Introduction

COVID-19 is, first and foremost, a global humanitarian challenge.

Thousands of health professionals are heroically battling the virus, putting their own lives at risk. Governments and industry are working together to understand and address the challenge, support victims and their families and communities, and search for treatments and a vaccine.

Within this health and economic crisis, consumer-packaged-goods (CPG) companies are facing significant changes in volume and volatility of demand and supply.

This document is meant to help senior leaders understand the impact of the COVID-19 situation on their supply chain and take steps to protect their employees, customers, supply chains, and financial results through a supply-chain control tower.
COVID-19 has already affected supply chains significantly and heightened uncertainty about the near future

What is happening

Demand for many items is **significantly volatile**. While short-term demand for some items has skyrocketed, demand for other items has significantly decreased.

Physical supply chains have been disrupted. Quarantines and lockdowns have **slowed or interrupted the physical flow of materials** around the globe.

A **tremendous level of uncertainty** has been introduced, and unpredictable events (e.g., unavailability of a warehouse and all its inventory because of potential infection, a supplier going out of business) require immediate action.

How to respond to the crisis

Create supply-chain **transparency** across different data systems connecting functions, plants, suppliers, and customers.

Set up a **cross-functional, empowered team** to accelerate decision making with imperfect data.

Decision making can be guided by **scenario-driven processes** that consider operational, customer, and financial impact.

Provide **senior leadership support** to break down functional silos and enable fast decision making.
We describe the journey to a post-COVID-19 next normal as having five stages

This document focuses on resilience, return, and reimagination considerations for CPG companies

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tr>
<td>Resolve</td>
<td>Determine the scale, pace, and depth of action required</td>
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<tr>
<td>Resilience</td>
<td>React to and manage the supply-chain shock through a control tower</td>
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<tr>
<td>Return</td>
<td>Ramp up to stable operations</td>
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<td>Look for moves to gain advantage</td>
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<td>Reimagination</td>
<td>Based on hard lessons from the crisis, reimagine what the next-normal supply chain should be (e.g., autonomous planning)</td>
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<tr>
<td>Reform</td>
<td>Understand how the regulatory and competitive environment of the industry may shift and have an impact on supply chains</td>
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</tbody>
</table>
The journey to post-COVID-19 ‘next normal’ has five stages. The following section focuses on CPG supply chain: Resilience

<table>
<thead>
<tr>
<th>Scope of this section</th>
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<tbody>
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Source: Adapted from “Beyond coronavirus: The path to the next normal”
COVID-19 crisis is resurfacing perennial questions that need an integrated crisis response, and it may define a next normal in CPG supply chains

<table>
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<tr>
<th>Customer service and collaboration</th>
<th>Supplier management</th>
<th>Manufacturing operations</th>
<th>Distribution-center (DC) network</th>
<th>Transportation management</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to <strong>simplify the portfolio</strong> to optimize manufacturer and retailer supply chains (win/win)?</td>
<td>How to fast-track new-supplier approval processes?</td>
<td>How to <strong>maximize manufacturing up time</strong> in labor scarcity and prioritize utilization of available capacity?</td>
<td>How to <strong>plan for backup capacity</strong> in case of DC closures? Flexible storage? Mobile warehouses?</td>
<td>Should the last-mile delivery be rethought to ensure transportation availability and the best customer service?</td>
</tr>
<tr>
<td>How to <strong>allocate insufficient inventory</strong> across customers to create win-win situation?</td>
<td>How to <strong>maximize supply continuity</strong> and raw material availability?</td>
<td>How to <strong>plan for backup sourcing</strong> where there is global production?</td>
<td>What to change in DC operations to maximize product availability and quick turnaround of products?</td>
<td>Are there opportunities between inbound and outbound that have not been considered?</td>
</tr>
<tr>
<td>How to <strong>address dipping service levels</strong> with partners?</td>
<td>How to <strong>adjust production plans</strong> with shortages in supply?</td>
<td>How to <strong>fast-track new formulation</strong> into production in case of potential new or substitute ingredients?</td>
<td>How to <strong>manage the right set</strong> of expedites?</td>
<td>How to manage the right capacity from partners?</td>
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<tr>
<td>How to <strong>improve end-to-end (E2E) cost to serve?</strong></td>
<td>How to <strong>reprioritize raw-material orders</strong> as demand signal shifts?</td>
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A control tower can increase resilience through transparency and rapid, fact-based decision making

