

COVID-19: Briefing materials

Global health and crisis response

Updated: April 13, 2020

Current as of April 13, 2020

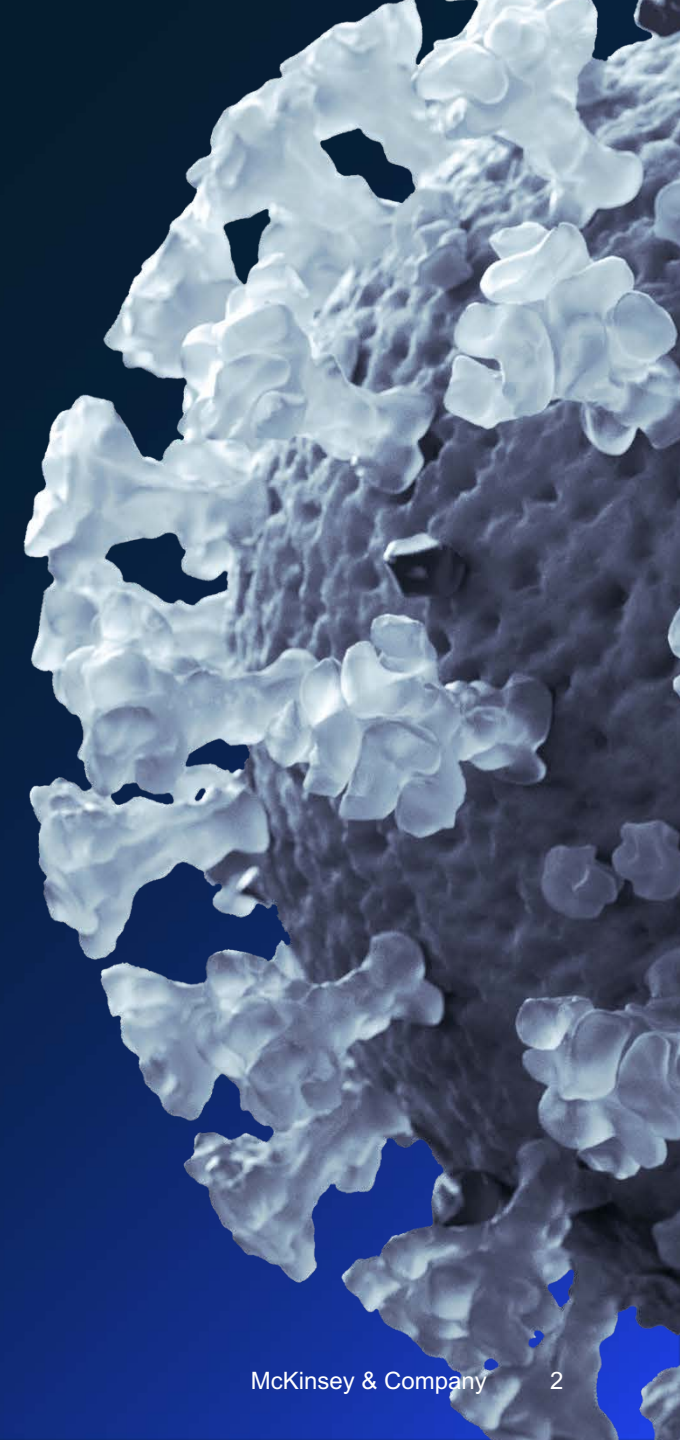
COVID-19 is, first and foremost, a global humanitarian challenge.

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.

Companies around the world need to act promptly.

This document is meant to help senior leaders understand the COVID-19 situation and how it may unfold, and take steps to protect their employees, customers, supply chains, and financial results.

[Read more on McKinsey.com](#) →



Executive summary

The situation now

At the time of writing, COVID-19 cases have exceeded 1.5 million and are increasing quickly around the world, with concerns that a 15% hospitalization rate could drive hospital system overload.

To reduce growth in cases, governments have moved to stricter social distancing, with “shelter in place” orders in many areas in the U.S., Europe, India, and other countries. This has driven rapid demand declines and fears of recessions, which governments are trying to meet through bailouts and other fiscal measures.

Some Asian countries, e.g. China, have kept incremental cases low, and are restarting economies. So far, there is little evidence of a resurgence in infections, though reinfection from abroad is being reported.

How the situation may evolve

There is a limited window for governments to drive adequate public-health responses and meet demand drawdowns with proportionate economic interventions. Without this, the possibility of a deeper effect on lives and livelihoods is more likely.

Scaled-up testing will soon clarify the extent and distribution of spread in the U.S., and Europe. There continues to be concern about the extent of spread and its consequences in countries with large populations and higher population densities

Learnings from other countries and recent innovations (strict social distancing rules, drive through testing, off-the-shelf drugs that can address mild cases, telemedicine enabled home care) could provide basis for a restart.

Actions that institutions can take

Having invested in setting up a basic structure to drive basic Resolve and Resilience planning, public and private sector institutions around the world are engaged in continuing protection of people (incl. workforce and customers), stabilizing supply chain (esp. PPE), as well as ensuring adequate cash and liquidity on hand.

In addition to this focus, some governments and companies are also starting to shift focus to what a Return to work may look like.

An effective Return depends on a number of factors – from ensuring that the local region has adequate readiness for a restart from a public health standpoint, to estimating timing for a return of demand, and other factors

Ensuring that the Nerve Center, has adequate strategic focus in the form of Plan Ahead team, continues to be an important organizing principle for many institutions

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**Sector-specific
impact**

The global spread is accelerating with more reports of local transmission

Latest as of April 12, 2020

Impact to date

>1.91M

Reported confirmed cases

>119,500

Deaths

>212

Countries or territories with reported cases¹

>180

Countries or territories with evidence of local transmission²

70

Countries or territories with more than 1000 reported cases¹

~0.1%

China share of new reported cases
April 7 – April 13

~38%

US share of new reported cases
April 7 – April 13

~46%

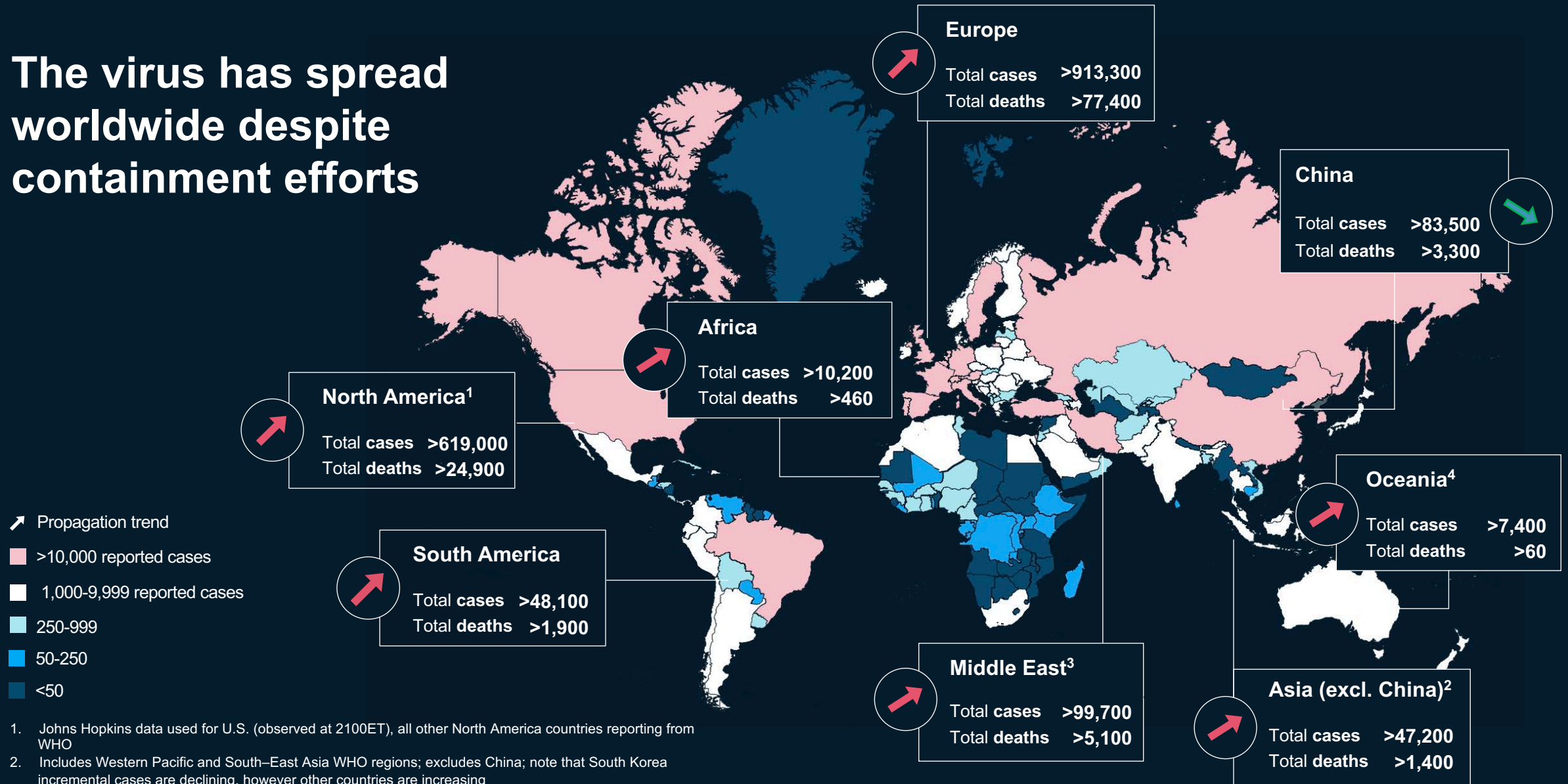
Europe share of new reported cases
April 7 – April 13

3

New countries or territories with cases
April 7 – April 13

1. Previously counted only countries; now aligned with WHO reports to include territories and dependencies; excluding cruise ship
2. Previously noted as community transmission in McKinsey documents; now aligned with WHO definition

The virus has spread worldwide despite containment efforts

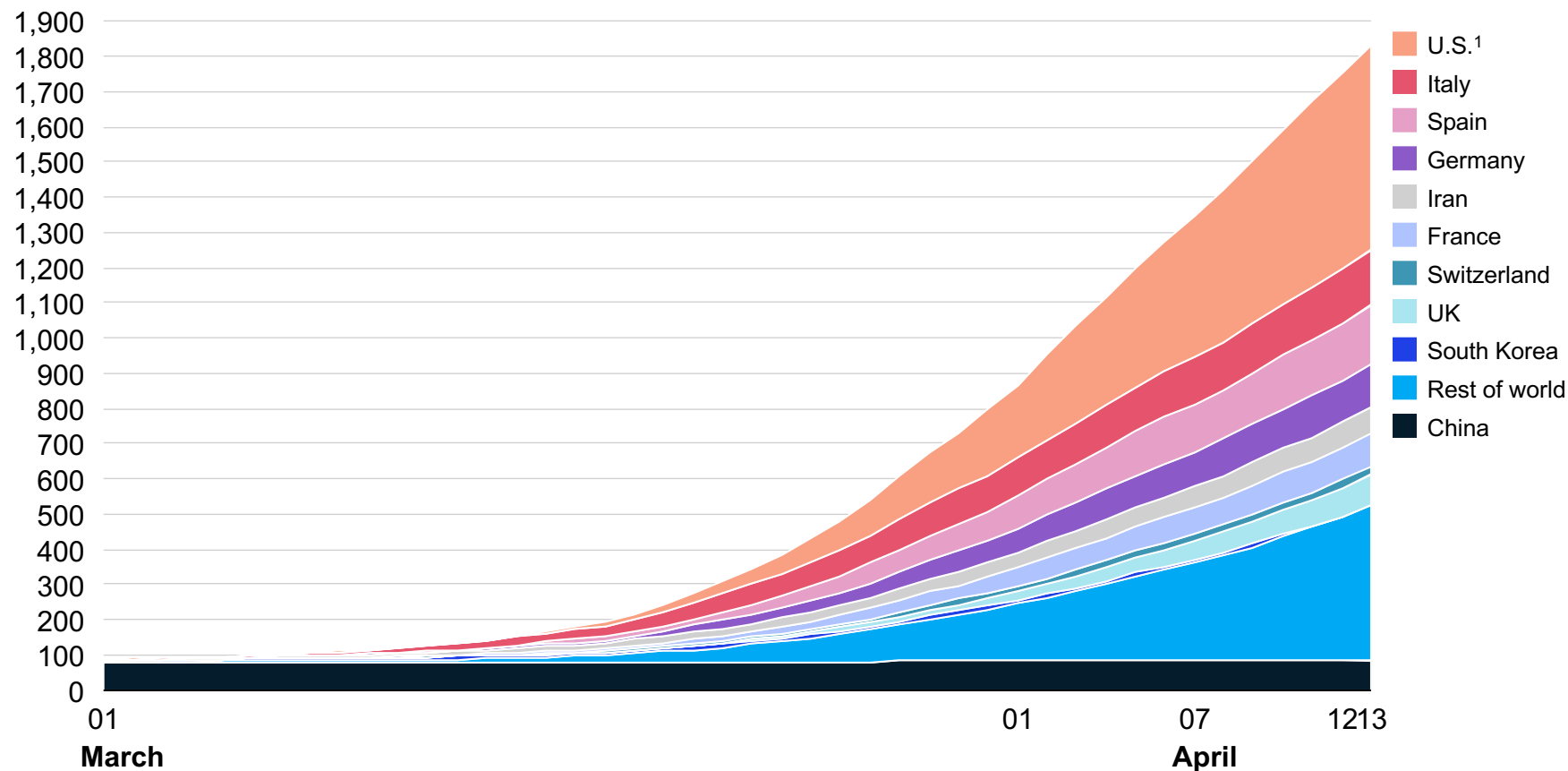


1. Johns Hopkins data used for U.S. (observed at 2100ET), all other North America countries reporting from WHO
 2. Includes Western Pacific and South-East Asia WHO regions; excludes China; note that South Korea incremental cases are declining, however other countries are increasing
 3. Eastern-Mediterranean WHO region
 4. Includes Australia, New Zealand, Fiji, French Polynesia, New Caledonia, Papua New Guinea

The greatest share of cases come from Europe and the U.S.

Cumulative number of cases since March 1st – April 13th

Thousands



Asia

Incremental cases for China and South Korea are now <100 per day with continued focus on disease surveillance and management of imported cases and localized transmission

Europe

The effects of lockdowns policies are beginning to show across multiple countries. While the absolute number of new cases remains high, daily totals have plateaued or are declining in a number of countries

United States

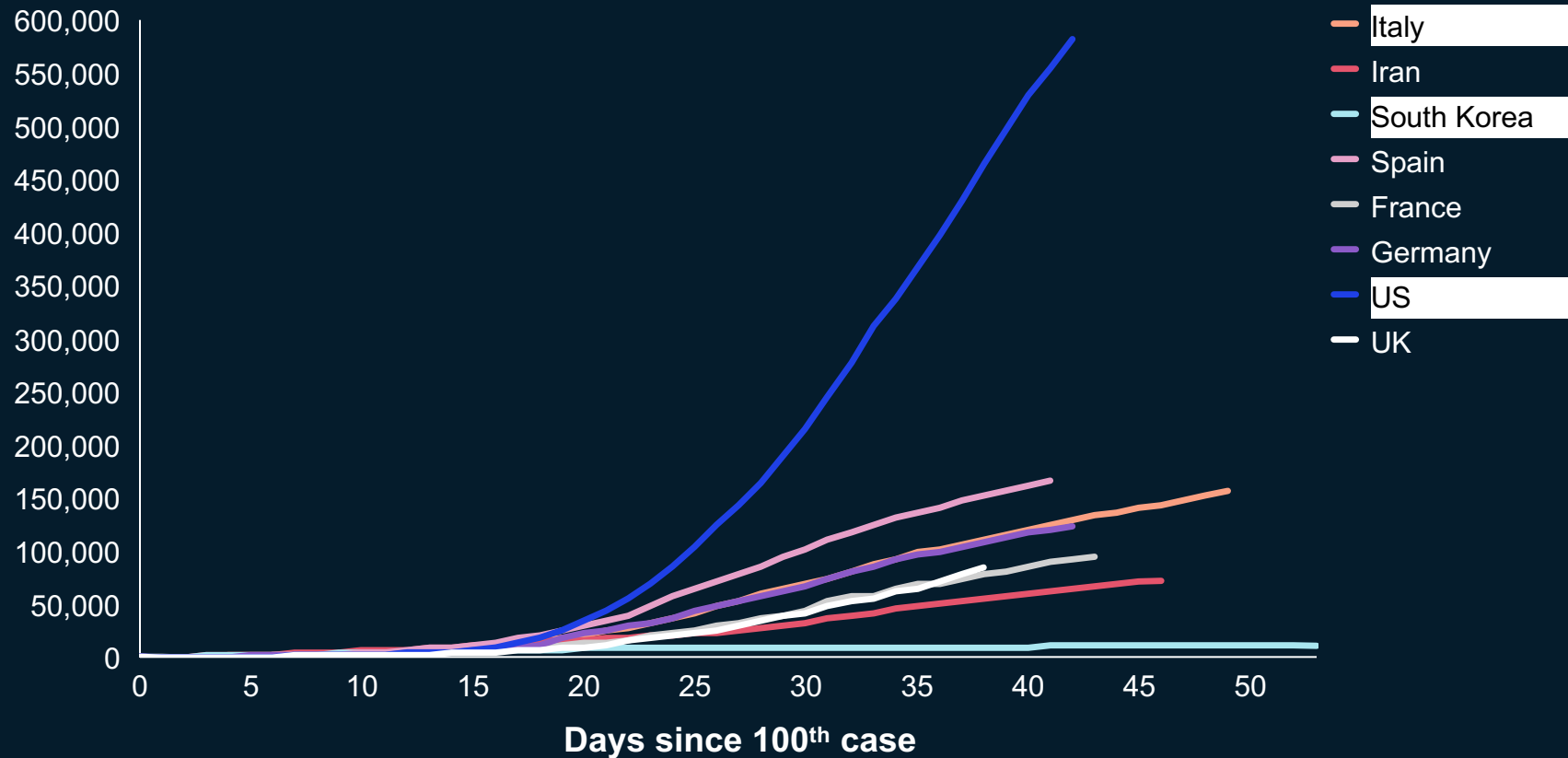
The U.S. consistently has the highest number of new cases in the world, but there is early evidence of plateauing in new infections – each of the first 12 days in April has seen between 25K and 35K new cases

1. U.S. data from Johns Hopkins University CSSE (Observed at 2100ET); all other data from WHO Situation Reports

Sources: WHO situation reports, Johns Hopkins University, press search

Countries begin with similar trajectories but curves diverge based on demographics and measures taken

Cumulative number of cases



Select country detail

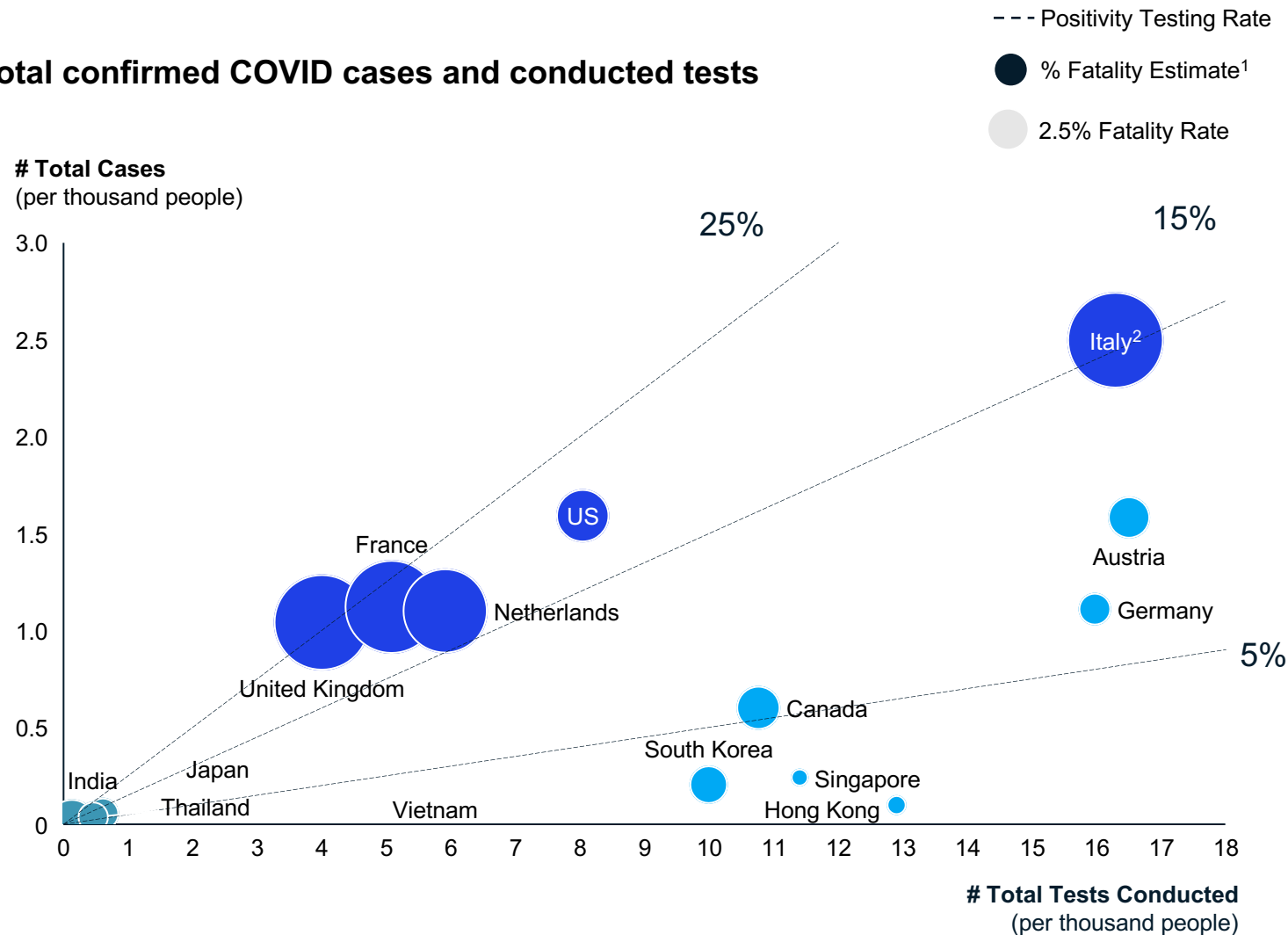
- **Europe:** Multiple European countries (including Italy, Spain, Germany) have seen their curves bend downward as the rate of new infections plateaus or declines
- **South Korea:** Aggressive testing, contact tracing and surveillance, and mandatory quarantines are helping isolate virus clusters and dramatically slow spread of outbreak.
- **United States:** Steepest rate of growth but the curve has bent over the last 10 days

U.S. data from Johns Hopkins University CSSE; all other data from WHO Situation Reports

Sources: WHO situation reports; Johns Hopkins University, press search

Countries with the widest testing tend to have the fewest cases per 1,000 people

Total confirmed COVID cases and conducted tests



3 Archetypes of testing approaches

1. Countries with limited testing

Low volumes of testing lead to few confirmed positive cases

2. Countries with moderate testing approach

Some countries test only (or predominantly) those with significant symptoms. Since milder cases are more likely to be missed, the Case Fatality Rate appears higher

3. Countries with broad testing approach

Countries that have taken broad testing strategies tend to be those that have had success in limiting the number of new cases

1. Number of deaths / confirmed cases
 2. Significantly more testing recently occurred

Sources: WHO situation reports, Johns Hopkins University, Our World In Data, The Government of the Hong Kong Special Administrative Region, The Singapore Government; Current as of 4/12 (South Korea, Japan, Canada, Austria), 4/11 (Italy, U.S., India, United Kingdom, Vietnam), 4/10 (Thailand), 4/7 (Netherlands, France), 4/6 (Singapore), 4/5 (Germany), 3/31 (Hong Kong)

State of the Science: Latest evidence on COVID-19

A

How is COVID-19 transmitted, and how long can it persist in different settings?

