Coronavirus and its impact on global supply chain

Impact of Coronavirus (SARS-CoV-2)

Feb. 24, 2020
Coronavirus is characterized with higher infection rate, but lower mortality compared with SARS.

<table>
<thead>
<tr>
<th>No. of Infection¹</th>
<th>Normal influenza in China</th>
<th>nCoV virus¹</th>
<th>H1N1 virus</th>
<th>SARS</th>
<th>H7N9 bird flu virus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mortality: ~0.01%</td>
<td>Mortality: ~6.6%</td>
<td>Mortality: ~0.6%</td>
<td>Mortality: ~6.6%</td>
<td>Mortality: ~40.5%</td>
</tr>
<tr>
<td>Less</td>
<td></td>
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</table>

1. Currently confirmed cases, excluding cured and dead patients
2. Calculated as follows: Casualties / Diagnosed cases
3. Accumulated, including infected, cured and dead

Current statistics of nCoV in China (as of Feb. 19ᵗʰ)

- **Diagnosed**: 74,576
- **Suspected**: 4,922
- **Dead**: 2,118
- **Cured**: 16,155

Source: National Health Commission of P.R.C, Kearney analysis
The number of infection is expected to reach the peak in late Feb. or early Mar., and central government is pushing for work resumption.

The situation will start to improve in Mar. and can fully recover in Apr.

- Dr. Nanshan Zhong, Infectious Disease Specialist

Epidemic forecast
- Expect to reach the peak in late Feb. or Early Mar.

Impact on business
- Mass manufacturer return rate reached 76%
- Government is pushing the resumption of work, and except Wuhan, all other 30 provinces have started to resume to work
- Increased resumption is expected in the 1~2 weeks, following the mandatory 14-day incubation period

Current status
- The overall no. of confirmed cases hasn't reached the peak
- However, the growth rate of newly confirmed cases has slowed down since Feb. 4th (despite the surge on Feb. 13th)
- The diagnostic criteria change also demonstrates government confidence in hospital readiness

Due to diagnostic criteria change of Wuhan

1. For majority production enterprise, service industry will still be impacted 2. Data before 2/8 not available 3. Formerly using Standard Nucleic Acid Test, now using "Clinically Diagnosed", i.e. those with symptoms such as fever, and CT confirmed lung infection

Source: National Health Commission of P.R.C., Kearney analysis
Hubei, the epidemic epicenter, together with Guangdong, Zhejiang and Henan are the 4 most affected provinces in China, accounting for 89% of the total infected.

Hubei is the most severely impacted province in China:
- With 83% overall infection
- With highest fatality rate of 3% compared with other provinces at 1%

Source: National Health Commission of P.R.C, Kearney analysis

XX% Percentage of infections

With >+1K cases confirmed
With 0.5-1K cases confirmed
Overall speaking, suppliers’ current output capacity is the major bottleneck, while transportation has also considerable impact on global supply chain.

### Supply from China

<table>
<thead>
<tr>
<th>Affected industry/sectors</th>
<th>Manufacturing</th>
<th>Transportation</th>
<th>Customs/Quarantine for export</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Global sourced automotive components/electronics</td>
<td>– Consumer goods (especially those using shipping liners)</td>
<td>– Food and beverage</td>
<td></td>
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<tr>
<td>– Apparel</td>
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<td>– Livestock</td>
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<tr>
<td></td>
<td>– China doesn’t adopt extensive quarantine measures against export</td>
<td>– Fresh goods</td>
<td></td>
</tr>
</tbody>
</table>

| Level of impact | | | |
|-----------------| | | |
| Severe impact | | | |

| Major challenge | | | |
|-----------------| | | |
| – Lack of protective appliance, such as mask, which is essential for on-site work resumption | – Ocean: noticeable impact on ocean lines through drops in demand (leading to additional idle capacity) and supply (ships cancellations) | – Foreign countries has started to enforce quarantine on certain product categories |
| – Mandatory 14 days quarantine policy | – Air: severely impacted with price surge, and capacity drop both for belly cargo and freighters | – Overall speaking, large-scale embargo is of low feasibility |
| – Partial work resumption mechanism due to people quarantine policy, and on-site related job such as production/assembly is severely impacted | – Land: paralyzed due to geographical quarantine, line haul transit time significantly extended or interrupted | |
| – Unachievable full capacity | | | |

**Source:** Kearney
Potential risks
- Upstream supply suspend due to people quarantine
- Protective appliance shortage
- Employee safety first policy, stoppage still possible at outbreak
- Low automation level/labour intensive procedures mostly affected, such as assembly
- Assembly/production line not fully resumed, although management staff is partially resumed to work.