Remote central control tower

- Focuses on optimal approach to maximizing product availability
- Set up with full authority and accountability to make decisions
- Organized as a cross-functional team
- Communicates the urgency of the situation and approach
- Tracks selected a set of metrics coupled with data and analytics to produce insights that guide decision making

Customer service and collaboration  Supplier management  Manufacturing operations  DC network  Transportation management

Data transparency and metric tracking
The journey to post-COVID-19 ‘next normal’ has five stages. The following section focuses on CPG supply chain: Return

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**Resolve**
Determine the scale, pace, and depth of action required

**Resilience**
React to and manage the supply-chain shock through a control tower

**Return**
Ramp up to stable operations
Adjust supply chains to the expected new demand
Look for moves to gain advantage

**Reimagination**
Based on hard lessons from the crisis, reimagine what the next normal supply chain should be (e.g., autonomous planning)

**Reform**
Understand how the regulatory and competitive environment of the industry may shift and have an impact on supply chains

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Source: Adapted from “Beyond coronavirus: The path to the next normal,” McKinsey.com
Demand archetypes during COVID-19 vary for CPG players, with volatility likely to continue across archetypes

<table>
<thead>
<tr>
<th>Demand archetypes</th>
<th>Illustrative demand profile</th>
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<tbody>
<tr>
<td><strong>1</strong> Sustained demand increase</td>
<td>![Graph showing a sustained demand increase]</td>
</tr>
<tr>
<td><strong>2</strong> Pantry load and consume</td>
<td>![Graph showing a pantry load and consume]</td>
</tr>
<tr>
<td><strong>3</strong> Pantry load and preserve</td>
<td>![Graph showing a pantry load and preserve]</td>
</tr>
<tr>
<td><strong>4</strong> Temporary demand decrease</td>
<td>![Graph showing a temporary demand decrease]</td>
</tr>
</tbody>
</table>

In all cases, volatility is likely to increase significantly:

- **Timing uncertainty**—when demand trends back to “next normal”
- **Demand uncertainty**—what new demand will be
- **Competitive volatility**—likely new competitions or competitive behaviors
- **Buyer volatility**—shopping behavior likely to change—channels could be different (e.g., more bulk, more e-commerce)
Archetype 1—Sustained demand increase

Example of actions to consider for return

Example: Cleaning products

Implement margin management for SKU portfolio

Proactive collaboration with retailers to determine product portfolio for next year, including new-product development

Optimize order complexity somewhere between the high complexity that used to exist and the extremely slimmed-down version during crisis peak

Move from fire fighting to scenario planning and proactive value-chain management

Drive margin management through E2E scenario planning from commercial through production and delivery

Invest in data and technology now to prepare autonomous planning capabilities

Optimize current capacity and plan for additional ramp-up capacity

Meticulously plan ahead for bottlenecks in personal protective equipment (PPE), cleaning product, space, etc., to protect labor to avoid reactive approach to capacity ramp-up

Leverage co-manufacturing network and consider building long-term, cost-efficient capacity

Secure transportation capacity with carriers
<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closely manage raw-material supply with demand-scenario planning for near term and long term</td>
<td>Work with suppliers to manage livestock to optimize cost while balancing supply risks in the future. Consider offering financial support to at-risk suppliers/farmers to secure future supply.</td>
</tr>
<tr>
<td>Prepare plans to quickly ramp up supply-chain capacity based on demand and labor situations</td>
<td>Prepare meticulous plans for operations ramp-downs and ramp-ups for facility cleaning to minimize downtime in case of COVID-19 infection cases. Optimize labor cross-utilization from low-demand channels and facilities.</td>
</tr>
<tr>
<td>Minimize wastage</td>
<td>Consider donating or selling products of “away-from-home” or excess products to associations in need of raw material while conventional-channel demand or conventional-channel capacity is absent.</td>
</tr>
</tbody>
</table>
Archetype 3—Pantry load and preserve
Example of actions to consider for return
Example: Pasta