We are learning more over time about how long the virus remains in the air and about survival on surfaces

According to one study¹, droplets can hang in the air for 0.5-3 hours

Durability on surfaces ranges from hours to days, with the virus surviving for longer on harder, less porous surfaces

More work is needed to understand the impact of these findings on transmission

B

What portion of patients are asymptomatic, and what is the fatality rate?

WHO and the US CDC estimate that between 20-50% of all infected individuals are asymptomatic

The same sources project a case fatality ratio (CFR) of all infected individuals of 1.4-5.7%

C

What therapies and vaccines are in development for COVID-19?

To date, there is no approved specific therapy or vaccine available for COVID-19. There are over 130 therapeutic candidates and 80 vaccine candidates² being considered across a range of modalities and use cases.

Among therapeutics, some small molecules are repurposed from other indications (e.g. antivirals, antimalarials); some showed efficacy in isolated cases³ under compassionate use

D

Do masks help reduce transmission of COVID-19?

Surgical masks catch both large and small droplets (coughed, sneezed, or exhaled by an infected individual)

Several countries have recommended public use of masks to various extents (e.g., fines in Vietnam for not using masks, Japan delivering cloth masks to each household)

1. <https://www.nejm.org/doi/full/10.1056/NEJMc2004973>, <https://www.nytimes.com/2020/03/17/health/coronavirus-surfaces-aerosols.html?auth=login-email&login=email>;
3. CDC

A. Viral viability varies among setting and surfaces, but impact on transmission is unclear

	Viability/ survival duration of virus		Mode of transmission
Air	Droplets can hang in the air for 0.5-3 hrs as aerosol ^{2,3}		Thought to be the 'receiving' primary mode of transmission
Surfaces	Cardboard	Approximately 8hrs on cardboard ¹	Hypothesized to be a mode of transmission ⁵ , however, studies show low concentration of virus ⁶
	Paper	4-5 days on paper ⁴	
	Glass	Up to 4 days ⁴	
	Metals	Up-to 48 hrs on stainless steel ¹ , and for up-to 4 hrs on copper ²	
	Wood	Up to 4 days ⁴	
	Plastic	6-9 days ⁴	
	Ceramics	Up to 5 days ⁴	
	Stone	2-12 days ⁴	
Polypropylene (incl. packaging, textiles)⁷	Virus can be found on materials containing polypropylene for ~16hrs ⁵		Hypothesized to be a mode of transmission ⁵ , however, studies show low concentration of virus ⁶

1. <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
2. <https://www.nejm.org/doi/full/10.1056/NEJMc2004973>
3. <https://www.nytimes.com/2020/03/17/health/coronavirus-surfaces-aerosols.html?auth=login-email&login=email>
4. [https://www.journalofhospitalinfection.com/article/S0195-6701\(20\)30046-3/fulltext](https://www.journalofhospitalinfection.com/article/S0195-6701(20)30046-3/fulltext)
5. <https://www.medrxiv.org/content/10.1101/2020.03.09.20033217v1.full.pdf>
6. <https://www.health.harvard.edu/diseases-and-conditions/coronavirus-resource-center>
7. <https://www.sciencedaily.com/releases/2020/03/200330110348.htm>

B. Estimates of the number of asymptomatic patients, case fatality ratio, and infection window continue to evolve

● = CDC estimate ● = WHO estimate ● = European CDC estimate

Metric	Expert estimate range	WHO / CDC estimate
Asymptomatic patients	It has been estimated that between 20-50% ¹ of all infected individuals were asymptomatic	
Case Fatality ratio	The case fatality ratio (CFR) of all infected individuals is estimated to be between 1.4-5.7% ²	
Infection window (viral shedding)	Viral shedding of infected individuals has been estimated to last between 10-20 days ³	

1. [Bloomberg](#), [iijonline](#), [ECDC](#), [Eurosurveillance](#), [The Hill](#)
 2. [JAMA](#), [The Lancet](#), [WHO](#), [Nature Medicine](#), [The Lancet](#), [CDC](#), [WHO](#)
 3. [CDC](#), [ECDC](#), [The Lancet](#), [JAMA](#), [Medrxiv](#)

C. There are over 80 vaccine candidates and 130 therapeutics candidates in development for COVID-19

Additional detail on following page ● Directionally positive result ● Directionally negative result

	# Candidates	Mechanism	Description	Earliest US target approval date (publicly announced)	Compound	Initial clinical evidence	Efficacy in isolated use?
Vaccines	~80	RNA/DNA-based	RNA packaged in a vector / direct introduction of plasmid DNA encoding antigen against which immune response is sought	Fall 2020 for select population (e.g. health workers) with emergency approval ⁵	Remdesivir	N/A	Improvement in compassionate use cases in US and other countries ¹
		Viral vectors / viral-like particles	Chemically weakened virus or molecules that closely resemble viruses	Early 2021 for emergency use authorization ⁶	Hydroxy-chloroquine	● Mixed results on viral clearance from small French and Chinese studies; positive result on clinical improvement from small Chinese trial. ⁷⁻¹¹ ●	Improvement in Japanese patient and patients in Australia ^{2,3}
		Protein-based	Purified or recombinant antigens from a pathogen	N/A	Favipiravir	● Positive result on viral load and clinical recovery in 2 Chinese trials ^{14, 15}	Test dosages effective in mild and asymptomatic cases ⁴
Therapeutics	~130	Small molecules	Largely repurposed compounds, including antivirals, antimalarials, steroids, and more	N/A	Kaletra (lopinavir, ritonavir)	● 2 Chinese trials showing lack of efficacy at HIV dosing ^{12, 13}	Improvement in Thai patient and patients in Australia ³
		Antibodies	Monoclonal and polyclonal antibodies – often new development using survivor samples	N/A			
		Other	Immune modulators (IL inhibitors or complement pathway inhibitors), cell therapies, gene therapies, RNA therapies, and traditional Chinese medicine	N/A			

▶ Candidates with early evidence available

D. At scale use of masks can have a role in reducing transmission of COVID-19, as reflected in recent policy changes

Surgical face masks can prevent transmission of coronaviruses



Many governments are facilitating the use of face masks, but with divergent approaches

There are two main modes of coronavirus transmission...

Spread through contact and large droplets, such as from a cough or sneeze

Spread through small droplets diffusing through the air over both short and long distances

...and surgical masks can catch both large and small droplets¹ as it's coughed, sneezed, or exhaled



South Korea²

Government banned export of medical masks; mandated 50% of mask production to be directed to centralized governmental supply
Government started rationing medical grade masks

Government published guidelines on re-using medical grade masks



Vietnam⁴

Banned export of face masks

Wearing mask is required in public places

Imposed hefty fines for going 'mask-less'



Japan³

It is a standard practice in Japan to wear masks in public while healthy

Japanese government plans to deliver 2 cloth masks per household



United States⁵

CDC initially recommended against general public wearing masks

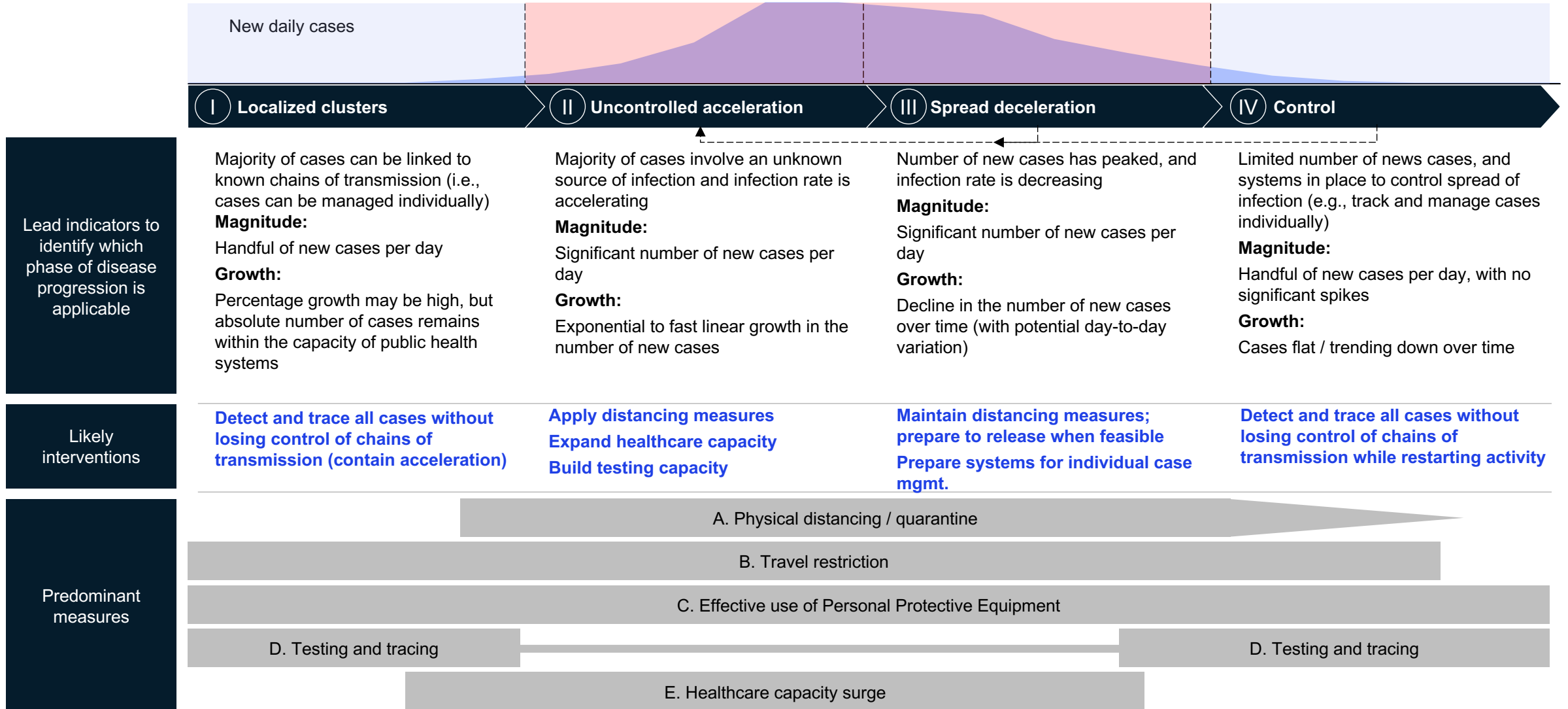
CDC updated its guideline, recommending wearing cloths masks (but is not recommending the use of surgical masks)

Some state/ local governments implemented compulsory mask wearing (e.g., LA)














However, cloth masks may not be effective against airborne aerosols

1. <https://www.nature.com/articles/s41591-020-0843-2>; 2. <https://www.wsj.com/articles/south-korea-ration-faces-masks-in-coronavirus-fight-11584283720>, 3. <https://english.kyodonews.net/news/2020/04/77fea577e0f9-japan-to-give-cloth-face-masks-to-50-mil-households-to-fight-virus.html>
4. <https://www.voanews.com/science-health/coronavirus-outbreak/vietnam-imposes-hefty-fines-going-maskless>; 5. CDC

Countries will decide which measures to implement based on local situations and disease progression



Emerging economies face unique challenges across public health measures and have adopted interventions to address them

Categories	Challenges	Key lessons from specific regions
A: Physical distancing / quarantine	<p>High population density and communal living hinders physical distancing</p> <p>High percentage of vulnerable population (migrants)</p>	<p>Quarantine early and aggressively</p> <p> Vietnam. Proactive and early- quarantine measures to isolate and confine COVID-19 infection (2/13 Lockdown of Vinh Phuc province)</p> <p> Columbia. Rapid national-wide lockdown measures (first in Latin America)</p>
B: Travel restriction	<p>Lengthened domestic travel restriction can be especially costly for countries dependent on primary and secondary industry</p> <p>Access to goods may be harder in developing countries</p>	<p>Aggressive border control</p> <p> Vietnam. Suspension of international arrivals including ex-pat Vietnam nationals while providing case-by-case exceptions to key industry stakeholders (e.g., Samsung Electronics)</p> <p> India. Suspension of all international commercial passenger flights (3/22)</p> <p> Columbia. Aggressive border closure (13 days post first case)</p> <p>Build upon existing social welfare policy</p> <p> Columbia. Additional payments to social welfare programs for families, young people and the elderly; continuance of free childcare and school lunches</p>
C: Effective Use of PPE	<p>Cost of medical-grade PPE is burdensome</p> <p>Communication of PPE importance may be lagging in developing countries</p> <p>Hygienic practices (e.g., washing with clean water) can be difficult especially in rural areas</p>	<p>Raise COVID-19 awareness</p> <p> Vietnam. Media running frequent messaging on COVID including PPE usage; Hefty fines for sharing “fake news” about COVID-19</p> <p>Facilitate mask-wearing behavior</p> <p> Vietnam. Wearing mask is required; hefty fines for going maskless</p> <p> India. Proactive export ban on surgical masks (1/31); Government recommends home-made cloths masks</p>
D: Testing and tracing	<p>Large-scale commercial testing is often out of reach in developing countries especially in rural areas</p> <p>Lower digital technology penetration (e.g., smartphones) hinders app-based tracing methods</p>	<p>Supplement with low-cost/high-volume testing</p> <p> Bangladesh. Approved the production of low-cost antibody detection test kits</p> <p> Vietnam. Imported 200,000 lower-cost rapid test kits to complement RT-PCR based tests</p> <p>Leverage previous pandemic infrastructure</p> <p> Nigeria. Using capabilities built during Ebola crisis (e.g., National Reference Laboratory for molecular testing, Emergency Operations Center) to track and isolate second- hand contacts of infected individual</p> <p> Columbia. Using capabilities built during Measles outbreak to conduct initial contact tracings</p>

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The Imperative of our Time

Imperatives

1

Safeguard our lives

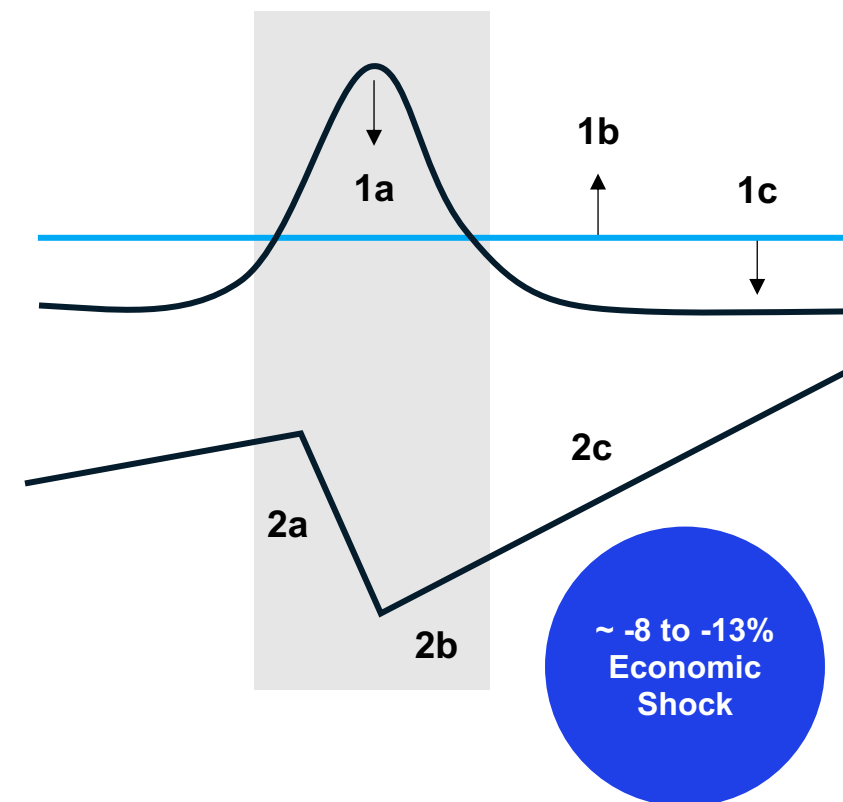
- 1a. **Suppress the virus** as fast as possible
- 1b. **Expand treatment and testing** capacity
- 1c. Find “**cures**”; treatment, drugs, vaccines

2

Safeguard our livelihoods

- 2a. **Support people and businesses** affected by lockdowns
- 2b. **Prepare to get back to work safely** when the virus abates
- 2c. **Prepare to scale the recovery** away from a -8 to -13% trough

“Timeboxing” the Virus and the Economic Shock



Scenarios for the economic impact of the COVID-19 crisis

GDP impact of COVID-19 spread, public health response, and economic policies

Virus spread and public health response

Effectiveness of the public health response in controlling the spread and human impact of COVID-19

Rapid and effective control of virus spread

Strong public health response succeeds in controlling spread in each country within 2-3 months

Effective response, but (regional) virus resurgence

Public health response initially succeeds but measures are not sufficient to prevent viral resurgence so social distancing continues (regionally) for several months

Broad failure of public health interventions

Public health response fails to control the spread of the virus for an extended period of time (e.g., until vaccines are available)

B1

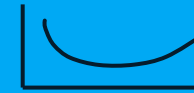
Virus contained, but sector damage; lower long-term trend growth



A3

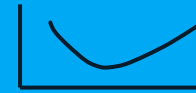
Virus contained, slow recovery

Virus Contained



A4

Virus contained; strong growth rebound



B2

Virus resurgence; slow long-term growth



A1

Virus resurgence; slow long-term growth

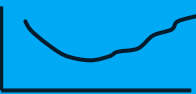
Muted World Recovery



A2

Virus resurgence; return to trend growth

Strong World Rebound



B3

Pandemic escalation; prolonged downturn without economic recovery



B4

Pandemic escalation; slow progression towards economic recovery



B5

Pandemic escalation; delayed but full economic recovery



Ineffective interventions

Self-reinforcing recession dynamics kick-in; widespread bankruptcies and credit defaults; potential banking crisis

Partially effective interventions

Policy responses partially offset economic damage; banking crisis is avoided; recovery levels muted

Highly effective interventions

Strong policy responses prevent structural damage; recovery to pre-crisis fundamentals and momentum