Current work arrangements
- Non-production department resumed
- Partial production capacity resumed (production plan subject to demand)
- Flexible work/remote work
- A/B/C shift

Labour intensive industry remains severely impacted due to quarantine policy which induced low level of work resumption

<table>
<thead>
<tr>
<th>Work Resumption rate</th>
<th>Automotive</th>
<th>Electronics</th>
<th>Consumer goods</th>
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<tbody>
<tr>
<td>&lt;50%</td>
<td>40-60%</td>
<td>10-20%</td>
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</table>

- Parts supplier partially resumed from Feb. 10th.
- Parts supplier in Wuhan not resumed yet
- Wafer fabrication, PCB and LCD panels less impact due to nature of continuous production
- Assembly related process mostly affected, ex. Foxconn only recovered 10% capacity
- Impact is differentiated depending on goods categories (e.g., SEA imports of Chinese manufactured F&B goods ranges from ~1-20%, against ~50-80% for apparel)
- Multiple segments in apparel supply chain are affected (labor intensive), especially those in Zhejiang province

1. Available data as of Feb. 13th
Source: desk research, Kearney
Automotive: All major automotive suppliers have postponed resumption, especially those in Wuhan...

### Tier 1 suppliers in Wuhan

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Products</th>
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<tbody>
<tr>
<td>Webasto</td>
<td>Auto sunroof, heating and air conditioner</td>
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<tr>
<td>BOSCH</td>
<td>Steering system, thermal technology</td>
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<tr>
<td>Ftech Zhongshan</td>
<td>Breaking system</td>
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<tr>
<td>Faurecia</td>
<td>Seat, interior, exhaust system</td>
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<tr>
<td>Valeo</td>
<td>Lighting, R&amp;D</td>
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### Emergency preparedness

<table>
<thead>
<tr>
<th>Work stoppage arrangement</th>
<th>Back up plan</th>
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<tr>
<td>Closed Munich HQ on Jan 29th (8 employees infected after back from China) and reopened on Feb 12th</td>
<td>No specific plan announced</td>
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<tr>
<td>Cancel all trips to China for the next 2 week, starting from Jan. 31st</td>
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<tr>
<td>Tentatively resume from Feb. 14th, Cancelled all trips to china until end of Feb</td>
<td>No specific plan announced</td>
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<tr>
<td>Closed production in Wuhan</td>
<td>Leverage capacity in Philippine plant</td>
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<td>Subject to OEM (Dongfeng Nissan, Dongfeng Peugeot Citroen)</td>
<td>Plant to transfer more capacity to other places if epidemic remains</td>
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<tr>
<td>6 plants in Hubei province still on shutdown, the other 52 will reopen on Feb 21st (will be working at less than 50% of capacity)</td>
<td>No specific plan announced</td>
</tr>
<tr>
<td>4 plants in Hubei province still shutdown (earliest restart on Feb 21st), the other 32 plants have reopened but are not at full capacity</td>
<td>No specific plan announced</td>
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</tbody>
</table>

Over 500 auto suppliers run operations in Wuhan, 54 of which are fortune 500 companies.

Source: desk research, Kearney
### China OEM postponed work resumption; flexible shift is adopted, therefore full capacity is not realizable

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<thead>
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<th>Feb</th>
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<td>26.</td>
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<td><strong>Domestic brand</strong></td>
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<tr>
<td><strong>Luxury brand</strong></td>
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Normal resumption date: 02/09

1. Following extension of Chinese New Year’s period by China’s State Council

Source: China’s State Council, desk research, Kearney

### As the supply chain interrupted, overseas OEM starts to face supply shortage

- **Closed 3 production lines till Feb. 17th in Kyushu plant, with 3K vehicles affected**

- **Stoppage at 7 factories due to wire-harness shortage, accounting for 40% of global production capacity, restarted on Feb 12th**

- **Closed Pyeongtaek plant from Feb. 4th to Feb 13th, due to assembly circuit shortage,**

- **Closed 3 plants from Feb. 10th to Feb 12th due to wire harness shortage**

- **Plant closed in Serbia due to audio system component shortage, will resume work before end of Feb**

- **Shanghai plant closed on Jan. 30th and reopened on Feb 10th. Model 3 production postponed by 1.5 weeks**

- **Nissan closed part of its production line in Kyushu, southwest Japan, on Feb. 14 and 17, and will also halt output on Feb. 24**

**Automotive:**

...which has led to ripple effect to domestic and overseas OEM, postponing or interrupting production
Consumer goods: Zhejiang province is the cluster for apparel manufacturing, and the slow resumption will eventually affect retailer’s stock.