Closely work with retailers, monitoring point-of-sale (POS) and inventory data to sharpen near-term view of demand and to adjust production

Use a supply chain control tower to actively minimize the total-delivered-cost of the supply chain
Balance on-hand finished-goods inventory within manufacturing and distribution network
Identify priority SKUs for inventory replenishment

Closely manage global raw-material supply to ensure supply while avoiding excess on-hand inventory

Create full visibility into owned and vendor-managed inventory
Anticipate potential supply risks and put mitigating actions in place
Closely link demand and production planning to find right inventory balance

Refresh supply-chain-resilience playbook based on forward-looking demand scenarios

Develop forward-looking demand scenarios based on epidemiological and macroeconomic scenarios and observed consumer shifts
Build and update a set of resilience levers, with clear actions and trigger points, to increase speed of response (e.g., if and when demand starts to drop)
Archetype 4—Temporary demand decrease

Example of actions to consider for return

Example: cosmetics

- **Stay close to near-term demand and adjust production schedule accordingly**

  - Use control tower to drive minimal total delivered cost with a focus on balancing labor costs and reduced demand
  - Consider maintaining full workforce through use of temporary furloughs instead of permanent layoffs of part of workforce

- **Strategically manage cash flow**

  - Adjust inventory targets to match near-term-demand forecast
  - Reduce hours of nonessential employees for duration of demand reduction

- **Take advantage of plant or production-line downtime**

  - Complete any required maintenance and clear opportunistic maintenance backlog
  - Consider pulling overhauls, upgrades, and capital projects forward, if possible with cash constraints

- **Prepare for employees to return to work**

  - Develop strategy for production ramp-up while minimizing risk of spreading infections
  - Define new policies (e.g., staggered break times, lunchroom capacity) and ways of working to encourage social distancing
  - Make necessary changes to shop floor and office layout
Return stage is also the time to consider how to build agility in supply chain to react to scenarios and evaluate cost and service options.

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<tbody>
<tr>
<td>What are the demand recovery scenarios across the portfolio?</td>
<td>Is it necessary to consider the geographic location of the supplier base?</td>
<td>How to reassess manufacturing priorities given the various consumer-demand shifts across products and channels?</td>
<td>How much buffer capacity is needed? At which locations?</td>
<td>What are the cost and availability scenarios for third-party-logistics market?</td>
</tr>
<tr>
<td>How to segment response to demand scenarios product or promotion activities that competitors would be launching?</td>
<td>How to increase visibility of supplier lead time?</td>
<td>How to quickly build buffer capacity for managing product-demand volatility? Which products and formats to prioritize?</td>
<td>What DC flows would continue to be at capacity? Can DC flows be changed to reduce network lead times?</td>
<td>Where are likely risks of availability and what new lanes and additional capacity buffers need to be built in?</td>
</tr>
<tr>
<td>How to balance inventory prebuild and service level to minimize wastage and maximize service levels?</td>
<td>How to continue to collaborate closely with suppliers to optimize raw-material availability (e.g., maintain supplier raw-materials inventory or supplier finished-goods inventory)?</td>
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</tr>
</tbody>
</table>
In particular, institutionalizing the E2E control-tower function can permanently drive agile decision making.

