figure 51 Frontpage of the Daily Mirror newspaper, Monday, October 21st, 2019. For entire article see (Young, 2019).

More recently, in November 2022, a UK Government Parliamentary Select Committee Hearing that included Members of Parliament for the likes of Middlesbrough, Warrington North and Bristol North (all regions host to Amazon fulfilment centres) had the opportunity to scrutinise the Head of Public Policy European Operations for Amazon, Brian Palmer. On the roster of questions put to Palmer were issues relating to Amazon's recruitment strategies and (mis)use of agency contracts, as well as the opaqueness of the data that Amazon keeps on its staff, a line of questioning informed by research conducted by the Oxford Internet Institutes Fairwork Project. Researchers generated a systematic rating system to score digital labour platforms against credentials pertaining to the fairness of

pay, conditions, contracts, management and representation (Fairwork, 2022). Amazon Flex (the platform's self-employed last-mile delivery work) scored poorly in the project's criteria for the minimum standards for fair work, coming in at 4/10, overshadowed only by the exploits of the likes of Uber Eats, Just Eat and Task Rabbit.

The most public attention the hearing received was the exchange between Palmer and Bristol North MP Darren Jones regarding Amazon's productivity quotas and their enforcement through a surveillance-based, three-tier strike system. For context, the performance of fulfilment associates who assemble customer orders by picking inventory off shelving pods or packing them in cardboard boxes is assessed via standardised predetermined hourly rates – i.e. the number of items they are expected to process each hour, or what is officially known within the company as the 'proprietary productivity metric system'. This system, enacted through a series of digital monitoring processes such as the wearable technologies that workers have strapped to their wrists that record their every movement around the warehouse floor, is so totalising as to record even the periods in which employees are idle from the assembly line – toilet breaks, momentary rest periods and the like. Stemming historically from Taylorist anxieties over 'time theft' in factories wherein industrial managers grew paranoid of 'systematic soldiering' from an increasingly conscious workforce (Taylor, 1911: 13-17), Amazon, in equally seeing *time as money* (Wajcman, 2014: 39-40), began in the 2010s to implement a time-discipline regime of their own. According to leaked documents, these are known internally as *time-off-task*s (TOT), in which "the system keeps track of gaps in scanning, and generates reports based on those breaks" until the point at which, at the end of each day, "supervisors review the report and deliver the TOTs to the associates to discuss why they were off task" (Lecher, 2019). Rack up too much TOT by consistently not meeting the predetermined rate (which is periodically modified to expect more of the worker), and management will issue you with a penalty strike. Be hit with three of these penalties, and your contract with the company will be terminated. This might go a long way in explaining why the average UK worker stays only a year with the company (McClenaghan et al., 2021).

Again, these techniques seem to be plucked directly from the Taylorist principles of scientific management. Engineer Ralph Barnes (1937: 534-4), credited with developing some of Frederick Taylor's early techniques for industrial production, would have likened them to *continuous performance sampling*. Along with measuring the speed of productive work – known more straightforwardly as 'work sampling' or 'process mapping' –

continuous performance sampling enabled industrial management to also account for the precise amount of time that the worker is idle during the working day. Amazon's TOT system, then, represents an algorithmic variant of continuous performance sampling that governs the 'tempo value' of distribution as it seeks to eliminate dead-time in circulation and turbocharge the productivity of living labour. We should be under no illusion that a digital Taylorism is the end objective here – public record requests show Amazon recently began funding a 'Logistics and Business Management Pathway' course at a high school in San Bernardino, California (where the 'Inland Empire', one of the most concentrated logistical landscapes the world has ever known, is located), with students tested on questions such as 'What are the basic principles of Frederick Taylor's concept of scientific management?' (Gordon and Kaori Gurley, 2022). Amazon are breeding a new generation of managers to operate their scientific-come-algorithmic system of labour control.

As sinister as this system sounds, Palmer was keen to repackage its practical deployment in suggesting that its intentions were not strictly to keep checks on the performance of Amazon workers and discipline them accordingly, but rather to monitor the productivity of the 'network' as a whole (again echoing the Taylorist logic of seeing individuals as modular components) and keep tabs on inventory control and safety procedures. Seizing the opportunity to challenge this specific claim, MP Darren Jones put it to him that individual workers are being swept up in the totality of this supposedly non-predatory metric system, offering up the story of an elderly man in his own constituency who worked for Amazon. Here is a segment from that exchange, taken from the hearing transcript (House of Commons, 2022):

> *Chair:* Let me give you an example. I represent a constituency that has one large Amazon fulfilment centre and another one just on the border. A couple of years ago now, I had a constituent who was 63. He was working with you to fill his time before his pension. He came to see me in my surgery. I do not know whether it was a wristband, a tablet or a device, but he had some kit that basically told him he was not packing things quickly enough. He had had two strikes already. He had to go and see his productivity manager. He went to see the productivity manager, and the productivity manager said, "Why are you not packing things more quickly? The system is telling us you are not being productive enough". He said, "I am 63. I am working as quickly as I can. It is pretty cold in here. I cannot go any more quickly". If you were to take that example outside the technology discussion, you would have

some real concerns around age discrimination. This is your technology tracking that worker's productivity in packing. That is surveilling the worker and not the goods, is it not?

Brian Palmer: I am not familiar with that particular example.

Chair: I do not want you to comment on the individual case because that is a cop-out of an answer. I want you to answer the question based on the example. Do you track the productivity of your workers in your warehouses—yes or no?

Brian Palmer: Yes.

Chair: You have just said to the Committee that you do not track the worker. That is not true, is it?

Brian Palmer: What I said was that the systems are not focused on tracking individual workers—

Chair: What do you mean by "focused"?

