14. Ahead of Time: The Infrastructure of Amazon's Anticipatory Shipping Method

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Abstract

This text conducts a close reading of Amazon's 2013 patent for a "Method and System for Anticipatory Package Shipping" on three levels in order to investigate the patent's aspirations towards a potential hardwiring of temporality. First, through the lens of media theory, the patent is conceptualized as a medium for transporting knowledge over time itself. On a second level, the patent is framed as a logistical medium both due to its aspired effects in the logistical realm and its internal logic. Third, the specific form of anticipation, prediction and prophecy is investigated by leveraging Elena Esposito's understanding of (digital) prophecy with a particular focus on temporality.

Keywords: algorithms, Amazon, logistics, media theory, prediction, temporality

What if effects preceded causes and answers preceded questions?

—John Durham Peters

In the industry of logistics, time is perhaps the most crucial resource not to be wasted. A variety of reference parameters are dedicated to measuring time in logistical processes, with names such as lead time, shipping time, and cycle time, as well as time bucket, time fence, time to market, and time of circulation. Reducing shipping latencies, providing real-time tracking of commodities, and forecasting consumer demand are elementary to structuring temporal

relations between customers, carriers, and merchants. Yet even within this context, Amazon's 2013 patent for a "Method and System for Anticipatory Package Shipping" marks a decisive shift in the industry's thinking on time saving in the way it extends logistics into the near-term future through a practice of prediction-based package shipping ahead of incoming orders.¹

The investigation of anticipatory package shipping, also referred to in the patent text as a form of speculative shipping, is a speculative undertaking in itself: At this point, we cannot know how far Amazon has actually implemented the principles as described in the patent. The company has neither confirmed nor denied the implementation of the patented methods.² However, one could assume that Amazon's logistical operations are coordinated in a similar way and that the patent provides at least fractional insights into how Amazon conducts logistical operations.³ On these grounds, I approach the patent from three media-theoretical perspectives with an eye to the system's potential implementation, analyzing the medium of the patent as a text genre with a specific temporality for the conveyance of knowledge, conceptualizing the anticipatory shipping method as a new form of logistical media for ordering time and space, and addressing the specific form of prediction and corresponding temporality of the patented methods in relation to Elena Esposito's analysis of prophecies in the digital age.

The Patent as a Medium

Patents, as the name would suggest, are rich sources for scholarly investigations in that they bring corporate research into the open.⁴ In the case of Amazon's anticipatory shipping patent, however, the text does not entirely deliver on this promise. Technical and methodical descriptions remain rather vague, and the patent text does not clearly designate the nature of the invention. As Albert Kümmel-Schnur has shown, it is not uncommon for companies to submit and be awarded patents where the material or process that is supposed to have been invented is unclear.⁵ This is the case with Amazon's patent for an anticipatory shipping process, which represents a bundle of methods, not a concrete technology. A close reading of the patent does not allow for an assessment of the concrete algorithms that are to be used or the parameters crucial for the predictions. What is described is rather a large number of different "embodiments," or potential material implementations, in an abstract way. The patent's vagueness raises a question of whether the company intentionally obfuscated corporate knowledge to secure economic advantage over potential competitors. But

the language of patents in general might be a cause, being situated between engineering-speak and legalese.

The medial form of the patent, as Christian Kassung argues, is one that is necessarily situated between implicit and explicit knowledge. The act of publishing a patent is connected to making knowledge explicit, at least to some extent, that allows for the communication between the assignee-to-be of the patent and the patent-granting institution.⁶ At the same time, a patent gives room to discursive and diagrammatical operations and aims to establish a new order of knowledge.⁷ The degree to which the implicit knowledge of the inventor has to be made explicit is dependent on the possibility of effective communication between the patent-granting institution and the prospective assignee.⁸ Kassung argues, moreover, that patents never describe a bare technology or a concrete apparatus by itself but rather a collective of actants in Latour's sense that must be connected for the invention to be realized.⁹ Patents, in this understanding, project a future network of actants. Thus, patents themselves have an inherent temporal logic: they project a possible technological future that does yet not exist at the time of the patent's filing.¹⁰ Hence, patents are actors that open, close, concentrate, and diffuse technical stories at the same time.¹¹

