Tracing the Story of Food Across Food Systems

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This paper addresses the impulse to render systemic food systems issues into stories in light of ongoing challenges such as food scares, food fraud, and the COVID-19 pandemic. Such stories about food systems are seen as embodying the ideal of supply chain transparency currently in vogue and regarded as key to solving food system inequities by shedding light on them. Read in the context of documentary cinematic unveilings of unethical production practices, transparency initiatives of various types, particularly those dependent on the real-time, crypto-ensured storytelling of blockchain and digital twinning technology, would seem to provide a new model of indexicality, a new contract with social reality. However, such tracing systems and the questions they raise instead describe the way in which food—and the land, people and animals who are involved in its production—becomes fodder for various power plays.

Keywords: food systems, food stories, documentary, supply chain, transparency, blockchain, indexicality

INTRODUCTION

A recent piece on the satirical website *The Onion* speculating on the future of farming proposed several absurd solutions for increasing the food supply such as "slightly more futuristic rakes," "robot meat," "VR asparagus," as well as "supply-chain tracking that enables consumers to know where their food originated and what adventures it had along the way" (What the future of farming looks like, 2019). The inclusion of a rather realistic form of "supply-chain tracking" in a list of otherwise risible inventions destined for the uncanny valley suggests that supply-chain tracing is somehow suspect in its ability to document food systems conditions. In line with other Big Tech interventions into agriculture, supply chain tracking in this guise appears to be little more than a Silicon Valley pipe dream that places food systems governance where it belongs: into the hands of predictable (and predictive) machines, not of pesky humans.

To a certain extent, the *Onion* piece is accurate in terms of where Big Food is headed in its use of supply chain tracing. Big food players such as Walmart, Cargill, and the IBM Food trust are hopeful that technology such as blockchains could help secure and identify the various nodes of the vast and decentralized supply chain of food. Blockchains are designed to distribute trust across an entire system of players all with the same shared information. Each transaction is secured by blockchain miners who use inordinate amounts of energy (approximately 1.5 households daily energy use per transaction) to compete in the solving of a mathematical puzzle for which they are awarded cryptocurrencies (Iansiti and Lakhani, 2017). Because of the costs involved, it is difficult, though not impossible (you need to have a 51% stake), to change the ledger, which nonetheless have become increasingly subject to hacking (Orcutt, 2019). The security offered by blockchain prompted Walmart to initiate a pilot project for food traceability in response to the 2019 E. coli Romaine recall in the U.S. (Banker, 2019). The IBM Food Trust since then has partnered with many food companies seeking to use blockchain to help minimize their risk in the face of devastating

food recalls (Nestlé Carrefour partner with IBM for blockchain food traceability for instant mashed potato, 2019).

Future Market, a food innovation and branding firm that uses brand design to help companies anticipate future food trends conceived of a concept food called Block Bird, a chicken that provides consumer with a complete, blockchain-verified story of itself, from ovum to oven. Touted as the "world's most transparent chicken," Block Bird's packaging features a removable touchscreen label that tells you everything you'd ever want to know about the chicken that you're about to cook for dinner: where it was raised, what it ate, which vaccines it received, its environment, even its birthday, if one chose, in macabre fashion, to celebrate it postprandially (Block Bird's, 2019). That imaginary concept chicken in fact has a real-world counterpart sold in China as the GoGoChicken (Wang, 2020, p. 48). Developed by the village of Sanqiao and Lianmo Technology, GoGoChicken relies on blockchain to assuage concerns about food fraud and supply chain inconsistencies (p. 50). Selling for about $40 a chicken, many times the market price, GoGoChicken appeals to the urban elite consumer who can certify their own ethical purchasing practices with a quick scan of the QR Code (p. 48). That price is justified in part by all the certifications, stamps, and rigorous standards the GoGoChicken has passed through before arriving on the consumer's plate, emblazoned with its prominently displayed QR code.

