

Cultural Systems of the Food Supply Chain

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Supply chains are complex relational networks of raw material suppliers (i.e., farmers, ranchers, etc.), manufacturers, wholesalers, retailers, and end consumers as well as the intermediaries that go between them. The network engages in a complex dance to meet each other's needs, and it generally operates effectively. The Covid-19 pandemic upended these networks and, in doing so, laid bare what was often less visible and rarely problematized in functioning supply chains: the complexity of the relationship networks and the latent cultural system of norms, values, practices, and underlying assumptions that orient the players in this network. Traditional supply chain research tends to overlook these cultural factors in favor of a more economically rational approach to understanding this aspect of the capitalist system (Kaihara, 2001; Kouvelis, Chambers, & Wang, 2006; Mor, Srivastava, Jain, Varshney, & Goyal, 2020) though there are some exceptions (Mollenkopf, Ozanne, & Stolze, 2020; Price, 1996).

In this paper, we use a socio-cultural lens to understand the economics of the food supply chain during the Covid-19 pandemic. In doing so, we argue that supply chain networks struggled to pivot in part because of this taken for granted cultural system of norms, practices, values, and assumptions that oriented the players within the supply chain as they moved goods across the food system. By critically analyzing these assumptions, understanding how these assumptions came to be held, and

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how they might be affecting the consumer environment, this paper opens up avenues for future cultural research on supply chain dynamics. We start by providing a primer on the normative values, practices, and underlying assumptions that make up the system itself and the orient agricultural suppliers, manufacturers, retailers, food service providers, and intermediaries.

The Food Supply Chain: A Primer

Philosophy and assumptions. In the 1980s, “Just in Time” (JIT) Manufacturing practices, generally credited to Toyota for pioneering, became taught as a best practice in business schools and was widely adopted. In JIT, manufacturers order raw ingredients and process products just before they are predicted to be needed by retailers in their stores (Cheng & Podolsky, 1996). JIT is sometimes referred to as lean manufacturing, because the goal is to create the least waste and the least inventory for everyone involved in the chain. In doing so it removes the need for large warehouses and storage facilities as materials spend little time idle in the network. Elaborate forecasting models are built to a certain level of specificity with relatively small tolerances for errors in prediction to ensure this leanness. These values of efficiency and a singular focus on profit maximization became naturalized as taken for granted business practices.

To function, the system makes some assumptions about consumer ideology and tastes. Consumer demand drives the system and it is assumed that consumer demand can be predicted based partially on prior demand (Kelber, 2019). These predictions, or forecasts, in industry parlance, can be made both across categories and even within categories, down to specific product flavors, by integrating data on shifting demographics and preferences of consumers. These predictions are generally made individually by companies based on the proprietary information they have available as well as industry level data that can be bought from data aggregators. Foundational economic thinking suggests that consumer demand for a product increases as the price of that product goes down; so, by decreasing waste in the supply chain, lower prices can then be passed on to the consumer (Mankiw, 2004). Over time, to accommodate JIT production, entire supply chain systems shifted to rely on: 1) the ready availability of all actors in the system and 2) the predictability of consumer demand. Because of the values of leanness and efficiency of this system, interruptions within a single entity, whether it is a single distribution channel, vendor, or supplier, can obstruct the entire chain. A small bit of slack built into forecasts and the competition between suppliers historically helped keep interruptions relatively rare. Also, while manufacturers often lost contracts at specific places, there was always enough churn and flexibility to develop new contracts with

other members of the same distribution channel (i.e., a different store or a different restaurant).

Relationships and output. A supply chain is essentially a network of relationships, entities relying on each other to accomplish a task. A number of intermediaries connect the various players. Intermediaries can take the form of wholesalers, distributors, brokers, or reps that connect the different nodes in the chain and facilitate their relationships. For example, in the food supply chain, a manufacturer or wholesaler cannot just ship their cereal to any supermarket. First, they must establish a relationship with that supermarket and fulfill any requirements that this supermarket places on the products that it receives. Manufacturers receive direction on everything from product packaging to box size to labeling and pallet sizing and these might be different for different retailers. For agricultural suppliers, this may involve the type of agricultural product (apples vs pears) as well as the way it looks, feels, and its size and shape. Importantly, these requirements also differ if the end user is a manufacturer or restaurant. For example, a restaurant may require a large quantity with very little labeling while a retailer requires smaller quantities in packages suitable for customers. Apples going into a pie might not have the same aesthetic requirements as those sold in a store. These require tight coordination as the manufacturer has to understand the specifications that their end-user requires and agricultural suppliers need to understand the specifications that manufacturers require.