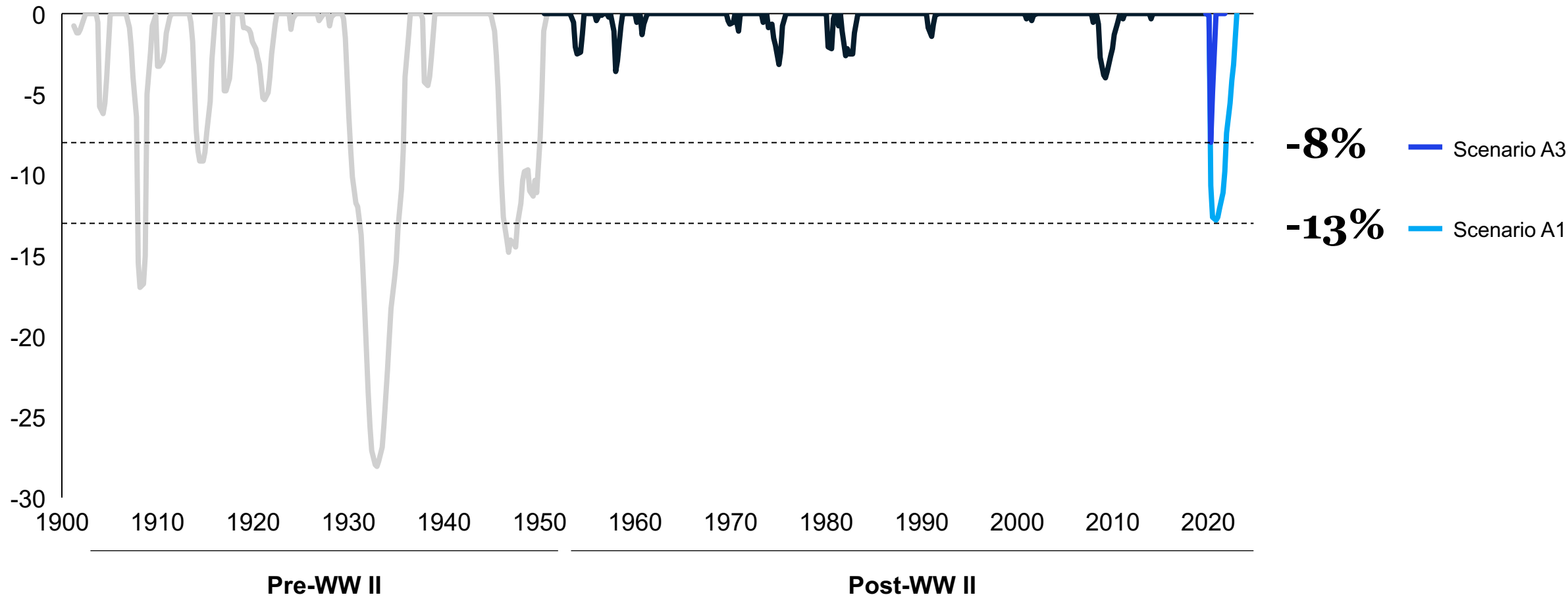
Knock-on effects and economic policy response

Speed and strength of recovery depends on whether policy moves can mitigate self-reinforcing recessionary dynamics (e.g., corporate defaults, credit crunch)

COVID-19 U.S. impact could exceed anything since the end of WWII

United States real GDP

% , total draw-down from previous peak



Source: Historical Statistics of the United States Vol 3, Bureau of economic analysis; McKinsey team analysis, in partnership with Oxford Economics



Scenario A3: Virus Contained

The virus continues to spread across the Middle East, Europe and the U.S. until mid Q2, when virus seasonality combined with a stronger public health response drives case load reduction

Epidemiological scenario

China and East Asian countries continue their current recovery and control the virus by early Q2 2020

Virus in Europe and the United States would be controlled effectively with between two to three months of economic shutdown; new case counts peak by end April and declines by June with stronger public health response and seasonality of virus



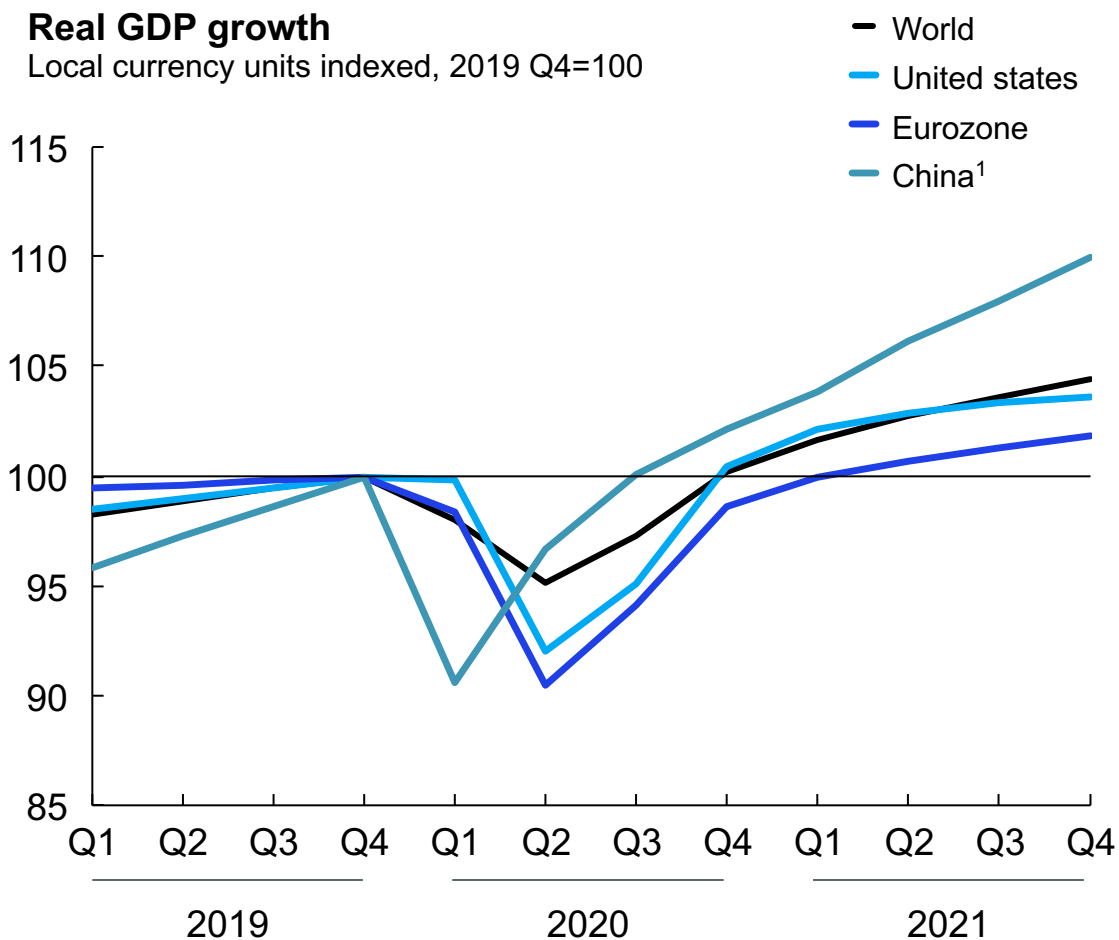
Economic impacts

China will undergo a sharp but brief slowdown and relatively quickly rebound to pre-crisis levels of activity. China's annual GDP growth for 2020 would end up roughly flat

In Europe and the U.S., monetary and fiscal policy would mitigate some of the economic damage with some delays in transmission, so that a strong rebound could begin after the virus was contained at the end of Q2 2020

Most countries are expected to experience sharp GDP declines in Q2, which would be unprecedented in the post WWII era

Scenario A3: Virus Contained



1. Seasonally adjusted by Oxford Economics

Source: McKinsey analysis, in partnership with Oxford Economics

	Real GDP drop 2019 Q4–2020 Q2 % change	2020 GDP growth % change	Time to return to pre-crisis Quarter
China	-3.3%	-0.4%	2020 Q3
USA	-8.0%	-2.4%	2020 Q4
World	-4.9%	-1.5%	2020 Q4
Eurozone	-9.5%	-4.4%	2021 Q1

Scenario A1: Muted World Recovery

The virus spreads globally without a seasonal decline. Health systems are overwhelmed in many countries, especially the poorest, with large-scale human and economic impact



Epidemiological scenario

China would need to clamp down on regional recurrences of the virus

The United States and Europe would fail to contain the virus within one quarter and be forced to implement some form of physical distancing and quarantines throughout the summer



Economic impacts

China would recover more slowly and would also be hurt by falling exports to the rest of the world. Its economy could face a potentially unprecedented contraction

The United States and Europe would face a GDP decline of 35 to 40 percent at an annualized rate in Q2, with major economies in Europe registering similar performance. Economic policy would fail to prevent a huge spike in unemployment and business closures, creating a far slower recovery even after the virus is contained

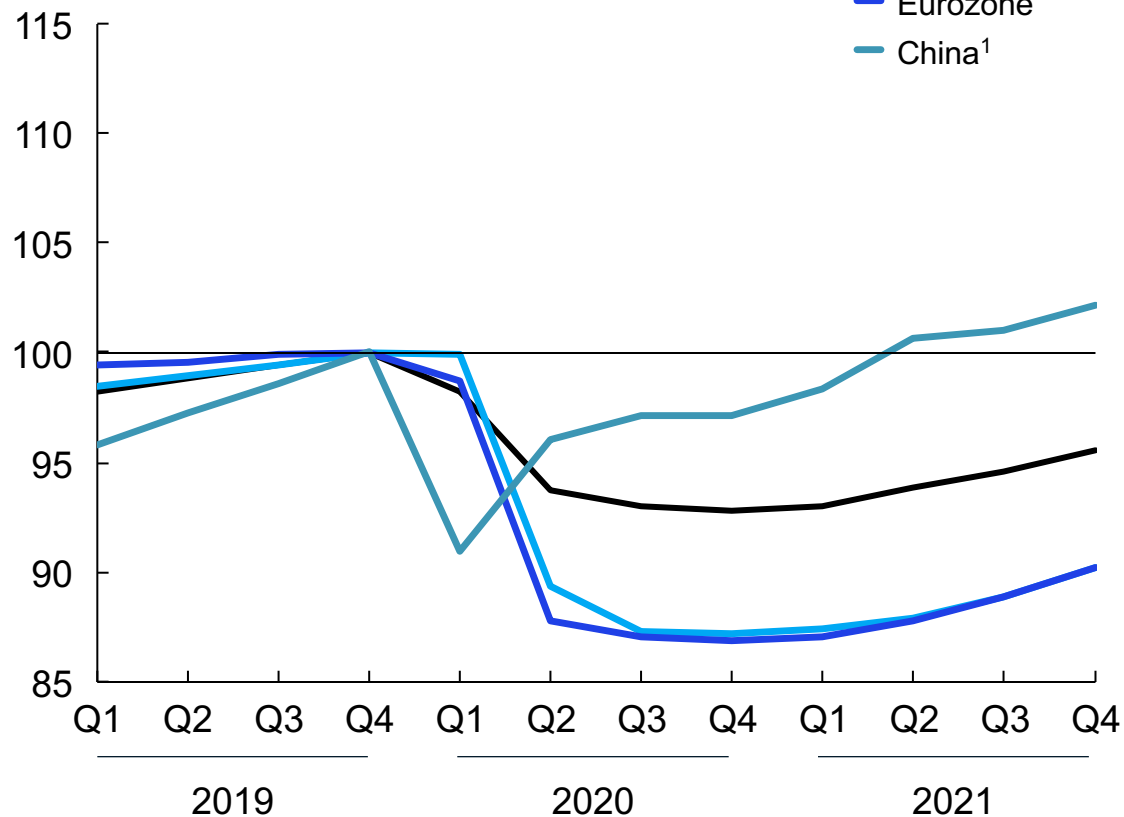
Most countries would take more than two years to recover to pre-virus levels of GDP

Scenario A1: Muted World Recovery

Real GDP growth

Local currency units indexed, 2019 Q4=100

- World
- United states
- Eurozone
- China¹



1. Seasonally adjusted by Oxford Economics

Source: McKinsey analysis, in partnership with Oxford Economics

	Real GDP drop 2019 Q4–2020 Q2 % change	2020 GDP growth % change	Time to return to pre-crisis Quarter
China	-3.9%	-2.7%	2021 Q2
USA	-10.6%	-8.4%	2023 Q1
World	-6.2%	-4.7%	2022 Q3
Eurozone	-12.2%	-9.7%	2023 Q3

What business leaders should look for in coming weeks

There are three questions business leaders are asking, and a small number of indicators that can give clues

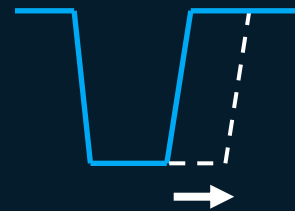
Depth of disruption

How deep are the demand reductions?



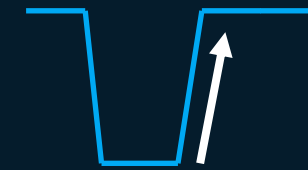
Length of disruption

How long could the disruption last?



Shape of recovery

What shape could recovery take?



Indicators

Epidemiological

- Time to implement social distancing after community transmission confirmed
- Number of cases – absolute (expect surge as testing expands)
- Geographic distribution of cases relative to economic contribution

Economic

- Cuts in spending on durable goods (e.g., cars, appliances)
- Extent of behavior shift (e.g., restaurant spend, gym activity)
- Extent of travel reduction (% flight cancellations, travel bans)

- Rate of change of cases
- Evidence of virus seasonality
- Test count per million people
- % of cases treated at home
- % utilization of hospital beds (overstretched system recovers slower)
- Availability of therapies
- Case fatality ratio vs. other countries

- Late payments/credit defaults
- Stock market & volatility indexes
- Purchasing managers index
- Initial claims for unemployment

- Effective integration of public health measures with economic activity (e.g. rapid testing as pre-requisite for flying)
- Potential for different disease characteristics over time (e.g. mutation, reinfection)

- Bounce-back in economic activity in countries that were exposed early in pandemic
- Early private and public sector actions during the pandemic to ensure economic restart

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Leaders need to think and act across 5 horizons

1

Resolve

Address the immediate challenges that COVID-19 represents to the institution's workforce, customers, technology, and business partners

2

Resilience

Address near-term cash management challenges, and broader resiliency issues during virus-related shutdowns and economic knock-on effects

3

Return

Create a detailed plan to return the business back to scale quickly, as the virus evolves and knock on effects become clearer

4

Reimagination

Re-imagine the "next normal"—what a discontinuous shift looks like, and implications for how the institution should reinvent

5

Reform

Be clear about how the regulatory and competitive environment in your industry may shift



Nerve center

Managing across the 5Rs requires a new architecture based on a team-of-teams approach.

3

Return

Create a detailed plan to return the business back to scale quickly

There are 3 distinct actors with different responsibilities in the Return from COVID 19

National governments, State and Local governments, and companies each play different roles in achieving a full Return - and stakeholders in different geographies can coordinate to define roles and responsibilities



National governments

- Contain the domestic virus spread
- Fasttrack testing, treatment and vaccine approval and production
- Protect and restart the economy



State / Local governments

- Administer virus treatment
- Enforce protection policies
- Safeguard vulnerable populations



Companies

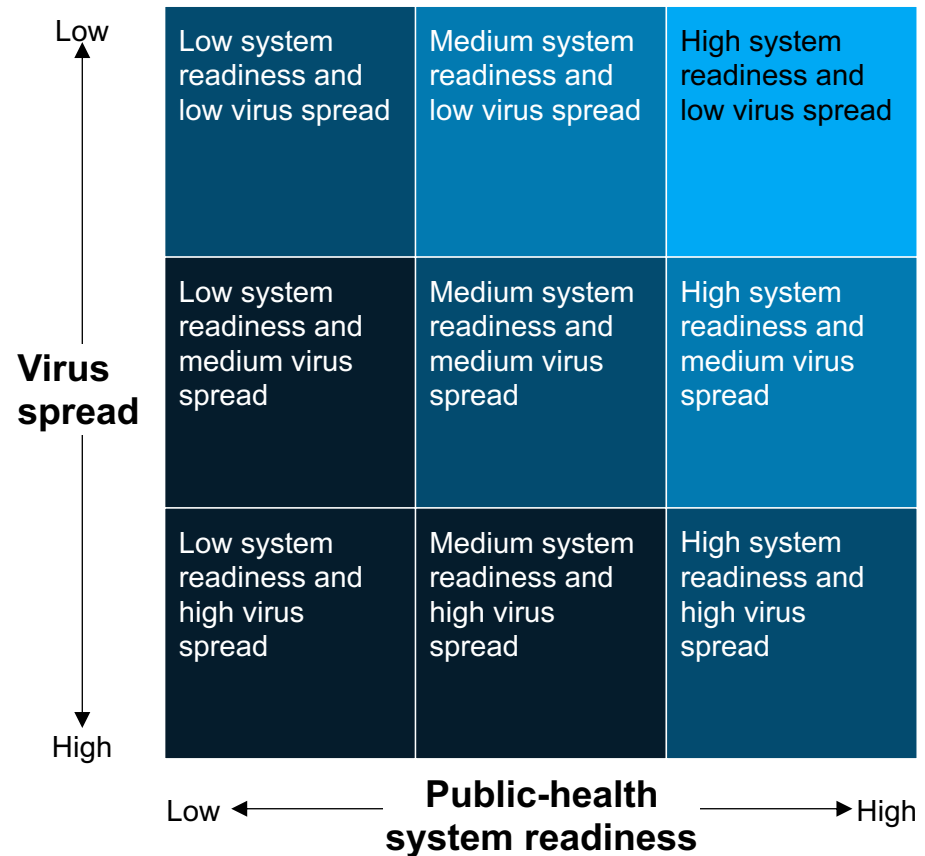
- Resume sustainable operations
- Protect employees in the workplace



National Governments

The extent of the healthcare system's ability to handle virus transmission is one key indicator for a national government's readiness for reactivation

Each region's readiness can be assessed along two dimensions



Virus spread

- **New daily infections**
- **Virus transmission rate (Rt)**, i.e. the number of people that catch the disease from a single infected person
- **New people requiring hospitalization and ICU care daily**

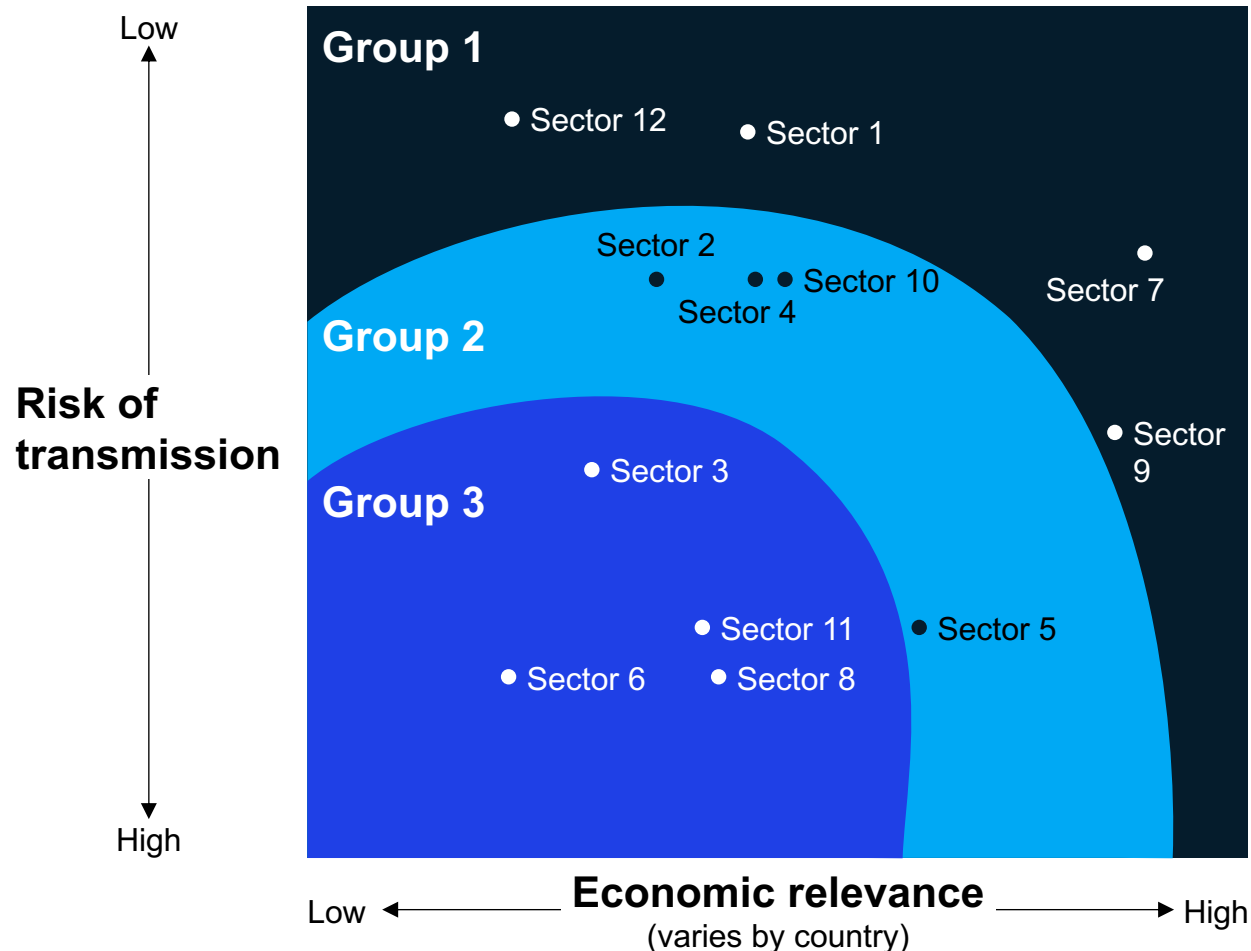
Public-health system readiness

- **Medical capacity**, especially ICUs (e.g., ICU beds, ECMOs)
- **Adequate medical resources** (e.g., trained doctors, beds, personal protective equipment)
- **Ability to rapidly test infections**
- **Effectiveness in tracking and isolating cases and contacts**, including digital tools for real-time sharing of critical data