While there is food industry excitement about blockchain technology, it has been seen as a necessary, but not sufficient element of digitizing. When applied to the material exchange of goods, blockchains have the potential to make transparent the entire supply chain. But skeptics argue that it's not enough for a few limited, proprietary blockchains to exist; instead, they argue that system-wide transparency and food safety would require a public utility-type infrastructure allowing for global standards about food to be interpreted locally among all players (di Ferrante, 2018). Critics of the use of food blockchains, moreover, find that their focus on commodities and an anonymized proof-of-work encrypted infrastructure obscures the role of human labor in ensuring quality (Splitter, 2018; Wang, 2020, p. 60).

Others see blockchain as valuable not so much for food safety, which can be fulfilled by existing databases, as it is for documenting the various attributes of a certain food item that make it palatable to consumers' food preferences. Food industry players such as Ripe.io, the self-styled "Blockchain of Food" boasts the tagline "Transparency in Every Byte" (Transparency in every bite, 2009). They want to apply blockchain to anticipating consumers' personalized food needs and preferences and being able to catalog the qualities of specialty food items into "product libraries" (Ramachandran et al., 2018). The blockchain would be used to aggregate information about a given food item into a "food bundle" that captures "the journey of food along the supply chain" (Galvez et al., 2018, p. 225; Ramachandran et al., 2018). The CEO of Ripe.io, Raja Ramachandran, describes the company's mission as not about "food safety and risk management" but "curation, quality, sustainability, and understanding of the food" (The potential role for blockchain in food, 2019). For example, one of Ripe.io's collaborations, a project called the Internet of Tomatoes, seeks to hack the ineffable qualities of *terroir* through "seed-to-signal" analog-to-digital sensors that track all specifications involved in the growing of a plant (Lamb, 2018). By making the tomato's conditions of growth transparent, the company sees its role as "tell[ing] consumers and businesses where their food comes from, how's it made, how's it distributed... effectively the story of food" (Lamb, 2018).

The intersection of story, truth, and transparency in the discourse of food blockchains resonates with the mandate of documentary film and media, a reality-based medium frequently used as a forum to engage, not simply inform, viewers and have an impact on public policy (Nisbet and Aufderheide, 2009, p. 450). Documentary viewer engagement, particularly in food documentaries, often relies on an affective connection with subjects, which filmmakers hope leads to ethical engagement with the issue at hand (Richardson-Ngwenya and Richardson, 2013, p. 344). The documentary film is traditionally understood as the ultimate vehicle for truth-telling for activists due to its historical alignment with radical decolonial and feminist assemblages, a status that has in recent decades waned due to the corporate alignments of big budget documentary film and the ubiquity of storytelling across sectors in the service of market-based logics (Juhasz and Lebow, 2018; Sarlin, 2021, p. 38).

The descriptive unit of food system transparency—the food story—is part and parcel of what Hockenberry et al. (2021, p. 3) describe as the "logistical imagination", which they argue encompasses the "representational and imaginative modes of logistical activity, as well as the aesthetic and performative practices that have emerged to grapple with logistical transformations." The protagonists of these stories are most often commodities as well as the people behind the commodities. As Anna Tsing argues, such protagonists in "narratives of capitalism" act as "exemplary figures through which we come to understand capital and labor" (2009, p. 152). This mediatization of the "food story" across activist, corporate, and nongovernmental domains is simultaneously indicative of a widespread rise of the "political economy of storytelling," which peddles easily digestible units of information and testimonial within a neoliberal societal frame (Fernandes, 2017, p. 10). A particularly surreal example of the ubiquity of stories in the food space is Walmart's suite of YouTube videos designed for its suppliers, one of which is called "The Secret Life of Sliced Turkey." The video lays out the optimal conditions for producing the cured meat sustainably and cheaply using research into life cycle assessment (LCA) (Freidberg, 2017, p. 24). LCA analysis is compelling to large corporations largely because it produces massive amounts of data about production, the "authority" of which, Freidberg (2017, p. 25) argues, "mirrors the vast geographic scope of many product supply chains". LCA analysis allows corporations to optimize (as well as justify) their operations on a scale commensurate with the supply chain of which they are a part.