Brian Palmer: Their primary purpose is not to track individual productivity.

Chair: From the worker's perspective, if they have a bit of kit or a device that is saying, "You need to be quicker" all of the time, that feels like the focus is on them and not the goods. Do you recognise that?

Brian Palmer: We do. You said that this was a couple of years ago. We have made changes in response to employee feedback on how those metrics are assessed. As I said, early in the tenure when you are starting out at Amazon productivity is not a factor in performance evaluation. We focus on safety.

Chair: He told me that he was going to be fired if he had three strikes on his productivity tracking. Are you saying that is not Amazon policy?

Brian Palmer: The folks who leave the company for performance-related reasons are a very small minority. That is not where we focus. If someone is having performance-related issues, we want to understand why and how we can help them. Maybe that is not the right function for them to be performing within the fulfilment centre.

Chair: It is really important that you answer the answer I am asking you. If someone has three productivity flags on the system, can they be fired at that point?

Brian Palmer: Yes.

This is one of the few times that a higher up in the corporation has had to directly address Amazon's time thrift in an open public forum. The back and forth was part of a 25 minute video put out by the channel 'PoliticsJOE' on YouTube that has received close to 150k views in just over a month (YouTube, 2022). The same clip, shortened for Twitter audiences, reached 1.7m people on the social media platform. Evidently, the prospect of seeing someone in the corporate elite at Amazon held to account is a popular medium that generates a significant portion of internet traffic. More than that though, Jones' forensic takedown of Palmer's rather feeble reasoning for Amazon's intense surveillance apparatus speaks to a broader current of social justice engulfing the public sphere against the nefarious activities of the platform. From activist campaigns like the globally constituted 'Make Amazon Pay' coalition headed by Progressive International that calls for just taxation, fair pay and transparency over Amazon's environmental impact, to the UK trade union Unite's 'Action on Amazon' coalition that provides a hotline for Amazon employees to whistle blow on unlawful and unfair treatment, Amazon's rationale for its labour practices and workplace conditions will no longer wash.

And yet, we cannot confidently assert that this backlash has amounted in any tangible differences, both to Amazon's algorithmic labour control regime within its distribution facilities or more broadly to the platform's revenues. Referring back to Figures 39 and 40 in chapter five, we can in fact see that quite the opposite is true. To emphasise this point, one might also consider Amazon's market prospects during the coronavirus pandemic that precipitated a deliberate global contraction of economic activity owing to nationally instigated lockdowns, social distancing and quarantine measures. At the end of 2020, when brick and mortar stores were feeling the slump of economic inactivity – only tempered by government furlough schemes – Amazon, utilising some of the lowest borrowing costs from the Federal Reserve ever secured in the US corporate-bond market (Brenner, 2020: 18), posted $8.1 billion in profit, an increase of 220% from the same period the year prior (Weise, 2021). That same year in the UK specifically, Amazon's sales jumped by half to £19.4bn, with the company occupying a third of all the warehouse space

in the entire country that summer (even using three makeshift 'pop up' fulfilment centres), hiring 10,000 permanent staff and another 20,000 temporary agency workers (McClenaghan et al., 2021). That might be because lockdowns elevated online sales to represent the primary form of consumption, thereby inaugurating the transmission revolution that Virilio theorised in its most absolute form (whilst also being the death knell for many high-street stores and small business owners), but there is a palpable trend that does not exactly indicate Amazon has found itself at the sharp end of some kind of emergent consumer sensibility. The platform were able to become a critical part of the emergency pandemic infrastructure because of the extraordinary growth it had undergone in the 2010s that allowed the physical expansion of its distribution network to explode during the back end of the decade, soon to be aided by the then chancellor Rishi Sunak's spring budget 'super-deduction' on the cost of 'main rate' assets – essentially a very large tax cut on infrastructure and equipment spending which disproportionately benefitted big business (Turner, 2021).

Hence, we are left with a peculiar if not all too familiar paradox: Amazon is under more scrutiny than ever, but such reverberations have not left so much as a dent on what matters to the platform – its sales and returning customers. Looking beyond glib declarations that there is no such thing as ethical consumption under capitalism, why might this be? To draw this research to a close, let us take up this one last question.

6.2 Like Magic? Unconscious Consumption and the Opaqueness of the Interface

David Hill's (2019; 2020; 2022) work on moral responsibility and moral injury provides one avenue to explore this question. Hill (2020) develops a theory of consumption in arguing that it is Amazon's *ubiquity* as a digital platform that has had the most profound impact on how we consume in recent years. Amazon's primary achievement, according to Hill, rests in how the platform's front-facing network mediates exchange to the consumer. Rapid and continuous innovation and integration of new technologies has generated interfaces that streamline transactions, resulting in a 'habitual' form of media that dematerialises our experience of consumption. Hill (2020: 525) sets that out as follows:

> Platform ubiquity encourages unconscious consumption. When we are constantly connected to retail environments via networked technologies, we come to inhabit an omnipresent marketplace, a condition that is promoted under the name u-

> commerce (or, ubiquitous commerce). Under these conditions, consumers are 'always on', potentially never not available to consumption, located within a marketplace that has no temporal or spatial constraints [...] Amazon's platform infrastructure acts as a central nervous system, embedded in geographies while creating a shop-floor wherever we desire it.