Governments could prioritize reopening of sectors based on risks of virus transmission and their economic relevance

An illustration of how countries might prioritize reopening of sectors along two dimensions

Illustrative Example



Essential services and sectors that continue operating regardless of the severity of transmission risk

- Healthcare and services relating to prevention and control of outbreak (e.g., testing)
- Essential goods (e.g., food, medicine)
- Other essential services (e.g., utilities, waste management, public defense)

Group 1: Examples of sectors with high economic relevance and low risk of transmission

- Agriculture
- Manufacturing
- Logistics

Group 2: Examples of sectors with some economic relevance and low or medium risk of transmission

- Real Estate
- Other professional services (e.g., accounting, marketing)

Group 3: Examples of sectors with low economic relevance and high risk of transmission

- Food and accommodation (e.g., hotels, restaurants)
- Educational institutions
- Recreational businesses (e.g., Gyms and fitness centers)

China example: Containment measures can be adapted based on assessed readiness for reactivation

Example of stages of reactivation China's regions went through

		Readiness to reactivate economy			
		Stage 1	Stage 2	Stage 3	Stage 4
Geography	Hubei	No restrictions, but remote working is recommended and households must ensure they follow health and safety measures	Each household to keep only one entrance and exit point open. Allowed limited number of entrances and exits per day	Curfew in place with nighttime outdoor access prohibited; each household is allowed limited numbers of entrances and exits	Mandatory to stay home in isolation with outdoor access prohibited
	Other provinces	No restrictions, but remote working is recommended and households must ensure they follow health and safety measures	Limited restrictions but highly encourage residents to work from home across multiple provinces	Curfew in place with certain restrictions on time of day, day of week, and other limitations that differ by province	Most provinces shut down with residents required to stay at home
Essential sectors		All sectors are allowed to operate and key supply chains operate on market basis	Government begins to prepare the management of key supply chains in partnership with the private sector	Government partially manages essential supply chains	Government ensures management of essential supply chains and infrastructure (ie. medical supplies, building of temporary hospitals)
Non-essential sectors		All sectors are allowed to operate while being cautious of health and safety measures	Most sectors are allowed to operate but must comply with specific physical distancing and health protocols (e.g., in restaurants)	Few sectors are allowed to operate after they have received approval and comply with physical distancing and safety protocols (e.g., manufacturing factories)	Issued order to shutdown all non-essential companies, where only those that can operate online are allowed
Transport	Hubei	Lockdown lifted, all transportation resumes in all Hubei cities including Wuhan. Residents who travel have to show "green" health code. People from other provinces can travel in and out of Hubei with green code	Easing of inter-province movement with Hubei. Transportation in Hubei cities apart from Wuhan resume. Residents must show "green code" and strict screening continues	Removed all traffic control points except for exits of Hubei province and at entrances/exits to Wuhan city. Hubei residents who travel within the province have to show "green code"	Locked down transport in and out of Hubei province, amongst cities in Hubei and within all Hubei cities including Wuhan
	Other provinces	All transportation within city, inter-city and inter-province resumes. People who travel have to show "green code"	Inter-province movement restricted	Limited inter-city movements with strict screening at traffic control points	Intra-city movement restricted
Assembly		Large events and gatherings that draw crowds are banned (e.g., concerts, tourist events)	Gathering limited to medium-sized groups. Workplace events encouraged to be cancelled or postponed.	Gatherings limited to small groups in private and public places	Remain within circle of household members in residential spaces

China example: Targeted demand and supply interventions can accelerate the recovery of sectors

Examples of interventions used by the Chinese government



Demand: Restore consumer confidence

Boost consumers' willingness to spend:

- Rolled out digital coupons via Alipay and WeChat pay to use for dining, shopping and travel for short period of time
- Reduce import tariffs on consumer goods

Communicate frequently across multiple channels

- Establish centralized reporting and communication channels to keep citizens informed
- Created an online epidemic control website to publish disease indicators and provide real-time updates
- Create health QR codes on leading platform Alipay to track mobility, and alert on risks



Supply: Accelerate business recovery

Guarantee transportation logistics and coordinate supply channels:

- Coordinate local raw material and accessory resources, and promote cross-city collaboration as needed

Assist enterprises in epidemic prevention:

- Advised companies to formulate prevention and control measures (employee inspections, facilities, adequate medical supplies)
- Investigation and research teams sent by central government to inspect work resumption progress

Solve labor shortage and difficulties in work resumption and recruiting:

- Arranged chartered transport and offered allowances to bring migrant workers from provinces with labour surplus to needed cities
- Subsidise "point-to-point" pickup and drop off of migrant workers
- Offer subsidies for couples returning to work and companies hiring more workers
- Receive money for every new hire by local firm and hiring a minimum of workers from outside provinces

Promulgate trade emergency measures:

- Registration fees exempted for specific drugs and medical devices
- Manufacturers of essential supplies and products will benefit from a one-time tax deduction for equipment purchases
- Import/export of technology by local companies is to be prioritized and receive special assistance from local departments

Alleviate pressure on cash flow and operating costs:

- Tax declaration extension
- Exemption of social insurance payments and housing provident funds for corporates
- Reduce electricity cost
- Subsidise loans, issue low cost loans, postpone loan repayment, reduce SSC, VAT reduction or exemption, and reduce rent for SMEs

99%

Work resumption rate for large enterprises outside Hubei as of March 28

92%

Work resumption rate for all government-owned firms as of early March

77%

Work resumption rate for small and medium enterprises outside Hubei as of March 29

**China example:
Sectors recover at different rates, with large industrial firms recovering the earliest and SMEs and services taking longer**

Industrial enterprises

- **99% of China's major industrial enterprises** have resumed production as of March 28
- In Hubei, 95% of major industrial enterprises have resumed operations, and **70% of employees have returned**

Automotive

- Returned to **97% operating rate**, 82% of employees have returned to work as of March 28

Steel & electronics

- **90% of employees** have returned to work as of March 28

Textile, machinery, light industries

- **70-90% of employees** have resumed work as of March 28

Construction & infrastructure

- 11,000 key projects outside of Hubei province have resumed, at a rate of **89.1% as of March 23**
- Major highway and water transportation work has resumption rate of 97%. Airport and major water projects respectively reported a rate of 87% & 86%

Restaurants

- Estimated **40% of restaurants** reopened and **only 20% of workers** returned as of mid-March

China example: Continued, targeted stimulus can support populations & businesses that struggle during reactivation periods

Examples of economic measures to support the most vulnerable segments in China

Efforts and measures to help unemployed and impoverished people

- Wanning city government in Hainan created 1,327 **temporary public welfare posts for epidemic prevention, including disinfecting and guarding for impoverished people**
- In addition to offering jobs for low-income families, many places in China **arranged shuttle buses, trains and flights to transport impoverished workers** from their rural hometowns back to work in big cities
- Local governments sought and dispatched workers, majority of whom were rural migrant workers in poverty, to **fill vacancies of enterprises that were facing shortages of labour**
- In the city of Huai'an in northern Jiangsu, the local government has announced measures including the **introduction of jobs and employment subsidies to encourage migrants to work in their hometown**

Financial aid provided to highly impacted SMEs and micro-businesses

- Offer **subsidized loans** to agricultural firms and SMEs
- **Postponement of principal and interest loan repayment** for payments from Jan 25 to June 30 2020
- From March 1 to May 31, 2020, **small taxpayers in Hubei province will be exempted from VAT** if their tax rate is set at 3%. Small taxpayers in other regions will pay rate of 1% on taxable sales revenue if their VAT rate is set at 3 %.
- **Reduce and postpone social security contributions**, reduce contributions for endowment insurance, unemployment insurance and work injury insurance
- Guide banks to issue **low cost loans to individual businesses**
- **Trim electricity charges** by 5% for companies not from high energy consuming industries
- **Encourage local governments to cut land use tax** as incentives for property owners to reduce rent for business tenants

COVID-19 poses a grim market for new graduates

- College graduates in China reaches a record high of 8.74 million while job recruitment has dwindled or been postponed due to the COVID-19 outbreak
- The Ministry of Education has announced measures to ease the pressure, including launching an **online campus recruitment service and expanding the enrolment of master's degree students**
- To provide more job opportunities, the country will **expand recruitment in basic education, primary-level medical care and community services**
- Government encouragement of new graduates to **work in grass-root institutions** in remote areas of the country



State / Local governments

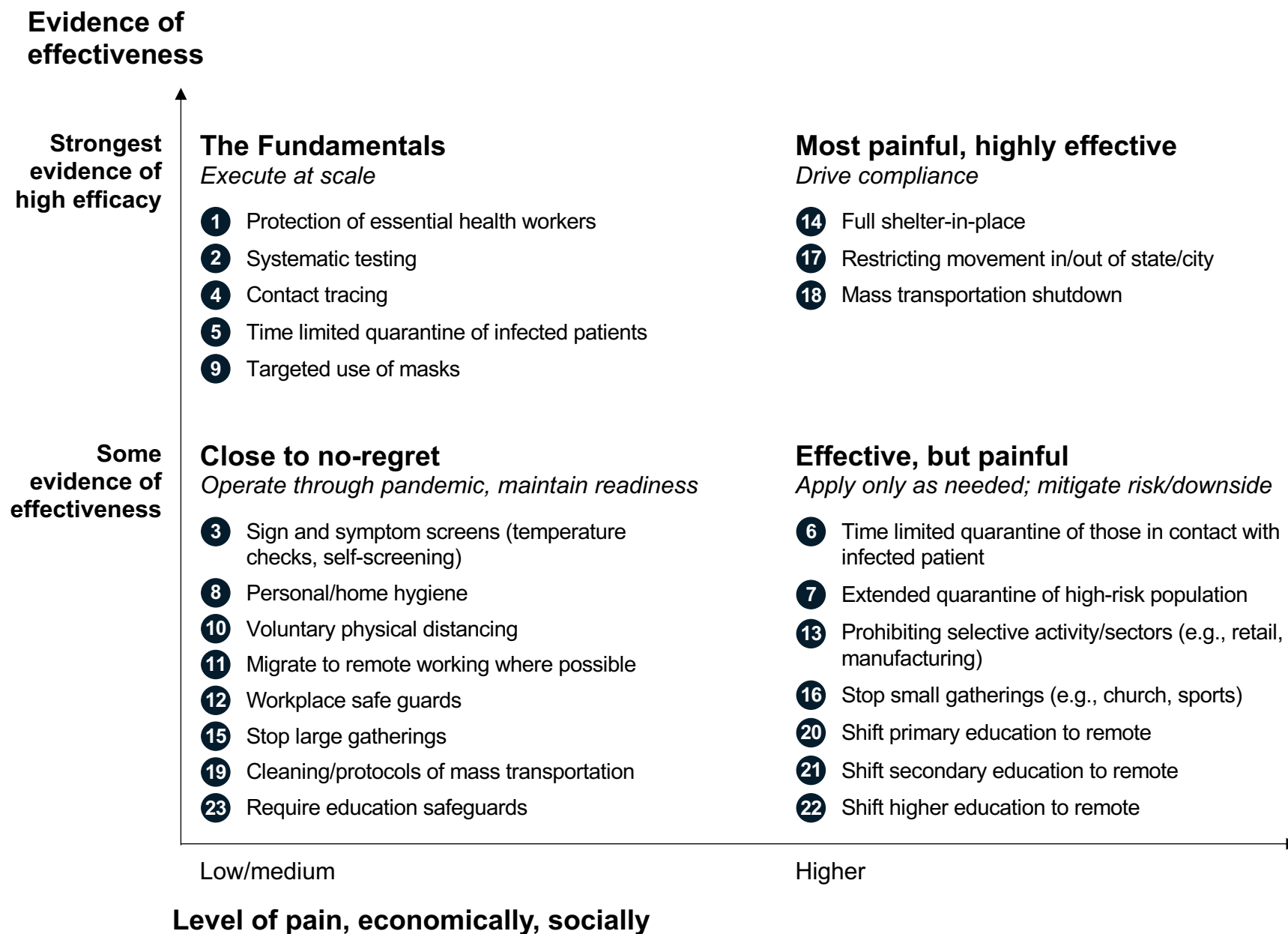
Local leaders can combat COVID-19 across six domains

Domain	Example objective	Potential metrics
I Foundational Public Health	Mitigate contagion by protecting healthcare workers, scaling testing capabilities, establishing contact tracing, setting effective quarantines, and adopting public use of PPE, and other “low regret” approaches	Mortality, hospitalizations, active cases, testing rate, healthcare worker hospitalizations, mask availability
II Societal Compliance	Achieving compliance with public health strategies among people and institutions , using communication, influencers, segmentation, penalties, enforcement, and support	Compliance by segment (old, young, low-income) and by intervention (physical distancing, remote work)
III Health System Capacity	Expand health system capacity including staff, supplies, and physical infrastructure likely through coordination, direct support (National Guard), funding, and directives	Resources (beds, ICU, vents, staff, supplies) per 1000 people; potential expansion once activations
IV Industry Safeguarding	Protecting the public at work, in stores, and at school by erecting safeguards to human interaction, helping businesses secure their operations, and creating safe environments for people to work	Portion of each industry confirmed to safeguarded Consumer confidence to engage safely
V Vulnerable Populations	Ensuring public support for individuals who are recently unemployed or homeless, or have chronic physical or mental health conditions that can be exacerbated by the epidemic	Trends in events (e.g. eviction rates, suicide rates, depression/anxiety RXs, hate crimes)
VI Economic Health	Minimize the economic impact and accelerate recovery by distributing federal stimulus, crafting local programs to supporting business, and incentivizing consumer spending	Unemployment rate, bankruptcies, sales tax, new business formation, state solvency

23 public health interventions identified and assessed across 4 dimensions (epidemic, economic, social and implementation)

Categories	Interventions to stop contagion	Evidence of impact on epidemic	Unfavorable economic impact	Unfavorable social impact	Implementation difficulty
Protection	1 Protection of essential health workers-adequate PPE and protocols	High	Low	Low	Low
	2 Systematic testing	High	Low	Low	Medium
	3 Sign and symptom screens (temperature checks, self-screening)	Medium	Low	Low	Medium
Detection/ quarantine	4 Contact tracing	High	Low	Low	High
	5 Time limited quarantine of infected patient	High	Low	Low	Medium
	6 Time limited quarantine of those in contact with infected patient	Medium	Low	Medium	Medium
	7 Extended quarantine of high-risk population	Medium	Low	Medium	Medium
Personal behavior	8 Personal/home hygiene e.g., hand washing, surfaces	Medium	Low	High	Medium
	9 Targeted use of masks	Medium	Low	Medium	Medium
	10 Voluntary physical distancing	Medium	Low	Medium	Medium
Economic activity	11 Migrate to remote working where possible	Medium	Medium	Low	Medium
	12 Workplace safeguards (e.g., masks, physical distancing)	Medium	Medium	Low	High
	13 Prohibiting selective activity/sectors (e.g., retail, manufacturing)	Medium	High	Medium	Low
Travel/ movement	14 Full shelter-in-place	High	High	High	Medium
	15 Stop large gatherings (e.g., church, sports)	Medium	Low	Low	Low
	16 Stop small gatherings (e.g., church, sports)	Medium	Low	Medium	Medium
	17 Restricting movement in/out of state/city	High	High	High	Medium
	18 Mass transportation shutdown	Medium	Medium	Medium	Medium
	19 Cleaning/protocols of mass transportation	Low	Low	Low	Medium
Education	20 Shift primary education to remote	Medium	High	Medium	Medium
	21 Shift secondary education to remote	Medium	Medium	Low	Medium
	22 Shift higher education to remote	Medium	Medium	Low	Low
	23 Require education safeguards	Low	Low	Low	Medium

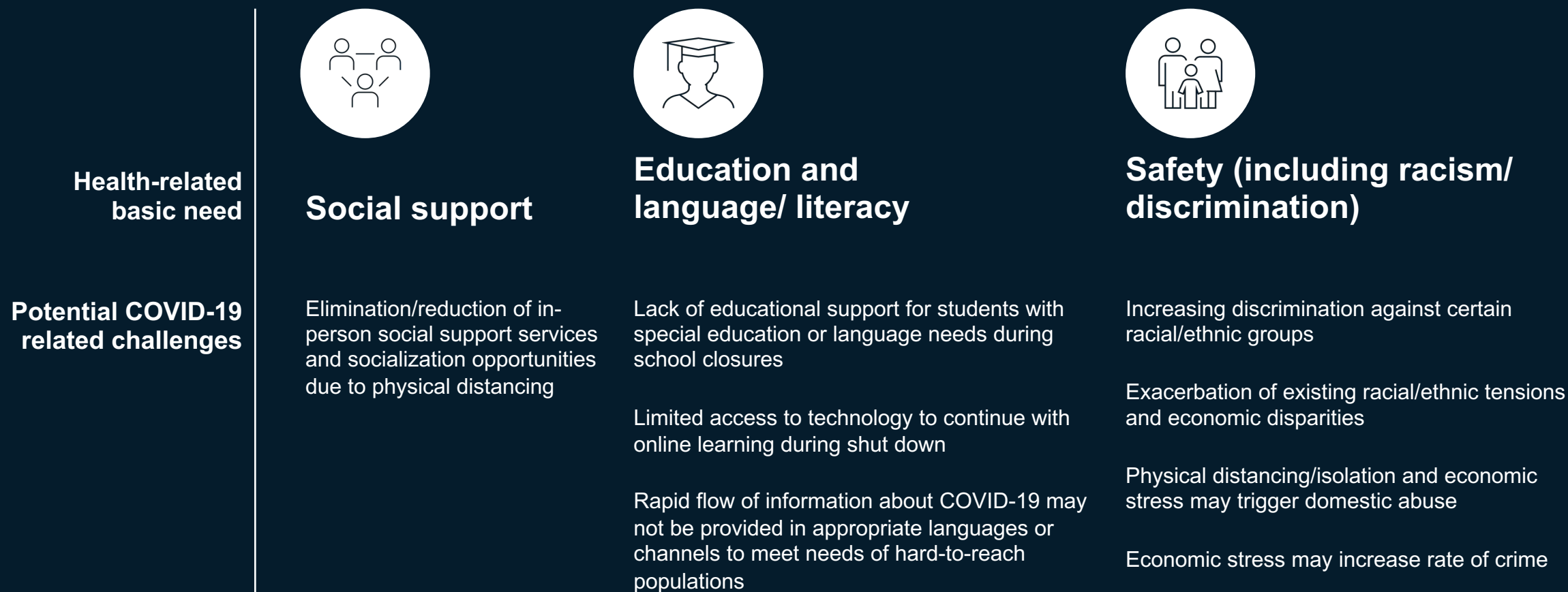
Interventions can be categorized by effectiveness and level of pain, with 5 fundamental interventions identified



COVID-19 exacerbates challenges across a variety of universal basic needs (1/2)



COVID-19 exacerbates challenges across a variety of universal basic needs (2/2)



Measures can be taken across levers to support people and businesses at the local level

Preliminary & non--exhaustive



People

People-oriented interventions should be tailored to account for underemployed populations and vulnerable populations