Construed in corporate circles as a value-add to their products, food stories are in turn secured through a blockchain. In the case of Ripe.io, the blockchain is regarded as a "digital twin of an existing item to tell the truth of that story" (Galvez et al., 2018, p. 225; Lamb, 2018). As virtual doubles of complex

physical system, "digital twins" contain a documentary impulse to replicate the real. Based in the engineering subfield of product lifecycle management (PLM), digital twins are virtual aggregates of real-time data about physical systems (Grieves, 2019). The concept has been extended to the biosphere itself, as the European Science Agency recently launched Digital Twin Earth as a way to eventually create a real-time model of planetary systems (Digital Twin Earth, 2020). One of the first projects for Digital Twin Earth is to create a digital twin of global food systems to be able to predict food system shortages (Working towards a Digital Twin of Earth, 2021).

Read in the context of activist-leaning documentary cinematic unveilings of unethical production practices, corporate transparency initiatives of various types, particularly those dependent on the real-time, crypto-ensured storytelling of blockchain and digital twinning technology, would seem to provide a new model of indexicality, a new contract with social reality. However, such tracing systems and the questions they raise instead describe the way in which food—and the land, people and animals who are involved in it—becomes fodder for various power plays.

In what follows, I will begin by reviewing the literature on transparency and why it matters to food stories, then show the reliance of geographers in the early stages of globalization on reflexive cinematic models for giving voice to commodities and their makers, and, finally, show how these same reflexive cinematic models, in distancing themselves from access to the real, severely constrain the terms of agency in food stories. In contrast, blockchain's reliance on just-in-time technology, which doubles down on the physical relation between signs and referents in order to exert control over the story of food, generates unexpected results, especially in the current advanced stage of globalization.

THE DREAM OF "RADICAL TRANSPARENCY" IN FOOD SYSTEMS

During the 1970s food crisis, there was a dramatic shift in the growth of the food system which contributed increasingly, according to Clapp (2016), to "our lack of awareness of the conditions of its production and the skewed nature of power differential along agrifood supply chains". Since then, with the mainstreaming of organic foods and sustainability, activists and savvy consumers have come to demand more knowledge of the food they buy, a stance that Opel et al. (2010) have argued is "fundamental for new kinds of global citizenship."

In an age of highly publicized food scares and recalls, the goal of using blockchain to organize the global food supply— what some call "radical transparency" (Gardner et al., 2019, p. 165)—is supposed to comfort consumers about the safety of their food supply. The use of transparency as marketing strategy (Broad, 2020, p. 1591; Edwards, 2020) is a mirror image of the "right-to-know" governance characteristic of democratic societies, but within proprietary, corporate silos (Lockie et al., 2015, p. 124; Mol, 2015, p. 160). This mirroring is not merely a corporate sleight-of-hand, but points to the

way in which transparency and publicity are intertwined and interdependent (Edwards, 2020) due to their embeddedness in networks of "communicative power" (Wood and Aronczyk, 2020, p. 1533). The GoGoChicken, for instance, draws its communicative power from the transparency of the distributed ledger recording the various transactions that made it possible. That sense of transparency, in turn, is communicated through publicity campaigns or marketing tools such as the prominently displayed QR code that announces that chicken's exploits in the supply chain.

