Operations Management Research
https://doi.org/10.1007/s12063-020-00166-9

A case study on strategies to deal with the impacts of COVID-19 pandemic in the food and beverage industry

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Received: 1 July 2020 / Revised: 6 September 2020 / Accepted: 20 September 2020

Abstract
This research investigates the impacts of the novel coronavirus disease, also referred to as COVID-19 pandemic, on the food and beverage industry. It examines both short-term and medium-to-long-term impacts of the pandemic and outlines strategies to reduce the potential consequences of those impacts. To this end, we use a qualitative, multiple-case-study methodology, collecting data from eight sample companies with fourteen respondents in the food and beverage industry in Bangladesh. The findings show that the short-term impacts of this pandemic, such as product expiry, shortage of working capital, and limited operations of distributors, are severe, while the medium-to-long-term impacts promise to be complex and uncertain. In the longer term, various performance metrics, such as return on investment by the firms, the contribution of the firms to the gross domestic product (GDP), and employee size, are all expected to decrease. Moreover, firms may need to restructure their supply chain and build relationships with new distributors and trade partners. The study proposes several strategies that managers in this sector can adopt to improve resiliency in the changing environment during and after the COVID-19 era. While this research is novel and contributes to both theory and practice, it does not consider small and medium-sized companies in the food and beverage industry. Therefore, the impacts and strategies we identify may not apply to smaller companies.

Keywords COVID-19 pandemic · Food and beverage industry · Impacts · Resiliency · Strategies · Sustainability

1 Introduction

The novel coronavirus disease, also referred to as COVID-19, was first identified in December 2019 in the city of Wuhan, which is in the Hubei province of China. Within a short time, the COVID-19 epidemic spread throughout the globe, becoming a true pandemic that has severely affected almost every country. The COVID-19 pandemic has a direct impact on public health (Paul & Chowdhury 2020a). As of September 6, 2020, COVID-19 had resulted in more than 26.9 million infections and more than 881 thousand deaths (Worldometers 2020). Along with its impact on public health, the pandemic has also impacted the operations of supply chains, sustainable economic growth, and the environmental performance of supply chains (Chowdhury & Paul, 2020; Khan et al., 2019; Suhi et al. 2019; Paul et al. 2019a; Khan et al., 2020; Moktadir et al. 2020).

The COVID-19 pandemic has also had significant economic consequences globally. In particular, the world economy faces a negative supply stock because of the pandemic, which has forced factories to keep shutting down, thereby disrupting the global network of supply chains. The Organization for Economic Co-operation and Development (OECR, 2020) has predicted the most substantial downward growth in South Korea, Australia, and Japan. More generally, because of COVID-19, people have been advised to maintain "social distancing" with severe effects on the business of tourism and travel-related industries. For example, the International Air Transport Association estimates that the pandemic has cost global air carriers between $63 billion and $113 billion in revenue in 2020 alone (Segal & Gerstel 2020). Many other

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Published online: 30 September 2020

industries, such as tourism and hospitality, food processing, education, fashion and apparel, leather, and other retail sectors, have all been affected significantly by COVID-19 pandemic.

Among the many industries impacted by the pandemic, the food and beverage industry is unique, fulfilling some of the most basic needs of humankind. This industry is one of the fast-growing industries in the world. In the European Union (EU), agriculture and the industrial sectors responsible for the production of food, beverages, and tobacco deliver 75% of the bio-economy turnover, and they account for 80% of the employment in the overall EU bio-economy (Klitkou & Bolwig, 2019). In India, the food industry accounts for over 40% of India's Consumer Packaged Goods (CPG) industry, and continues to grow at record levels (Ministry of Food Processing Industries of India, 2017). In line with the growth of the food and beverage industry globally, the food-processing growth rate in Bangladesh, which is the context of the current study, was 6.1% in 2010, while just five years later, in 2015, the growth rate was 12.5%. The total number of people employed in this sector is 1.3 million, making up 10.27% of the total number of people employed across all industries (Nath 2012). In short, the food and beverage industry plays a vital role in the national and international economy including Bangladesh. Like other industries, the food and beverage industry has been hit hard by impacts from the COVID-19 pandemic, which has caused enormous losses in many sectors of the global economy. It is thus all the more crucial to explore the impacts of COVID-19 pandemic on the industry and to consider potential strategies for dealing with those impacts.

There are several strands of research on business disruption and its management in the context of the food and beverage industry (Bruzzone et al. 2013; Sharma & Singhal 2018). Some of the latest studies have investigated the impacts of COVID-19 pandemic on the food supply chain, but they have not considered strategies to overcome the negative impacts of the pandemic. For example, Deaton and Deaton (2020) investigated the effects of COVID-19 pandemic on food security in the context of Canada's agricultural system. Hobbs (2020) assessed the impacts of the pandemic on food supply chain resilience while also discussing the demand-side shocks caused by panic buying and consumption patterns in Canada. However, to the best of our knowledge, no research has yet explored the impacts of COVID-19 pandemic on the food and beverage industry in the context of an emerging economy. Therefore, this research contributes to the emerging economy by investigating the case of the food and beverage industry which is one of the fastest-growing industries in Bangladesh.

Further, nor have researchers examined strategies for overcoming those impacts and thereby improving resiliency in such contexts. To fill these gaps in the literature, the present study establishes the following research questions.