“Remote” central control tower

- Forward-looking scenario planning highly frequent (e.g., weekly/daily)
- Executive/chief supply-chain officer reporting and escalation of critical issues for close partnership with commercial team
- Structured and cross-functional problem solving for efficient decision making
- Root-cause analysis and resolution implementation to gear toward continuous improvement

Data transparency and metrics tracking

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In parallel, companies are considering various measures to minimize risk of reinfection

Example mitigation measures seen across industries

| Protect workers and minimize on-site contact | Provide PPE to every worker and install hand-washing stations, and frequently monitor for compliance  
Stagger starts and ends of shifts and create break shifts  
Make production teams as small as possible and implement social-distancing measures |
|---|---|
| Encourage best-practice hygiene and behaviors | Senior leaders and managers to role-model best practices and use of safety gear on site to minimize risk of exposure  
Leverage remote-working tools (institute remote working for high-risk sites and, if feasible, for other sites) until confirmation of containment of the virus  
Reduce of essential travel and/or eliminate nonessential travel; encourage new ways of working where possible |
| Adapt facilities to prevent contamination | Develop detailed, site-specific checklists for processes, needed equipment, and postcrisis operational guidelines  
Keep rigorous control of site entry and take temperature of everyone who enters  
Increase frequency and intensity of facility cleaning, and ventilate facilities per latest guidance by health authorities  
Reorganize layout of workstations and office areas to ensure distance of more than 1.5 meters is respected  
Close communal areas (e.g., meeting rooms, changing rooms) and discourage use of elevator  
For special areas, install additional cleaning procedures or machines |
| Establish containment plans in case of reinfection | Dedicate resources that are trained and committed to ensuring control of the spread in case of reinfection  
Announce new developments, measures, and changes to established protocols in case recontamination does occur  
Provide counselor or health expert to deal with health-related questions |

Note: Many of these measures are also applicable to earlier stages of recovery. To prevent reinfection, it is important to continue to focus on these during the return stage.
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**Reform**
Understand how the regulatory and competitive environment of the industry may have an impact on supply chains
The next normal for supply chain could be framed by four themes

Sample levers

Reimagining a sustainable operations-strength advantage

- Rethink network strategy, footprint, and partnership models to create a more resilient and flexible E2E value chain
- Risk management is equally important as efficiency
- Prioritize local partners and increased control and transparency with global partners
- Replicate capabilities with contract manufacturing in multiple locations
- Accelerate transition to omnichannel for greater customer collaboration
- Leverage subscription incentives to shape customer demand online

Accelerating E2E value-chain digitization

- Link internal and external digital systems, including those of suppliers
- Launch autonomous planning to accelerate data insights into actions
- Reinvigorate factory-of-the-future efforts
- Launch digital logistics
- Remove supply-chain bottlenecks through automation, Internet of Things (IoT), and predictive analytics
- Continuously monitor throughput data for choke points and opportunities to remove bottlenecks

Rapidly increasing capital- and operating-expense transparency

- Reassess total operational cost structure
- Revisit operating model and governance while boosting investment in the Future of Work
- Set a new standard for rationalization and management of supply-chain complexity; use transparency to prevent business-cost creep resulting from incremental complexity

Driving the Future of Work with new workforce skills and capabilities

- Standardize process and train employees in health and safety measures
- Leverage remote-working tools to bring central team expertise to address daily issues on demand at the plant level
- Redeploy lean and automation to create safe working environment
- Reskill production employees from executing repetitive tasks to data-driven operation, troubleshooting, and improving automated equipment

Deep dive follows
Portfolio of 50+ digital use cases can serve as inspiration to tailor specific approaches for companies

- **Digital machines**
  - Integrating artificial intelligence into processes and machines for optimized performance

- **Digital maintenance**
  - Leveraging physical components, such as sensors, and advanced analytics for targeted and proactive maintenance

- **Digital performance management**
  - Creating single-source-of-truth performance-management engine with real-time leading and lagging indicators

- **Digital quality management**
  - Enhancing quality, efficiency, and effectiveness using data, analytics, and IoT

- **Digitally enabled sustainability**
  - Linking advanced analytics with IoT capabilities to step-change performance and reduce energy use and waste
Example digital use cases