In the wake of COVID-19 and its disruption of global supply chains, governmental agencies, NGOs, and policymakers have been doubling down on digital, automated, IoT solutions, all focused on keeping those chains intact. Being able to tell the "story of food" through digitized traceability was by far a major goal, as in, for example, the Obama-era FDA Food Safety and Modernization Act (FSMA) and its recent "New Era of Smarter Food Safety" program, aimed at "leveraging technology and other tools to create a safer and more digital, traceable food system" (U.S. Food and Drug Administration, 2021). Such measures are in line with the Obama administration's overall interest in using digital means to render the workings of government more transparent to the public (Fallon, 2019, p. 115). Yet, as in the case of the GoGoChicken, governmental and NGO initiatives are often in collaboration with corporations, which have the necessary capital to invest in tracing systems. The 2021 U.N. Food Systems Summit, for example, has been criticized for its prioritizing of corporate interests over those of subsistence farmers (Canfield et al., 2021; de Wit et al., 2021).

While certain uses of blockchain, particularly in mobile technologies, can mitigate "information asymmetry" (Lin et al., 2020, p. 673), generally, there has not been enough evidence to justify such optimism (Feng et al., 2020, p. 121033). As such, the transparency that blockchain promises is more of an ideal or even a commodity in itself, not unlike the status of geographically diverse foods in 1990s London, which were subject to "double commodity fetishism" because of both their far-flung provenance and their difference from more widely available mainstream foods (Cook and Crang, 1996b, p. 132). Goodman notes a similar trend in fair trade networks, where the legibility to Northern consumer markets of growers of foods from the Global South ironically depended on the commodification of foodstuffs, a process that was as material as it was semiotic (2004, p. 894–895). Transparency, moreover, being linked to blockchain platforms, is like the cold chain standard of "freshness" that Freidberg (2009, p. 5) argues "depends less on time or distance than on the technology that protects it". Of course, the ubiquity of the discourse of transparency in food systems and wider environmental governance makes it appear more absolute and less context specific.

The literature on transparency in food systems varies in its assessment of this trend of a naturalized transparency in food governance. Among players up and down the supply chain, including the state, the public and corporate entities, transparency is seen to remedy mistrust (Gupta and Mason, 2014, p. 5; Lockie et al., 2015, p. 124). In terms of ethical standards in labor and environmental governance, more transparency is

presumed to lead to better conditions, based on the precedent of public right-to-know efforts concerning pollution (Mol, 2015, p. 154). But the reality is different. In the case of corporations, when disclosure is even an option given the prevalence of trade secrets, voluntary disclosure often is motivated by wanting to avoid governmental regulation (Gupta and Mason, 2014, p. 6). This preemptive disclosure often biases government in favor of liberal economic policies which ultimately benefit large businesses with the capital to invest in traceability systems (p. 8). Such policies often reinforce existing power and wealth inequities rather than remedy them, which is what transparency was intended to do (p. 10–11). In essence, an impulse that was intended to restore trust and instill equity does the opposite: creating distrust and privileging companies already possessing a lion's share of the market (Lockie et al., 2015, p. 124). Moreover, the shift in blockchains toward interoperability and standards across platforms will further privilege Big Food entities able to meet those standards (GS1 US: Supply chain blockchain has evolved, 2021). Transparent stories about food therefore do not seem to be sufficient for transformative change on the ground without the targeted deployment of those stories and the involvement of stakeholders directly affected by whatever is at issue (Broad, 2016, p. 58; Gardner et al., 2019, p. 164–166). As Gupta and Mason maintain as part of their "critical transparency studies perspective," transparency is a "fundamentally contested political terrain" (2014, p. 9) rather than a sure vehicle for truth-telling.

COMMODITY ANALYSIS, DOCUMENTARY FILM, AND THE PROMISE OF BLOCKCHAIN INDEXICALITY

A recent editorial in *Nature Food* addresses the tensions and contradictions in the uses of blockchain for food systems: "Though big data has the potential to reduce narratives of food provenance to issues of supply chain processes—multinationals have begun to explore the capabilities of distributed ledger technology in rooting out issues of land rights, child labor and forced labor along the food supply chain. The potential of blockchain as a tool of food justice is immense" (The hands that feed us, 2020). In touting the value of blockchain as a tool of food justice, *Nature Food*'s editor buys into a common deployment of transparency as a response to a moral failing (Harvey et al., 2013, p. 295). Calls for transparency in the food system seem to build on the cachet of what Goodman calls the "moral economy of food" that began to emerge in the "political ecological imaginary" of fair trade networks in the 1990's (2004, p. 894). In this vein, food stories enabled through blockchain resonate with earlier attempts in food justice movements, such as that of fair trade, to reveal the on-the-ground conditions of the commodity chain.