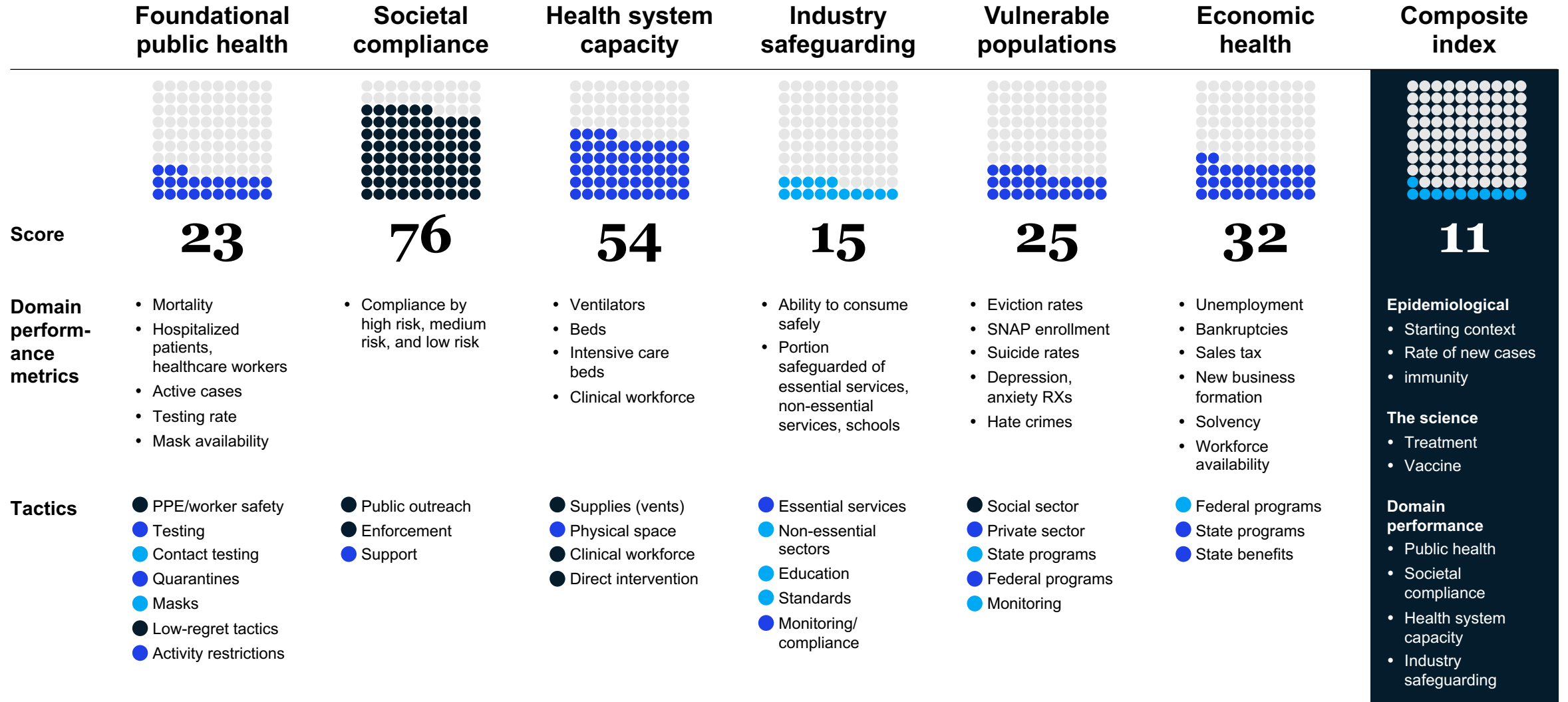


Businesses

Business-oriented interventions should be tailored to account for specific sectors (e.g. tourism, airlines), business sizes (e.g., SMBs) and regional differences (e.g., rural vs. urban)

Lever	Example specific measures
Protect current employment	<ul style="list-style-type: none"> Support continued employment through targeted wage subsidies
Enable rapid returns to the workforce	<ul style="list-style-type: none"> Reduce barriers to accessing work (e.g., loosen licensing requirements) Create COVID-19 response job portals to connect the unemployed or underemployed with companies seeing spikes in demand
Support critical needs	<ul style="list-style-type: none"> Ease critical expenses through residential loan forbearance measures or eviction freezes Identify and communicate to beneficiaries of any stimulus funding measures to ensure appropriate enrollment
Improve liquidity/cash flow	<ul style="list-style-type: none"> Ease financial obligations, e.g., postpone/waive taxes or fees for SMBs or hardest hit sectors, commercial mortgage loan forbearance measures Accelerate state's payment of outstanding AP to state vendors Facilitate process for SBA loans/grants, e.g., portal to support application prep
Invigorate demand	<ul style="list-style-type: none"> Target affected sectors and SMBs with dedicated state purchasing/ procurement programs Shift attention to demand spikes and essential needs
Re-start/continue operations	<ul style="list-style-type: none"> Support shift to remote operations, e.g., expanded WiFi coverage, targeted loans for remote work equipment

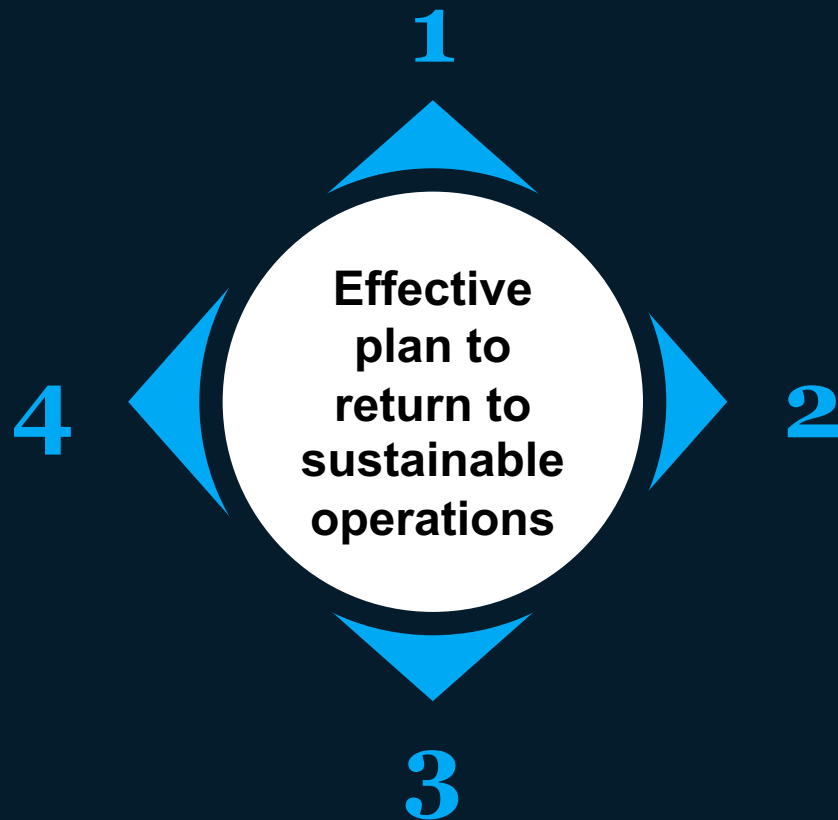
COVID-19 readiness dashboard structure for state/local governments





Companies

Many uncertainties are causing lack of clarity on return planning for corporations



1 Future of work

- Will COVID-19 driven changes (e.g., in remote work) accelerate other changes (e.g., greater percentage of jobs done through gig-style contracts) that affects current plans on hiring & talent management

2 Workforce safety

- What leading indicators could precede a lifting of shelter at home provisions?
- Will less impacted regions restart sooner than more impacted regions?
- Will companies be liable if they return employees to work and they fall ill?
- How much advance warning will federal, local, state governments give before shelter at home provisions are lifted?
- Will there be restrictions mandated by the government at the time of a restart/ return to work?
- Are there any employee segments that would like current remote work arrangements to continue, and can still be productive?
- What new norms need to be defined and followed to ensure no spread in our facilities?

3 Strategic shift to 'next normal'

- Will COVID-19 driven changes (in the market, consumers, competitive landscape, other) result in fundamental strategic shifts for the company soon after COVID-19, and will that drive the need for a new set of skills that are not currently assumed in the workforce plan?

4 Financial impacts

- What will the extent of demand drawdown be?
- What are the chances of an economic recession (in spite of bailout packages and other measures)?
- What implications would a potential downturn have on the business (revenue hit, liquidity issues, other)
- What do these implications mean for the workforce?
- Will the bailout package (or post COVID reform measures) include provisions that affect the organization in a fundamental way?

A basic framework for return to work planning

<p><u>Who</u> to transition</p> <ul style="list-style-type: none">• Workforce criticality• Extent of Remote Work Possible• Extent of RW advisable long-term	Onsite critical	Onsite flexible	Virtual	Other
<p><u>When</u> to transition</p> <ul style="list-style-type: none">• Shelter-at-home provisions• Local Public Health Readiness• Return of demand locally• Readiness to travel	<1 month	1-3 months	>3 months	
<p><u>How</u> to transition</p> <ul style="list-style-type: none">• Policies for at-risk vs. general employees• Communications & outreach• Pre-return capability building (new norms)• Facility preparedness• Post-transition norms & preparedness	High Restriction Operations	Partial Restriction Operations	Next Normal Operations	

Who to transition: Four categories of workforce for the immediate post-shelter-at-home environment



Maintain remote work, while increasing flexibility

- Focus on remote support, productivity, connectivity, health
- Shift contracts where needed & possible towards flexible arrangements



Define plan for staged return based on local context

- Identify milestones for starting a safe return to work process (e.g., local public health system readiness, government return to work guidelines)
- Develop detailed plan for return to work based on key considerations: virus spread, guidance from public health authorities, workforce readiness to return to work, legal liability



Return to work with increased work flexibility

- Define plan for return to work, including staggered shifts and slower ramp-ups
- Re-train to move to more flexible skill sets
- Shift contracts where needed & towards flexible arrangements



Transparency, reskilling, preserve company's future

- Provide transparency into reality of situation facing company
- Re-train or seek opportunities to shift focus
- Other actions to preserve future of company

What you have to believe before returning your workforce back to sustainable operations

Shelter at home provisions are removed



Local public health situation indicates recovery



Demand within region is starting to return (in case the region is a market)

When to transition

Charting the path toward returning to work and planning for economic recovery

When to transition: Leaders must monitor key milestones to chart path toward recovery

Businesses can anticipate return to work and plan for economic recovery by monitoring readiness indicators



Example Return to work readiness milestones

Health system capacity

- >5 ICU beds per 10,000 adults
- >45 hospital (Med/Sur) beds per 10,000 adults

Case progression

- Rate of new cases falls below <8%
- <.02% of the population is currently sick

Testing and Tracing

- Positive tests represent <20% of total tests administered
- Availability of rapid testing
- Contact tracing at scale infrastructure in place
- Progress toward 70% of population immune (via vaccine, recovery, or tested immunity)



Example Economic recovery readiness milestones

Economic stimulus

- Degree of distribution of government stimulus

Social distancing behavior

- Traffic congestion returns to within 30% of 2019

Corporate confidence

- Unemployment rate is going down
- Purchasing Managers Index is over 50

Consumer confidence

- Consumer Confidence Index rises from prior month
- Discretionary credit card increases for two weeks
- Retail foot-traffic returns to within 20% of pre-crisis

When to transition: An effective leading indicator dashboard can help determine timing of recovery

■ Indicates recovery

		Indicators of recovery: Regions do not need to meet desired thresholds of all indicators to be “ready”	Priority region 1	Priority region 2	Priority region 3	Priority region 4	Priority region 5
Prerequisite	Shelter-in-place	<ul style="list-style-type: none"> All shelter-in-place orders have been rescinded 	■	■	■	■	■
	Health system capacity	<ul style="list-style-type: none"> >5 ICU beds per 10,000 adults >45 hospital (Med/Sur) beds per 10,000 adults 	■	■	■	■	■
Readiness for return to work	Case progression	<ul style="list-style-type: none"> Rate of new cases falls below <8% 	■	■	■	■	■
		<ul style="list-style-type: none"> <.02% of the population is currently sick 	■	■	■	■	■
	Testing and tracing	<ul style="list-style-type: none"> Positive tests represent <20% of total tests given 	■	■	■	■	■
		<ul style="list-style-type: none"> Availability of rapid testing 	■	■	■	■	■
<ul style="list-style-type: none"> Sophistication of contact tracing infrastructure 		■	■	■	■	■	
<ul style="list-style-type: none"> Progress toward 70% of population immune (via vaccine, recovery, or tested immunity) 		■	■	■	■	■	
Readiness for economic recovery	Economic Stimulus	<ul style="list-style-type: none"> Degree of distribution of government stimulus 	■	■	■	■	■
	Social distancing	<ul style="list-style-type: none"> Traffic congestion returns to within 30% of 2019 	■	■	■	■	■
	Corporate confidence	<ul style="list-style-type: none"> Unemployment rate is going down 	■	■	■	■	■
		<ul style="list-style-type: none"> Purchasing Managers Index is over 50 	■	■	■	■	■
Consumer confidence	<ul style="list-style-type: none"> Consumer Confidence Index rises from prior month 	■	■	■	■	■	
	<ul style="list-style-type: none"> Discretionary credit card increases for two weeks 	■	■	■	■	■	
	<ul style="list-style-type: none"> Retail foot-traffic returns to within 20% of pre-crisis 	■	■	■	■	■	

How to transition: “Return to workplace” should be executed with care

Sample employer interventions¹



Healthy human interactions

- Ensure employees and customers stay > 6 ft apart
- Sanitize high-contact surfaces
- Separate customers and employees from potentially ill individuals
- Ensure hygienic handling of items that come in contact with the broader population (e.g., materials handling)
- Mandate temperature checks upon entry



Seamless business operations

- Flexible sick leave so workers can stay home when ill
- Support function flexibility (e.g. backup supply chains, contractors)
- Manage absenteeism and enable remote work, rotating days/weeks
- Operate multiple locations without travel
- Structurally limit physical contact between employees (e.g., barriers between workstations)



Safe work environment

- Improve building conditions and airflow (e.g., ventilation, no-touch bathrooms)
- Educate on good hygiene habits (e.g., handwashing, sanitizer)
- Routine and targeted deep cleaning (e.g., if an employee tests positive)
- Provide personal protective equipment where needed (e.g., facemasks, gloves)

Interventions should be assessed and evaluated across key dimensions including:

- Effectiveness of dealing with the pandemic
- Implementation difficulty
- Disruptions to business

1. Any steps on safety should be taken in accordance with CDC / local Department of Health guidelines
Source: CDC, OSHA

China example: Protocols specifically tailored by sector can also help lower transmission (1/2)

Examples of protocols in manufacturing sector in China

Factory worker safety

Staggered working shifts, arrival times and lunch breaks; temperature screening and sanitizers; physical distancing seating arrangements; worker space decontamination; required to issue personal protective equipment to all workers; wear masks at all times

Maximize worker availability

Cover costs for travel/relocation for dislocated workers returning to work (with 14-day quarantine for those returning from high risk provinces); flexible work hours; proactive assessment of worker health codes (green/yellow/red)

Inbound supply

Suppliers, manufacturers, and customers have shared resources proactively, given mutual dependence including PPE (masks, disinfectants), idle transportation asset, and personnel; manufacturers have simplified offerings to high running items, shifting focus to locally supplied SKUs, and key input suppliers are more closely tracked

Logistics

Change in operating model, including running multiple drivers per truck asset with staggered timings to fully utilize asset; segregation of drivers, transfer points, and rest/cleaning checkpoints; drivers wearing full protective equipment; ensure distribution center safety measures

Non- manufacturing function

Implemented work-from-home accommodations to roles that are able to; flexible work schedules and teleworking; staggered work times to ensure availability of research spaces while maintaining physical distancing

Large Electronic Manufacturer

A large electronics manufacturer has introduced frequent temperature testing and plans to give tens of thousands of coronavirus tests to workers along with an equally large number of chest x-rays. Workers with elevated temperature are immediately taken to a hospital, and those around them are closely watched.

Car manufacturer

After shutdown was lifted, a car manufacturing facility gradually resumed operations and has now returned to full activities. Among other measures, employees are also prohibited from sharing apartments and provided isolated accommodations instead.



Workers sit spaced out and facing the same direction during lunch to reduce risk of infection

Some precautionary measures include:



Body temperature checks at arrival



Regular factory disinfection



Workers having lunch in isolation



Having a mask disinfection cabinet every 200m.

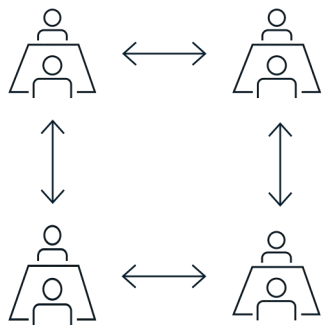
Singapore example: Protocols specifically tailored by sector can also help lower transmission (2/2)

Examples of protocols in food and restaurants businesses in Singapore

Pre-lockdown, food & restaurants across the country rolled out several health safety measures to prevent contagion

One restaurant **moved out around 10% of tables** to ensure adequate spacing, **ensure 1m spacing** between customers by placing 1m stickers at queue line, and **collected customer contact details** for contact tracing.

One restaurant **spaced their touchscreen kiosks 1m apart** with **staff will disinfect the screens every 15-30 mins**. They will have **1m floor markers** along with **safe distancing signages** at various spots in stores. **Staff are also required to wear masks and are prohibited from accepting personal cups**.

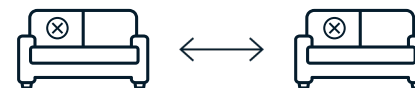


Shopping malls and public venues continue to operate with crowd control and physical distancing measures

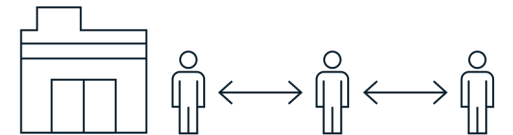


Crowd control measures in full force at malls, attractions and public venues, sealing entrances

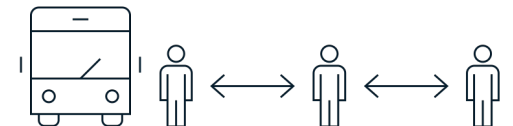
Limit capacity and disperse groups of more than 10



Public areas implementing at least **1 metre physical distancing** with **seat markers**

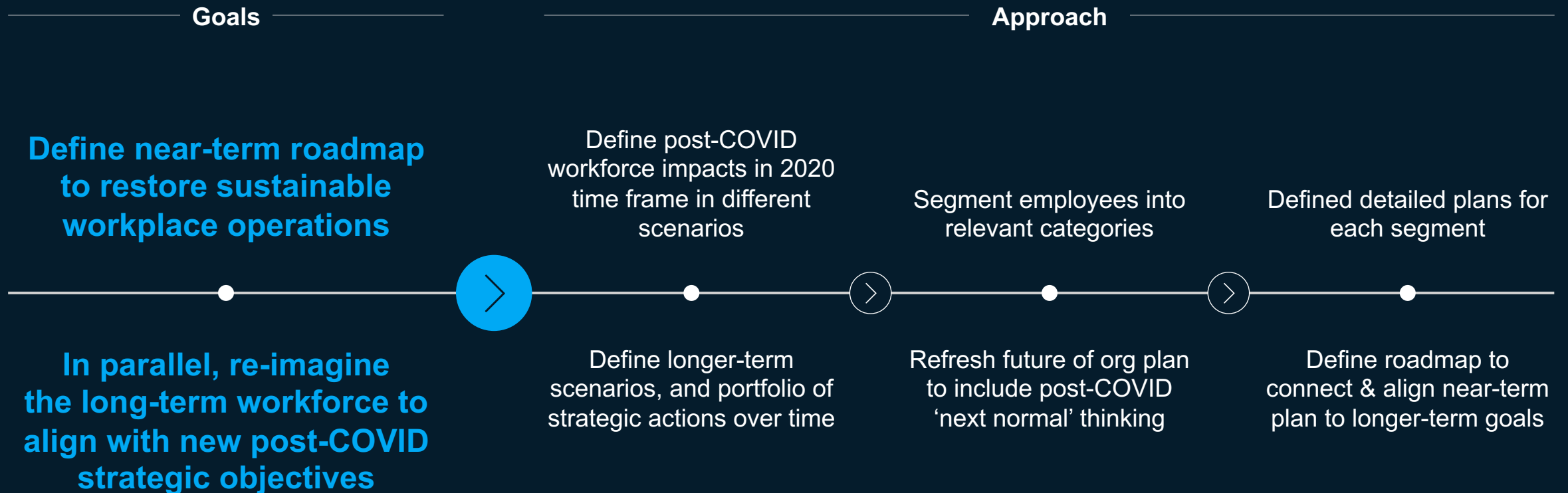


Malls **limiting capacity of visitors** with queue for entrance screening



physical distancing at public transportation **stops**

Approach for effective return to sustainable operations for a corporation

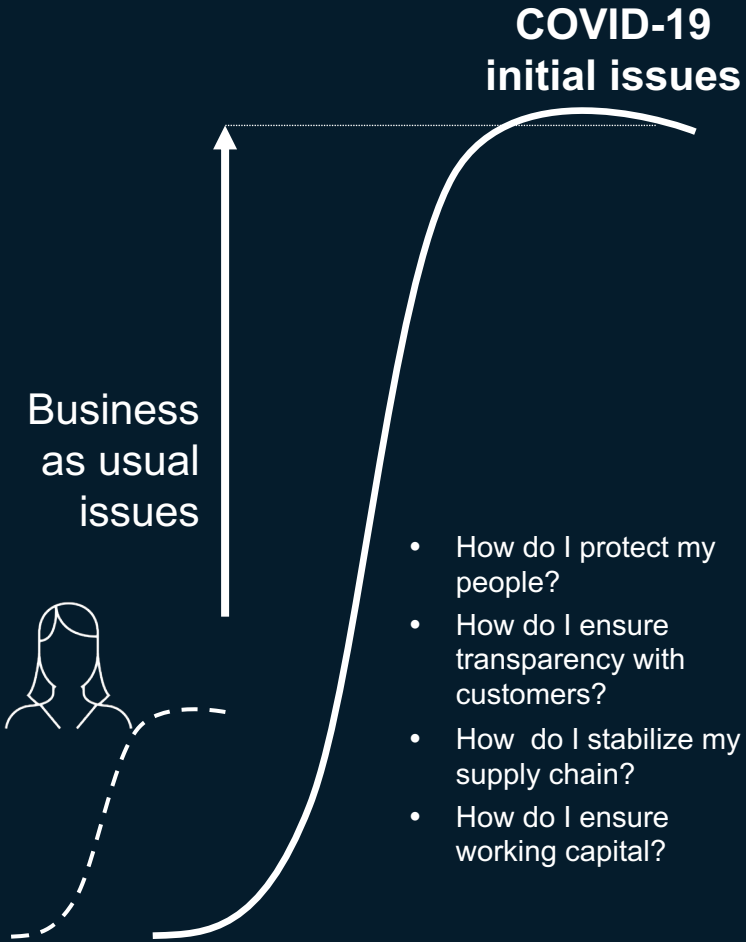




Nerve center

Managing across the 5Rs requires a new architecture based on a team-of-teams approach.