1. Processing includes miscellaneous steps, such as: Embroidery, coating, washing, fabric maintenance, etc. 
   Source: Public information, Kearney

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<table>
<thead>
<tr>
<th>Industry cluster</th>
<th>Zhejiang</th>
<th>Zhejiang</th>
<th>Zhejiang</th>
<th>Zhejiang</th>
<th>Jiangsu</th>
<th>Guangdong</th>
<th>Not specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value chain</td>
<td>Spinning</td>
<td>Grey fabric weaving</td>
<td>Dyeing printing</td>
<td>Processing²</td>
<td>Fabric wholesale</td>
<td>ODM (export)</td>
<td>Retailer</td>
</tr>
</tbody>
</table>

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- Seasonal categories, and apparel are major sourced categories
- The work resumption delay will have “ripple effect” on the whole value chain, bringing stock and logistics under pressure

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Apparel financial performance in China A-share market

Among 54 listed stock..

- 13  
  Biggest drop of 37.42% compared with the beginning of the year 2020

- 41  
  ...3/4 of the market value drops

- Affected by the factory stoppage and shipment delay, seasonal categories are mostly affected.
- According to our observation, most suppliers are not resumed yet

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Walmart Shenzhen global sourcing office
Beside issues with their Chinese suppliers, global companies still face tremendous challenge brought by paralyzed logistics network.

Logistics is highly related (high elasticity) to demand by producers’ output, and should recover soon once demand resumes (assuming government policy also becomes supportive).

### Current situation

<table>
<thead>
<tr>
<th>Mode</th>
<th>Details</th>
</tr>
</thead>
</table>
| **Ocean** | - Huge capacity surplus indicates plunge in demand side  
- Long distance liners are affected with 30 ships cancelled on China to Mediterranean lanes, with additional impact on short distance liners, such as companies operating to South-East Asia  
- Demand side is the bottleneck |
| **Air** | - Belly cargo most affected, with ~90% \(^1\) of the scheduled flights suspend/adjusted  
- Market responded with abrupt air freight surge, also volume shifting to freighter, which are less impacted  
- Capacity side is the bottleneck |
| **Land** | - Logistics: collapsed due to traffic restriction/block enforced by quarantine policy  
- Traffic to Wuhan dropped by -87% \(^1\)  
- Cross provincial lines haul transit time has been significantly extended or interrupted  
- Demand and capacity are both affected |

### Future trend

- In general, as the infrastructure to overall economy, domestic logistics will resume sooner than other industries, backed with strong support from government.
- For domestic logistics, **3 factors** affected logistics resumption to full capacity: demand, government policy (delayed work resumption, quarantine, road block etc.), and labor shortage, among which government policy is the major element affecting logistics efficiency.

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1. Available data as of Feb. 13th  
Source: G7 logistics newsletter, Kearney
Ocean transport: Drop in liner demand is mostly caused by the declining demand, with additional shipping constraints due to lanes cancellations.

Container availability lay-up in major Chinese ports and increased idle capacity in global shipping indicate a plunge in demand.

Container Availability Index for Shanghai¹ (Week 8)

<table>
<thead>
<tr>
<th>Surplus</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Dry Cargo</td>
<td>0.54</td>
</tr>
<tr>
<td>40 High Cube</td>
<td>0.31</td>
</tr>
<tr>
<td>40 Dry Cargo</td>
<td>0.69</td>
</tr>
<tr>
<td>2020</td>
<td>0.54</td>
</tr>
<tr>
<td>2019</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
</tr>
</tbody>
</table>

Supply and Demand constraints both have noticeable impact on ocean shipping operations:

- A large number of blank sailings were implemented from the end of January to coincide with the Chinese New Year holidays
- Global container lines such as Maersk and Hapag Lloyd announced reducing Asia-Europe capacity
- 30 ships on China to Mediterranean lanes were cancelled by late February, taking out ~50% of scheduled departures

Total idle capacity in global box shipping fleet²(TEU)

<table>
<thead>
<tr>
<th>% of total capacity</th>
<th>2020</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 3, 2020</td>
<td>637,555</td>
<td>2.8%</td>
</tr>
<tr>
<td>Week 8, 2020</td>
<td>834,198</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

Notes: 1. Container x Change; a value over 0.5 indicates a surplus of containers, deficit vice versa.
2. Lloyd’s List Intelligence

Source: Desk research, Kearney

International ocean shipping features long lead time, long distance and high predictability with a well-ahead reservation cycle of vessels, operators have more leeway to adjust shipping schedules to minimize impact on operations. However significant carefulness measures (ships cancellations) are scheduled to have an impact.