This is an important claim, for it signals a shift in the final (excluding disposal) and most important process of the life cycle of a commodity towards a consumptive practice that, by all means, does not even require the full conscious participation of the customer. Purchasing becomes automatic, as if it were muscle memory. In the same way that this research has documented how the logistics revolution has transformed the commodity circuits of our global supply-chains (see chapter three), a similar process has taken place at the level of the end user. The shipping container and RFID tag make geographical proximity to natural resources less of a necessity, just as the virtual store deprioritises the physical need for the buyer to travel to specialised zones (supermarkets, shopping centres, high streets and the like) by making transactions instantaneous, thereby precipitating the simultaneity of an instant in such a way as to compress the space-time of consumption that Harvey (1989: 266) conceptualised in *The Condition of Postmodernity*. Amazon's 'everything store', in reduplicating the store-front and a smorgasbord of selection through virtualisation and digitalisation (Rosa, 2013: 101), shrinks the time-horizons for decision-making (Urry, 2000: 125). Not only does this instigate a decline in 'waiting culture' consistent with the rise of *convenience* and instant gratification as a sought after quality of shopping, but, as Hill argues, it minimises the practical steps one needs to go through to acquire commodities, to the point that it becomes an unthinking part of our everyday life. This goes a long way in explaining why, despite the flurry of public information about the injurious working conditions that make superfast delivery possible, our consumptive patterns are suffering from a moral and ethical *lag*.

Hill puts forward four technological apparatuses that Amazon has optimised in order to take us closer to an *unconscious consumption*. The first, and arguably the most influential in terms of flattening the consumptive experience into a single, alloyed process, is the one-click-buy feature Amazon have developed over several decades (see Figure 52). The one-click method streamlines the exchange where money capital changes hands by storing detailed customer information including shipping addresses and payment details (Mellahi and Johnson, 2000: 448). Amazon filed the US patent for one-click in the e-commerce

market in 1997 and had monopoly ownership over the idea until it expired in 2017 (although they were never able to secure it in Europe), even suing a rival online bookstore for alleged patent infringement (Hosanagar, Lodish and Berman, 2017). What made the technology so valuable as to be a protected piece of intellectual property is twofold. The first is that it provides a positive incentive for users to willingly hand over their data, allowing Amazon to build an extractive database of customer payment and preference information that none of its competitors could match. Secondly, frictionless checkouts make for more guaranteed purchases. Collated from research over 10 years, the Baymard Institute (2022) found that 69.99% of e-commerce shoppers abandon their online carts. According to the authors, a significant portion of the reasons (complicated checkout process, payment methods and so on.) behind such high rates of abandonment could be eradicated by the truncating process that one-click underwrites, others of which (shipping costs, delivery speeds etc.) Amazon promises anyway. No specific research has been conducted with this particular question in mind, but estimates assume that the one-click feature could return a 5% increase in sales on the platform (Pathak, 2017). One-click compresses the 'checkout flow' of the transaction, short-circuiting the process of reflection that stands between one's recognition of a desire and its fulfilment via the market (Greenfield, 2017: 36). The less 'form elements' that the online user must provide commands for, the less of one's own volition is required for the critical transaction and hence the more the entire undertaking can be carried out unconsciously without thought for what the process and its moving parts entails.

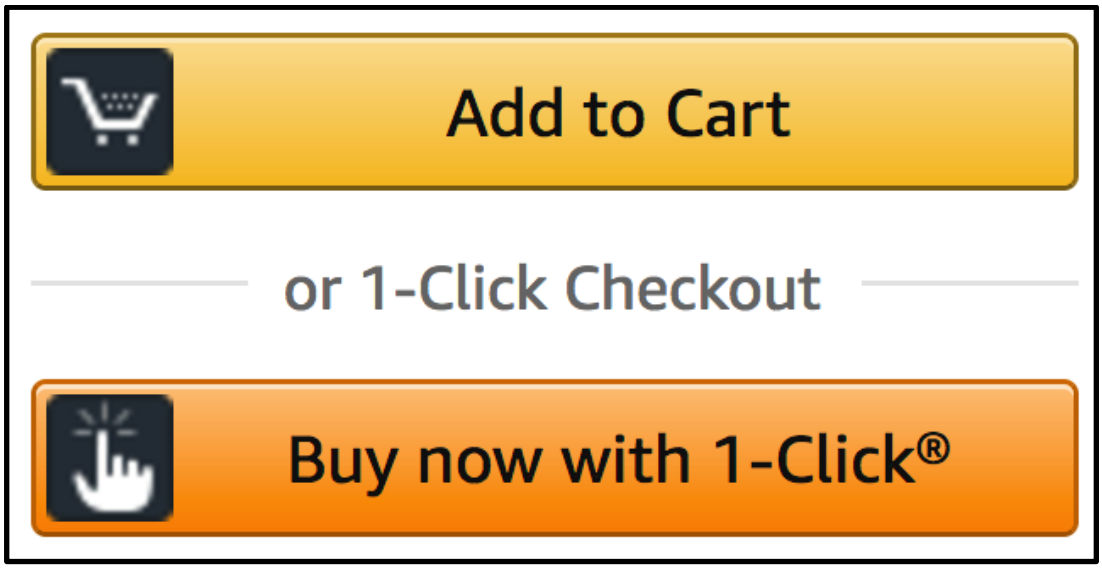


Figure 52 Amazon's one-click digital interface, available on Amazon.com website and the Amazon app. *Taken from Geekwire (2017)* Available at: https://www.geekwire.com/2017/amazons-1-click-patent-expires-today-soon-youll-able-accidentally-order-stuff-across-entire-internet/

Bratton's (2015: 219-243) writing on the info-technical 'interface' in his chapter on the *Interface Layer* of The Stack is a useful supplement here in understanding the ontological purpose and effects of something like the one-click system. An interface, writes Bratton (2015: 220), is "any point of contact between two complex systems that governs the conditions of exchange between those two systems". Perhaps unhelpfully, Bratton deliberately conceptualises interfaciality as a catch-all term, intended to describe everything from levers, to buttons, to images (provided they can be used to control what they represent) to even the human hand. What unites an eclectic mix nevertheless is how they translate and simplify the functions of the infrastructure at large in order that the user can affect and be affected by it. Thus, in addition to arbitrarily fixing and limiting the possibilities of the end user, it also narrativises the *meaning* of those possibilities (Bratton, 2015: 219). In this sense, digital interfaces are like the algorithmic protocols laid out in the introduction of this research that are a crucial component of infrastructural intermediation. Beyond denoting mere conduits of information, they also *produce* information by translating and relating it from here to there (Bratton, 2015: 230). The more computational power these interfacial nodes can mobilise, the more they give structure to greater quantities of complex information-logistical flow that can be represented as if they were a single pattern or machine (Bratton, 2015: 232-4). In Amazon's case, this is essential, since one-click buy must collapse a series of informationally and logistically dense procedures into a single real-time digital button.

