A transformative supply chain response to COVID-19

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Abstract

Purpose – This research employs a transformative service lens to examine the role of the supply chain ecosystem in ensuring the health and safety of employees and customers as a well-being outcome during the coronavirus disease of 2019 (COVID-19) pandemic.

Design/methodology/approach – This is a conceptual paper examining the response of the supply chain to the current food crisis caused by the pandemic.

Findings – Based on the service-dominant logic (SDL) paradigm, the COVID-19 examination of the supply chain ecosystem provides a foundation for further research employing a transformative lens.

Research limitations/implications – The COVID-19 situation is primarily explored from a Western, educated, industrialised, rich and democratic (WEIRD) societies’ context. Future research should explore the applicability of the transformative service lens to other societies.

Practical implications – The conceptual discussion and research agenda provide direction for researchers, practitioners and policymakers towards a transformative supply chain ecosystem.

Originality/value – This research includes the well-being of employees and customers in the service supply chain outcome measures, draws supply chain management into the TSR domain, while also solidifies a service ecosystem perspective of supply chain management.

Keywords Service ecosystems, Food supply chain, COVID-19, Transformative service research, Well-being

Introduction

The coronavirus disease of 2019 (COVID-19) crisis has drawn attention towards both the capability as well as the fragility of the food supply chain in meeting consumers’ needs. Disruptions in the supply chain and sudden changes in consumers’ behaviour suggest the need for renewed attention to the underlying processes involved in food production and distribution. The service-dominant logic (SDL) perspective provides an appropriate paradigm for supply chain scholars and practitioners to move past a traditional focus on goods, to understanding supply chain activities as processes with which to co-create value with customers (Lusch, 2011), which may be particularly relevant in these uncertain times. Supply chain management scholars increasingly perceive supply chains as networks or systems that form a service ecosystem of resource integrators in the value co-creation process (Ketchen et al., 2014; Stolze et al., 2016). This evolving perspective comes as scholars and business practitioners address social and environmental concerns related to long-term sustainability. The instrumental logic of 20th century economic primacy is now coming to terms with the broader role of business in creating social and environmental outcomes (Aksoy et al., 2019).

Simultaneously, scholars have identified improved well-being through transformative service as a key priority for service organisations and service researchers alike as well as the need to protect vulnerable consumers in the service setting (Ostrom et al., 2010, 2015). Transformative service research (TSR) traces its origin to the transformative consumer research (TCR) movement (Rosenbaum et al., 2011) which challenges consumer researchers to focus on enhancing the well-being of individuals (e.g. consumers and employees), families,
communities and ecosystems (Mick, 2006; Pettigrew et al., 2014; Prothero et al., 2011). Well-being is defined as “a state of flourishing that involves health, happiness and prosperity” across physical, emotional, social, economic, spiritual, environmental and political dimensions (Mick et al., 2012, p. 6). TSR extends the TCR agenda by pointing to the ubiquitous nature of services in consumers’ lives and the potential of service entities to impact well-being (Anderson et al., 2013; Rosenbaum, 2015). While traditional service research focusses on outcomes such as customers’ satisfaction and loyalty as a means towards improved firm profitability, TSR focusses on the role that services play in affecting individual and collective well-being (Rosenbaum et al., 2011).

TSR scholars have explored a myriad of topics, including the adoption, impacts and design of transformative services (Anderson et al., 2018; Alkire et al., 2019; Black and Gallan, 2015; Edgar et al., 2017; Leo et al., 2019; Mende and van Doorn, 2015), but have yet to fully address the role of the supply chain in bringing about enhanced individual and collective well-being outcomes (Ostrom et al., 2010). This gap is important to remedy in light of the COVID-19 pandemic, which has revealed the importance of supply chains in delivering vital goods and services within society. Of most relevance to the current research study, Nasr and Fisk (2019) challenged service researchers to explore real-world problems, while Finsterwalder et al. (2017) argued for an ecosystem approach. Employing a TSR lens, the purpose of the current research study is to examine the role of the supply chain ecosystem in enabling the safe provision of food during the pandemic. The key to this provision is ensuring the health and safety (i.e. protection from viral infection) of employees and customers as a well-being outcome. In doing so, this research includes the well-being of both employees and customers in the service outcome measures, draws supply chain management research into the TSR domain, while also solidifies a service ecosystem perspective of supply chain management.