Many leaders are experiencing a big increase in COVID-19 issues...

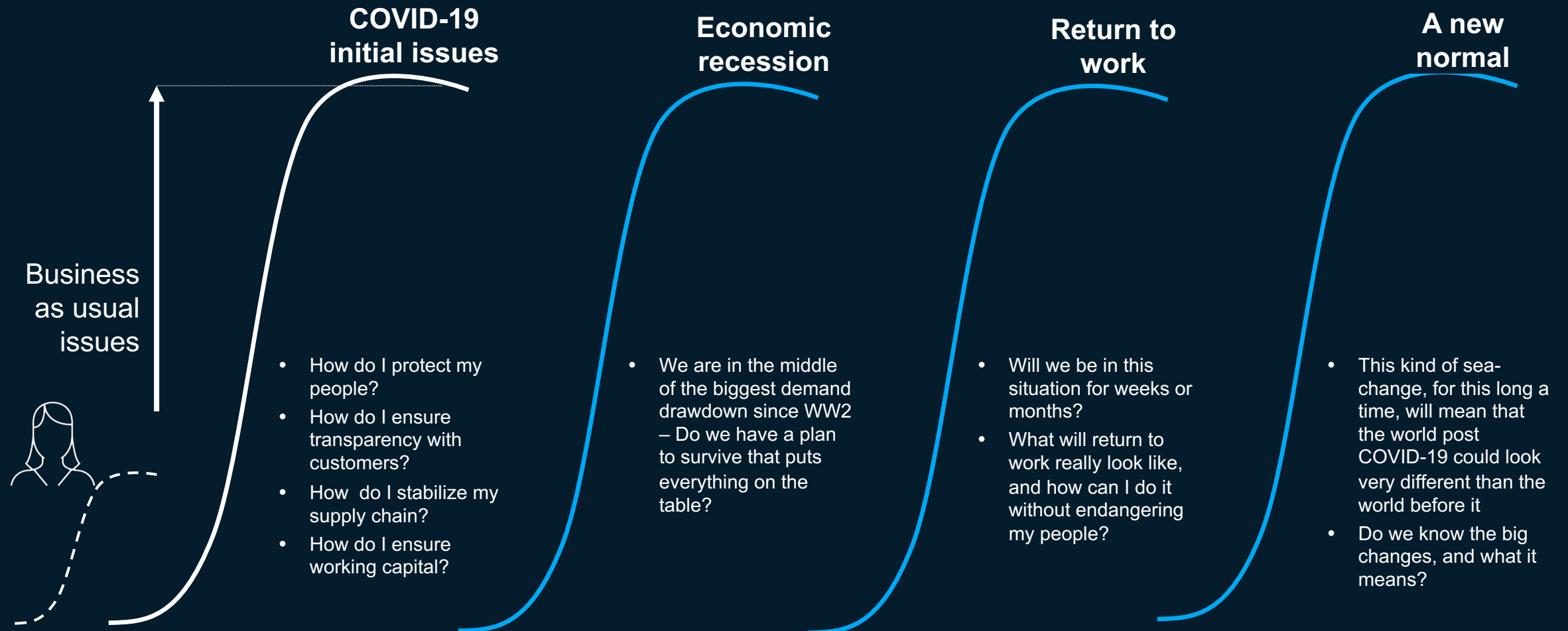


COVID-19
initial issues

Business
as usual
issues

- How do I protect my people?
- How do I ensure transparency with customers?
- How do I stabilize my supply chain?
- How do I ensure working capital?

...but there is a tsunami of ever-more-complex issues that lie ahead



When facing such a tsunami, companies make four mistakes



Inadequate Discovery

Optimism bias, lack of adequate 'sensing mechanisms' (e.g., escalation failures), over-reliance on past patterns, risk rationalization

Industrial manufacturer: pushed out fix timelines for failed product more than 12 times. Top management optimism bias was called out multiple times by regulators, politicians and other observers



Constrained Solution Design

Many crises have a technical core, which needs new solutions to be invented (e.g., BP top hat) or imported anew into the sector/ geography

Energy company: Many public failures to fix process safety issue before success. Challenge was that the fix needed new engineering innovation



Slow or Bad Decision Quality

Groupthink, political pressures, high-emotion situations; Unfamiliarity – pattern recognition-driven thinking fails; Desire to wait for more facts slows response

Challenger disaster: NASA engineers pressured Thiokol to change their 'no-launch' recommendation (Thiokol shifted their stance to satisfy their biggest customer) in spite of a well-understood technical failure on O-rings.



Inadequate Delivery (Execution failure)

Chaos during disruptions frequently translates to lack of accountability and direction, 'operations addiction' on the part of top management, leading to failures of execution

Automotive manufacturer: Was criticized for multiple aspects of recall activity (e.g., unclear terms and conditions, inadequate call center staffing, other challenges)

The central question

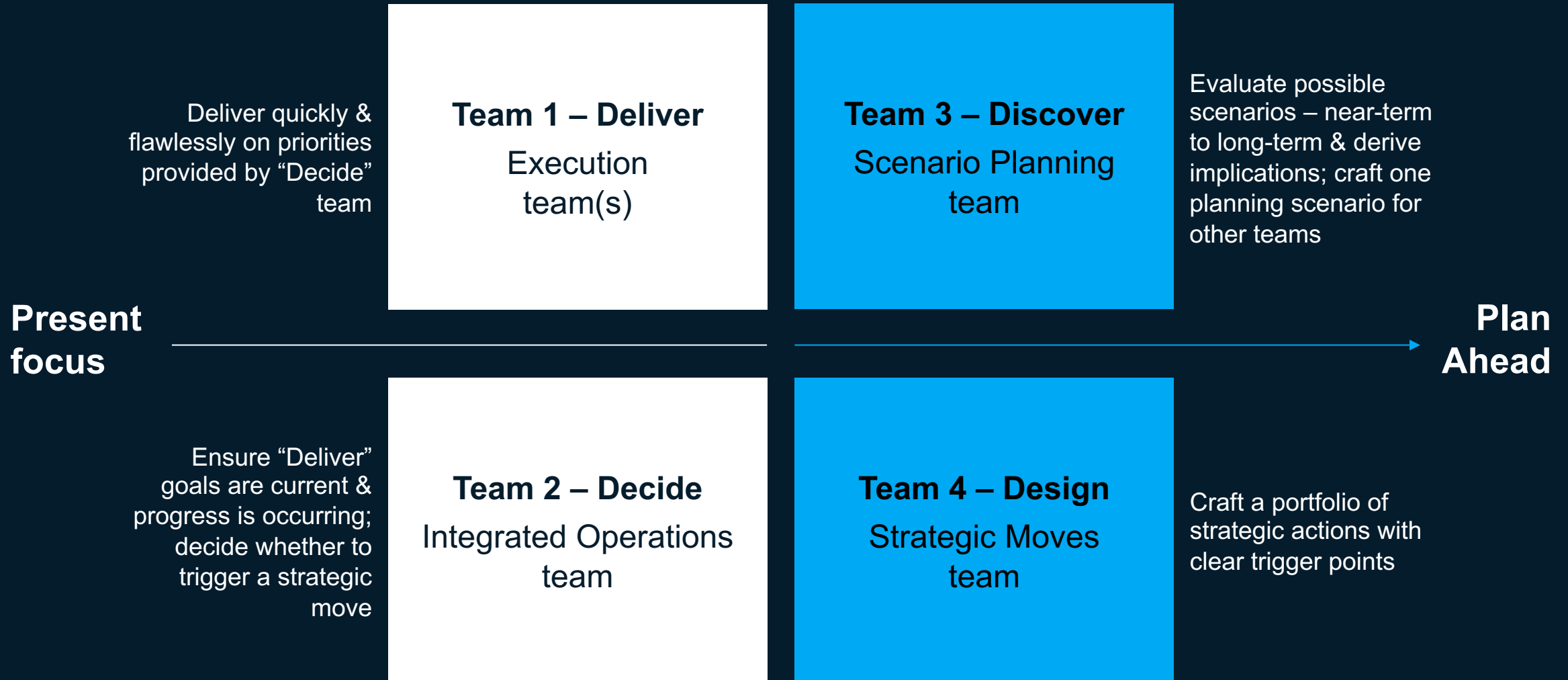
How can I increase my organization's capacity and speed to respond decisively to today's issues...

...while uncovering the truth about the future, and shoring up defenses to meet it?

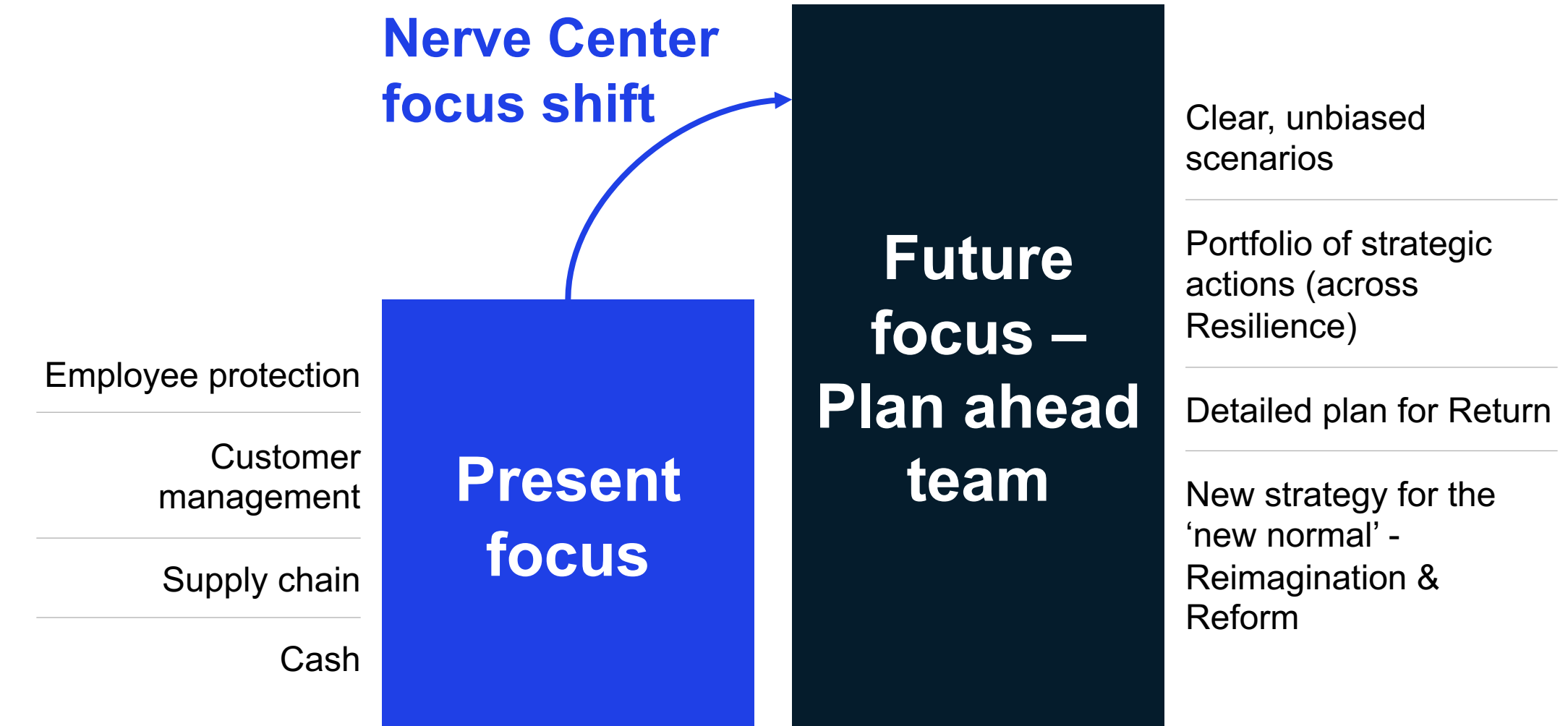
Nerve centers are a specific organizational construct, meant for institutions that are facing existential, high-velocity disruptions, that are designed to address this question

How Nerve Centers achieve this – “team of teams” made of 4 teams

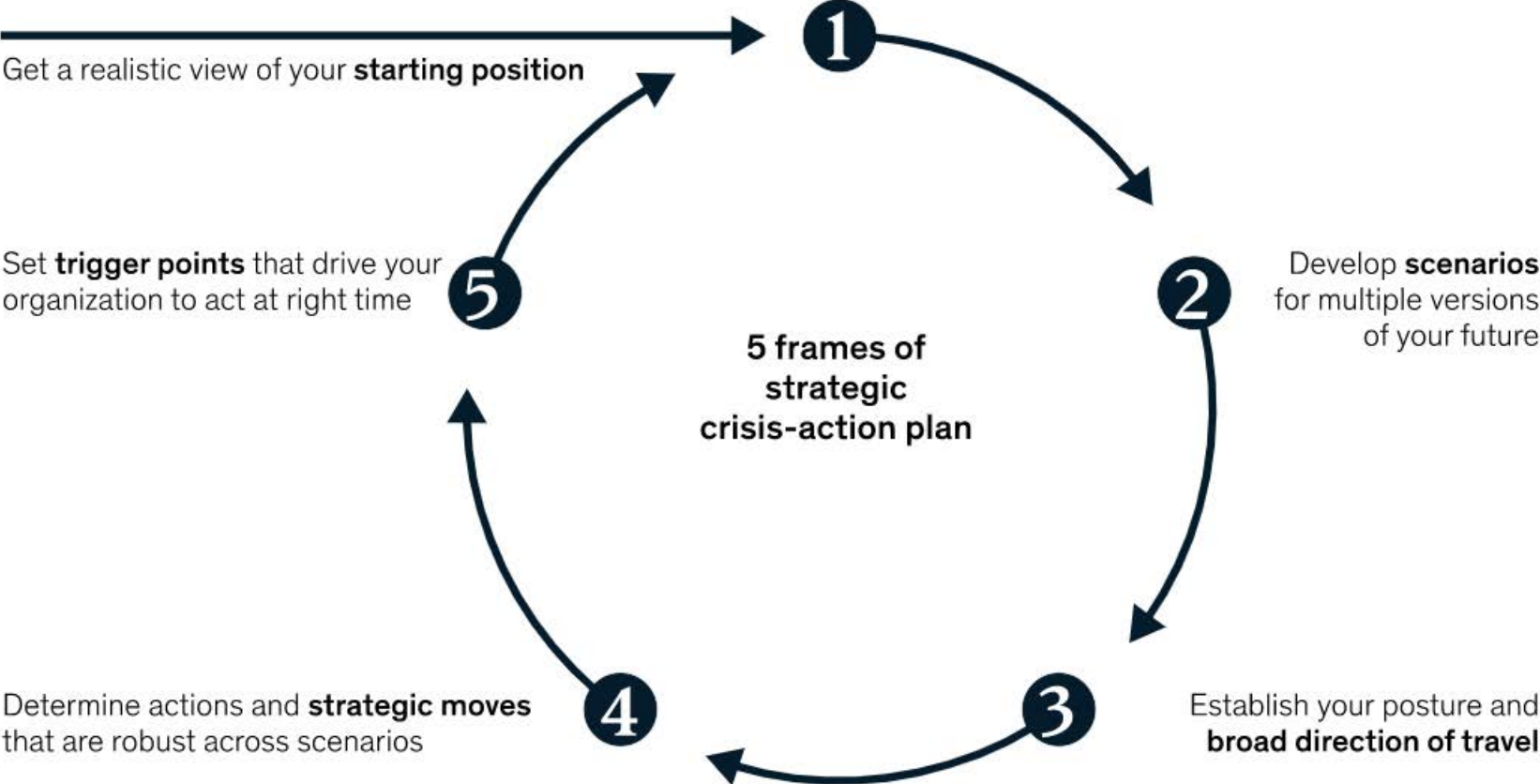
Deliver, Decide, Discover, Design



Nerve Center needs to evolve from present focus to include plan ahead teams



A plan ahead team can offer quick responses to rapidly changing circumstances using 5 frames



Please refer to this [link](#) to read the full article

Nerve Center design is based on military command principles

Core concept: Create an organization that can Observe, Orient, Decide and Act faster than the environment

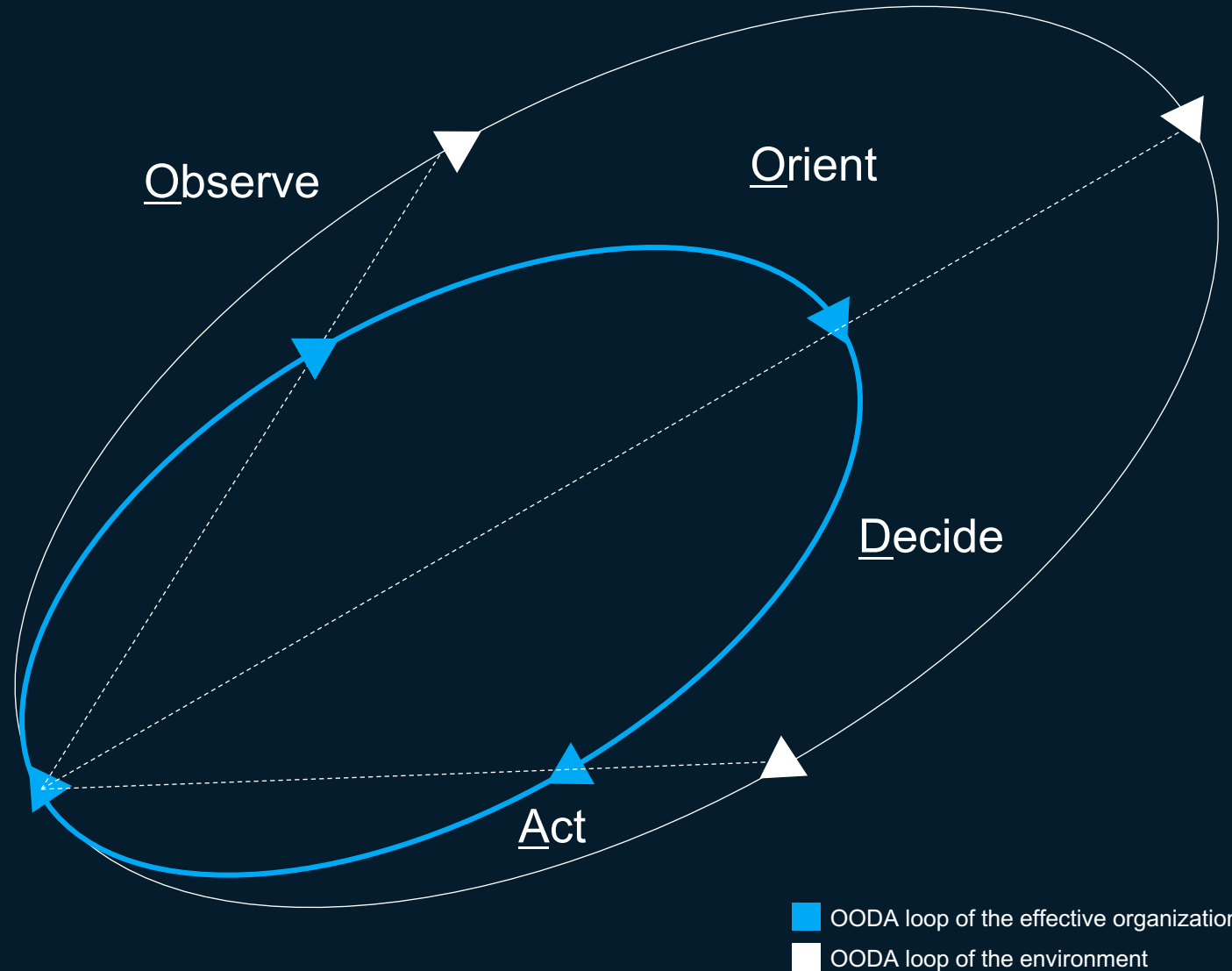


John Boyd's OODA loop

John Boyd was a Colonel in the U.S. Air Force, whose ideas on the art of war revolutionized U.S. military thinking, especially after the Vietnam War

Boyd's key concept: The OODA loop.