In the case of Amazon's anticipatory shipping patent, the company seeks to extend conventional logistics into the future through a new network of predictive actants. Central points or nodes of the logistical network of conventional package shipping are called hubs. A hub in the context of the patent can be a warehouse, fulfillment center, or sortation center. Fulfillment centers are in essence the e-commerce variation of what has traditionally been referred to as warehouses.¹² Amazon's fulfillment centers are modelled on Walmart's distribution centers, which at their introduction took over the classical functions of warehouses. The change in name reflects the change in function for these structures; whereas a warehouse would store goods, in the *ideal* distribution center they are not stored at all. This is particularly evident with so-called cross-docking distribution centers, where incoming goods are immediately unpacked from trucks and sent through the center's conveyor belt system to the correct outgoing truck, headed for, say, a retail store. Amazon's fulfillment centers function somewhere in between a distribution center and a classical warehouse.¹³

The patent provides a description of conventional order fulfillment systems before elaborating the principles of anticipatory shipping, noting that, traditionally, an item "is not shipped ... until a customer places an order for that item to be delivered to a specific delivery address."¹⁴ In conventional logistics, a customer order initiates the shipping process,

and the act of shipping triggers the payment. With anticipatory shipping, however, the company spends money on the shipping process without prior or simultaneous customer payment. Neither an order nor money is the input.¹⁵ This is particularly important given that Amazon would pay USPS and FedEx, or as of very recently, Amazon Delivery Service Partners, for transporting the package.¹⁶

In the patent a form of *speculative shipping* is introduced, or the “shipment of packages without completely specifying delivery addresses at the time of shipping.”¹⁷ One important aspect of speculative shipping is the method of late-select addressing, or “late addressing,” as it is also called in the patent, which occurs as a package passes through one of the hubs. This method allows for packages to be shipped without a specified delivery address and for the delivery address to be added en route after the package has shipped. A subform of speculative shipping is anticipatory shipping, which constitutes the patent’s most interesting innovation:

In some embodiments, *speculative shipping* of a package may occur in anticipation of a customer ordering items in that package, but before such an order has actually occurred. In such embodiments, speculative shipping may also be referred to as *anticipatory shipping*.¹⁸

In other words, the patented methods facilitate the shipping of packages before they are even ordered, based on the ability “to forecast or predict customer demand for a given item.”¹⁹ This forecasting model can ideally draw on large amounts of data about customers, such as previous wish list activities, shopping carts, product searches, and the duration of mouse hovers over items.²⁰ What is predicted by this mechanism, in essence, are probable futures.

Of course, predictions can be wrong and orders might not be placed as expected. To minimize financial risk, the patent also accounts for false positives, or faulty predictions. What we might call a *fallback mechanism* can be set up to keep costs related to an already-shipped package as low as possible: redirecting the package to another geographical area where a future purchase is likely, returning the package to its point of origin, incentivizing a future purchase by offering a discount or other nudge toward a potential purchase, or considering the costs of an already-shipped package as an investment in customer’s “goodwill”:

In some instances, the package may be delivered to a potentially-interested customer as a gift rather than incurring the cost of returning or redirecting

the package. For example, if a given customer is particularly valued (e.g., according to past ordering history, appealing demographic profile, etc.), delivering the package to the given customer as a promotional gift may be used to build goodwill.²¹

In this last option, false positives become a matter of building customer relationships.²² In the case of offering a discount and nudging potential customers toward a purchase, however, false positives from the anticipatory shipping algorithm are countered instead using Amazon's classic recommendation algorithm for curating the display of products. If a package were shipped but not yet met by a corresponding order, the product would be offered via the e-commerce platform to customers in near proximity to the current location of the shipped package at the given time. To make the offer more attractive, a discount could be provided.

Subsequent to determining the potential cost of returning or redirecting the near-proximity package, the package is offered to the potentially-interested customer at a discounted price, where the discounted price depends on the determined potential cost of return or redirection.²³

Combining the anticipatory shipping and recommendation algorithms allows for the fulfilling of prophecies. A sale is not only predicted but also produced.²⁴ In the following section, I discuss how this production occurs through a specific ordering of time, or a hardwiring of temporality.

Anticipatory Shipping as New Form of Logistical Media

The etymology of logistics is often traced back to the Greek λογιστικός (*logistics*), which means "skillful at calculation" but also "pertaining to reason."²⁵ In her work on logistics, Gabriele Schabacher (2008) refers to the French verb *loger*, originally meaning the temporary accommodation of soldiers or guests in a housing space. It was only this latter of three meanings of logistics that was taken up by researchers and experienced further differentiation in military-historical contexts.²⁶ Logistics, from a current point of view, can be regarded as a discipline, a perspective, or a set of cultural techniques engaged in (re)ordering time and space.²⁷ Monika Dommann argues that logistics, stemming from military strategies concerned with keeping fighting forces supplied, designates an engineering science dealing with the symbolic representation, monitoring, and control of flows of materials.