Supply chains as service ecosystems

While supply chain management has traditionally resided within the goods-dominant realm, logistics operations and outcomes address service management issues (e.g. Mentzer et al., 2001). Logistics operations focus on creating value through the integration of products and services (Bouzaabia, et al., 2013; Heaslip et al., 2018). As organisations work to enhance service offerings, third-party logistics (3PL) providers play a liaison role amongst supply chain organisations, orchestrating resources between manufacturers, retailers and consumers (Zacharia et al., 2011). The integration of products and service offerings has also been critical in the e-commerce and omnichannel retail environments. For example, an Amazon.com shopping cart includes a product and logistics service such as delivery offered on an online retail service platform. Retailers operating in omnichannel environments increasingly compete on services that transcend their traditional focus on the provision of goods (Peinkofer et al., 2016).

The field of humanitarian logistics and crisis recovery also demonstrates a strong focus on service management as well as the potential for collaboration between resource integrators in the supply chain to bring about successful responses to a crisis. Logistics service operations account for 80% of humanitarian aid costs tied to distribution of emergency relief goods such as water, food and shelter (Jahre et al., 2015). The current trend in international humanitarian service organisations is to develop shared logistics services that can be offered to each other within the disaster recovery ecosystem (Heaslip et al., 2018). This demands a shift from the traditional, reductionist supply chain management perspective (e.g. goods delivered efficiently) to a more holistic service supply ecosystem perspective.

Thus, the service ecosystem view of supply chains, supported through the SDL perspective, provides an appropriate base for exploration of the food supply chain response to the COVID-19 crisis. One important aspect of the service ecosystem is the recognition that
consumers are an integral part of the ecosystem along with the various organisations that make up the supply chain network, especially due to the emphasis on value co-creation (Grönroos, 2011). The supply chain network has been in flux as multiple organisations have had to work together in new ways to ensure the provision of food amidst disruptive forces.

Fundamentally, the supply chain ecosystem concept builds on systems thinking, in which a service system acts as a dynamic network of exchange consisting of interactions between actors (Barile et al., 2016; Finsterwalder et al., 2017; Vargo and Lusch, 2016; Spohrer et al., 2007; Stolze et al., 2016). However, supply chain researchers have traditionally focussed on economic performance as the outcome of the ecosystem. Shifts towards social and environmental sustainability (Montabon et al., 2016) provide evidence of additional outcomes that should be considered. This shift can be accelerated by adopting the TSR focus on well-being outcomes (Anderson et al., 2013; Anderson and Ostrom, 2015). A transformative approach recognises the potential for supply chains to provide access to goods and services that improve individual and collective well-being. This shift aligns the supply chain ecosystem concept with the approach advocated by Finsterwalder et al. (2017) in the TSR literature. A transformative supply chain ecosystem captures the network of organisations that interact to coordinate information and exchange resources to source and distribute supply to meet demand with the well-being of organisations, individuals and society as end goals. Sustainable food production and availability play a pivotal role in the well-being of people, individuals and organisations as well as the well-being of the planet and the natural environment. Thus, food supply chains are uniquely poised to have a transformative effect on the collective well-being of both people and the planet.

The supply chain service ecosystem response to the coronavirus disease of 2019 crisis

Although the COVID-19 pandemic is seen first and foremost as a health crisis, it is also a food crisis. In the USA, the food supply system has evolved over decades from being locally and regionally based, to becoming a global network of relatively few large multinational companies (Roth et al., 2008). Although research has addressed environmental and social sustainability within the food supply chain, the underlying focus of cost performance has predominated (e.g. Pullman et al., 2009) with emphasis on efficiency, predictability and tight control of inventories (Charles, 2020). The magnitude of the COVID-19 crisis exposes the fragility of the entire food supply system, providing a rare opportunity for researchers to explore this system and its underlying dynamics in real time.