While end users might ultimately purchase the finished product in a store or restaurant and drive demand for that item, governments play important roles in shaping the final product. For example, government entities require that products sold directly to the consumer must have specific nutritional labels while products sold to intermediaries, producers, and restaurants do not need these labels. For example, butter sold in the grocery store must be packaged and labeled differently than butter provided to a restaurant or a cake manufacturer. Often these requirements mean that the machinery associated with production as well as the relationships with distributors are different depending on the ultimate destination of the product. These fairly rigid networks of production mean that many smaller businesses and even larger ones might not be equipped to easily shift supply from one sector of the industry to another. These practices were generally just taken for granted as industry norms until the Covid-19 pandemic.

Upended Assumptions, Disrupted Practices

The Covid-19 pandemic created an immediate, existential shock to consumers and employees' lives around the world. As governments mandated businesses, schools, and even public spaces close, the rhythm

of everyday life and commerce shifted dramatically. “Essential businesses” - hospitals, grocery stores, some factories, and some restaurants, remained open, but, otherwise, people were home. Their entire lives shifted and, as a result, demand for products from toilet paper to cleaning products to books and sweatpants to baking yeast and sandwich bread shifted as well. People were terrified with little information and it was unclear how long it would last.

These dramatic and immediate changes in how people lived and worked upended and disjointed supply chain networks, particularly food supply chains with perishable raw materials. This laid bare the previously taken for granted norms, values, and assumptions undergirding these networks. The assumptions existed both on the supplier side as well as on the consumer side. In this section, we detail what the pandemic revealed about the assumptions that the supply chain operates under as well as how the consumer side has affected them. We then interrogate the cultural system underlying these and discuss the challenges associated with changing them.

Supply chain. To be sure, on the supplier side, the pandemic revealed the precarity of JIT production. One of the underlying requirements for JIT production is predictable supply. In order for manufacturers to create products that meet consumer demand, they need a predictable supply of raw materials. However, in a globalized supply chain, the raw ingredients for even something as simple as a jar of Nutella can come from around the world. For example, the sugar may come from Brazil, the cocoa from Nigeria, the palm oil from Malaysia and the hazelnuts from Turkey (Miroudot & Backer, 2012). All of these ingredients must be brought together at a manufacturing facility in order to be processed. However, in order for this to happen, the manufacturing facility has to be open and producing at capacity, the agricultural producers have to all be able to produce the correct amount of raw ingredients and employees need to be available to harvest the materials. There needs to be enough ships, containers, and trucks in the right places at the right times to move the ingredients around the world to the various manufacturing plants, and there need to be enough drivers, captains, and dock workers in the right locations around the world. Moreover, borders within countries and even between cities must be traversable. However, closures and social distancing measures put in place by countries around the world rendered many of these essential network nodes incapacitated: employees were locked down, many factories closed or parts for machines were unavailable, many ships, containers, and trucks were out of position, and certain countries became challenging to move into or through. The different responses of nations and even local governments and evolving medical guidance made these disjunctures challenging to predict. Moreover, because of the leanness of JIT production, there were often few storage facilities for raw materials that could be held while

waiting for other supplies, backing up the entire chain. In short, highly integrated relationships that made up supply networks and allowed them to function efficiently disintegrated.

Beyond the precarity of the system though, the pandemic showed just how separated consumers are from the means of production, the extent of which Marx likely did not even imagine. Consumers have come to expect that they can come into the grocery store and all of the products that they want will be available in the highly differentiated product forms to suit their identities or preferences. Most customers have little conception about where their food is coming from and the complex supply network makes it just as difficult for consumers to even find out. In sum, all consumers see is that they are generally paying a lower price at the retailer. It is facilitated by JIT production but the back-end is not visible to the end consumer. In the manufacturer's eyes, this alienation likely benefits the consumer and helps the manufacturer themselves compete in the marketplace amongst the other options that the consumer has.

Rapid demand transformation. The supply shocks of course were further exacerbated by demand shocks as changes in people's lives and social worlds fundamentally transformed how and why they engaged with the marketplace. In the food industry, as consumers pivoted away from eating out at restaurants and towards procuring their own ingredients, it triggered a supply imbalance increasing the product type and quantity demanded at retail outlets and decreasing that at food service outlets. Yet this transformation was not built into forecasts from anyone in the supply chain from agricultural producers to retailers resulting in product shortages in some areas and massive oversupply in others.