The way that interfacial relays manage otherwise illegibly complex chains of interaction in order to function as social tools also means that interfaces naturally reduce and conceal their complexity as a prerequisite of their opaqueness (Bratton, 2015: 234). Here we get our first indication of how platform ubiquity actively dilutes our perception and denies exteriority by projecting real world phenomena in its own selective image (Hill, 2020: 532). This causes a blockage in our cognitive senses that anaesthetizes consumption as a practice, disconnecting the *act* of buying online from its material constitution in space and time. Bratton (2015: 234) sees in this evidence that interfaces are inevitably an ideological and dialectical construction: "[T]heir reduction toward resolution is doctrinal", he writes. What Bratton infers here is that, more than being just true to life encapsulations of the material world and a mirror onto itself, interfaces can also actively intervene in the shaping of that world. Indeed, interfaces are

> tools that reproject and extend their conceptual gathering of relations back out onto the world. Once more, unlike static diagrams, such interfaces can directly affect what they represent; as the chain of signification runs both from the event up through a chain of representation to the image [that] represents it, it also runs back down to the event, and so the *User*-manipulated image of the thing becomes the medium through which the thing can also be manipulated. (Bratton, 2015: 234)

When we ponder the one-click buy interface in these terms, we start to see how such *technologies of simulation* actively work against the building of a consumer consciousness capable of interfering with Amazon's exponential trajectory. Hill (2020: 532) argues that this leaves us all prey to a kind of *moral injury* insomuch as the perceptual field guiding our sensory experience is polluted, eaten away at as a relational separation begins to emerge between consumption and its conscious thinking component. Likening it to tuberculosis, Hill sees this process as an exhaustive one, since it uses up our ability to think clearly about what we are doing, or what we cannot see when we are seeing. This amounts in a disintegration of responsibility, wherein the *contact* that is essential to our moral relationships is stifled as we lose sight of the people and spaces that bring us our stuff (Hill, 2020: 532). Thus, no matter the headlines or the hearings, at no point is the Amazon customer invited to draw up a mental image of any of the operational parts that are sprung into motion by their activation of the one-click buy button, and so at no point is the separation between production and consumption in any way bridged. The conceptual void that exists between these two acts eliminates the possibility of a cause and effect linearity that might prompt one to reflect on their own role and position at the rear end of the networked world they are embedded in because we cannot look beyond the abstract geography of the screen (Hill, 2020: 525-6).

It might be a crude comparison, but Cubbit (2017: 80) is right to say that such a dissociation of consumption from its material consequences repeats the central structure of coloniality in the same way that the "reality of the colony was always hidden from the imperial consumer by the sweetness of sugar, the whiteness of cotton sheets, the brilliance of gems". The brilliance of Amazon's gems is found within the 'high-tech sheen' (Hill, 2020: 531) of its online interface, so opaque as to render its constitutive parts as effectively *weightless*. As it achieves this status it gets swept up in the business ontology of the digital economy (Hill, 2020: 531) like the delusive nouns (cloud, silicon, and so on) that give the impression that communications infrastructure is untethered from gravity and

therefore geography. This is precisely what Ursula Huws (1999) warned about when she speculated in ‘Material World: The Myth of the Weightless Economy’ that

> [a] new orthodoxy is in the making, an orthodoxy in which it becomes taken for granted that 'knowledge' is the only source of value, that work is contingent and delocalisable, that globalisation is an inexorable and inevitable process and that, by implication, resistance is futile and any assertion of the physical claims of the human body in the here-and-now is hopelessly old-fashioned. The implications of this emerging 'common sense' are immense.

The implications have indeed been immense, if for no other reason than the ‘hidden abode of production’ that Marx (1889: 123) wrote about in chapter six of the first volume of *Capital* have resurfaced in an even more abstract form. The orthodoxy of the digital economy, now in full flight, perpetuates the myth that its inner-workings are unmoored from physical matter, in so doing reducing the spaces of labour to background noise that, at least theoretically, will never spill over into our everyday lives.

Nothing signifies this more than the fact that we are quicker to associate Amazon with an anthropomorphised cardboard box (see Figure 53) than we are an army of human logistical workers in the gigantic warehouses that this research has drawn attention to. This sort of rupture is a necessary condition of what Marx (1889: 48) called commodity fetishism to describe how the products of human labour are disconnected from their physical properties. Instead of thinking of commodities as embodied labour, as ‘stamps’ of human exertion, we project subjective social meaning onto them that abstracts them from their objective existence as physical things. This is what Marx (1889: 47-8) meant when he said that there exists a “definite social relation between men, that assumes, in their eyes, the fantastic form of a relation between things”. Our social experience and encounters in the world play out through objects that we ascribe meaning beyond their relation as physical matter. This again acquires a dialectical pattern, since the more we project social relations onto things, the less those things appear as the product of human labour, and vice versa. Amazon and the rise of platform logistics simply intensifies this abstraction to a whole other level. As Hill (2020: 525) notes, the *taken-for-grantedness* of modern consumption does not necessarily represent an overall shift in its teleological assumptions from what Marx termed commodity fetishism, but there has been a definite sharpening of these

assumptions, such that even Marx might need an afternoon to think it through. The material activities that sustain our consumption have long been invisible to us, but