COVID-19 has brought the food supply chain into the public arena as consumers and supply chain organisations react to the crisis. Consumers have reacted by hoarding products in the face of real and anticipated food shortages (Hall et al., 2020; Venuto, 2020). They have dramatically shifted their shopping behaviour to online purchase/delivery options, far outstripping the supply chain’s immediate ability to cope (Dunkley, 2020; Smith, 2020). Many consumers are struggling to afford food, given the sudden loss of employment and shifting demand to food pantries (Charles, 2020). Within the supply chain, the sudden shifts in demand and health-related regulations have caused profound disruptions such as farmworkers not being available to harvest crops, the collapse of the food service/restaurant sector and changing working conditions in food processing plants inhibiting productivity (Cagle, 2020; Corkery and Yaffe-Bellany, 2020a; Hall et al., 2020; Yaffe-Bellany and Corkery, 2020).

The COVID-19 crisis has provided an opportunity for transformation in the food supply chain towards well-being outcomes. Much of what is known about the food crisis comes from media reports documenting the food-related effects of the pandemic, which have been distilled into four themes, as depicted in Figure 1. The new normal of food supply chains is yet to be achieved or understood but can be anticipated by understanding these key themes
Figure 1. Interrelated supply chain themes identified during the coronavirus pandemic of 2019

1. Demand shifts from food service to grocery channels and food pantry channels
   - Consumer stockpiling creates retail stockouts
   - Shift in demand creates ICT-size problems of adjustment
     - packaging/transport/wirehousing challenges to meet consumer demand
   - Online shopping shifts distribution and logistics patterns (home-delivery; click & collect/BIOPIS)
   - Supply chains shorten as consumers deal directly with farmers, local co-ops, farm markets

2. Online shoppers endure long cycle times due to insufficient capacity to fill/deliver orders
   - Websites and consumer interfaces overloaded, providing poor customer experiences
   - Change in consumer buying patterns creates huge demand for labour in distribution facilities to pick/pack/deliver orders
   - Food pantries overwhelmed with demand but lack volunteers to process due to safety concerns

3. Sick workers must stay home (this also affects productivity in Demand/Supply mismatch)
   - Increased awareness of worker safety, worker value, social needs (paid sick-leave, scheduling flexibility, health care benefits)

4. Increased security in retail stores to ensure health/safety standards as well as to control shopper behaviour that could create unsafe situations
   - Channel members must equip employees with protective equipment; training and space requirements reduce productivity in processing/picking/packing operations

5. Consumers no longer feel safe visiting retail stores, minimizing store experience & store visits
   - Contactless delivery
   - Contactless payment
   - Higher use of self-service, self-checkouts in stores
   - Retailers educating consumers about in-store health and safety procedures

6. Food waste occurs as channel demands shift; labour shortages at processing and distribution; farm labour unavailable due to lack of migrant workers
   - Oversupply from food service channels can’t easily be shifted to food pantries (for both financial and lot-size reasons)
underlying the current situation. Hindsight evaluation will certainly be able to cast a more reflective light on the food crisis.

**The crisis response through changed service operations**

Particular attention now turns to changes in the supply chain ecosystem related to a well-being outcome that has suddenly become paramount that of employees' and customers' health and safety. Across the supply chain, significant challenges must be overcome to keep employees at safe distances from each other to minimise disease transmission (Tuzovic and Kabadayi, 2020). While some work occurs in traditional production environments such as meat processing facilities (Parshina-Kottas et al., 2020), much food supply chain work also occurs in service operations such as distribution centres or call centres. Organisations have responded with changed work routines, flexible hours and work locations (work-from-home options), protective barriers between employees, to name a few operational changes.