RQ1: What are the potential impacts of COVID-19 pandemic on the food and beverage industry during and after the pandemic?
RQ2: What are some potential strategies for dealing with the impacts of COVID-19 pandemic and for improving resilience in this sector?
RQ3: Which specific strategies are effective in addressing which particular impacts?

To answer these research questions, the present study investigates the short-term as well as the medium-to-long-term impacts of the COVID-19 pandemic, and considers what strategies management should take to reduce these impacts and to improve resiliency within what is a rapidly changing environment. This study undertakes a case-study based qualitative approach to investigate the impacts of the COVID-19 pandemic. In this study, a qualitative research technique used as it works efficiently where the numerical data is not available as well as the research questions are exploratory in nature. Also, it helps to narrow down a vast research field into one easily researchable topic.

This paper is organized as follows. Section 2 presents a review of the research conducted on supply chain disruption and supply chain disruption management, particularly in the context of epidemics and pandemics. The research methodology is described in Section 3. Section 4 discusses the main findings of the study. Managerial implications are discussed in Section 5. Finally, Section 6 concludes the paper with a discussion of the study's limitations and future research directions.

2 Literature review

This section reviews the extant literature on supply chain disruption to report the current state of knowledge about disruption management in the food and beverage industry, particularly in the context of epidemics or pandemics.

2.1 Risk and disruption management

In business and organizational research, risk is generally defined in terms of negative variations from the expected outcomes (Miller 1992). This means that only the incidents that have negative impacts on the outcome of the organization's operations are considered as a risk (Chen, Sohal & Prajogo 2013; Guertler & Spinler 2015). Disruption, meanwhile, is a particular type of risk that involves catastrophic events (Chen et al. 2019; Meena & Sarmah 2014; Scholten et al. 2014; Paul et al. 2019b and c). Disruption risk can impact the sustainability of the supply chain (Moktadir et al. 2018).

Disruptions, in this sense, have been investigated from two main perspectives in the literature. The first perspective

focuses on the geographical location of the disruption. More specifically, two types of disruption scenarios based on location have been explored: local disruptions and local plus global disruptions (Sawik 2011; Paul et al. 2016; Paul et al. 2017). In the case of local disruption, the events at issue involve a single factory or supplier, such as a fire or the breakdown of machinery at a specific plant. On the other hand, for the scenarios that entail both local and global disruptions, all or some of the supply chain partners across the globe are simultaneously impacted (Ritchie & Brindley 2000; Ivanov 2020a; Manuj & Mentzer 2008; Zhao et al. 2013). The other main perspective on disruption considers the functions of the supply chains that are affected. In this connection, research has considered supply-side disruption (Pal et al. 2014; Gülpnar et al. 2014; Ray & Jenamani 2013; Wang & Yu 2020), production disruption (Paul et al. 2019b; Bao et al. 2020), transportation and distribution disruption (Chaghooshi & Moein 2014; Wilson 2007; Hishamuddin et al. 2015), demand-side disruption (Paul et al. 2014a and b; Kirchoff et al. 2011; Ray & Jenamani 2016), and the combination of two or more the previously listed types of disruption. This perspective focuses on how a disruption in a particular function of a supply chain can imbalance the entire supply chain network, due to the ripple effect it creates (Kim et al. 2014; Dolgui et al. 2020; Das et al. 2019; Ivanov et al. 2019; Pavlov et al. 2019).

To overcome a company's vulnerability to disruptions, it is imperative to formulate and implement strategies for managing disruption (Park et al. 2016; Paul and Rahman 2018; Paul et al. 2018). Several such strategies have already been recommended and tested in the literature. For example, inventory stockpiling, diversification of supplies and suppliers, and creating back-up suppliers have been suggested as ways of managing disruption risk (Tomlin & Wang 2009). Moreover, strategies such as emergency sourcing (Huang et al. 2018; He et al. 2015), buffer inventory (Darom et al. 2018; Paul et al. 2015a, 2015b), and reserve capacity (Paul et al. 2014a, 2014b; Hishamuddin et al. 2013), as well as collaborative strategies such as on-time and quality information sharing (Sarkar & Kumar 2015; Chowdhury et al. 2016) and flexibility (Glenn et al. 2009), have also been suggested for purposes of disruption management. The proper configuration of resources and infrastructure is also required, along with disruption orientation, to ensure that firms can manage disruptions efficiently (Ambulkar et al. 2015). These strategies for managing disruption can make a supply chain more resilient (Tang 2006).

2.2 Disruption in the food and beverage industry

Similar to other industries, the food and beverage industries, at any given time, face several disruptions. The potential disruptions associated with the food and beverage industry arise from many sources in the supply chain, including customers, suppliers at different tiers, internal production processes, and distribution and storage, as well as external environments such as political circumstances and wars (Bruzzone et al. 2013). In addition, the supply chain of the food and beverage industry is associated with uncertainties and delays because the industry itself is dynamic in nature and carries a risk propensity (Sharma & Singhal 2018). Based on a case study on Back Alley Café, Kristina and Wijaya (2017) classified 59 incidents in the food and beverage industry into four categories; the categories include incidents involving extreme, high-level, medium-level, and low-level risks. Economic growth opportunities in the industry are threatened by such disruptions, which may also, in the process, damage the environment. When the food and beverage industry loses efficiency due to risks of this sort, it may very well revert to high levels of water consumption and wastewater production (Valta et al. 2015). Hence, to ensure a responsive and effective supply chain, proactive strategies are required to handle these disruptions and vulnerabilities (Nyang'au 2016). Previous research has shown that firms in the food and beverage industry are capable of improving their performance by undertaking efficient disruption management strategies. Thus, Adeleke et al. (2020), for example, reported that the implementation of appropriate disruption management strategies had enhanced the performance of food and beverage firms in Nigeria.