The declared goal of managerial logistical thinking, as Schabacher (2008) describes it, is always optimization. Optimization is here understood in terms of permanent improvement of logistics management and organizational forms, aiming for the smooth flow of commodities, information, services, and persons, preferably in a cost-saving way.²⁸ The just-in-time (JIT) model, also known as the Toyota Production System (TPS), concretely revolutionized logistical processes: time was considered one of the most valuable resources not to be wasted, with optimization being turned especially toward reducing wasted time.²⁹

In recent years, shipping processes have accelerated markedly, with shipping latencies decreasing and JIT principles rendering commodities constantly in motion, requiring them to be at the right place at the right time and spending as little time as possible on shelves. The connection between the logistical paradigm and time can be seen clearly in the corporate quest for efficiency as timesaving. Deborah Cowen argues, with reference to total cost analysis, that prior to the logistics revolution, different business activities were seen as separate, with transportation being seen as following the production process and not as a moment of it.³⁰ With total cost analysis, this changed, resulting in a new hardwiring of both time and space in the realm of corporate logistics, as production facilities moved away from metropolitan areas and distribution centers took their place. Such relocations were counterintuitive within the old paradigm, but the higher transportation bills made sense in terms of lowering overall cost.³¹

Alongside Walmart, Amazon is one of the largest organizations operating in the realm of logistics and has built out a massive infrastructure for its operations. Attention to the infrastructures of contemporary networks of information and materials has been of great interest in recent media studies. "Infrastructuralism," as recently articulated by John Durham Peters, "suggests a way of understanding the work of media as fundamentally logistical."³² For our purposes, the insight can also be reversed: the work of logistics is fundamentally a question of media.

In his investigation of radar, Judd Ammon Case introduces logistical media as "media of orientation" that "have to do with order and arrangement first, and representation second, if at all."³³ This perspective on the power to arrange seems indeed useful for understanding anticipatory shipping. The arranging and re-arranging of relationships between different actors, such as retailers, carriers, and customers as well as goods, databases, and money, describes what Amazon does through different medial forms on a daily basis. The patented methods connected to anticipatory shipping are a way of rearranging the paths and in particular the temporal relationships of

these people, things, and institutions. A particular infrastructural ordering of space and time produces a moment of exchange, a sale. It is only by having the particular material arrangement of fulfillment centers, trucks, planes, roads, sortation centers, and algorithms that the patent works.³⁴

Peters describes logistical media in *The Marvelous Clouds* as having the job of “ordering fundamental terms and units” and setting “the terms in which everyone must operate.”³⁵ As examples, he lists calendars, clocks, and towers, as well as names, indexes, addresses, archives, and money. Taking up the topic of new technologies later in the book, Peters adds that digital media, such as those we see in Amazon’s order fulfillment systems, “serve more as logistical devices of tracking and orientation” and “revive ancient navigational functions: they point us in time and space, index our data, and keep us on the grid.”³⁶

Amazon’s system of anticipatory package shipping is governed by an assemblage of digital media that produces an overlap of virtual and real space: the “real” space, inhabited by potential customers, is made manageable in terms of supply and calculation through a division into “geographical regions” where space is organized according to grids.³⁷ The grid, as an instrument for partitioning, allocating, and relating entities, is a central feature of logistical media. Peters writes: “The job of logistical media is to organize and orient, to arrange people and property, often into grids.”³⁸ The centrality of the grid to efforts at economizing time can be seen in Alan E. Branch’s definition of logistics, from a business perspective, as the “time-related positioning of resources ensuring that material, people, operational capacity and information are in the right place at the right time in the right quantity and at the right quality and cost.”³⁹ What Branch stresses, notably, is the “rightness” of place and time. Resources must be in the right place to be on time, and the more minutely structured are time and space, the more potential opportunity there is to be in a particular place on time. The ability to coordinate objects in a grid of space in real time, I argue, is made possible and provided through the digital—thus, *digital logistical media*.