Destination countries requiring less than 14 days of travel (e.g. China to SEA) are subject to more cautiousness from authorities.
Air transport: Transport capacity has been slashed due to passenger flight suspension, and therefore caused mild surge in air freight

Reduced belly cargo capacity (accounting for ~50% of total air cargo capacity)

- 90% of passenger flights to mainland China have been suspended by Cathay, suspension estimated to be through to the end of April

- Operators slashed belly cargo capacity, e.g. Lufthansa scaled back freighter services in response to crew health concerns and uncertain demand

Mild rate climb also due to local manpower restrictions in China

- Due to quarantine situation, freight forwarder staff in China are required to work from home

- Ground handlers such as truckers, warehouse staff, and manufacturing staff would not be able to return to work for longer than expected, causing further rate volatility

Less affected freighter flights but also downscale capacity

- Freighter operators have also been pulling capacity out of Hong Kong and China

- Reduced belly capacity might trigger some demand shift towards freighters to expedite delivery, but only to a limited volume

25,000 fewer flights operated to, from and within China during the week of Feb. 3 than a fortnight ago, with services suspended by 30 airlines

Air freight surge out of reduced airlines

- Shanghai to Los Angeles ~+12%
- Shanghai to Europe ~+9%
- Shanghai to Amsterdam ~+19%
- Shanghai to London ~+4%

“One of our customers is moving a shipment to air freight because they do need goods before the intended arrival date”

A rail operator at Davies Turner in Britain.

1. Available data as of Feb. 13th
Source: TAC Index and UPS official website, OAG, Kearney
Land transport: Inbound ground logistics has been significantly impacted due to road shut down and traffic control.\(^1\)

Inbound transportation to Wuhan Compared with last year  
-87%

Ground logistics within Hubei to Wuhan Compared with last year  
-65%

- Traffic restrictions/blockage (especially on inbound traffic to Wuhan) stemming from the quarantine policy have caused a logistic collapse, with significant extension or disruption of cross provincial transit time.
- Demand and capacity have both been disrupted in the wake of quarantine measures taken by local and central authorities, as inhabitants and logistics professionals are both affected.
- Road transport capacity recovery is still ongoing in light of continued public measures to halt infections progress.

\(^1\) Available data as of Feb. 13th  
Source: G7 logistics dashboard, CFLP, Kearney
Extensive embargo is of low possibility but quarantine will be enhanced in certain product categories, and might decrease efficiency.

Outbound quarantine initiatives in China:

- **No specific initiatives** have been adopted, **limited impact** on export.
- According to *Frontier Health Quarantine Law of the P.R.C.*, ‘all goods that may spread quarantinable infectious diseases shall be subject to quarantine inspection and shall not be allowed to leave China without the permission of the frontier health and quarantine organ’, therefore the **outbound procedures** might take slightly longer.

Promote precise quarantine, strengthen sampling and laboratory testing to resolutely prevent outbound and inbound viral spreading.
- Head of China Customs

Inbound quarantine measures of destination countries:

**U.S.:**

- Certain categories, such as agricultural products has been **banned for import**.
- Crews are **required to stay on board** in case of staying in China in the past 14 days.

**WHO recommendations:**

- On 31st Jan. (BJT), WHO defined Coronavirus as **Public Health Emergency of International Concern (PHEIC)**.
- Temporary recommendations are provided to help prevent the international spread, e.g. quarantine check of goods.
- However, travel or trade suspensions are not recommended by WHO.

**Other countries:**

- **Indonesia** has stopped import of all **live animals** from China and are considering banning food and beverage.
- **Jordan** has **banned import of all animal and vegetables** from China.
- **India** has ordered checking of **agriculture and livestock** imports from China.

**Comments:**

- According to a survey about H1N1, only **11%** of interviewed countries issued temporary bans on importing goods from infected areas, although **70%+** conducted quarantine check.
- Considering the infectivity and fatality rate, **extensive embargo are of low possibility** and quarantine of certain categories might be enhanced.