Documentary films often have played a role in revealing the injustice of such conditions. Food documentaries such as *Black Gold* (2006), *Bananas!* (2009), and *The Dark Side of Chocolate* (2010) critique industrial agriculture by tracing the trajectory of its resulting commodities across "logistics space" (Baron et al., 2014; Cowen, 2014, p. 2). In this way, documentary film is itself a logistical medium that transports and translates

specific social realities for an imagined public. Like supply chains, documentaries possess an internal logic of moving assets. Kahana (2008) describes documentary as a "transitional medium" that "carries fragments of social reality… and in transporting them *translates* them from a local dialect to a lingua franca" (2008, p. 2). This process of translation is not unlike that which occurs in the "moral economy" of fair trade networks, as described by Goodman, where the commoditization of a food from Southern countries to Northern ones involves both a physical and semiotic transformation that Goodman (2004, p. 894-5) argues ultimately is a necessary condition for Northern countries' ethical consideration of Southern food producers.

Cook and Crang (1996b), following Marcus (1990), are invested in a distinctly cinematic approach to commodity systems analysis: one that embraces the contrasting juxtapositions of montage (especially parallel intercutting) to describe the global circuits of commodities from point of production to point of sale. They are invested in the parallels between the "New Ethnography" of the early nineties and the "'New Documentary' movement" of the same era, both of which questioned the objectivity of its representations of the world, particularly the worlds of cultural others (Cook and Crang, 1996b, p. 18; Williams, 1993). In reference to food systems, the "others" in question are the people who produce the foodstuffs that eventually circulate as commodities. Cook and Crang (1996b) argue that commodity driven films often rely on the unveiling technique, which gives too much importance to the place of provisioning and none to the place of consumption (p. 148). Instead, Cook and Crang argue for leaning into the commodity form by "roughing up" its surface (p. 147) in order to attend to uses and abuses of the commodity form itself as it circulates (p. 148). Cook and Crang sees their work as giving voice not only to the "mute" grapes of David Harvey's analysis (Cook and Crang, 1996b, p. 135; Harvey, 1990, p. 423), unable to attest to the conditions in which they were produced, but also to the commodity fetish itself, which takes on various guises as it circulates in the market (Cook and Crang, 1996b).

Amos Gitai's documentary film *Pineapple* (1984), which tracks the journey of a can of Dole-brand pineapple from a grocery store shelf to a Hawaiian plantation, resonates for Cook and Crang (1996a) as an example of filmic commodity analysis par excellence because of its interest in not merely exposing labor violations but for reflexively using the film medium itself to explore power structures in that industry. In telling the story of pineapple, they argue, Gitai's film questions the stories that the captains of industry tell themselves, as well as those of middle management and field workers. Unlike the blockchain chicken, for example, which aims toward a story of complete transparency, Gitai's canned pineapple is rendered in many ways more opaque through the film's cinematic ambling, counterintuitive editing choices and dissonant soundtrack. The viewer is left with more questions than answers, but with perhaps a higher fidelity recording of the actual ways in which commodities generate meaning.