Real-time interconnection, as Ned Rossiter argues, is crucial to logistical optimization: “Without real-time interconnection logistical operations become exercises in inefficiency.”⁴⁰ Rossiter, in this way, and in contrast to Peters and Case, draws a line between prior forms of organization, such as clocks and calendars, and contemporary digital technologies. He describes logistical media as an “instrumentalization of location-aware mobile technologies” that are “designed to exert control over the mobility of labor, data, and commodities as they traverse urban, rural, atmospheric

and oceanic spaces and traffic through the circuits of databases, mobile devices and algorithmic architectures.”⁴¹

Without diminishing the non-digital entities involved in fulfillment centers, trucks, schedules, sortation hubs, planes, roads, railways, and container ports, I want to focus on the all-encompassing network of digital logistical media governing these entities. Amazon’s patent describes a setting where predictive algorithms, which are inherently digital technologies, govern logistical processes. What is novel about the patent is a potential change in algorithmic logic rather than in any material shipping infrastructure. Just as total cost analysis comes to view business activities as interconnected, digital systems compose these activities as literally and technically interconnected. The alignment of data and goods described in Amazon’s patent is both produced and ensured by digital devices of tracking and recording. In this regard, the text stresses the importance of “machine-readable identifiers.” That is, inventory items and packages must be automatically traceable through “bar codes, magnetically or optically-readable characters, or other types of marking and scanning techniques,” such as “radio frequency identifier (RFID) tags or other types of transponders.”⁴² The technological identification of items allows for automatic control in the sense of both monitoring and governing their direction, i.e., routing.

Digital logistical media, as the example of Amazon’s anticipatory shipping method makes clear, represent a culmination of logistical techniques into a potentially all-encompassing interconnective entity. In the contemporary situation in which our world is ubiquitously populated by digital computers, one could speak of a *hardwiring of time* (and space) through the networks of algorithms and digital devices that govern the flow of information and goods—thus setting the terms of a politics of digital time. The predictive logic described in the patent is leveraged for not only logistical operations but also customer behavior. The following section will therefore present a third perspective on the patent by investigating the specific logic of prediction inherent in the methods of anticipatory shipping.

Anticipation, Prediction, Prophecy

Predictive analytics have become increasingly important as processes of decision-making in various sectors of contemporary societies.⁴³ The Latin *praedictiō* has two meanings as “the act of mentioning in advance,” namely, “prediction” and “prophecy.”⁴⁴ Algorithmic predictions could be considered to carry out this second meaning as the prophecies of our time, in the way

they structure the relation between present and future. Elena Esposito draws a striking comparison between ancient divinatory practices and today's prediction practices performed by "web intelligence." Prophecy takes on different meanings depending on whether the future is considered open or predetermined. In this regard, a key difference between divination and algorithmic prediction lies in each society's underlying understanding of the future. While divination speaks to an already-decided future, algorithmic prediction provides forecasts of probable futures. This difference becomes particularly relevant and visible in the case of false positives. If a divinatory prophecy did not come to pass, it was not the prophecy that was considered false. Because the future was regarded as predetermined and already decided, the interpretation was instead to blame: "one did not understand correctly, but the oracle was right."⁴⁵ False positives were epistemologically impossible.

In a modern and contemporary understanding of time, the idea of a predetermined future has, in the same way, become epistemologically implausible. The future is rather considered as ever evolving, open, and developing from human actions: "it cannot be known in advance because it does not yet exist."⁴⁶ What is possible, though, is the algorithmic forecasting of probable future behavior by looking at past behavior. When Esposito describes the effort of economically-oriented systems to bring future events and risks under control, she draws on Norbert Wiener's cybernetic notion of control. According to her reading of Wiener, "the past of a system is never sufficient to determine its future. One can collect all the possible information about the past, but it will not be enough to know the future."⁴⁷

Even if we cannot know the future, predictions can be produced through algorithmic means. What we can get from algorithmic predictions, is a "statistical future," i.e., "the distribution of possible futures of the system (the present future)."⁴⁸ This idea of multiple possible futures corresponds well to the patented methods of anticipatory shipping, which accounts in advance for multiple futures. The most peculiar aspect of prediction in anticipatory shipping is the way it accounts for false positives, what we called its fallback mechanism. This fallback mechanism is, again, the redirection of the package to another location, the return of the package to where it came from, or the production of consumer demand for the product by offering a discount and very short delivery time.