The food retail environment represents a particularly important context due to the intersection of employees and consumers in the same servicescape (Bitner, 1992). Thus, safety and health become especially important as outcomes of such service operations, as previously established in hospital (Parish et al., 2008), airport (Jeon and Kim, 2012) and other service settings (Kuppelweiser and Finsterwalder, 2011). Retail operational processes, or retail logistics, have moved from a focus on store image, satisfaction and loyalty intentions (Bouzaabia et al., 2013) to minimizing exposure risk, from shifting shelf-restocking to off-hours; managing flow through a retail store in terms of volume of customers at a time and directional movement throughout the stores; tangibilising safety measures through floor markings, in-store signage and sanitation stations throughout the store (Bove and Benoit, 2020); checking out sneeze guards separating employees from customers; contactless payment options. Store operating procedures such as opening hours and dedicated shopping hours for vulnerable consumers have also been enacted to protect both employees and consumers (Ostrom et al., 2015; Dietrck et al., 2017). Technological solutions also allow shoppers to shop online but pick-up their pre-packed orders with minimal contact (either in designated locker locations or at kerbside), with concomitant changes in workers’ responsibilities and customers’ engagement in the food shopping experience. Shoppers’ behaviours have also changed with mask-wearing, contactless payment procedures or store navigation behaviours. Both shoppers and store employees are taking on co-creation responsibilities to protect their health during the shopping experience (Vargo and Lusch, 2008).

With the growth of e-commerce, home delivery logistics services have grown rapidly in the past decade (Jara et al., 2018). Food retailers have been developing online presence with home deliveries for years (Cairns, 1996; Heim and Sinah, 2001) but with the COVID-19 crisis have been suddenly hit with a level of demand that has proved difficult to fulfil (Bhattarai, 2020). Scholars have been documenting the customers’ expectations of last mile logistics services since the early days of e-commerce (Esper et al., 2003; Mentzer et al., 2001) as well as operational service challenges that increasingly include managing crowdsourced delivery services (Castillo et al., 2018). The COVID-19 crisis has created a new set of challenges to which supply chain managers must respond. As demand for home delivery services has surged, supply chain organisations have had to adapt their own supply replenishment processes, their order fulfilment processes and hire new employees to be trained in the specifics of order picking and home delivery (Dodds, 2020). While retailers have faced the majority of this demand, other supply chain organisations that are traditionally further upstream, such as wholesalers or even farmers, are also now providing home delivery service provision (Cridle, 2020; Peyton, 2020; Rao, 2020). Some retailers have adapted quickly to the increased demand and have innovated new operational approaches to serve customers...
through the development of “dark-warehouses”, which are essential distribution centres with retail store layouts catering solely to online customers with no physical customers present (Broughton, 2020).

Employees’ and consumers’ safety and health issues have become important elements of the last mile service provision. Customer service expectations now include the desire to stay safe and healthy during the shopping experience (Esper, 2020). Thus, contactless delivery becomes an important service attribute in addition to traditional measures of timeliness and order accuracy (Wolfe, 2020). Work environments that foster healthier and more protective situations for both employees and customers will need to be incorporated into measures systems that have focussed on traditional measures of order fulfilment efficiency and quality.

The crisis response involving other stakeholders
The food supply chain ecosystem involves other stakeholders as well, whose roles have also become much more visible during the pandemic. One important stakeholder includes the government. The food industry tends to be highly regulated in many nations, with a safe and secure food supply considered to be a “primary tenet underlying social stability” (Whipple et al., 2009, p. 575). Food contamination or adulteration that might occur along the supply chain can result in social impacts of illness or loss of life, while also creating negative economic impacts for firms or even entire industrial sectors (Bell et al., 2016). For these reasons, agencies such as the Food and Drug Administration (FDA) or the United States Department of Agriculture (USDA) regulate the handling and processing of food throughout the supply chain and hold companies responsible for safe operating practices. But current regulation focusses on pathogen-related food safety within the supply chain, not pathogen-related human safety. The COVID-19 pathogen presents a new arena for considering the role of government regulations within the food industry that may be focussed on employees’ and customers’ health and safety. Concern over workers’ safety has hindered organisations’ ability to move product to market, resulting in temporary shortages in some nations (Esper, 2020). Government agencies are also facilitating exchange between non-traditional partners (e.g. farmers and food pantries), acting as resource integrators to ensure the supply of food to those in need (Corkery and Yaffe-Bellany, 2020b).