The key to victory is to be able to make appropriate decisions faster than the rate at which the environment evolves



Contents

01

COVID-19:
The situation now

02

Scenarios and
path forward

03

Planning and
managing COVID-
19 responses

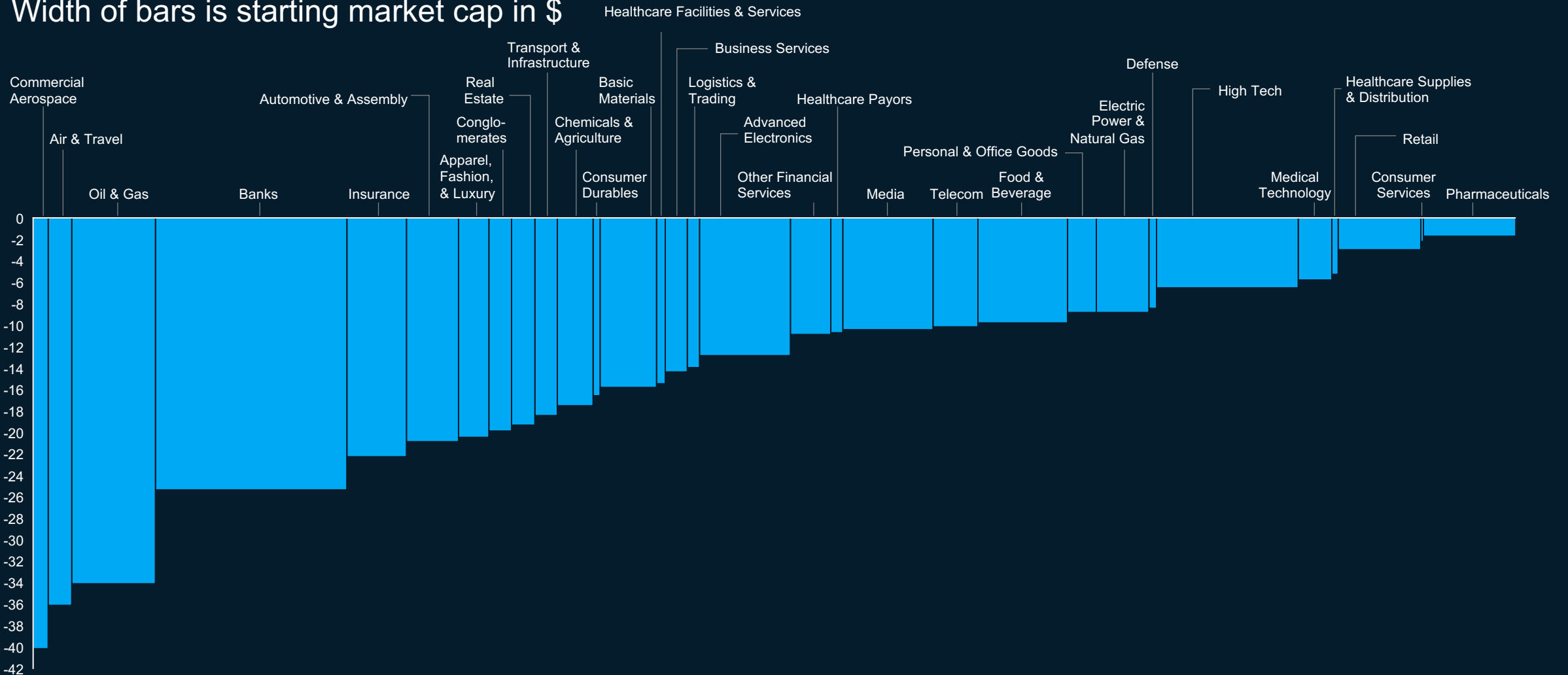
04

Sector-specific
impact

Market capitalization has declined across sectors, with significant variation to the extent of the decline

Weighted average year-to-date local currency total shareholder returns by industry in percent¹.

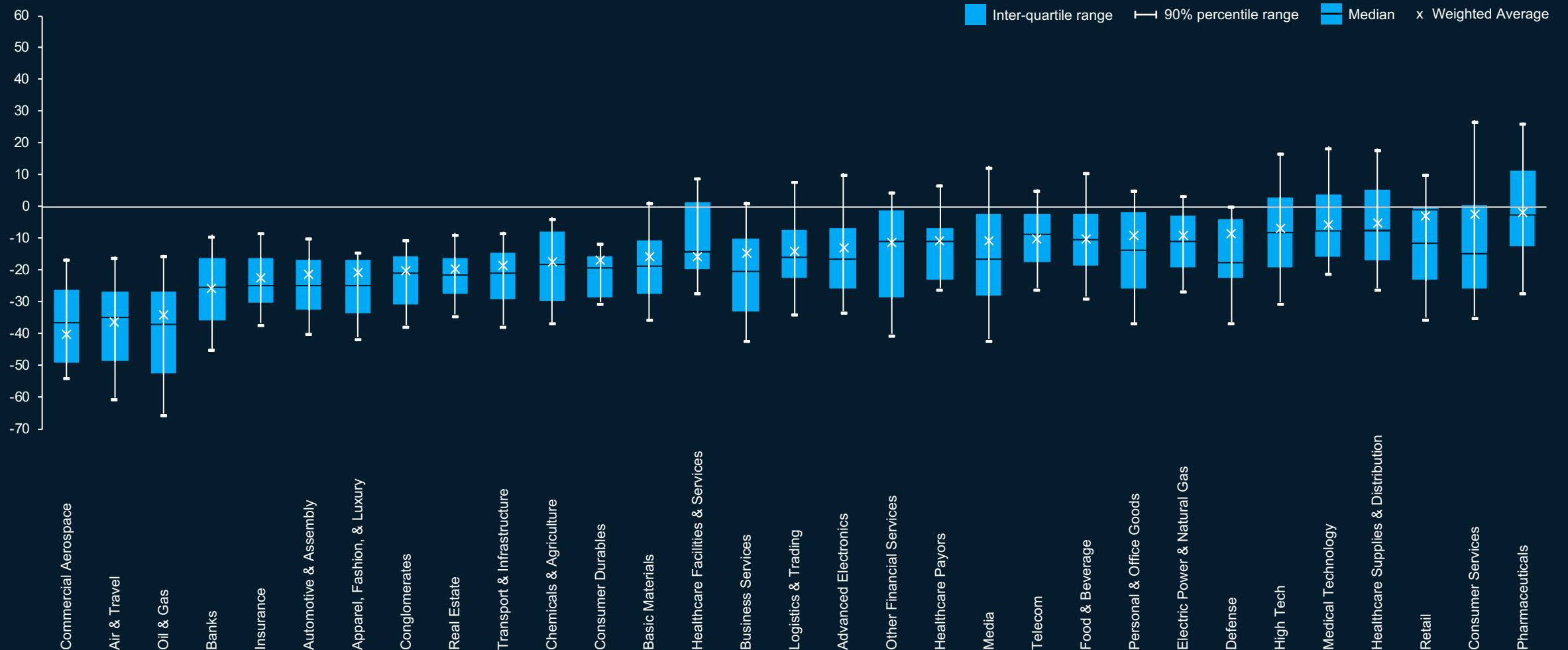
Width of bars is starting market cap in \$



1. Data set includes global top 3000 companies by market cap in 2019, excluding some subsidiaries, holding companies, companies with very small free float and companies that have delisted since

Even within sectors, there is significant variance between companies

Distribution of year-to-date total shareholder returns by industry percent¹



1. Data set includes global top 3000 companies by market cap in 2019, excluding some subsidiaries, holding companies, companies with very small free float and companies that have delisted since

Preliminary views of some of the hardest hit sectors

Based on the partially effective scenario



Commercial Aerospace

-40%



Air & Travel

-36%



Oil & Gas

-34%



Insurance Carriers

-22%



Automotive

-21%

Avg. stock price change¹

Industry specific examples

Preexisting industry conditions, challenges with airlines' balance sheet resilience, and high fixed costs cause **near-term cash flow issues and long-term growth uncertainty**.

It may take years to recover from production and supply chain stoppages, due to critical vendors located in areas impacted by the virus and liquidity challenges especially amongst Tier 3 suppliers.

Long order backlogs mitigate some concerns, especially on narrowbody aircraft, though widebody demand could be structurally impacted in the near-term

Deep, immediate demand shock 5-6x greater than Sept 11; ~70-80% near-term demand erosion due to int'l travel bans & quarantines now prevalent in 130+ nations

N. Hemisphere summer travel peak season deeply impacted since pandemic fears coincide with peak booking period

US gov't is providing both grants and loans to the travel industry as part of a broader package; **analysts estimate grants will last major carriers ~2-6 months**

Recovery pace faster for **domestic travel** (~2-3 quarters); slower for **long-haul and int'l travel** (6+ quarters)

Oil price decline driven by both short-term demand impact and supply overhang from OPEC+ decision to increase production

Oversupply expected to remain in the market even after demand recovery, and post 2020, unless OPEC+ decides to cut production

Erosion of gas demand driven by reduced power and industrial activity, combined with **historically high storage levels**, puts downward pressure on overall gas price levels. **Cash cost gas price economics expected in the next 1-2 years**, with potential volatility in the 2023-2024 horizon

US insurers have been strongly affected, especially reinsurers and life & health insurers

Reduced interest rates and investment performance impacting returns – esp. for longer-tail lines

Disruptions expected in new business and underwriting processes due to dependence on paper applications and medical underwriting

Lock-downs around the world forced insurers to extend grace period for renewing the policies from 15 to 30+ days that will lead to drop in premiums in 2020

Existing vulnerabilities (e.g., trade tensions, declining sales) **amplified by acute decline in global demand**

Mar. 26 Survey of US auto consumers indicates 70% of car buyers are deferring by ~6 mo. or no longer intending to purchase; **~15% of Chinese light vehicle volume loss in 2020** under current recovery trend, and **~25-30% in EU and US markets**

Despite ongoing Chinese economic restart, where most Chinese factories open again with production ramping up, there is **continued supply chain and production disruption** as majority of EU and US OEMs have temporarily closed plants until mid-to-late April

1. In last 30 days for selected sector indices

Air & Travel

9/11, YoY change Sept 2000 vs. 2001
 2008 Fin. Crisis², YoY change Feb 2008 vs. 2009
 Now, YoY change Mar 2019 vs. 2020

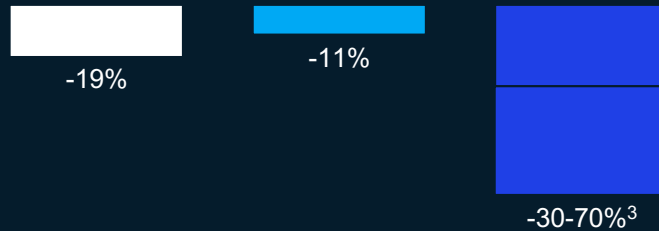
Current Impact

COVID-19 is an unprecedented crisis

The initial demand shock is worse than 9/11 or the 2008 Financial Crisis

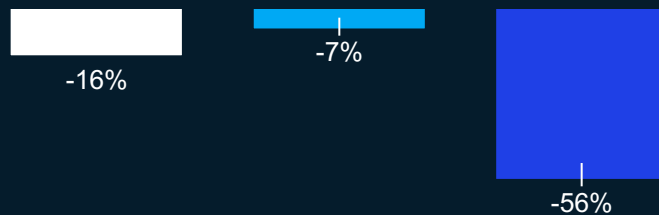
US airline capacity (ASM)

7x bigger drop vs. Fin. Crisis



US hotel occupancy

8x bigger drop in occupancy vs. Fin. Crisis

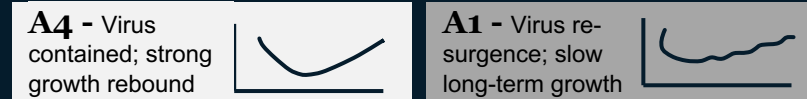


Medium-term expectations (through 2020)

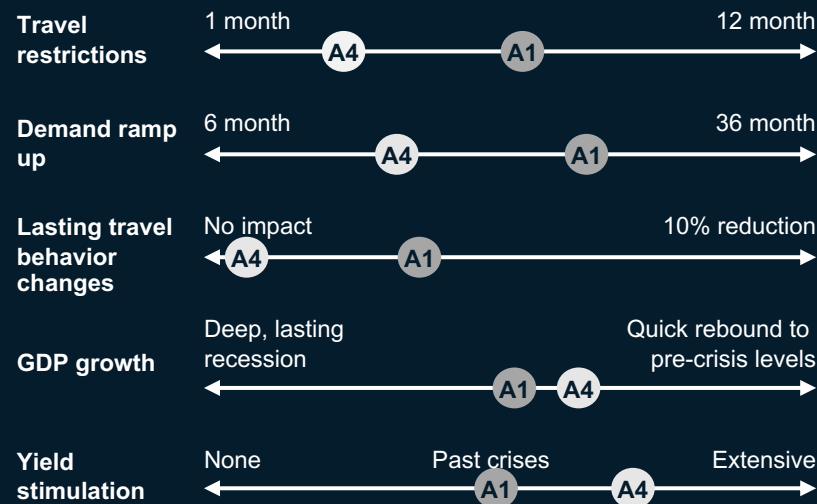
70-80% Capacity reductions in April

Flights to and from Europe, Middle East, and Africa were among the hardest hit ; Intra-regional flights within the Americas are least impacted to date, but likely to decline further

31%-45% reduction in airline travel demand is estimated in the two most likely scenarios, returning to pre-crisis status quo over a 1-2 year period



Airline demand recovery dimensions for scenarios A1 and A4



Early thoughts on evolution post-COVID

Convergence of remote work technologies, biosecurity issues, and sustainability concerns could structurally shift demand curves downward

Government intervention though a stimulus package, to ensure there is not a liquidity crisis, may have implications for industry structure as increasingly involved interventions may impact strategy and operations (e.g. equity stakes, conditions for support)

Given low oil price expectations for the short-term, operating costs may be reduced but could also impact aircraft leading market

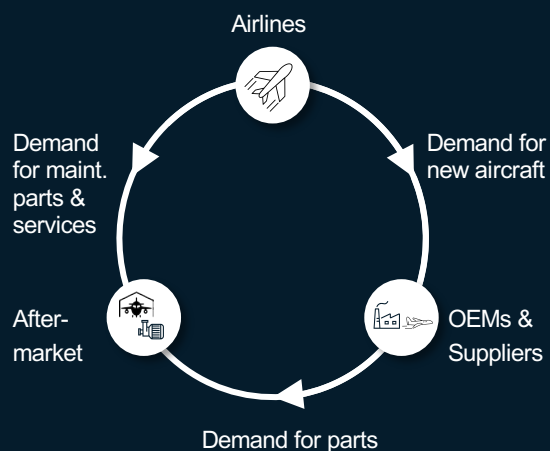
1. For capacity, load factor, and occupancy, YoY change of Sept 2001 | 2. For capacity, YoY change of Feb 2009, for airline load factor and hotel occupancy rate, YoY change of March 2009, for hotel stocks | 3. Based on latest capacity adjustment announced by AA/DL/UA | 4. Based on forecast from United Airlines

Commercial Aerospace

■ Gross orders ■ Cancelled orders ■ Wide body aircraft ■ Narrow body aircraft — Years: Wide body — Years: Narrow body

Current Impact

The underlying drivers for commercial aircraft equipment and services is driven by airlines; Airlines have significantly reduced capacity and grounded fleets

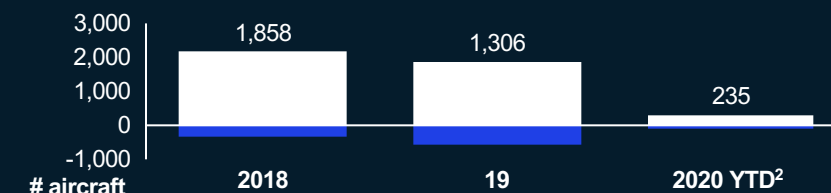


1. Narrow body orders declined 21% and wide body orders declined 18% from 2017 – 19. Narrow body cancellations grew 4% and wide body cancellations grew 5% during the same period
2. Boeing reported 18 gross wide body orders in Feb. and 43 737 MAX (narrow body) cancellations. Airbus reported 287 total gross orders and 13 cancellations as of 3/15
3. Assumes 2020 YTD backlog = '19 backlog – '20 cancellations YTD (56 cancellations YTD from Boeing and Airbus)
4. 2020 backlog years figures assume 2020 deliveries remain at 2019 levels
5. Calculates backlog years assuming no dip in 2019 and 2020 deliveries (deliveries remain at 2018 levels)
6. Actual backlog is 14.6 years (backlog shown in chart assumes no dip to deliveries in 2019)

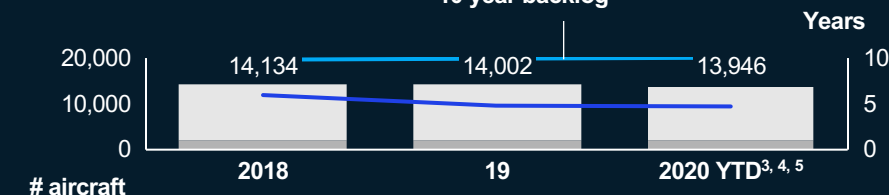
Medium-term expectations (through 2020)

19-20YTD commercial aircraft orders, backlog, backlog years & deliveries

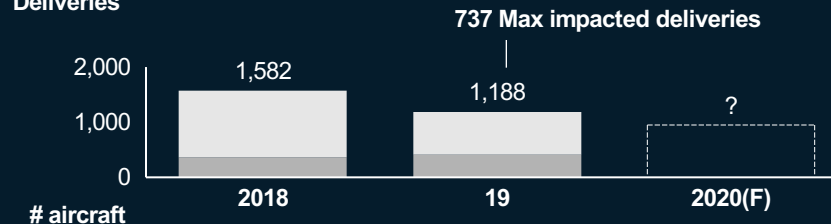
Net orders¹



Backlog



Deliveries



Early thoughts on evolution post-COVID

Intrinsic demand for aircraft likely disappears in 2020

Airline balance sheet concerns will lead to restructuring of order books; cash conservation efforts at airlines constrain capital set aside for delivery payments

Low fuel price expectations for the short-term could extend life of older assets, but not into major heavy maintenance check cycles

Government intervention may mitigate near-term risk of employee furloughs and supply chain insolvencies

Oil & Gas

Current Impact

LNG

COVID-19 has affected regions that account for over 80% of global LNG demand; Chinese LNG imports (17% of global imports) fell by 7% yoy Jan-Mar 2020; buyers have triggered Force Majeure, cancelled cargoes and engage in contract renegotiations

Oil

Demand decline due to COVID-19 (5.4-11.4mbd for 2020 under A3 & A1 scenarios) and OPEC+ deal failure pushed oil prices under \$30/ bbl.

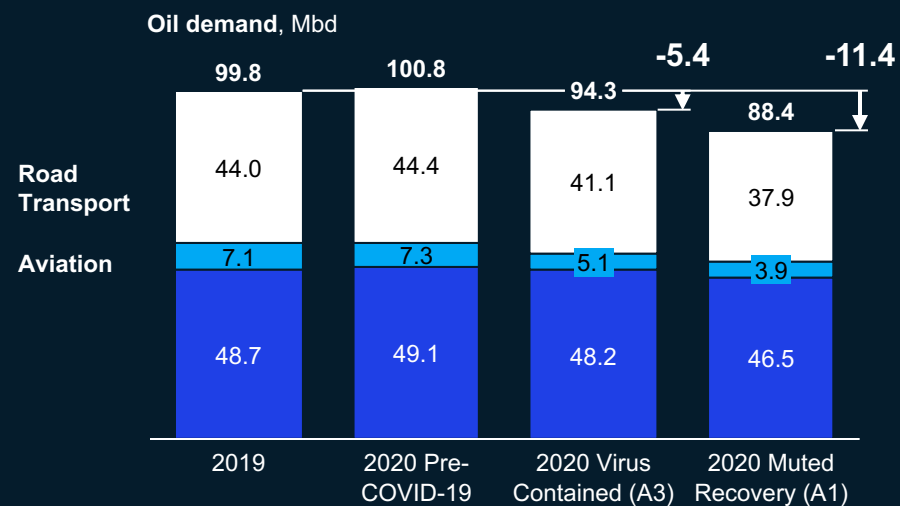
Short term demand destruction (potential to be 20mbd for April) could lead to **storage constraints and regional prices to fall even sharper**, while US drilling activity has already been cut (90+ fewer rigs running, -10+% in the last 2 weeks).