What remains unclear after a close reading of the patent, though, is what exactly would cause the fallback mechanism to take effect. Basically, the prediction would need to be declared wrong under specific circumstances. In the case of anticipatory shipping, one cannot know if a predicted purchase within a geographical area—after an indefinite amount of time—would

have occurred after all.⁴⁹ The validity of the prediction is temporally limited by, say, a “time to live”⁵⁰ for the package – in order to set the fallback mechanism into place to – in case of embodiment c) – induce the sale. Of course, there is still no guarantee that the desired customer behavior will occur, but at least there is a second chance. The form of temporal control described in the patent follows the cybernetic meaning of control, as Esposito describes it:

Control, in this case, is achieved not by comparing the input (the present) with a goal (the future), but by comparing the input with memory (the past), in order to draw an always renewed and always open projection of possibilities. The future is rewritten again in each present. ... This future is open without being indeterminate, and uses the past to multiply the available possibilities.⁵¹

In the third embodiment of anticipatory shipping’s fallback mechanism, reality is readjusted to the prediction. This embodiment reveals itself as the most radical articulation of rewiring temporalities because the future order within a geographical area is not only predicted but produced in the present. In other words, potentiality is sought to be turned into an actuality through technological, specifically, algorithmic, means.

Conclusion

The algorithmic governing of shipping networks and fulfillment centers towards anticipatory strategies represents an articulation of rewiring temporalities. With Amazon’s predictive algorithms, it is not only time that is brought under digital control but also, and particularly, the aggregated purchase behavior of clients. As Wolfgang Ernst writes, “Algorithms do not focus on the individual event but detect patterns, rhythms, and regularities to be extrapolated into the future.”⁵² The operation of nudging potential customers toward a purchase is basically an effort of aligning the “world” and prediction, of increasing the possibility that the prediction will come true.

In many cases in the press and online, Amazon’s patenting of anticipatory package shipping has brought forth articulations of uneasiness. One potential reason for these reservations might be found in the company’s lack of transparency regarding its algorithms. Robert Seyfert and Jonathan Roberge point out that users often expect Amazon’s conventional recommendation algorithm to fail:

The astonishment often expressed when Amazon's recommendation algorithms correctly predict (or produce) our taste, and directly result in a purchase, goes hand in hand with complaints of how wildly off the mark they are. We have come to expect failing algorithmic systems and we have indeed become accustomed to dealing with them.⁵³

Indeed, following Seyfert and Roberge, at times the only response to Amazon's miscalculations is to laugh. It is remarkably hard to peek into the inner workings of algorithms and understand their potential mistakes, particularly involving the anticipatory package shipping methods on the table. To determine whether Amazon's algorithms succeed or not in predicting our aggregated taste and shopping behavior is basically impossible from the outside.

Not only do the predictive algorithms remain opaque, but the relations between patented and actually implemented methods at Amazon also remain unclear. Amazon has not yet commented on the implementation status of anticipatory shipping, as the company typically declines to comment on patents.⁵⁴ A quick search for patents assigned to Amazon Technologies Inc. returns a list with 8,493 results.⁵⁵ This might be an effect of the company's current policies, trying to patent everything that seems to be potentially applicable and profitable in the future. The long list of patents, however, makes it even more difficult to determine which patents have been or will be implemented.

Irrespective of the actual implementation status of the methods described in the anticipatory shipping patent, one can observe that Amazon seeks in its business practices to collect ever more customer data and offer ever shorter delivery times. Nevertheless, the patented methods can be used to think about the rewiring of temporalities set out by predictive algorithms in ever faster and more efficient logistical processes. In essence, the patent along with the presented approach, allows us to think about a rewiring of temporality in terms of effects preceding causes, or shipments preceding orders.

Notes

1. Joel R. Spiegel, Michael T. McKenna, Girish S. Lakshman, and Paul G. Nordstrom, Method and System for Anticipatory Package Shipping, US Patent No. 8,615,473, filed August 24, 2012, and issued December 24, 2013.
2. See Atle Mikkola Kjøsén, "Anticipating Realization: Value's Logic of Movement and Amazon's Anticipatory Shipping," Conference Paper, Historical