Government liaison activities between producers and organisations that cater to food-insecure communities – e.g. food pantries and shelters – highlight another important stakeholder group in the food supply chain ecosystem, whose role has been elevated by COVID-19. These organisations have played a significant role during the pandemic, as demand for food has risen sharply due to sudden rises in unemployment. Food pantries have felt a double-hit during the crisis, as usual sources of supply suddenly dried up when restaurants and food service operations closed, forcing new supplier arrangements with food service wholesalers and even farmers (Corkery and Yaffe-Bellany, 2020b). Simultaneously, preparing and serving available food became challenging due to these organisations’ reliance on volunteer labour – a labour pool now concerned about health and safety while volunteering. Managing to secure food and keeping workers and recipients safe while distributing food to those in need have become a logistical service challenge for these organisations. While emergency food provision may be similar to disaster recovery or humanitarian crisis situations, food pantries are not temporary solutions in a confined geographical area, as might be seen in a hurricane-ravaged area. Instead, food pantries seem to play a more permanent role in many societies and that role has taken on increased importance as the pandemic has evolved. Logistical service solutions will be needed to meet demand under new conditions of both food and labour supply shortages.
The transformative supply chain service ecosystem

The previous discussion has highlighted service operations’ issues relating to health and safety outcomes of workers and customers in the food supply chain ecosystem. There are two important points to address from the previous discussion. First, individual actors have been the focus in highlighting service-related issues for various actors due to the COVID-19 supply chain disruption. Each of these actor groups constitutes an element within the ecosystem. But ecosystems, by their nature, are characterised as much by the interactions between actors as by the individual actors’ actions themselves. It has been important to first establish the changing service landscape for actors within the food supply chain ecosystem, whether they be organisations, government or non-government agencies or consumers. But equally important will be consideration of the interactions between ecosystem’s participants. New exchange or information-sharing relationships between ecosystem’s members will be particularly important to address. Equally important will be consideration of the ways in which consumers interact with various providers, whether they be organisational employees, volunteers or more faceless interactions with organisations/agencies. Table 1 begins to highlight important research directions for scholars addressing food supply chain issues, whether in response to COVID-19 or any other potential supply chain disruption, particularly within an ecosystem approach. The COVID-19 pandemic has highlighted the importance of how perceptions of value can change rapidly. The SDL ecosystem approach adopted in this research provides paradigmatic grounding for considering value creation and its evolution within the food sector.

Second, COVID-19 has not only revealed the fragility of the food supply chain but also its latent capacity and resiliency to adapt and protect consumers’ and employees’ health and safety when confronted with a disruption. While supply chain researchers will need to address issues of traditional concern, such as capacity management within the system, efficiencies of production and distribution, store and delivery operational productivity and service quality, the focus on health and safety outcomes for employees and customers emphasises the opportunity for the supply chain ecosystem to also be considered part of the transformative service movement. The focus on health and safety as a well-being outcome has received sudden and significant attention by companies, policymakers and consumers alike. To that end, Table 1 highlights important research directions for scholars to develop a transformative focus around health and safety. Given the service ecosystem perspective provided by the SDL paradigm, the research directions suggested in Table 1 not only address new forms of service operations to enhance health/safety but also suggest the need for new measures of health/safety well-being outcomes as part of supply chain performance metrics.