> what is remarkable is the speed and ease with which the concealment of social relations can be facilitated. Tracking purchases through the website or app presents an abstract geography – *package has shipped; out for delivery; your item has been delivered* – that gives the illusion of smoothness behind speed. (Hill, 2020: 525)

It is little wonder how common it is to hear a customer raving about an order that 'magically' appeared on their doorstep well before it was expected to arrive (Stone, 2013: 3), since Amazon's operations have all the hallmarks of a magic trick. The performance of magic requires a *method* (how the trick works) to achieve an *effect* (what the spectator sees) (Kuhn, Amlani and Rensink, 2008: 350). Effective magic relies on the spectator experiencing the latter whilst being ignorant to the former. In Amazon's case, the illusion of 'generalised arrival', when goods arrive without seemingly having ever left (Virilio, 1998: 16; Hill 2020: 525), is achieved when the customer experiences the effect – receiving a parcel in their home – whilst not being thrust into the mental space to think of the method – the specially engineered logistical zones on the peripheries of towns and cities that are the unzipped interfaces through which the customer has access to the service. Peripheralisation, virtualisation and fetishization coalesce to prevent the class consciousness that Marx saw as a necessary precondition of social revolution, which in this case might at the very least threaten Amazon's market dominance.

Figure 53 Still from a 2017 television advertisement depicting an animated Amazon parcel singing Supertramp's 'Give a Little Bit' as it is ordered online, travelling via warehouse, air and road to be delivered to a young girl in time for Christmas. Available at: https://www.youtube.com/watch?v=0ITWgx8K6Ko

6.3 Consumption Transformed

The one-click method, although argued above to be one of Amazon's most influential interfaces to date, looks comparatively primitive to where the platform is taking consumption next. Hill invites us to consider three other technologies of consumption that promise only to deepen the inherent and 'magical' abstraction that occurs when we shop online: Amazon Dash, Amazon Echo, and Amazon Key. Each bit of kit, being their former's successor, promote unconscious consumption in their own unique ways at various points of entry, even if their practical limits in the market show that these technological developments are still a way off being properly embedded *socially*.

The Amazon Dash, a self-service machine of the 'internet of things', is one such 'disruptive' technology that renounces the need for the consumer to embark on the traditional journey across the funnel stages of awareness, consideration, evaluation, and action (Farah and Ramadan, 2017: 596). Coming in the form of a physical button tethered to a branded product (Hill, 2020: 524) that can be mounted via an adhesive to any hard surface, the Dash turns the act of repeat purchases of essentials like detergent, deodorant, and dog poo bags into little more than a reflex: the push of a button that one need not even go online to do (as is required with one-click buy) – nothing more than the embedding of microprocessors in everyday objects to connect them to a digital marketplace (McGuigan and Manzerolle, 2015: 1834). Once pressed, it sends a notification confirming the order to the mobile app of the Amazon Prime user, where the item is subsequently delivered to the customer's set address (Ramadan, Farah and Kassab, 2018: 133). There are limits to the *scope* of this integration based on the amount of goods it proves convenient for. But for products where integration *does* make sense – i.e. those that do not fulfil consumer desire so much as they do basic functions that constantly need replenishing – the Dash sets a dangerous precedent. The *level* of integration allows the unthinking to become unruly in these exchanges, with consideration only afforded to the action of locating and pressing the button, allowing the individual to let-up on routine activities that they would likely prefer to do without anyway. A year after its launch in 2015, Amazon reported a 650% increase in the number of orders through the Dash, prompting the expansion of its geographical reach to the UK market not long after (Ramadan, Farah and Kassab, 2018: 133). Its universalising 'omnipresence' (McGuigan and Manzerolle, 2015: 1835; Hill, 2020: 525) surely explains this success, with multiple studies (Farah and Ramadan, 2017; Farah and Ramadan, 2017b; Ramadan, Farah and Kassab, 2018) confirming that

continuous interaction with the tech device leads to a higher purchase involvement, creating a self-perpetuating relationship between consumer and platform. Indeed, Dash consumers reported a greater frequency of unplanned purchase completions because the devices act as round-the-clock, convenient purchase points that bolster impulsiveness (Farah and Ramadan, 2017b: 59). Amazon's Dash removes the user's navigational steps to fulfilment in the marketplace and passivises consumption to the same level of cognition as turning off a light switch upon leaving a room. Ultimately though, the amount of Dash buttons Amazon discovered its customers would potentially need in their homes rendered the whole solution unpractical. It made more sense for the button to be integrated online or within the device (such as a washing machine) itself, and so the Dash was discontinued in 2019.

None of these innovations were in vain, according to vice president of devices and services at Amazon Daniel Rausch, who declared that the "Dash button was an awesome stepping stone into the world of a connected home" (Fox Rubin, 2019). Amazon Echo, the voice-activated speaker configured to a wireless network running virtual assistant Alexa, provides an alternative and a successor. The Echo transplants Amazon into the living space, responding to voice cues at the users demand. It was an instant hit when it launched proper in 2014, selling over one hundred million units in the next five years (Stone, 2021: 13). Although it has not made the inroads Amazon would have liked in terms of primarily being a gadget that acts as the voice-controlled interface between the customer and the website or app (itself an interface linking the customer to its supply-chains), one can theoretically part with enough personal data as to be able to fling supply-chains into motion with a single voice command. This is certainly the vision of Jeff Bezos himself, who hopes, thanks to developments in AI dictation, that in the future we will talk to our devices more (Stone, 2021: 23-4). Bezos accepted that there was place for the Echo to become a voice-activated speaker through which to play music, but never wanted this to be its marquee feature – too small-time for a device seemingly on a trajectory to usher in a Star Trek like existence where artificially intelligent beings serve as personal assistants (Stone, 2021: 31-2). But these would be personal assistants only to the extent that they would be more sophisticated camouflages to the workings of the network as a whole. Thus, if the one-click button was able to flatten complex interactions operating over multiple scales of governance into a single function, then the Echo, with its 'giant treelike structure'

(Stone, 2021: 34) and without a *seeing* component of consumption in which images provoke thoughts, renders the interface all the more arcane and impenetrable.