2.3 Research gaps

The existing literature on disruptions in the commercial food and beverage industry has not considered the impacts of epidemics or pandemics on this sector. Instead, most of the research on the disruptive effects of public health crises of this sort have focused on humanitarian issues, such as how food and other forms of relief can be distributed efficiently (Dasaklis et al. 2012; Ivanov 2020a; Paul & Chowdhury 2020a). Yet commercial firms in the food and beverage industries have been affected by a number of recent epidemics as well as the COVID-19 pandemic (Hudecheck et al. 2020). The impacts of these disruptions are severe, because such crises have long-lasting ripple effects and can impact the operations at multiple levels simultaneously, including sourcing, production, and distribution (Ivanov 2020a; see also Choi 2020; Ivanov 2020b; Ivanov & Dolgui 2020; Samson 2020). COVID-19 has had, for the same reasons, a severe impact on the firms in this industry (Cappelli & Cini 2020). However, the specific impacts of this pandemic on the commercial food and beverage supply chain firms are still unknown, because research in this area has not yet emerged. Therefore, by investigating the impacts of COVID-19 pandemic on the food and beverage industry, the current study can contribute to the literature. Moreover, our focus on strategies for reducing the impacts of the pandemic can serve as a guide for the managers in this sector. In addition, because we use a developing country, Bangladesh, as a case study for

investigating the impacts of the COVID-19 pandemic, this paper can enrich current understandings of how disruptions affect food and beverage supply chains in developing countries (Karuppiah et al. 2020; Tumpa et al. 2019; Gaikwad et al. 2020).

3 Research methodology

This section provides details about the research methodology, including methods of data collection and data analysis, that we used in our study.

3.1 Research methods

This research adopts a qualitative, case-study-based methodology. Qualitative research, which collects and works with non-numerical data, is a method used to narrow down a vast field of research into one easily researchable topic (Creswell 2013). It seeks to interpret the meaning and provide an in-depth understanding of a particular situation or problem (Mohajan 2018). Given that the current COVID-19 pandemic is a unique type of supply chain disruption, it is important to conduct an in-depth study to determine the short-term and medium-to-long-term impacts of the pandemic and to consider how companies in particular industries can minimize its impacts. Hence, we use a case-study-based analysis as the most appropriate approach (Yin 2013).

We used semi-structured interviews to gather data from respondents, with interviews being the most commonly used source of data in case-study-based research (Eisenhardt 1989; Sharan 1998). The interview protocol is provided in Appendix A; we used this protocol to collect data from the respondents. The study gathered data from fourteen respondents in eight companies, compiling an amount of information that is sufficient to understand the phenomena under investigation (Yin 2013): namely, the challenges of operating in the food and beverage industry of Bangladesh during the era of COVID-19. Persons involved in managing the operations were selected for the interviews, since they have knowledge about the impacts of COVID-19 pandemic—knowledge that can inform possible strategies for responding to its impacts. Moreover, in selecting the respondents, we ensured that they had significant work experience in the industry. As shown in Table 1, most of the respondents have ten or more years of experience in this sector. The interviews we conducted lasted 45–60 min, and 50 min on average. The interviews were conducted either via face-to-face meetings or over the phone, using the interview protocol provided in Appendix A.

3.2 Research context and data analysis

We collected data from the food and beverage industry in Bangladesh, in part because this industry contributes substantially to the economy of Bangladesh. The food and beverage industry is a fast-growing industry in Bangladesh. The industry employs around 1.3 million people, or 10.27% of the total workforce across all industries in Bangladesh (Nath 2012). The industry also contributes substantially to the GDP of Bangladesh. Thus, in 2013, the contribution of the food and beverage sector to the GDP of Bangladesh was 1.64% (Raihan et al. 2017). However, due to COVID-19, this industry is facing enormous challenges, which need to be investigated thoroughly so that managers can formulate proper strategies in response (Kalerkantho, 2020). Our study systematically analyzes the data we collected by categorizing and comparing the interviews (Yin 2013; Signori et al. 2015). Moreover, we took appropriate measures to improve the reliability of our findings, such as using purposive sampling to ensure that companies that produce both food and beverage were represented, and maintaining the anonymity of the data (Shah & Corley 2006). We carefully reviewed the interview data in order to identify the main short-term and medium-to-long-term impacts of the COVID-19 pandemic. Interestingly, most of the respondents converged in their accounts of the key short-term and medium-to-long-term impacts and of the best strategies for overcoming them. Table 1 shows the profiles of respondents and the representative companies.

4 Findings and discussions

This section presents the primary findings of the study. The findings are presented in two sub-sections: the impacts of the COVID-19 pandemic, and potential strategies to reduce or mitigate those impacts.

4.1 Impacts of COVID-19 pandemic

We set out to investigate both short-term and medium-to-long-term impacts of COVID-19 pandemic on the food and beverage industry in Bangladesh, and our discussions with the respondents from the representative companies clearly indicate that this pandemic has had both types of impacts. For example, R7 mentioned that "the impacts of COVID-19 will not end in one day. While several areas of our business have already been impacted, we think the impacts will be greater in the post-COVID-19 era." Similarly, R2 stated, "we are currently facing several challenges, which will continue for a long time in the future." Based on our complete data-set, our findings concerning the short-term and medium-to-long-term impacts are as follows.