**Digital machines**

**Digital maintenance**

**Digital performance management**

**Digital quality management**

**Digitally enabled sustainability**

- Cycle-time optimization through big-data analytics of manufacturing line programmable logic controllers (PLCs)
- Mixed reality to enable digital standard work and training
- Digital lean tools (e.g., eKanban, eAndon, eSpaghetti)
- Advanced industrial Internet of Things (IIoT) applied to process optimization
- Artificial-intelligence-powered process control
- Artificial-intelligence-guided optimization of machine performance
- Digitally enabled variable task time
- Digitally enabled modular production configuration
- Light-guided production sequence
- Automation use in packaging
Example digital use cases

Digital machines

Digital maintenance

Digital performance management

Digital quality management

Digitally enabled sustainability

Cost optimization of operations through sensor analysis
Remote assistance using augmented reality
Predictive maintenance aggregating data based on historical and sensor data
Machine alarm aggregation, prioritization, and analytics-enabled problem solving
Real-time pipeline cost optimization based on edge sensors
Analytics platform for deviation root-cause identification
Example digital use cases

- Digital machines
- Digital maintenance
- Digital performance management
- Digital quality management
- Digitally enabled sustainability

Digital dashboards to monitor overall equipment efficiency (OEE) performance
Digital standard work
Analytics platform for remote production optimization
Digital twin for remote production optimization
Enterprise manufacturing intelligence system to upgrade operations management
Integration platform to connect machine-level data with enterprise software
Real-time asset performance monitoring and visualization
Reporting of sensor-based manufacturer key performance indicators (KPIs)
Digital tools to enhance a connected workforce
Digital recruitment platform tailored to shop floor
Digital twin of sustainability
Digitally enabled human-machine matching
Example digital use cases

- **Digital machines**
- **Digital maintenance**
- **Digital performance management**
- **Digital quality management**
- **Digitally enabled sustainability**

Scanning to replace and improve performance for high-cost coordinate measuring machines

Automated in-line optical inspection to replace end-product manual inspections

Digital work instructions and quality functions

Digitized standard procedures for line operations with integrated workflow

Mixed-reality glasses to guide operators in end-of-line inspection

Field quality failures aggregation, prioritization, and advanced-analytics-enabled problem solving

IoT-enabled manufacturing quality management

Digital quality audit

Quality improvement by predictive analytics
Example digital use cases

- Digital machines
- Digital maintenance
- Digital performance Management
- Digital quality Management
- Digitally enabled sustainability

Energy optimization by predictive analytics
IIoT real-time energy-data aggregation and reporting dashboard
Sensor-based data collection for energy management
A digital transformation of the factory and supply chain can lead to significant improvements across a range of KPIs.

<table>
<thead>
<tr>
<th>KPI improvements</th>
<th>Impact range observed</th>
</tr>
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<tbody>
<tr>
<td><strong>Productivity</strong></td>
<td></td>
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<tr>
<td>Factory-output increase</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td>Productivity increase</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td>OEE increase</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td>Product cost reduction</td>
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<tr>
<td>Operating cost reduction</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td>Quality cost reduction</td>
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<td><strong>Sustainability</strong></td>
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<td>Waste reduction</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td>Water-consumption reduction</td>
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<tr>
<td>Energy efficiency</td>
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<td><strong>Agility</strong></td>
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<td>Inventory reduction</td>
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<td>Lead-time reduction</td>
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<td>Changeover shortening</td>
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<td><strong>Speed to market</strong></td>
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<td>Speed-to-market reduction</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td>Design-iteration time reduction</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td><strong>Customization</strong></td>
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<tr>
<td>Configuration accuracy increase</td>
<td><img src="image" alt="Impact range" /></td>
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<tr>
<td>Lot-size reduction</td>
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A digital journey as part of the reimagination stage can start in different ways, from light touch to heavy implementation.

- **Lighter touch**:
  - Diagnostic and benchmarking to create case for change
  - Senior-executive virtual immersion day

- **Heavy implementation**:
  - Workshops to select lighthouse and design pilot
  - Analyze sample data for digital opportunities, estimate potential impact, and select lighthouse and plan
  - Pilot at selected lighthouse
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