The last on Hill's list and different from the previous two technologies insofar as it is not an interface so much as an *appendage* tacked onto the interfacial chain, is Amazon Key (see Figure 54). Similar in purpose to the widely used Amazon Locker, the Key service produces the most 'magical' (by which is meant *illusive*) effect yet. The Key is a smart-lock that can be fitted to your front door, garage door, or car boot that allows delivery drivers to let themselves in and drop packages off without as much as a digital trace (Hill 2020: 530). If the Echo inverts the privacy of the home by opening up its walls to the platform's wireless network, the Key's addition to the 'smart-home' opens its *doors* to the platform's delivery network by connecting it to the internet of things, creating a streamlined process that does not even require the parcel to be actively *received* by the customer. Not only does this make for smoothness of flow (since it removes the possibility of orders being undelivered if no one is home), but it also eliminates the last and sometimes only chance for the end-user to bear witness to the machinations of the network and the human labour that gives it gravity, since orders can be fulfilled without the customer ever having to come into contact with another living soul. Unconscious consumption, Hill (2020: 225) writes, affords no consideration of departure or of journey – a generalised arrival where "[t]hings just appear". The 'last-mile' of delivery is an important signifier in this respect because it reminds us of the work that sustains consumption, that our objects must be *handled* in order to be moved to within our sight. If goods are transported straight through our door whilst we are away at work, then the human-fronted experience of delivery is well and truly eroded.

A similar trade-off occurs with Amazon Key as was described with the one-click buy feature, in which the user has the incentive of an enhanced customer experience in return for laying down their personal and private data, part of Amazon's drive to colonise the home by building 'walled gardens' around its customers (Fowler, 2017). Amazon Key is paired with the platform's security Cloud Cam Amazon Ring, which made headlines of its own in 2022 when it was reported that Ring had shared video footage from its customers' devices with the police without asking customers or receiving a warrant from the authorities (Hollister, 2022). The trade-off therefore has invariably more at stake. This was heavily indicated by the fact that 68.8% of Americans said they were not willing to use Amazon's in-home delivery services, with Prime members only slightly more inclined to have a smart-lock than

non-Prime members (Alaimo, 2018). Past users of Amazon Key report a dissatisfaction with the 'finickity' technology, with the smart-lock jamming on more than one occasion including when a delivery was attempted, not to mention that the smart-lock takes over the function of the original door lock so that there are potentially times when a family member or friend will need to receive a text message from Amazon to get into the home (Fowler, 2017). Not only has research found that the Cloud Cam can freeze when an unexpected delivery person shows up (Greenberg, 2017), but if for one reason or another an in-home delivery cannot be fulfilled in its allotted window, Amazon have been known to have sent inaccurate alerts about when packages might arrive, meaning the customer is left in the dark about when someone might be (momentarily) entering their home (Fowler, 2017).