Table 1 Profile of the representative companies and respondents

Company	Respondents	Position	Experience (in years)	Products sold by the company	Company size (employees)
Case A	R1	Assistant Manager, Finance & Accounts	10	Beverage	1200
Case A	R2	Manager, Operations	12	Beverage	1200
Case B	R3	Regional Sales Manager	14	Beverage	1700
Case C	R4	Senior Executive, Finance & Accounts	7	Food and Beverage	3000
Case C	R5	Regional Sales Manager	10	Food and Beverage	3000
Case D	R6	Area Sales Manager	9	Food and Beverage	1800
Case D	R7	Assistant Manager, Sales Operations	8	Food and Beverage	1800
Case E	R8	Manager, Operations	14	Beverage	1700
Case F	R9	Assistant Manager, Sales	10	Food and Beverage	2200
Case F	R10	Divisional Sales Manager	14	Food and Beverage	2200
Case G	R11	Manager, Sales	14	Beverage	1100
Case G	R12	Regional Sales Manager	9	Beverage	1100
Case H	R13	Executive, Operations	5	Food and Beverage	800
Case H	R14	Manager, Sales Operations	11	Food and Beverage	800

Short-term impacts Several respondents mentioned product expiry as one of the short-term impacts of the pandemic. Their products had been placed in retail stores in March 2020 to meet the demand of the peak buying season (March through June), but those products now had a high chance of reaching their expiry dates. As R2 put it, "we produced a large amount of our products at the beginning of March to fulfill the demand of peak season. However, since most of the retail stores and restaurants were closed during April and May due to government restrictions, we are very much concerned about the expiry of these products." In a similar vein, R8 stated, "food and beverage products have a short life; we expect a huge expiry of products in the places of trade, the distributor's warehouse, and the company's depot."

The second short-term impact that emerged from our discussions with the participants is the shortage of working capital during this crisis period. For example, R8 mentioned that "the sales volume has decreased so much that we are now experiencing huge cash flow shortage." Similarly, R9 stated that "the quantity of the company's products being taken by distributors is currently very low. Hence, our cash inflow is far below what we expected." This particular short-term impact leads to some other short-term impacts. For example, due to reduced cash inflow, companies are struggling to carry out normal operating expenditures, such as paying the salary of the staff, covering the rent of the factory and warehouses, and taking care of utility bills, the interest charges from bank loans, and other operating expenses. One of the respondents, R13, mentioned that "it is very difficult for us to carry out regular operational expenses such as employee salaries and wages, utility expenses, rent, and bank-loan interest, due to the slow cash inflow during this crisis period." Similarly, R1 stated, "we are facing a huge challenge to manage operating costs because of a shortage of cash."

Moreover, companies are struggling to open a letter of credit (LC) in order to obtain source materials that would allow them to meet future demand. Given that companies are currently facing the problem of product expiry, they are planning to keep materials ready for the future and restart production when the public-health restrictions are eased. Their aim is to ensure that they do not lose any future sales due to a lack of materials or internal production problems. However, because of shortages of operating capital as well as limited banking hours, firms are struggling to open LCs. For example, R1 noted that "the frequency of opening LCs has decreased due to slow cash inflow. While we used to open an LC every month, lately we have opened an LC every other month." Likewise, R8 said, "we are not able to open an LC as per regular practice due to a shortage of cash."

The final short-term impact mentioned by the respondents is the closure or limited operations of distributors and trade partners. The operations of the distributors remain limited because most of the restaurants and retailers are closed. When distributors do deliver products to the market using a vehicle, their total expenditures exceed the total earnings due to the low volume of sales. For example, R9 said, "the operations of many distributors have temporarily remained closed because sales have been drastically reduced; this reduction is due to the closure of the retail stores." Similarly, R3 mentioned that "distributors are reluctant to serve the market during this crisis period, because their operating costs are higher than the profit they make by delivering the products." Table 2 summarizes the short-term impacts of the COVID-19 pandemic in the food and beverage industry, with the asterisk symbol indicating which companies noted each impact.

Table 2 The short-term impact of the COVID-19 pandemic on the food and beverage industry

Short-term impacts	Case A	Case B	Case C	Case D	Case E	Case F	Case G	Case H
Loss due to product expiry (S1)	*	*	*	*	*	*	*	*
Shortage of working capital (S2)	*	*	*		*	*	*	*
Difficulty of carrying out normal operating expenses (S3)	*	*	*	*	*	*	*	*
Cash shortage leads to delay in opening LCs (S4)	*		*	*	*	*	*	*
Closure or limited operations of distributors and trade partners (S5)	*	*			*	*	*	*

Medium-to-long-term impacts Along with short-term impacts, our interviews brought to light many medium-to-long-term impacts from COVID-19 pandemic. Reduction in return on investment (ROI) is one of the significant medium-to-long-term impacts mentioned by the respondents. Business performance, including profit and loss figures, is calculated in the food and beverage industry in Bangladesh on a quarterly basis. Given that the companies' sales volume has already decreased in the first and second quarters in 2020, and given that it is expected to decrease further due to the pandemic, companies have forecasted lower sales in the coming days. As a result, companies may suffer from a reduction in ROI in the medium-to-long term (i.e., in the rest of quarter Q3 and also in Q4). Thus R4 mentioned that "we have observed a huge loss in sales during Q2 2020, which will negatively impact the profitability of the whole year." Along similar lines, R1 mentioned that "sales in April and May 2020 have dropped by 80% when compared to sales in the same months in 2019. As a result, we are expecting a reduced ROI in this financial year." As the ROI of the companies has decreased and may be further reduced, there is a high probability of long-term job cuts during and after the crisis period. As R14 put it, "we expect job cuts in the long-term, because the ROI of the company may decrease. I think this will happen not only in our company, but also in the industry as a whole." Similarly, R5 stated that "we cannot assess the future prospects of the business at this moment. Being uncertain, the company may not retain the same workforce levels."