The reflexive documentary film, in providing a model to geographers for mediating and framing access to the real as a function of ideology (Williams, 1993, p. 13–14), however,

belies its counterintuitive legacy of naturalizing cultural others through the gesture of giving them a voice. Film scholar Pooja Rangan has dubbed this tendency in reflexive documentary film, particularly participatory documentary, which gives subjects the chance to participate in the documentary process, as the discourse of "immediation" (2017, p. 7). Such a move is problematic according to Rangan because it denies "agencies that elude the coordinates of liberal selfhood" (p. 176). These contours of liberal selfhood are the same values underwriting the anthropomorphic "political economy of storytelling" (Fernandes, 2017, p. 10), the same values that equate increased transparency in the food system with gains in social justice rather than questioning the terms of the transparency itself. Similar to the reflexive documentary film, such transparency would, in Rangan's assessment, make entities in the food system who typically are invisible to consumers and have borne the brunt of its excesses—working people of color, animals, and the biosphere as a whole— "visible by 'giving' them selfhood or a voice" (p. 176). Such visual and logocentric renderings of agency, in Rangan's estimation, do not allow for other understandings of the world, which is limiting especially when it comes to characterizing food and food systems. A similar point has been taken up recently by critics of the 2021 U.N. Food Systems Summit, who argue that the Summit prioritized smart technologies for meeting the U.N.'s Sustainable Development Goals over more culturally relevant agroecological, Indigenous and traditional agricultural knowledge (de Wit et al., 2021).

Rangan argues that the "antimimetic enterprise" (p. 177) of reflexive documentary, especially in light of the rise of digital film and media (Doane, 2007), ultimately denies the indexical connection of film to the world (Rangan, 2017, p. 180). Recalling that the index as described by Charles Sanders Peirce involves the physical proximity between sign and referent (famously, the relationship between foot and footprint, and in the case of film, light and film stock), Rangan argues for a documentary signification marked by touch rather than sight (Rangan, 2017, p. 179–180). Drawing on Laura U. Marks notion of "haptic visuality" (Marks, 2000, p. 162), the examples Rangan draws on in this alternate mode center on projects showcasing the incidental interactions of animals with various recording apparatuses that are otherwise illegible to humans (p. 180). More pertinent to food systems, Marks theorizes food as inspiring a particular form of "haptic visuality" in intercultural films that helps exiled viewers of those films remember culturally relevant "gustatory epistemologies" (Marks, 2000, p. 225–226). In such films, senses such as taste and smell structure thought and models of agencies outside the liberal mold.

Blockchain, with its contractual claim to truth ensured through just-in-time sensor signals certified by anonymized proof-of-work systems, would seem to similarly reinstate a form of indexicality focused on the physical relationship between referent and sign. Smaill (2018) argues that the regimes of spatialization and duration within the realm of data-driven, real-time visualization technologies provide both a challenge to and opportunity for rethinking documentary mediations of the environment (p. 2). While she analyzes real-time tracking software of sharks, her assessment of the "documentary impulse"

of such digital technologies given their "dynamic and durational representation of the real" (p. 2) could potentially be applied to food blockchains. As such, blockchain food stories point to a lesser known aspect of cinematic indexicality that draws not solely on a physical connection to the real world, but the spatio-temporal framing of the real, in this case, through real-time updates along the commodity chain (Malitsky, 2012, p. 245–256). What is called the deictic sense of indexicality communicates presence and immediacy by pointing or indication (Doane, 2007, p. 133–134; Malitsky, 2012, p. 246). In this vein, traditional commodity chain analysis, and its more recent blockchain-secured iterations, establishes the truth of something by pointing to its arrival at various points on the supply chain, movements which are registered by sensors, third-party certifiers, and individuals. Truth in blockchain depends on the fidelity of the sensor and the ability to aggregate signals to create a picture of truth with potentially emergent properties. The true power of blockchains, according to its promoters, is not to unveil or render transparent the truth, as in earlier commodity systems analysis, nor to show that reality to be a function of ideology, as in the work of Marcus and Cook and Crang, but to predict the truth or discern second order emergent properties of the system in which the food circulates.