- Materialism (UK), 2014, https://www.academia.edu/9288107/Anticipating_Realization_Values_Logic_of_Movement_and_Amazons_Anticipatory_Shipping. After the patent on anticipatory shipping was published in late 2013, it got some attention from the news and various technology-oriented blogs, but there is only little scholarly work on this patent, notably that by Kjøsén. At this point, I would also like to sincerely thank Kjøsén for a productive email exchange and generous comments on the draft text. Furthermore, this paper owes a lot to and builds on the collaboration with Nikolaus Pöchhacker addressing the relation of anticipatory shipping to the production of markets, see Nikolaus Pöchhacker and Eva-Maria Nyckel, "Logistics of Probability: Anticipatory Shipping and the Production of Markets," in *Explorations in Digital Cultures*, ed. Marcus Burkhardt, Mary Shnayien and Katja Grashöfer (Meson Press, 2020), <https://explorations.meson.press/chapters/logistics-of-probability/>.
3. For a close look on the influence of patents on software development in the US, see Gerardo Con Díaz, *Software Rights: How Patent Law Transformed Software Development in America* (New Haven, CT: Yale University Press, 2019); "Intangible Inventions: A History of Software Patenting in the United States, 1945–1985" *Enterprise & Society* 18, no. 4 (2017), 784–794. doi:10.1017/eso.2017.36.
 4. An alternative take on patents would be their conceptualization as "imaginary media" themselves or as documents describing imaginary media, following Jussi Parikka's elaborations on Eric Kluitenberg (ed.), *Book of Imaginary Media: Excavating the Dream of the Ultimate Communication Medium* (Amsterdam and Rotterdam: Debalie and NAI Publishers, 2006). Given that patents are oriented toward future technology that may or may not be invented, or we may or may not know if a patent has been implemented as in the present case of Amazon's anticipatory package shipping, which could be described as "media imagined, non-existent, but worthy of exploration in terms of how it can reinvigorate current media cultural design and debates." Parikka, *What Is Media Archaeology?* (Cambridge: Polity Press, 2012), 61.
 5. Albert Kümmel-Schnur, "Patente als Agenten von Mediengeschichte," in *Bildtelegraphie: Eine Mediengeschichte in Patenten (1840–1930)*, ed. Albert Kümmel-Schnur and Christian Kassung (Bielefeld: Transcript, 2012), 16.
 6. Christian Kassung, "Die Zukunft des Wissens und eine Geschichte der Patente," in *Nicht Fisch – nicht Fleisch. Ordnungssysteme und ihre Störfälle*, ed. Thomas Bäumler, Benjamin Bühler, and Stefan Rieger (Zürich: Diaphanes, 2011), 156. Although Kassung's text is mainly concerned with patents for concrete technical apparatuses, his diagnosis remains true for software patents and patented methods.
 7. Kassung, "Die Zukunft des Wissens," 153. See Bowker (1992) as well as Potage and Sherman (2010) For further analyses of patents, see Geoffrey Bowker, "What's in a Patent?," in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. Wiebe E. Bijker and John Law (Cambridge, MA,

- and London: The MIT Press, 1992), 53–74; Alain Pottage and Brad Sherman, *Figures of Invention: A History of Modern Patent Law* (Oxford: Oxford University Press, 2010).
8. Kassung, “Die Zukunft des Wissens,” 156.
 9. See for example Bruno Latour, *Pandora’s Hope: Essays on the Reality of Science Studies* (Cambridge, MA: Harvard University Press, 1999).
 10. Another reason why patents could be understood as documents describing *imaginary media* (see Parikka, *What Is Media Archaeology*, 61; Kluitenberg, *Book of Imaginary Media*).
 11. Kümmel-Schnur, “Patente als Agenten von Mediengeschichte,” 27.
 12. See Kjøsén, “Capital and Post-Cybernetic Control: On Amazon’s Patent for Anticipatory Package Shipping.” Presentation on April 5, 2018, Faculty of Information and Media Studies, Western University, London, Ontario; Oliver Nachtwey and Philipp Staab, “Die Avantgarde des digitalen Kapitalismus,” *Mittelweg* 36, no. 6 (2015), 67.
 13. See Kjøsén, “Capital’s Media: The Physical Conditions of Circulation” (PhD diss., University of Western Ontario, 2016), <https://ir.lib.uwo.ca/etd/4156/>.
 14. Spiegel et al., 16.
 15. Kjøsén, email message to author, July 11, 2018.
 16. For more on Amazon Delivery Service Partner, see Louise Matsakis, “Why Amazon Is Giving Employees \$10,000 to Quit,” *Wired*, May 14, 2019, <https://www.wired.com/story/amazon-delivery-paying-employees-to-quit/>.
 17. Spiegel et al., 16.
 18. Spiegel et al., 16. Emphasis added.
 19. Spiegel et al., 17.
 20. Spiegel et al., 22.
 21. Spiegel et al., 22.
 22. However, unasked-for gifts by corporations are not always the best idea in terms of Customer Relationship Management, as they basically violate the “rules” of gift-giving and can produce irritation, even anger, for customers. This was the case e.g. with Apple’s “free gift” of automatically downloading U2’s then-new album for all iTunes users in 2014. See Robert Booth, “U2’s Bono Issues Apology for Automatic Apple iTunes Album Download,” *The Guardian*, October 15, 2014, <https://www.theguardian.com/music/2014/oct/15/u2-bono-issues-apology-for-apple-itunes-album-download>.
 23. Spiegel et al., 21.
 24. At this point—on the important difference between *demand* and *sale*—I wish to quote Atle Kjøsén from an e-mail correspondence on July 11, 2018: “Often “demand” is confused for “need” and for “purchase.” In the case of the patent, “demand” is actually already proven by Amazon because the consumer has added items to their wish list, shopping cart, looked at the items x number of times and so on. There is clearly a demand there, but that demand may not be backed up by cash. Hence, the whole point of logistics is to not match supply with demand, but match supply with cash. ... What is predicted and produced is not demand (it was already there),