Other potential medium-to-long-term impacts include those affecting supply chain relationships and structure. One such impact concerns the reduction in trade relationships, or relationships involving the manufacturers and the wholesalers/retailers who sell their product for profit. Companies in the food and beverage industries generally spend on trade promotion by providing retailers extra product for free. For example, while selling products to retailers, a beverage manufacturer may allocate one or two units of free product for every 12 units purchased. Due to the COVID-19 pandemic, however, companies may not be able to provide such promotions to retailers or wholesalers. Thus, R12 said, "we usually run different trade promotional activities to build a strong relationship with retailers and wholesalers. However, during this crisis period, we have reduced these trade promotional costs to survive in the industry." Likewise, R2 remarked, "we may need to reduce trade promotions during this crisis period."

A complete restructuring of the supply chain, and a rebuilding of supply chain relationships, may prove to be another significant medium-to-long-term impact. During the crisis period, distributors, who purchase products directly from the manufacturers and sell them to wholesalers and retailers, have faced a situation in which their operating expenses are higher than their revenue. Hence many distributors are currently closed. Many of them may never reopen, since they may not be able to carry operating costs during the closure. Thus R11 noted that, "if the sales remain low for a longer period, many distributors may permanently close their business. As a result, we need to find out new distributors and build relationships with them." In the same vein, R12 stated, "many distributors may change their profession from distributorship to other professions in the post-COVID-19 era. This will force us to build new partnerships." Another respondent, R7, said, "I think in the post COVID-19 era the popularity of online sales will increase." These responses clearly highlight that firms will need to restructure their supply chains, with a high focus on online modes or omni-channels.

A final medium-to-long-term impact is a reduction in how much the industry as a whole contributes to the GDP. The shaky situation in the food and beverage industry during and after the pandemic may reduce the sales and revenue of the industry, leading, in turn, to a decrease in contribution to GDP. As one respondent, R11, put it, "the continuous decrease in sales revenue may lead to a reduction of the contribution of this industry to GDP." Likewise, R6 mentioned that "consumers are likely to avoid chilled beverage products during and after the pandemic and focus on homemade goods for their own safety." The possibility of a reduction in demand over the medium-to-long term certainly will have an impact on the contributions of the food and beverage industry to the economy in general, and to GDP in particular. The medium-to-long-term impacts of the COVID-19 pandemic on the food and beverage industry are summarized in Table 3. Once again, the asterisk symbol denotes the case companies that mentioned the respective impact.

Table 3 The medium-to-long-term impacts of the COVID-19 pandemic on the food and beverage industry

Medium-to-long-term impacts	Case A	Case B	Case C	Case D	Case E	Case F	Case G	Case H
Reduction of return on investment (ROI) (L1)	*	*	*	*	*	*	*	*
Job cuts in the industry (L2)	*		*		*	*	*	*
Reduction of trade relationships (L3)	*	*			*	*	*	
Rebuilding and restructuring of the supply chain network (L4)	*	*		*	*	*	*	*
Reduction of the industry's contributions to GDP (L5)	*		*	*	*		*	

4.2 Management strategies for dealing with the impacts

In addition to exploring the short-term and medium-to-long-term impacts of COVID-19 pandemic on the food and beverage industry, the interviews with the respondents also covered strategies for tackling or responding to these impacts. When the respondents mentioned impacts of the pandemic, they were asked about potential strategies for minimizing each of the impacts. While these strategies cannot completely negate the impacts, they may potentially reduce their severity. In doing so, the strategies can enhance the companies' resilience capabilities in a rapidly changing environment.

Based on our discussions with the respondents, we identified the main strategies linked with each of the impacts, with a view to determining what strategies are most useful for what sorts of impacts. For example, according to the respondents, First Expiry First Out (FEFO) is the prime strategy for minimizing the risk of product expiry. In turn, by reducing the threat of product expiry, the strategy can also minimize losses in companies' return on investment. As one of the respondents, R2, said, "we use a dashboard in the factory's warehouse and regional depot to maintain FEFO properly. Moreover, we are now randomly checking the distributor's warehouse, to see whether they are maintaining this approach or not." In a similar vein, R8 mentioned that "we are now delivering first, from our company's warehouse as well as from the regional depot, the products that will expire the soonest."