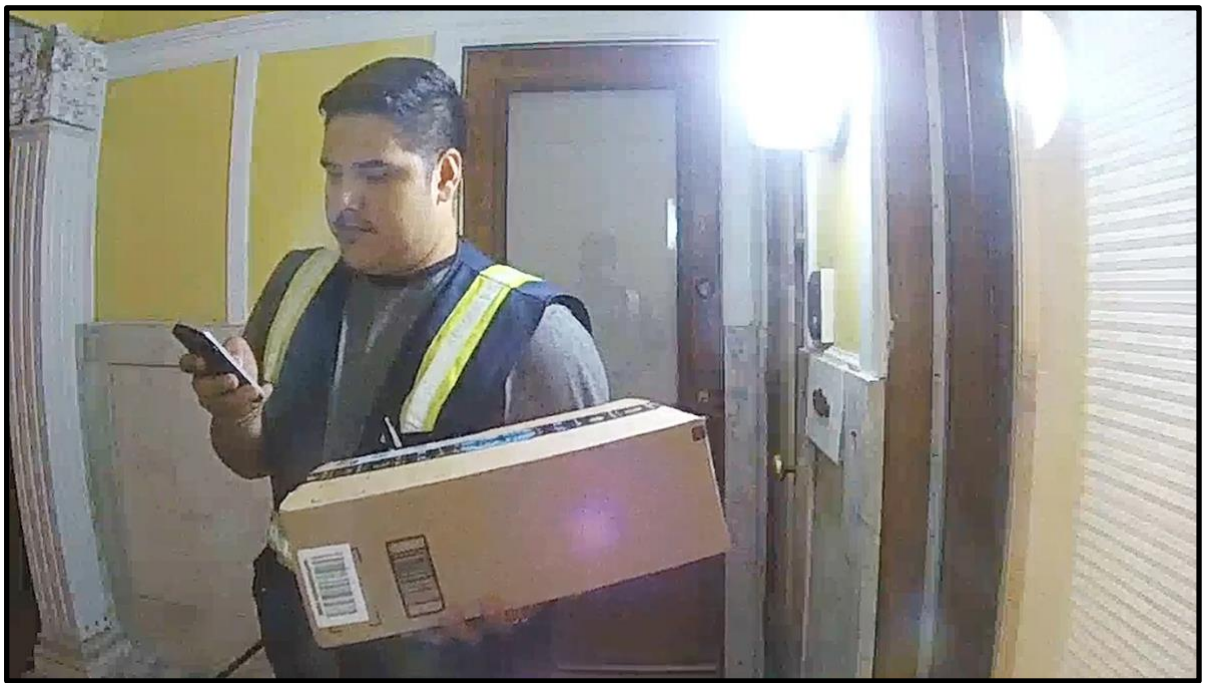


Figure 54 Amazon Key: Amazon drivers making in-home deliveries knock first, then use an app that grants one-time access to unlock the door. (Geoffrey A. Fowler/The Washington Post). Available at: https://www.washingtonpost.com/news/the-switch/wp/2017/12/07/amazon-wants-a-key-to-your-house-i-did-it-i-regretted-it/

Evidently, there are real limits to the extent that a platform like Amazon can transform consumption in its own image, even if the direction of travel only points one way: towards a total separation between cause and effect in the consumption of commodities that creates a pure omnipresent marketplace, a *de-linking* that makes the arrival of material goods almost occult (Bratton, 2015: 231). The Key is a perfect example of how the techno-capitalist pursuit of *routing real objects to digital bits* that Bratton (2015: 132) wrote about comes up against the reality of the urban spaces and structures that so often create

unwelcoming spatio-temporal conditions for frictionless delivery. Not everyone has the same front door (the older ones proving inherently more difficult to the installation process), and neither do we live in infrastructural singularity– last-mile delivery drivers, being humans with physical limitations and being capable of making mistakes, must navigate immensely dense and diverse urban terrains that can often go wrong for reasons beyond their control. The ability to communicate all the idiosyncrasies of the city back through to Amazon's network so as reach a high enough level of synchronisation as to achieve an unconscious mode of consumption is therefore an unfolding process that requires active and continuous intervention in the landscape in parallel with ever-deeper degrees of interfacial abstraction. This is what Bratton (2015: 230) terms the *aesthetics* of logistics and Hill (2022: 6) the *eroticism* of logistics, where the visual incomprehensibility of the origins of supply-chains leaves a vacuum for the 'industry vision' of technology platforms to fill with their second-order interface designs: a reductive, narrativised redrawing that behaves as a 'surface ideology' to disfigure the appearance of logistics as mediated to its users. Indeed, as logistical routes link the curve of things from one space to another, they "also enrol the *User* not only into an aesthetic of logistics but also logistics itself as an aesthetic ideal" (Bratton, 2015: 231). The erotic model of logistics, in positing a *pure* surface that cannot coexist with its opposite (i.e. the bumpy material world), mystifies the physical geographies of object mobilities (Hill 2022: 9). This triumph of aesthetics over ethics in no small part explains the paradox of Amazon: a platform that attracts heat but *only after the event,* never in time to interrupt its exponential sales.

How might one interrupt Amazon? There is of course no struggle like a workers' struggle, meaning that any attempt to contest platform dominance must start with workplace organisation. In the UK, this requires building on the unionisation drive that the GMB have kickstarted. How about for those on the other side of the interface, however, who only ever experience aestheticism and opaqueness? In these instances, we can turn to Hill (2019; 2022) one final time for possible solutions.

6.4 Confronting Amazon

In the branch of philosophy known as aesthetics, Amazon's delivery network could arguably be characterised as 'sublime' in the sense that it meets the Kantian definition of overwhelming our powers of perception and imagination, both in terms of its sheer size,

but also in the difficulty of putting any kind of coherent form to its inner workings. Using Lyotard (2009), Hill (2019: 31) makes the case that there is a moral function in the sublime that is realised when we are met with something that "forces us to confront what is more than we can think", precisely because an experience of the "limitations of what it is to be human is what takes the sublime from being merely terrifying and moves us towards an attempt – however forlorn – to grasp what escapes our understanding". In other words, witnessing something with a magnitude so great that it *exceeds* thought can in fact create an impulse to act, because it pushes us to contemplate the idea of humanity and our place within it, asking us to consider what could be achieved beyond the glass ceiling of our 'limit experience' as it is historically constituted (Hill, 2019: 32-3). This may even provide a more plausible claim to moral action than those in critical media theory that insist on narrative order, which Hill (2019: 33-5) in fact argues is brimming with contradictions.

How might we apply this moral reasoning to Amazon? One certainly gets the impression that the opaqueness of the interface and the unthinking of consumption that takes place on the platform means that we consume in impunity because we do not consider the human costs of superfast delivery – the injuries, the precarity, the intimidation, and so on. And yet, as has been explored throughout this conclusion, an uptake in critical coverage and scrutiny of the platform, up and to the point of hearing the humanising stories of Amazon workers like the elderly man on his second penalty strike at the fulfilment centre on the outskirts of Bristol, has not necessarily translated in an uptake in moral urgency capable of reconciling meaningful social change. It is neither the stated position here nor presumably within Hill's work to deny the power of individual representation, which continues to be critical to workers' struggle. But Amazon's mystifying presence presents a unique challenge to moral intervention that demands more than just isolated individual accounts. Hill (2022: 4) suggests then, that we capitalise on the constructive utility of the sublime by staring it in the eye. In the case of Amazon, the sublime is that which we cannot comprehend when we order online – the abstruse material reality that exists in the shadows behind the aestheticization and eroticisation of logistics:

> bearing witness to what resists representation [...] could be vital to a critique of the latent worlds that harbor and convey our goods, the cargo mobilities and logistical spaces that are sustained by great but often hidden labors and that are rewritten

> according to the demands of global trade. For Lyotard (1992), to bear witness in this way was not an indexical act but the evocation of a feeling that there is something that escapes us, that perhaps necessarily escapes what we can hold in thought, such that we might communicate, not an image of the thing itself, but an imprint of its excessiveness, a feeling of the sublime. (Hill, 2022: 4)

Hill (2022: 9) describes this approach as the *postal model of logistics* that attempts to communicate what escapes representation amidst the "contingent mess of the world of things on the move". A behemoth like Amazon must be confronted on these terms. There is good reason for this.