- but a sale: the moment whereby commodities change hand for money. But in that case, it is not merely the algorithms that produce a sale, but also the physical infrastructure of FCs, hubs, trucks etc. (the infrastructure of the order fulfillment system). After all, if the package is not in a geographical area where demand has been detected, the sale cannot be produced."
25. *The Brill Dictionary of Ancient Greek*, 2015 ed., s.v. "logistics"; see also Deborah Cowen, *The Deadly Life of Logistics: Mapping Violence in Global Trade* (Minneapolis: University of Minnesota Press, 2014), 26; and Gabriele Schabacher, "Raum-Zeit-Regime: Logistikgeschichte als Wissenszirkulation zwischen Medien, Verkehr, und Ökonomie," *Agenten und Agenturen: Archiv für Mediengeschichte*, ed. Lorenz Engell, Joseph Vogl, and Bernhard Siegert (Weimar: Bauhaus University, 2008), 137.
 26. Schabacher "Raum-Zeit-Regime," 137.
 27. For more on cultural techniques, see Cornelia Vismann, "Kulturtechnik und Souveränität," *Zeitschrift für Medien- und Kulturforschung* 1 (2010), 171–181; Liam Young, "Cultural Techniques and Logistical Media: Tuning German and Anglo-American Media Studies," *M/C Journal* 18, no. 2 (2015), <http://journal.media-culture.org.au/index.php/mcjournal/article/viewArticle/961>. For more on the ordering of time and space, see Monika Dommann, "Handling, Flowcharts, Logistik: Zur Wissensgeschichte und Materialkultur von Warenflüssen," *Nach Feierabend 2011: Zirkulationen. Zürcher Jahrbuch für Wissensgeschichte* 7, ed. David Gugerli et al. (Zürich: Diaphanes, 2011), 75. For a history of logistics from a media-theoretical perspective, see Schabacher, "Raum-Zeit-Regime" and Dommann, "Handling, Flowcharts, Logistik." For an investigation on the political economy and potential violence of global logistics processes, see Cowen, *The Deadly Life of Logistics*.
 28. Schabacher "Raum-Zeit-Regime," 144f.
 29. For more on TPS, see Taiichi Ohno, "Toyota Production System" (1978), *The Roots of Logistics: A Reader of Classical Contributions to the History and Conceptual Foundations of the Science of Logistics*, ed. Peter Klaus and Stefanie Müller (Heidelberg: Springer, 2012), 173–182.
 30. Cowen, *The Deadly Life of Logistics*, 36–38. See also Kjösen, *Capital's Media*, 78. Kjösen argues for qualifying the current *capitalist mode of production* as "logistical ... due to the increased centrality of logistics to business since the 1970s" (73).
 31. Cowen, *The Deadly Life of Logistics*, 38.
 32. John Durham Peters, *The Marvelous Clouds: Toward a Philosophy of Elemental Media* (Chicago: University of Chicago Press, 2015), 37.
 33. Judd Ammon Case, "Geometry of Empire: Radar as Logistical Medium" (PhD diss., University of Iowa, 2010), 1, <http://ir.uiowa.edu/etd/474>.
 34. Kjösen, email message to author, July 11, 2018.
 35. Peters, *The Marvelous Clouds*, 37.
 36. Peters, *The Marvelous Clouds*, 7.
 37. Spiegel et al., 15. This real space is also built up and ordered by the infrastructure of fulfillment centers, sortation hubs and so on. These hubs are

not placed randomly. Cowen elaborates on how logistics is a reorganization of space; before factories were located close to the market, but after the logistics started calculations of total cost, factories were often located closer to important transportation nodes.