Product rotation was found to be another vital strategy for minimizing the risk of expiry. Generally speaking, retailers put products with more recent dates in front and products with older dates in the back of the shelf. As a result, while new products are sold, old products reach their expiry date before being purchased. Therefore, respondents suggested product-rotation methods whereby products are either rotated within the store, from the back of the shelf to front of the shelf, or else rotated between stores, from low-traffic stores to stores with higher sales volumes.. For example, R11 mentioned that "when we go for a market visit, we work with retailers to rotate the products that are expiring first from the back of the shelf to the front. If a retail store seems incapable of selling the product before the expiry date, we transfer the products to high-traffic retail stores to minimize the chance of expiry." From the responses, it is evident that product rotation not only minimizes the risk of expiry but also reduces negative relationships with traders and positively impacts return on investment. Thus, R5 remarked, "product rotation can minimize the expired products, and this helps to reduce the loss of ROI." Another respondent, R3, stated, "the relationship with traders deteriorates mainly due to refusals to provide compensation for product expiry. If the field force does the product rotation properly, this will minimize the expiry, and help maintain good relationships with traders."

Given that sales revenues have decreased substantially during the pandemic, and given that future sales seem uncertain, the management may decide to make job cuts over the longer term, as reported in the previous section. The interviews also revealed, however, that instead of making job cuts, companies can use the strategy of a partial sacrifice of remuneration, agreed to by employees and employers. This strategy recurs in the responses of the respondents. For example, R9 said, "with an agreement between employees and employers, salaries can be reduced in order to retain the total workforce." In the same vein, R1 mentioned that "we understand that an employee losing a job during the crisis period will impact an entire family. Hence, we want to keep our human resources but need to reduce salaries for a certain period of time."

The responses also revealed that, after the crisis period, staff will be requested to work harder during extended hours to make up for the losses caused by the pandemic and to maintain the contribution to GDP. One respondent, R10, mentioned that "we will extend our regular opening hours, say by two hours, after the pandemic, in order to enhance productivity and cover the previous loss." R4 stated, "we have no other way but to work hard with extended hours to make the business viable after the COVID-19 era." The study also reveals that staff might be called on to work weekends, via an agreement between employees and employers. These considerations tie in directly with ROI and the desire to increase contributions to the overall economy. For example, R11 mentioned that "with the agreement between employees and employers, we can utilize some holidays as working days after the pandemic to make up for the loss." Similarly, R1 remarked

that "we may need to work during the weekends and holidays in the post-COVID-19 era to minimize the loss."

Short-term incentives for the distributor surfaced as a strategy for ensuring the survival of distributors during and after the crisis period. They can also help increase cash flow, allowing companies to offset the shortage of working capital, carry out operational expenses, and open LCs to meet future demand. For example, R9 mentioned that "we have given short-term incentives to the distributors, based on the volume of products they order, to help make them operational. This is likely to increase sales and cash flow." Likewise, R2 said, "short-term incentives to the distributors during this crisis period work as a tonic to push them to deliver products even though the sales volume is low. It helps to increase cash inflow to the company to manage operational expenses." By keeping distributors operational, companies can also reduce the necessity to rebuild relationships with new suppliers. As noted previously, companies may need to find new distributors and suppliers if their current partners stop operations. Such incentives to the distributors can undoubtedly help in this regard. As R13 put it, "if the distributor survives, we will not need to find a new distributor in the post-COVID-19 era and can conduct business with them [i.e., the current distributor] for a long time."

Another strategy that emerged is decreasing trade promotion costs in order to reduce operational expenses. One of the respondents, R12, mentioned that "we spend around 40 taka [the local currency of Bangladesh] per case in the form of trade promotions. At this moment, we are not in a position to spend the same amount on trade promotions." In the same vein, R2 said, "generally, we give trade promotions to boost sales, but during the crisis period, the overall demand is very low. Therefore, we would like to reduce the trade promotion cost to save money for essential operational costs." The reduction of trade promotions can also help reduce the loss of ROI. For example, R8 said, "every taka counts; if we can minimize costs by decreasing trade promotions, we can reduce our loss of ROI."

Finally, the study reveals that companies need to restructure their supply chain designs, by building online sales infrastructure to complement their traditional retail-based sales capabilities. By increasing sales, this initiative can increase cash inflows to meet working capital, carry out operational expenses, and increase ROI. As R2 put it, "we need to build our capability to run the business in both online and offline modes because the online mode is likely to become the main mode of sales after this pandemic." Similarly, R7 stated, "we need to build our infrastructure for online sales, because we are currently selling products using several external online interfaces." Table 4 summarizes the strategies for reducing the impacts of COVID-19 pandemic in the food and beverage industry.

Table 4 Strategies for minimizing the impacts of COVID-19 pandemic on the food and beverage industry

Strategies	Effective for minimizing short-term impacts	Effective for minimizing medium-to-long-term impacts
Follow FEFO method	S1	L1
Product rotation in trade	S1	L1, L3
Partial sacrifice of remuneration agreed to by employees and employers		L1, L2
Extended office time after the crisis period		L1, L5
Utilize weekends and holidays as working days		L1, L5
Short-term incentives for distributors	S2, S3, S4, S5	L4
Minimize trade promotion costs	S2, S3, S4	L1
Focus on building online infrastructures	S2, S3, S4	L1, L4

5 Managerial implications

In exploring the short-term and medium-to-long-term impacts of the COVID-19 pandemic on the food and beverage industry in Bangladesh, our study also outlines potential strategies that managers working in this industry can adopt to help minimize these impacts. Practitioners in this industry can undoubtedly use the findings of this study to understand how COVID-19 pandemic has impacted or will impact the operations of their supply chain, and how they can work to mitigate such impacts. Our data suggest that product expiry is one of the most critical short-term impacts, given that the respondents repeatedly mentioned this issue during the interviews. Even in normal times without any disruptions, product shelf life is generally considered to be one of the greatest challenges and constraints in the fresh food and beverage industry (Soman et al. 2004). Our findings indicate that the situation has become worse in the current period, because sales have decreased drastically.