At a micro consumer level, there was alarm; it felt like there was not enough product, or one's specific preferred brand and product line variant, to go around - something that many people in the US rarely experienced or contemplated. When people stopped taking for granted that the supplies they needed like toilet paper would always be there on the grocery shelves (and in the exact format they preferred - Charmin, extra gentle mega rolls) it triggered feelings of scarcity which further increased demand for the products that were already hard to find. Media stories of consumers stockpiling goods further influenced shoppers to stock up on items that they did not necessarily need. In essence, consumers reacted as their assumptions about the stability of the system were quashed by taking actions that further destabilized the system. The problem repeated itself across many categories. For instance, demand for yeast increased as more consumers baked bread, stories reported on this baking, and stockpiling ensued. While overtly, consumers had expressed very specific tastes and preferences prior to the pandemic, the demand changes showed just how malleability these preferences really were.

When their favorite brand and type of toilet paper was not available, consumers pivoted. However, while this encouraged trial of new products, it remains to be seen whether these pivots will be long lasting.

Taking a global perspective, these supply and demand mismatches seem like an easy problem to solve. In the toilet paper example, many offices were closed and so had no need for toilet paper. In the yeast example, many bakeries were closed or had significantly reduced sales and had no need for yeast. However, because the practices in commercial and consumer markets are so distinct with different production processes, packaging volumes, design requirements, quality control requirements, and labeling requirements, it rendered such shifts extremely difficult. Moreover, relational holes in the supply network meant that the yeast producer might not be connected directly with the right retailer or the right wholesale distributor to make such a pivot. This caused an imbalance, where, for example, certain farmers had so many potatoes that they had to throw them out but grocery stores were having trouble keeping the potatoes in stock (Narishkin, Imam, & Morgan, 2020). Another barrier that drove this type of issue were existing contracts. Due to the established relationship network, certain growers grew certain types of potatoes meant for retailers while others were growing other types meant for food service and the relationships could not be shifted easily. The buyer and producer had specific contracts with highly specific product specifications to minimize waste and oversupply. Relationships meant to make the system run more efficiently and make the ingredients move more easily across the chain hobbled the chain when the relationships become gatekeepers to their specific endpoints.

In sum, the pandemic upended the capitalist status quo that an abundance of goods in a range of product forms seamlessly flow to consumers to meet segmented demand through a predefined sequence of highly specialized and dispersed vendors in the most cost-efficient manner possible. In doing so, it revealed a number of disconnects, failures, and institutional barriers that challenge underlying norms, values, and assumptions about supply chain networks. In the next section, we speculate on the changes that may or may not occur in these networks as the inadequacies of the current system are put into full relief.

The Post-Pandemic Supply Chain

In her foundational research, sociologist Ann Swidler (1986) describes unsettled and settled times. During settled times, she describes how cultural systems are taken for granted. However, unsettled times not only make visible these otherwise invisible cultural systems but provide windows for introspection and opportunities for cultural change. Across entities, the pandemic revealed that which was taken for granted. Supply chain players were no different. Those that survived interrogated extant

practices and the underlying norms, values, and assumptions to mitigate future losses, and the public awareness raised about the food supply chain during the pandemic allowed the public and policy makers the opportunity to rethink both micro level food values and the broader ideological system in the context of food security and sustainability. In this section, we focus on the short-term shifts in practices and potential longer-term shifts in supply chain and consumer culture, both explicit and less articulated.

During the pandemic, some requirements were relaxed (ex. certain labeling or packaging requirements for specific distribution channels). This short-term relaxation in requirements diminished distribution channel bifurcation allowing products to go to different types of end consumers than they could in the past. This also allowed the supply to somewhat realign to demand. In addition, as the pandemic went on, companies saw the value of diversification and began to diversify their relationships. Time also allowed producers who needed longer production lead times, such as those supplying agricultural products, to readjust to demand needs and new relationship requirements. For example, many fruits and vegetable suppliers need a year of lead time in order to change output. The question remains, though, whether these adjustments are short or long-term. In particular, will institutional and relational norms be reoriented to allow products an easier route to market, no matter their initial destination or will they revert back?