38. Peters, *The Marvelous Clouds*, 37.
39. Alan E. Branch, *Global Supply Chain Management and International Logistics* (New York: Routledge, 2009), 1.
40. Ned Rossiter, "Coded Vanilla: Logistical Media and the Determination of Action," *South Atlantic Quarterly* 114, no. 1 (2015), 139.
41. Rossiter, *Software, Infrastructure, Labor: A Media Theory of Logistical Nightmares* (New York: Routledge, 2016), 8.
42. Spiegel et al., 17. See also Christoph Rosol, *RFID. Vom Ursprung einer (all) gegenwärtigen Kulturtechnologie* (Berlin: Kadmos, 2007).
43. See also Pöchhacker and Nyckel (2020), 1.
44. *Oxford Latin Dictionary*, 1994 ed., s.v., "*praedictiō*."
45. Elena Esposito, "Digital Prophecies and Web Intelligence," *Privacy, Due Process and the Computational Turn: The Philosophy of Law Meets the Philosophy of Technology*, ed. Mireille Hildebrandt and Katja de Vries (Oxon and New York: Routledge, 2013), 134. The future was perceived as predetermined, and therefore *immutable*. According to this belief, it could not be altered by human actions—"not even by those who try to oppose it" (134). As an example of the future's inevitability Esposito refers to the story of Oedipus.
46. Esposito, "Digital Prophecies and Web Intelligence," 134.
47. Esposito, *The Future of Futures: The Time of Money in Financing and Society* (Cheltenham: Edward Elgar, [2009] 2011), 194.
48. Esposito, *The Future of Futures*, 194; see also Wiener, *Cybernetics: Or control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948), 37, 92–93.
49. Alternatively or in addition, one could suspect that *costs* may play a decisive role in this scenario, though time and cost are, of course, connected quite closely. Thus, declaring a failed prediction could be something like "Possible sale x has a y % chance in z hours/days." Kjösen, email message to author, July 11, 2018.
50. "Time to live" (TTL) is an attributed number that enables a mechanism to prevent the indefinite rerouting of *packages*; however, in this case, *data packets* or *datagrams* in the Internet, enabled and structured by the Internet Protocol: "This number designates the maximum number of hops that that datagram is able to take before it is deleted. At each hop, the time-to-live is decreased by one. If the time-to-live reaches zero, the routing computer is obligated to delete the datagram. This ensures that datagrams will not hop around the network indefinitely, creating excess congestion." Alexander R. Galloway *Protocol: How Control Exists after Decentralization* (Cambridge, MA: MIT Press, 2004), 45. This description—respectively the reappropriation of the package metaphor as providing a surplus meaning—works surprisingly well for the temporal control of packages "hopping"

- through the network of hubs, fulfillment centers, and delivery centers as conceptualized in the anticipatory package shipping patent. For further discussion of this similarity between the routing of data packets and packages, see Christoph Neubert and Gabriele Schabacher, "Verkehrsgeschichte an der Schnittstelle von Technik, Kultur und Medien. Einleitung," in *Verkehrsgeschichte und Kulturwissenschaft* (Bielefeld: Transcript, 2012), 25.
51. Esposito, *The Future of Futures*, 194.
 52. Wolfgang Ernst, *Chronopoetics: The Temporal Being and Operativity of Technological Media*, trans. Anthony Enns (London and New York: Rowman & Littlefield, 2016).
 53. Robert Seyfert and Jonathan Roberge, "What Are Algorithmic Cultures?" in *Algorithmic Cultures: Essays on Meaning, Performance and New Technologies*, ed. Seyfert and Roberge (London and New York: Routledge, 2016), 14f.
 54. Alan Boyle, Amazon Wins a Pair of Patents for Wireless Wristbands That Track Warehouse Workers," *GeekWire*, January 30, 2018, <https://www.geekwire.com/2018/amazon-wins-patents-wireless-wristbands-track-warehouse-workers/>; Celan Yeginsu, "If Workers Slack Off, the Wristband Will Know (And Amazon Has a Patent for It)," *New York Times*, February 1, 2018, <https://www.nytimes.com/2018/02/01/technology/amazon-wristband-tracking-privacy.html>.
 55. Google Patents, searched June 14, 2019, <https://patents.google.com>.

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