As a result, companies need to undertake appropriate measures to control the problem of product expiry. To this end, companies can develop an online ordering platform and introduce a fast delivery system to get the products to end consumers in a timely fashion. Alongside this policy, managers need to ensure that they dispatch the food and beverage products that are expiring first. Such an approach should be implemented at the different stages of the downstream supply chain, including when products are delivered from the factory to distributors, from distributors to traders (wholesalers or retailers), and from retailers to customers. To encourage the downstream partners to follow the approach, firms can also

provide some incentives. For example, a retailer can be given some monetary incentives if the retailer can reduce the return of expired food and beverage products. At the same time, managers need to instruct the field force to rotate the food and beverage products that have imminent expiry dates. Our findings show that rotation can be made within stores, from the back to the front of the shelf, or between stores, from low-traffic retail stores to higher-traffic retail stores. However, the field force needs to play an active role here to ensure proper rotation. The field officers need to check the expiry date of the product when making their scheduled visits to markets (using safety measures appropriate for the COVID-19 pandemic), and undertake the appropriate rotation methods by considering the sales volume of the retail stores in question.

With respect to other short-term impacts, it is clear that companies are currently suffering from a lack of working capital, given that their operating cost is higher than sales revenue. Therefore, managers should identify and implement every possible strategy for increasing sales. According to our findings, the most promising option is to focus on online sales. The findings suggest that whereas companies in developed countries are well-equipped with an omni-channel sales infrastructure (Montgomery et al. 2019), food and beverage companies in developing countries are not yet able to take full advantage of such omni-channel sales methods. Therefore, we recommend that food and beverage industry managers sell products not only via their websites but also through other e-commerce interfaces. Expanding sales channels can help reduce the problem of the liquidity crisis, thereby assisting companies in meeting operational expenses and opening LCs for raw materials in order to meet future demand. While this might not be the right time to make major investments in developing online infrastructure, managers should seriously consider how to expand their sales channels and build infrastructure whenever possible, since our findings suggest that sales of food and beverage products in online modes will increase in the post COVID-19 era.

Our study also reveals that distributors are struggling to operate their businesses due to low sales volume, and that some of them have either shut down their operations or are in the process of shutting down. Given that, in the food and beverage industry, distributors play a crucial role in ensuring product availability in the market (Lee & Klassen 2008), managers should give short-term incentives to distributors based on the volume of product ordered, so that they can sustain their operations and cover the products' delivery cost. Management should also adopt a long-term perspective on their relationships with distributors, assuring them of a standing commitment so that they come forward to help companies (Chowdhury et al. 2019). Distributors will thereby be encouraged to deliver products to the market and also order them from manufacturing companies. Such efforts will not only address the problem of the distributors' continued business viability, but also improve the companies' relationships with them and help increase products' availability in the market over the long term.

The findings on medium-to-long-term impacts suggest that the ROI of the companies will decrease due to the COVID-19 pandemic. Hence, managers should take the required steps to minimize all non-emergency costs. Given that trade and promotion cost is generally high in the food and beverage industry (Budd et al. 2017), we recommend that managers reduce or postpone trade promotion costs during and after the crisis period. However, to ensure that taking such actions does not affect their trade relationships, companies can assure their trade partners that this strategy is temporary and that it will be reversed once the companies recover from the pandemic. Further, job cuts are another major impact of the pandemic. In this regard, managers should work collaboratively with employees to cut a certain percentage of remuneration, as agreed by both parties, during the crisis period and also, if required, for a certain period in the post COVID-19 era. Such steps can help maintain total workforce levels. When reducing the remuneration, managers can give employees the option to take additional leave or work fewer hours to justify the pay cut.

Our findings confirmed that the reduction of trade relationships will be a medium-to-long-term impact on the food and beverage industry. As COVID-19 pandemic impacts supply chain infrastructure, trade relationships may be undermined. Therefore, managers need to focus on how to build strong trade relationships with different partners in order to ensure supply chain sustainability. Managers of the food and beverage industry can think how to collaborate with trade partners such as suppliers, manufacturers, distributors, and retailers in a faster way using the latest technology. Technological infrastructure as well as trade policy development considering COVID-19 situation may help to collaborate among trade partners in a faster way. Further, managers can offer some incentives to partners for operating their businesses, and this strategy, too, may help reduce the impacts of the pandemic.

The need to rebuilding and restructure the supply chain network is likely to be another medium-to-long-term impact of COVID-19 pandemic. Since COVID-19 is an infectious disease, the pandemic has made it very difficult to run business operations in a normal way. Our study suggests that managers should take steps to build a more resilient supply chain network for the food and beverage industry. It is certain that the COVID-19 pandemic will change the ways of doing business, managers should be focused on building resiliency by integrating different emergent technologies, including artificial intelligence, big data analytics, data-driven supply chains, blockchain technology, and the Internet of Things (IoT), into their business operations over the long term (Moktadir et al. 2019). Further, to minimize human contact in food processing, managers may think about the implementation of robots.