It must be recognised that health and safety represent only one well-being outcome of the food supply chain ecosystem. As discussed within this paper, health and safety have been primarily presented as individual-level outcomes. But a transformative agenda suggests that not only do scholars, organisations and policymakers need to consider individual-level outcomes but also outcomes at organisational, community and societal levels. Such discussions are beyond the scope of this initial foray into transformative supply chain ecosystems but will enrich the literature, and practice by considering the outcomes of health and safety at broader levels of analysis. Particularly with a COVID-19 type of disruptive force, how can the food supply chain ecosystem’s efforts to protect individual-level health and safety create outcomes at broader community and society levels? What are organisational, community or societal perceptions of value when considering the food system’s role in community-level protection from a viral disease, for example? Beyond the health and safety outcome, what other well-being outcomes should food supply chain ecosystem participants address in their own business activities or in interactions with each other? These remain important directions for future research that have been beyond the scope of the current research study.
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<tr>
<td>(1) Keeping employees at safe distances and/or providing protective equipment to minimise disease transmission risk</td>
<td>(1) What are the operational risks of existing or proposed operating processes to ensure employees’ health?</td>
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<td>(2) How should employees’ health/safety be measured?</td>
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<td>(3) What operational changes need to be implemented in order to ensure higher levels of employees’ health/safety? What are the impacts on productivity?</td>
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<td>(4) What are consumers’ reactions to organisations’ efforts to improve employees’ health/safety?</td>
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<td><strong>The retail servicescape and retail logistics</strong></td>
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<td>(1) New operational procedures to manage flow of customers—employees’ activities—interactions between customers and employees</td>
<td>(1) How have operational changes impacted store operations and productivity?</td>
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<td></td>
<td>(2) How is the customers’ response to retailer efforts to protect their health/ safety?</td>
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<td>(3) How do consumers respond to changes in service provision, in terms of retailers’ loyalty and customers’ satisfaction? How do customers’ satisfaction measures need to change to capture new perceptions of how customers evaluate their shopping experiences?</td>
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<td>(4) How have perceptions of value co-creation changed in light of these operational changes?</td>
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<td>(2) New operational procedures to protect vulnerable customers—special operating hours—locker pickups—kerbside pickups</td>
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<td><strong>Last mile service operations</strong></td>
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<td>(1) New operational fulfilment services through dark warehouses</td>
<td>(1) How do dark warehouses or other operational solutions impact firms’ performance and employees’ work environments?</td>
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<td>(2) How do retailer-based operant resources related to special order fulfilment processes support social distancing, sanitising or contactless interactions between employees and customers?</td>
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<td>(3) How do customers and employees respond to this form of shopping/delivery?</td>
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<td>(4) How does value co-creation occur?</td>
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<td>(5) How are perceptions of value changing for consumers (and retailers) with this new form of shopping?</td>
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<td>(2) Home deliveries provide enhanced safety protection of contactless delivery</td>
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<td><strong>Government agencies</strong></td>
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<tr>
<td>(1) Local or national government agencies impact food production and distribution services through regulatory actions</td>
<td>(1) How do changing regulations impact productivity as well as employees’ and customers’ health throughout the supply chain?</td>
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<td>(2) How does the government influence value co-creation processes?</td>
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Table 1. Transformative supply chain research opportunities (continued)
Finally, the COVID-19 pandemic not only reveals the fragility of the food supply chain ecosystem but also its inherent potential to adapt to meet societal needs and protect and enhance the well-being of individuals and ultimately society. The representation of the COVID-19 food supply chain response presented in this paper is probably most true for Western, educated, industrialised, rich and democratic (WEIRD) societies (Henrich et al., 2010). Future researchers are encouraged to move beyond this context to highlight issues and solutions for transformative food supply chains to support individual and collective well-being across a broader spectrum of social contexts.

References


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<tr>
<td>(1) Finding new sources of supply, changing operational practices to accommodate changed sourcing and lot sizes</td>
<td>(1) How do food pantries fulfil customers' needs? Consider the societal role in the food supply chain ecosystem</td>
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<tr>
<td>(2) Scaling service operations to accommodate higher demand, often with limited staff</td>
<td>(2) What does value co-creation look like in this community segment? And how have perceptions of value changed in the face of the pandemic?</td>
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<td>(3) Engaging with other stakeholders to facilitate the ability to serve needy communities</td>
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<td>(4) Ensuring health and safety of volunteer workers and customers</td>
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| Food supply chain ecosystem | (1) How do the different ecosystem actors interact to coordinate information and exchange resources to source and distribute food supply and to meet demand? |
|                           | (2) What are the well-being outcomes for organisations, communities and society as a whole? |
|                           | (3) What other well-being outcomes should be incorporated into the food supply chain ecosystem? |

Table 1.


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