Amazon has already begun to fashion its own politics of representation to counter that of its opposition. The platform now frequently runs promotional ads that follow the individual lives of fulfilment associates, narrating positive stories of workers whose standings have seemingly improved since joining the 'Amazon family'. A recent advert that Amazon heavily promoted on Instagram and can also be found on YouTube (2022b), for example, features the children of eight Amazon employees at the fulfilment centre in Darlington all reporting how proud they are of their parents and their jobs. Amazon worked with the production team for the TV series *The Secret Lives of Four Year Olds to* produce an "exclusive behind the scenes peek into the magic that happens at the fulfilment centre ahead of Christmas" (About Amazon, 2022). Clearly, Amazon is not averse to humanising its workforce and revealing the *method* of the magic's effect. Only this must be done on its own terms, depicted through the stage-managed lens of children who, for obvious reasons, could not begin to imagine the journey of an object. The platform has gone so far as to acquire the services of comedy actor and familiar face Terry Crews to appear in a TikTok commercial promoting the benefits of working for the company. Crews, followed by cameras, does a 'day' working various roles in a fulfilment centre, being gifted a level of autonomy that actual 'associates' could only ever dream of. Thus, waging a war against Amazon strictly at the level of representation appears to be a losing battle, not least because of the deep pockets and reach of the corporation and the increasing sophistication of their communications operations.

One ought to take this an as indication that Amazon need be confronted on a *transcendental* level that, as Hill makes the best case for, can get closer to a critique of the sublimities of our latent logistical worlds. This research hopes to have begun that

endeavour by laying bare when, why, how and for what purpose logistics infrastructure is spatially produced, asking the reader to steer into the skid of Amazon by accosting the sublimeness of its fulfilment architecture and being able to put form to the contemporary phenonomon that is unconscious consumption. To paraphrase Rosa Luxemburg, the most radical thing one can do is always proclaim loudly what is happening, and indeed *where* it is happening.

Proclaiming it loudly, this conclusion sought to bring together the three constitutive parts of Amazon that consolidate platform power: work, interface and landscape. We have shown that there is an unceasing negotiation between the intensification of work in Amazon distribution centres – achieved primarily through the integration of digital Taylorism – and the inebriating forces of the interface that obfuscate any critical engagement with what makes same-day and next-day delivery workable. Amazon's pursuit of an omnipresent marketplace is contingent on synchronising these discrete processes, which relegate the landscapes of fulfilment to the periphery of our minds. As this research ultimately hopes to have demonstrated, that does not make these landscapes any less material. It simply means that there a certain geographical areas – owing to their historical composition as determined by deindustrialisation, rurbanisation, and the various scales of political governance – that are assigned, essentially against their will inasmuch as conceived space must totally dominate lived space, the new infrastructural regime of platform logistics. This is Amazon country. It is the peri-urban condition of this new regime, a consequence of the logistics revolution and decentralisation of the Fordist city, that fortifies unconscious consumption as effectuated through the aestheticisation and eroticisation of logistics. Amazon have emerged from the material forces of history at the same time as they are actively shaping them. And because this shaping is predicated on the idea of a 'pure' logistics that is averse to seam space in circulation, but the material world is inherently friction-filled at almost every single point of the supply-chain, it means that Amazon cannot just sit around tinkering with its technological interfaces until they just so happen to get it right and those interfaces become socially embedded. Rather, they must actively and periodically intervene in the built environment in such a way as to bend it to their will, treating space as a means of production and justifying it as any good capitalist firm does – job creation, consumer satisfaction, and critical infrastructure.

Returning to the debate put forward in the introduction, then, we can now confidently settle this particular conflict. After exploring the production of logistical space at the core of

Amazon's platform model, one is inclined to take a position anchored between the likes of Jodi Dean at one end and Evgeny Morozov at the other in terms of whether our socioeconomic system is closer to feudalism or capitalism. Amazon is a spatially productive outfit that was born from the contradictions of capitalism as it sought renewal from Fordism through a more hands-on approach to landscape. The 'fulfilment network' is merely a spatial expression of flexible production, which became the only way to escape the crisis of industrialism. This did indeed signal a shift in priorities from production to distribution, from absolute surplus value to relative surplus value, but it in no way meant that the capitalist firm would rest on its laurels in being unproductive and extractive in the way that feudal lords might have been. Amazon certainly extract rent like it were the eleventh century, but the means by which they secure these rentier channels can only be conceived of from a starting point within the capitalist system – or the post-industrial capitalist system, to be more accurate. That is what platform logistics is: a dynamic infrastructural regime that both supports and feeds on the existing capitalist mode of production, stretching it to its limits and sharing in its exploited value. It without a doubt undermines the integrity of the price mechanism in the long run, but platform logistics is the actually existing variation of capitalism, its saving grace, rather than the idealistic version that Von Mises and Hayek drew up in their heads. The whole point of Morozov's (2020) polemic was to bring more coherency and consistency to the contemporary Left's account of modern capitalism so that the task of challenging it would not be a lost cause. With Amazon being part of that challenge, this research hopes to have stressed the value of tackling it as a logistics platform that is rent-seeking only as long as it is space-making, and that generating a critical intervention of these spaces should be front and centre to the fight.

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