The reduction of the industry's contributions to GDP surfaced as another medium-to-long-term impact of COVID-19 pandemic. It can be predicted that countries will generally lose GDP significantly due to the impacts of the pandemic. Therefore, governments should take actions to mitigate this situation, such as offering incentives and support to the food and beverage industry, and they should also develop a long-term strategic action plan. Additionally, in the post COVID-19 era, managers, via agreements with employees, should undertake other initiatives to increase the productivity of their companies, such as additional shifts, extended office hours, and working on weekends and holidays. Such initiatives can enhance the food and beverage industry's contribution to the national GDP.

6 Conclusions and future research directions

This study explores the impacts of the COVID-19 pandemic, as well as strategies for dealing with those impacts, in the food and beverage industry in Bangladesh. The results show that, in the short term, the impacts of COVID-19 pandemic include more expired products, shortage of working capital and hence difficulty in carrying out operational expenses, delay in opening LCs, and closures of distributors' operations. The impacts will no doubt continue for a more extended period, and in the medium-to-long term, those impacts are likely to include a reduction in ROI, job cuts in the industry, negative relationships with traders, a restructuring of supply chains focusing on online trade, and an overall decrease of the industry's contribution to GDP. The research also reveals several strategies that can be adopted to minimize the impacts. These strategies include implementation of the FEFO method, product rotation within and across retail stores, a partial sacrifice of remuneration agreed to by both employees and employers, extended office hours and a partial opening of operations on weekends and holidays in the post COVID-19 era, short-term incentives for distributors, minimizing trade promotion costs, and developing infrastructure to boost online sales.

The contribution of this study is remarkable because this is the first study to explore comprehensively the impacts of the COVID-19 pandemic on the food and beverage industry and to provide potential ways of mitigating those impacts. The findings of this study have substantial relevance for both theory and practice. Not only do we enhance the literature on disruptions in the food and beverage industry; what is more, by taking Bangladesh as the subject of the study, we also supplement the literature on this industry in the context of emerging economies (Tumpa et al. 2019). The findings provide managers of the food and beverage industry with a clear understanding of the impacts of COVID-19 pandemic, as well as guidelines on how to deal with those impacts.

While the study makes a substantial contribution in these areas, a few limitations of our research can be noted. First, the study used a case-study approach by drawing on data collected via interviews. Although all the necessary steps have been undertaken in the research design stage to improve the precision and reliability of the findings, nonetheless, the study lacks generalizability due to the nature of the research methodology we used (Yin 2009). Therefore, in the future, a large-scale survey could be undertaken to verify the strategies provided in this research and to increase the generalizability of the findings. Second, the study relies on data collected from large organizations operating in the food and beverage industry in Bangladesh. Given that small and medium-sized enterprises (SMEs) versus large organizations vary in their operations and strategies (Karuppiah et al. 2020), the findings may not completely reflect the situation among SMEs. Therefore, a future study could explore the impacts and strategies in the context of SMEs or compare the findings for large firms with those for SMEs. Moreover, given that the impacts of the pandemic vary across industries (Paul & Chowdhury 2020b), future studies could explore industry-wise impacts to explore how COVID-19 pandemic has impacted each industry.

Finally, some of the short-term impacts and medium-to-long-term impacts seem correlated. For example, lower sales and an increase in expired products certainly reduce the ROI. However, the study is silent on this issue, and the interrelationships among the factors examined are beyond the objectives of this study. Future research should consider these interrelationships, which may provide important directions when it comes to formulating robust action plans. In addition, the present study does not attempt a ranking of the impacts and strategies. A future study investigating the relative importance of the strategies might be useful for the companies deciding where they should focus their efforts first, as they, along with the rest of the industry, seek to recover from the pandemic.

Interview Protocol

Opening

Thank you so much for your valuable time. First, I would like to briefly explain the research theme to you. The broad objectives of this research are twofold: (1) to explore the short-term and medium-to-long-term impacts of the COVID-19 pandemic in the food and beverage industry; and (2) to identify potential strategies for reducing the impacts.

You have been selected as a respondent in this study because you are involved in managing the operational activities of a food and beverage manufacturing firm that we are using as a representative company in our study. We sincerely believe your knowledge and practical experience with managing the operational activities of the firm can substantially contribute to achieving the aims of this study.

Our interview with you will be open-ended. You will respond to the questions based on your experiences and knowledge;

hence, there are no right and wrong answers to any question. The anonymity and confidentiality of your response will be strictly maintained. You also can withdraw from this project at any time without having to explain your reasons for doing so.

Interview questions:

1. *What is your role in the supply chain/position?*
2. *How long have you been working for this organization?*
3. *How many employees do you have?*
4. *What products does your company manufacture?*
5. *How has the COVID-19 pandemic impacted the operations of your company?*
6. *Would you please describe the short-term impacts of the COVID-19 pandemic on your company?*
7. *You talk about short-term impacts of the COVID-19 pandemic on your firm, such as .... How can your company reduce each of these impacts?*
8. *What are the medium-to-long-term impacts of the COVID-19 pandemic on your company?*
9. *You talk about the medium-to-long-term impacts of the COVID-19 pandemic on your firm. How can your company reduce each of these impacts?*

Floating Prompts

Could you please explain this in more detail?

May I humbly request that you discuss this matter a bit more fully, please?

That's insightful; could you please continue explaining this.

Could you kindly give a specific example, please?

Closing

I would like to thank you again for your time. Please let me know if you need a copy of this study when it is completed in the near future. Moreover, please feel free to contact me if you have any further queries about our research.

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