The rules of engagement surrounding information sharing that drive forecasting models might also shift, but this would require changes in values and norms about the nature of collaboration and competition even within supply networks. On the whole, the supply chain can shift quicker and more efficiently if all members have full and up to date demand information. The industry has traditionally not shared full information up and down the supply chain with the retailer/food service provider being the closest to the consumer and seeing the most up to date demand from them. This has created increasingly larger overreactions to demand changes further back up the supply chain, a phenomenon known as the bullwhip effect (Miragliotta, 2006). A lack of up to date information creates noise, makes adjustments difficult, and distorts forecasts. It reduces the ability for all members of the chain to act together. Thus, even though the members have a shared goal, they do not share all information necessary for the accomplishment of that goal pushing the goal further from reach. This creates phenomena like shortage gaming where retailers are ordering more products than they think they need since manufacturers are only fulfilling certain percentages of their order. For example, if the retailer orders 50% more product and the manufacturer fulfills 50% of the order, then the retailer gets the correct number. The problem is that this just distorts forecasts for the manufacturer, who, at some point in the future, might have made a variety of investments based

on these orders which are unlikely to reoccur.

Additionally, the question remains as to whether the supply chain will remain in a JIT system or whether it will take a more proactive approach to avoid being caught flat-footed during periods of shifting demand. Companies outside the industry, even Toyota the original developer of JIT, have started shifting to a stockpiling model where critical components likely to be in short supply, such as semiconductor chips, are stockpiled ahead of time (Keckarovska, 2021). Similarly, companies have proactively tried to diversify sourcing from suppliers and areas around the world and are building more warehouses. While neither of these solutions resolve issues surrounding relationships and distribution channels, they likely ease issues related to fulfillment supplier relationships that break down, for whatever reason, or demand increases. With this backstop, costs likely are passed along to the consumer and the route to profitability might not be complete efficiency and low storage costs. In fact, efficiency in periods of turbulence may be affected by the ability of a company to be flexible in its production and be prepared for the potential bottlenecks that it might encounter. On the other hand, in settled times, will the extra costs associated with flexibility cause it to be abandoned by manufacturers?

As companies in the supply chain become more resilient in response to changes in the demand environment, there may be a societal benefit to excess food supply chain production. This extra production could be leveraged proactively with excess raw materials and products being diverted to food banks, discount stores, and social service agencies providing more food accessibility for society as a whole. For this to be embraced and codified as company policy though, it would require a values shift to truly embrace triple bottom line and B corporation status where efficiency truly becomes redefined. It would also require alignment with the donation supply chain, which itself involves networks of transportation providers, warehouses, and end users. Food donation is not free, which means there needs to be enough of a cultural shift for organizations to be willing to align investments with this opportunity.

Another possible shift is that organizations might begin to rethink marketing's sacred cow: consumer segmentation. This has been the dominant form of marketing philosophy and education for the last 50 years as companies orient entire growth strategies around creating demand for and designing differentiated products for an increasing number of consumer segments. As a result, companies both created and satisfied demand such that everyone has their highly differentiated favorite of pasta sauces or cereal. Marketing convinced consumers not only that this differentiation was important to fulfill their own unique individual preferences but that these tastes were part of how they constructed their unique identities, particularly for western consumers (Iyengar, 2010). However, this strains the supply chain contributing to

lower output and higher prices as machinery must be reset in order to create different versions of product. During the pandemic, major food manufacturers stopped producing their lowest selling versions of their products to improve throughput of the highest selling versions. The success of removing products targeted towards specific segments may foretell the future of targeted marketing and a return to a future where the manufacturer creates a product that is generally good enough for a large portion of the population rather than really good for a small percentage of it. This would represent a major shift not just in norms and practices, but marketing values and consumer cultural practices.

Finally, when the veil over the means of production lifted, it also revealed to consumers and policy makers the vast inefficiencies in the system. News stories described how food sat rotting with no path to the grocery stores as store shelves were empty, boats lined up at ports, and delays in production due to supplier issues far away. This raised consciousness about the environmental, human capital, and resource distribution inefficiencies. Yet it is unclear if these are enough to shift consumer ideology or to galvanize policy change surrounding sustainability. Here too, a broader definition of success is needed to shift practices and there are glimmers of change. We do see that the stock market is beginning to reward companies that focus on a triple bottom line approach that integrates sustainability into a profitability calculus. The question is how supply chain changes will be integrated into this reorientation.

In conclusion, the Covid-19 pandemic created a severe disruption to people's lives, communities, the business world, and the supply chain system that grows, produces, and delivers the products for them to function. The disruption laid bare the underlying values, norms, practices, and assumptions that undergirded the supply chain and consumers' relationships with it. This offered opportunities for introspection and reconfiguration not only of practices but of those core values. The question moving forward is if and how these lessons will result in long term cultural and institutional change.

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