The purported emergent properties of blockchain food stories are in tension with their restoration of a physical connection or proximity between sign and referent. Blockchain food stories in the current stage of late globalization call attention to the fact that the relationship between the index and its referent is never a straightforward one of representation, but instead is marked by an uncanny haunting by the referent that merits further scrutiny (Doane, 2007, p. 124). Researchers of globalization in its early stages were encouraged to "follow the things" (Appadurai, 1986; Cook, 2018, p. 5) in order to better understand them. But, in the current conditions of advanced globalization, as Hulme argues, not being able to follow things seems a more likely scenario given the complexity of supply chains and their tendency to break down (Cowen, 2014, p. 2; Hulme, 2017).

The early 2021 blockage of the containership the *Ever Given* in the Suez Canal brought to light the utter dependence of global supply chains on the smooth sailing of their shipping vessels. An image distributed by the PR arm of the Suez Canal Authority of-the-little-excavator-that-could, earnestly trying to dislodge the outsized vessel from the banks of the canal, was reappropriated in a slew of anti-capitalist memes riffing on the theme of the futility of individual effort in the face of global, systemic catastrophe. In a kind of self-fulfilling prophecy of the lures of the neoliberal championing of the individual, the operator of the excavator, in defiance of the memes, said he was motivated to work harder than ever (Jankowicz, 2021). And yet, the release of the vessel itself did not mark the end of this supply chain snafu. As of the writing of this article, nearly $1 billion of goods are still stuck in administrative and legal limbo (Wackett, 2021). On a local scale, the preponderance of selectively empty grocery store shelves in the early stages of the pandemic in the U.S., when, for example, toilet paper and dried pasta were nowhere to be seen, but gargantuan tubs of mayonnaise and sheaves of shelf-stable flour tortillas were there for the taking, prompted

the author herself to wonder about things like the differences between retail and institutional supply chains and the collective food procurement values of a community. The unpredictable effects of supply chains, despite being ruled by tracking and tracing systems and figured by relatable, anthropomorphic food stories, suggests that the fantasy of control posited by blockchain and other digital twin technologies is an elusive one.

CONCLUSION

I have discussed the rise of the conceit of the "story of food" as regards the recent calls for the use of blockchain and digital twin technology in light of ongoing disruptions to the food system. Such food stories are seen as communicating ideals of food system and supply chain transparency, which serve purposes as diverse as value-adds for corporations, governmental oversight and activist calls to action.

That stories as a unit of description are being used at all to describe the food system is on one level an indication of the ubiquity of neoliberalism and its subjectification of systemic issues and championing of individuals. But if we consider stories and characters about the food system as uncanny doubles or dopplegängers of that system rather than authentic replications of it—just as digital twin technology was originally conceived— then the emergent properties of these food systems, particularly in this late stage of globalization, could shed some light on the unpredictability of life under capitalism.

In the early stages of globalization, simply denuding commodities of their aura and revealing the conditions of their production was perceived as sufficiently illuminating for consumers engaged with the fair trade movement. There, the food story became an arguably essential aspect of enabling consumers from northern countries to both connect with and ethically compensate southern producers. The reliance of those food stories on the cinematic experimental and reflexive aesthetic of the New Documentary is further evidence that formal innovation was considered a necessary if not sufficient means to decenter liberal Western modes of reference in ethnographic studies of globally connected commodity chains.

But in the current, advanced stage of globalization, no such easy circuits exist. Blockchain seems to promise a way to distinguish signal from noise in supply chains. Its reliance on physical and deictic senses of indexicality through both its underlying proof-of-work infrastructure, which is dependent on electricity expenditure, and its aggregation of data through just-in-time analog-to-digital sensors creates innumerable instances of contact between sign and referent. The closeness between blockchains (aka digital twins) and the systems they emulate make them more like dopplegängers than straightforward representations. Maybe at times too close for comfort, the digital twins that claim to tell the truth of food systems ignite the logistical imagination by promising producers and consumers the fantasy of absolute control while leaving some room for the emergent properties of those food systems to disrupt those truths.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

SK: undertook all research and writing of this article.

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