Medium-term expectations (through 2020)

Based on our global COVID-19 scenarios, **LNG demand will decline by 3-10% compared with pre-COVID-19 case** to 320-350mtpa (compared with 380mtpa supply capacity). Near-term LNG prices will be driven by cash cost economics (with gas prices in Europe and Asia at \$1-2/mmbtu premium to US gas prices)

Global oil demand substantially reduced due to restrictions in road transport and capacity declines in airlines across the world through Q3 2020

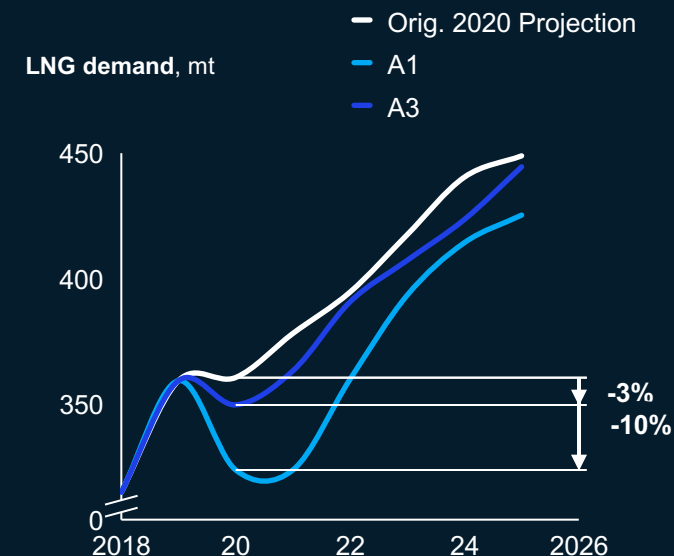
Low short-term oil prices are expected to continue for most of 2020 unless we see a large supply cut. Production shut-ins could start to materialize in the short term and help to balance the market. Potential OPEC+ deal could be reached in the next few weeks



Early thoughts on evolution post-COVID

Following the sharp oversupply, volatility in the market in the 2023-2025 horizon with sporadic tightness, followed by a period of oversupply (given 80+mtpa LNG capacity taking FID in the last 2 years)

Short term price dynamics that do not involve an OPEC+ intervention increase the likelihood of having an under-investment scenario play out in the medium-term, resulting in a new price up-cycle



Appendix

Leaders need to think and act across 5 horizons

1

Resolve

Address the immediate challenges that COVID-19 represents to the institution's workforce, customers, technology, and business partners

2

Resilience

Address near-term cash management challenges, and broader resiliency issues during virus-related shutdowns and economic knock-on effects

3

Return

Create a detailed plan to return the business back to scale quickly, as the virus evolves and knock on effects become clearer

4

Reimagination

Re-imagine the "next normal"—what a discontinuous shift looks like, and implications for how the institution should reinvent

5

Reform

Be clear about how the regulatory and competitive environment in your industry may shift



Nerve center

Managing across the 5Rs requires a new architecture based on a team-of-teams approach.

1

Resolve

Address the immediate social and mental challenges that COVID-19 represents to the institution's workforce, customers, and business partners, and take basic steps to protect liquidity.

Resolve: Making hard decisions on immediate challenges

Resolve employee, customer, supply chain, immediate liquidity, and technology concerns

Private sector focus



Emerging concerns

Employees

How do we manage safety for the returning workforce (e.g. in research labs, production facilities)? How do we offboard in socially responsible ways? Is there potential for employer controlled testing for employees?

Customers

How do I stay in touch with customers and remain relevant to them when they don't desire or need my services? How do I inspire loyalty in my customers?

Supply chain

How do we create transparency across the supply chain and customer demand?



Example actions

Implement physical mechanisms to reduce transmission (e.g., cleaning, staggering shifts)

Invest in facility and employee level equipment and supplies (e.g., cleaning)

Over-communicate with all employees on current and future plans to keep employees safe

Reskill and redeploy instead of offboarding employees where possible

Explore creative employment solutions (e.g., loan talent to other orgs, divest business line)

Leverage and educate employees on applicable government support and benefits programs

Screen employees, visitors and clients based on temperature checks, travel history and self-reported or visible symptoms

Offer testing or covering the cost of testing motivated by symptoms, contact tracing, travel history, etc.

Demonstrate flexibility to customers during times of hardship

- **Major airlines** are offering change/cancel flexibility. Most are also allowing passengers to reseat themselves on the plane in accordance with physical distancing

Going out of their way to **keep customers and employees safe** regardless of impact to balance sheet

- **Hotels in Europe and Asia** are providing “quarantine” service (e.g., room reservation with nobody next door)
- **Grocery stores** are limiting purchases of essential items, limiting the number of customers in store, and temporary closing locations for deep cleans, among other safety measures

Demonstrate **commitment to healthcare**

- **Coffeehouse chains, car rentals and shoe companies** are offering free products and services to healthcare workers
- Furniture distribution centers are being repurposed as testing centers for NHS workers

Other examples of companies **being ‘agile’ in attracting customers**

- **Rideshare companies** are pivoting to delivery
- **Local restaurants and restaurant chains** are offering free and contact-free food deliveries

Monitor supply disruption risks by mapping supplier and sub-tier connectivity to COVID-19 associated shocks

Monitor extending lead times to gauge performance and capacity against supplier promises

Map inventory end to end across the supply chain to identify current days of inventory and to predict impacts of disruptions

Validate realistic final demand with customers and ensure customers aren't exhibiting bad behaviors

Predict production capacity, logistics capacity, and availability of supply

Establish four control towers to guide demand/capacity/S&OP decisions and manage supply chain risks working with the Corporate Nerve Center

Employees: Companies should invest and prioritize to protect the safety and morale of employees unable to work from home

Private sector focus

Non-WFH employees face a unique set of concerns...



However, best-in-class companies are finding new ways to address employee concerns while protecting them from unnecessary risk:

Perceived unfairness: having to continue going into work while other employees stay home with their families

Safety risk: significant increase in potential exposure to disease (e.g., commute, customers and other employees in the workplace)

Perceived value: Don't feel as valued by company and that their safety is not prioritized

Fear of illness: In addition to clinical harm (e.g., fever, body aches), fear of being isolated from their families if ill

Major U.S. retailer

Flexible work policies including relaxing absenteeism policy (i.e. allowing workers to stay home for personal reasons)

Food delivery companies

Minimizing contact between deliverers and customers (e.g., cashless payment only, leaving bags at door, all employees provided masks and gloves)

Leading UK retailer

Extending benefits to include back-up child and elderly care (up to 25 days) and mental health benefits (e.g., teletherapy sessions)

Leading Italian banks

Limiting operating hours for all branches with access granted only upon pre-arranged appointment to minimize contact and increase sanitization time

Global coffee shop retailer

Offering 14 days of “catastrophe pay” for U.S. workers exposed to COVID-19, over 60, pregnant, or have underlying health issues (in addition to existing sick pay)

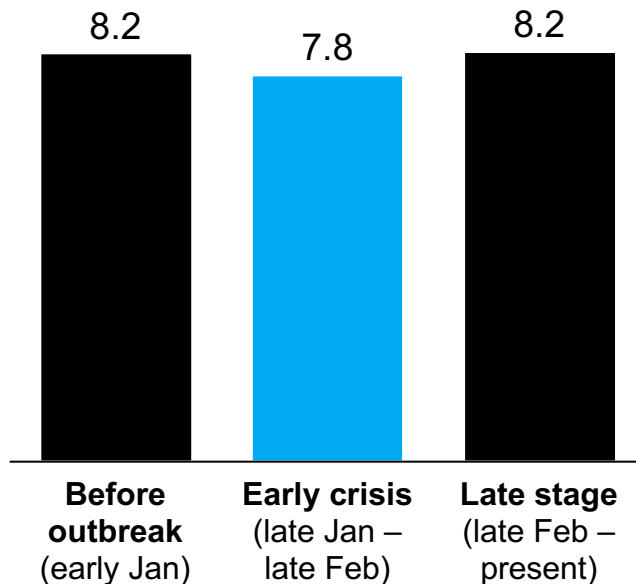
Employees: We have observed 4 key levers to maximize engagement & productivity of work from home colleagues

Private sector focus

A study China demonstrated a decrease in energy level during the pandemic

Energy Value

“What is your energy level from 1-10?” asked to 1,300 employees across 50 companies in China spanning 8 sectors



Respondents to the survey attributed the declining energy value to 3 primary factors



Blurred boundary between work and life



Anxiety deepening as the epidemic unfolded



Telecommuting unsuitable for current work flows



Energy levels started to improve as increasing normalcy was established aided by 4 levers that companies used

People

Provide psychological safety (e.g., delegate decision making powers, role model empathy)

Communicate practical WFH tips (e.g., family communication, physical and mental need mgmt.)

Structure

Define **clear objectives and key results** (OKRs) to effectively set and communicate goals and outcomes

Allow high degree of autonomy in decision making with collaboration across BUs

Process

Establish a clear cadence (e.g., pre-scheduled daily and weekly meetings, frequent check-ins)

Define **clear and integrated workflows**, align strategic goals and clarify roles and responsibilities


Technology

Leverage a **suite of digital tools / new media** to address specific work needs

Setup an **effective ergonomic, digitally enabled remote working environment** to ensure productivity

Customers: Set up agile Rapid Revenue Response squads to drive progress during the pandemic for B2B & B2C companies

Private sector focus

 Deep-dive to follow

Phase 1: Reset and calibrate



- **Understand which trends and pockets are growing** by analyzing customer insights, sentiment, and demand signals
- **Diligence all your current commercial activities** - from sales to communications to expenses
- **Align on value proposition** and what truly aligns to the immediate needs of your customers or prospects

Phase 2: Activate key levers



Prioritize B2B and B2C commercial levers to pursue:

- **Sales and channel:** Identify realistic opportunities and high growth channels, build remote selling capabilities, invest in customer outreach and customer service preparedness
- **Pricing/Promo:** reset pricing / discounts to meet customers' evolving near-term needs
- **Marketing:** Reinvest marketing spend across opportunities and high-traffic channels that will drive highest ROI growth; ensure tone is sensitive, relevant and authentic
- **Product / CX:** Adjust offerings/SKUs to meet customers' demand signals; establish genuine connection with customer and employee needs
- **Commercial Cost/Cash:** Manage discretionary spend, both working and non-working, re-allocating rapidly

Phase 3: Read and respond



- **Evaluate performance of tactics activated**, likely re-setting ROI measurement approach
- **Continually optimize tactics** that work
- **Align on next wave of commercial tactics** by integrating new customer insights and market demand signals

Repeat and optimize: "Activate key levers" and "Read and respond"

Customers: Deep-dive on Sales & Channel and Pricing & Promotions for B2B and B2C companies

Private sector focus

Sales and channel



B2B

Identify and prioritize highest ROI sales initiatives

Review customer account coverage based on the customer's new operating model

Empower sales teams to sell remotely with remote trainings, adequate remote working equipment and a realistic view of pipeline opportunities

Invest in internal information and update demand tracking and forecasting

Get creative with customer outreach – pull in leadership, invest in company banners for video backdrops, shift some rewards and recognition to new work-from-home reality

B2C

Identify existing high-growth channels (e.g. eCommerce) and explore launching new and innovative channels— especially leveraging the gig economy with new workers are likely entering the workforce daily

Ensure digital shelf and assortment are fully represented

Empower salesforce for remote and virtual work

Optimize on-site performance and double down on customer service preparedness

Pricing and discounts



Understand customers evolving needs

Implement “flex pricing”, value-focused messaging and loyalty rewards. Think about way to meet near-term customer needs, without needlessly destroying long term value (e.g., de-bundle offering, one time discounts)

Ensure efficient deal execution process. Stand up a “value council” to develop clear guidelines and objectives for the commercial team to follow

Refresh item segmentation based on new shopping behaviors

Cater promotions to the current context with a focus on “if/then” plans, context specific products and services, eCommerce channels, etc.

Constantly reevaluate promotional effectiveness through the crisis

Consider loosening return / cancellation policies and offering financing opportunities for larger purchases

Supply chain: Actions to consider in response to COVID-19

Private sector focus

Immediate (1-4 weeks)

- Understand exposure**
- Estimate how demand changes across customers
 - Leverage **direct communication channels with direct customer** when determining demand signals
 - Use market insights/external databases to **estimate demand for customer's customers**
 - Task S&OP team to build 3-6 plans under a range of demand scenarios month to determine required supply**
 - Determine how supply will be impacted and understand key risks**
 - Work with tier 1 suppliers to understand supply chain risks throughout all tiers**; complement with outside-in analytics where tier 1s do not have transparency
 - Account for all inventory (e.g., in transit, in warehouses, in spares stock) and calculate inventory buffer**
 - Conduct scenario planning** to understand how inventory buffer changes in various disease scenarios
 - Run **supply chain "stress tests" vs. supplier balance sheets** to understand when supply issues will start to stress financial or liquidity issues
 - Assess whether border closures or restrictions will disrupt supply chain**
-
- Take action to address anticipated shortages**
- Evaluate any option for new supply sources**
 - Identify alternative sources** if supplies are affected and accelerate exploration of additional options
 - Determine possible geographies and supplier shortlists** in case alternate supply is required
 - Identify ways to expedite qualification process** and/or insource for components where supply is threatened
 - Contact authorities in areas where **customs clearance could become a challenge**
 - Determine what portion of supply can be swung to another site** if shutdown persists **based on sourcing strategy** (single, dual, multi)
 - Revise production plans as required** based on:
 - Expected supply shortages
 - Products in most consumer need, with highest margin, or and highest opportunity cost / penalty production
 - Understand robustness of current supply chain logistics**
 - Estimate **available logistics capacity; pre-book air freight¹ / rail capacity** as required by current exposure
 - Collaborate** with all parties to **jointly leverage freight capacity, new/alternate supply** sources, etc.
 - Other actions**
 - Watch for extending lead times** to gauge performance and capacity against supplier promises
 - Use after sales stock as bridge** to keep production running if needed
-
- Protect employees and suppliers**
- Work with supplier to source personal protective equipment for production lines** operating in affected markets (e.g., glasses, gloves and masks)
 - Engage with crisis communication teams to **clearly communicate to employees** on infection risk concerns (e.g., disseminate facts about virus from credible source) and work from home options
 - Consider short-term stabilization for suppliers** (e.g., low-interest loan) to allow for a faster restart

Mid-term (4-12 weeks)

- Continuously improve material supply stability**
- Identify alternative options based on anticipated demand**
 - Evaluate **alternative sourcing options for all the materials impacted** – availability of suppliers, additional cost due to logistics, tariffs, estimate of price increase of the components
 - Enhance the **demand verification process** to correct inflated demand to mitigate the bullwhip effect
 - Provide support for smaller suppliers**
 - Provide continuous **support for mid-small size tier 2-3 suppliers** in financial troubles
 - Assess **regional risks** for current and backup suppliers
-
- Kick off designing resilient supply chain for the future**
- Codify & digitize processes and tools**
 - Codify the processes and tools** created during the crisis management as formal documentation
 - Digitalize process and tools** to integrate demand, supply, and capacity planning
 - Develop systems to "bullet proof" supply chain**
 - Convert war room into a **reliable supply chain risk management process**
 - Ensure stakeholders **address vulnerabilities** across all parts of the supply chain
 - Trigger the new supply network **design for resilience**
-
- Build collaborative relationship w/ ext. partners**
- Work with government to ensure industry can ramp up as quickly as possible** as crisis resolves
 - Actively engage investors** and other stakeholders to build transparency on the situation and get help

1. Given costs, airfreight might not be an option for many industries; availability is already limited

2

Resilience

Address near-term cash management challenges,
and broader resiliency issues

6 steps toward end to end resilience plan

01

Identify and prioritize key risks

Identify and prioritize key macro, sector and company idiosyncratic risks based on exposure and impact

02

Develop tailored scenarios

Develop company specific scenarios based on the range of outcomes of the highest priority risks

03

Conduct stress testing of financials

Stress test the P&L, Balance Sheet, Statement of Cash Flows to assess and frame the potential gaps for planning

04

Establish portfolio of interventions

Identify an end to end portfolio of interventions and trigger points

05

Set up a cash management dashboard

Improve cash transparency and implement tighter cash controls to mitigate downside scenarios

06

Build the resilience dashboard

Build the dashboard of key leading indicators to monitor that can be dynamically updated

1&2: Efforts require continuous re-evaluation of financial and market forecasts and corresponding actions

1. Identify key risks

Key activities

- Understand the **impact of key macroeconomic variables** (e.g., GDP, unemployment rate) on performance of your of PnL (e.g., revenue and cost)
- Impacted PnL variables could include:
 - **Volume:** consumer demand correlated with GDP
 - **Cost:** Commodity price evolution (e.g., oil and gas, food index) correlates with COGS
 - **Price:** housing prices and inflation correlate with price customers are willing to pay
- Refine a final list of no more than ~20 macroeconomic variables with **quantified impact** to key PnL items

Sample output

	Key risks identified	Impact Likelihood		
		Manageable/ Remote	Major/ Possible	Critical/ Probable
1: Macroeconomic risks	Economic (incl. currency) volatility	●	●	●
	Downturn/recession in key markets (including level of disposable income, GDP growth, unemployment)	●	●	●
	Inflationary pressures	●	●	●
2: Market/ commodity price risks	Oil prices	●	●	●
	Commodity prices of key raw materials	●	●	●
	Indirect tax increases and/or significant restrictions on marketing	●	●	●
3: Other/ Idiosyncratic risks	Failure to shape or participate in critical industry/consumer trends or consolidation eroding competitive position	●	●	●
	Non-compliance with areas of higher regulatory scrutiny	●	●	●
	Failure to manage key sustainability risks	●	●	●
	Failure to deliver value from acquisitions	●	●	●
	Cyber threats against most important digital assets	●	●	●
	Unstable or hostile political environments	●	●	●
	Data privacy breach harming trust/reputation	●	●	●
Changes in international tax environment	●	●	●	



2. Develop tailored scenarios

- **Develop scenario narratives** for Baseline and ~2-3 adverse scenarios, with overlay for duration and magnitude of Covid-19 near term shock
- **Contextualize scenarios with assumptions** on macroeconomic variables (e.g., in worst-case GDP declines 20%)
- For each scenario, **link macroeconomic projections back to PnL** (e.g., best-case scenario includes 10% drop in demand, 20% drop in price, and 30% drop in COGS)
- Ensure scenarios capture strategic, financial and operational risks with consideration of 2nd order impacts

		Increasing severity			
		Baseline	Adverse 1: [...]	Adverse 2: Adverse 1 + [...]	Adverse 3: Adverse 2 + [...]
Growth	Global GDP	Growth rises to 2.5% in 2017	Growth slows to just over 2.2%	Growth slows to just over 2.2%	
	Country specific	[...]	[...]	[...]	
Commodity Prices	Oil	Prices rise by ~70% by 2021	Prices rise by ~60% by 2021	Prices rise by ~60% by 2021, but are more volatile	
	[...]	Prices rise by 10%	Prices rise by just under 9%	Prices more volatile due to contagion	
Employment Costs	US	Wages flat	Wages fall in real terms	Wages fall in real terms	Same as Adverse 2
	[...]	Wages flat	Wages flat	Wages fall in real terms	
Exchange rates	Major currencies	Euro and Pound weakening relative to Dollar	Near term Euro and Pound appreciation relative to Dollar	Near term Euro and Pound appreciation relative to Dollar followed by substantial weakening	
	Emerging market currencies	Stable	Stable	Stable	
[...]		No	No	No	[...]

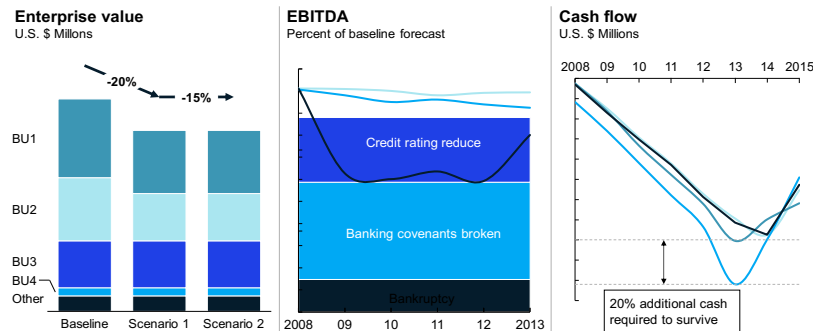
3&4: Efforts require continuous re-evaluation of financial and market forecasts and corresponding actions

3. Conduct stress testing of financials

Key activities

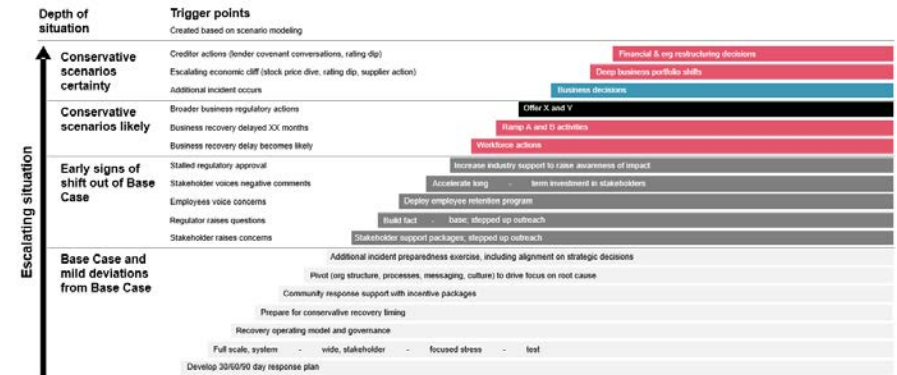
- For each scenario,
 - assess impact on the financial statements (P&L, Balance Sheet and Cash Flows)
 - assess gap relative to Baseline
- Run simulations at Corporate level to assess range of outcomes to assess impact on credit quality, cash and liquidity
- Run 'reverse stress-tests' to determine conditions for credit/liquidity crunch

Sample output



4. Establish portfolio of interventions

- Prioritize critical areas of **exposure** and areas of **lower/risk uncertainty**
- Define & size **portfolio of potential interventions** (across operations, supply chain, capital, targeted M&A and divestitures and customer engagement)
- Launch quick wins on **immediate stabilization** (supply and demand-side) related to Covid-19
- Identify which are “no regrets” vs. trigger based and get pre-approval for higher risk moves, with clear agreement on conditions for activation



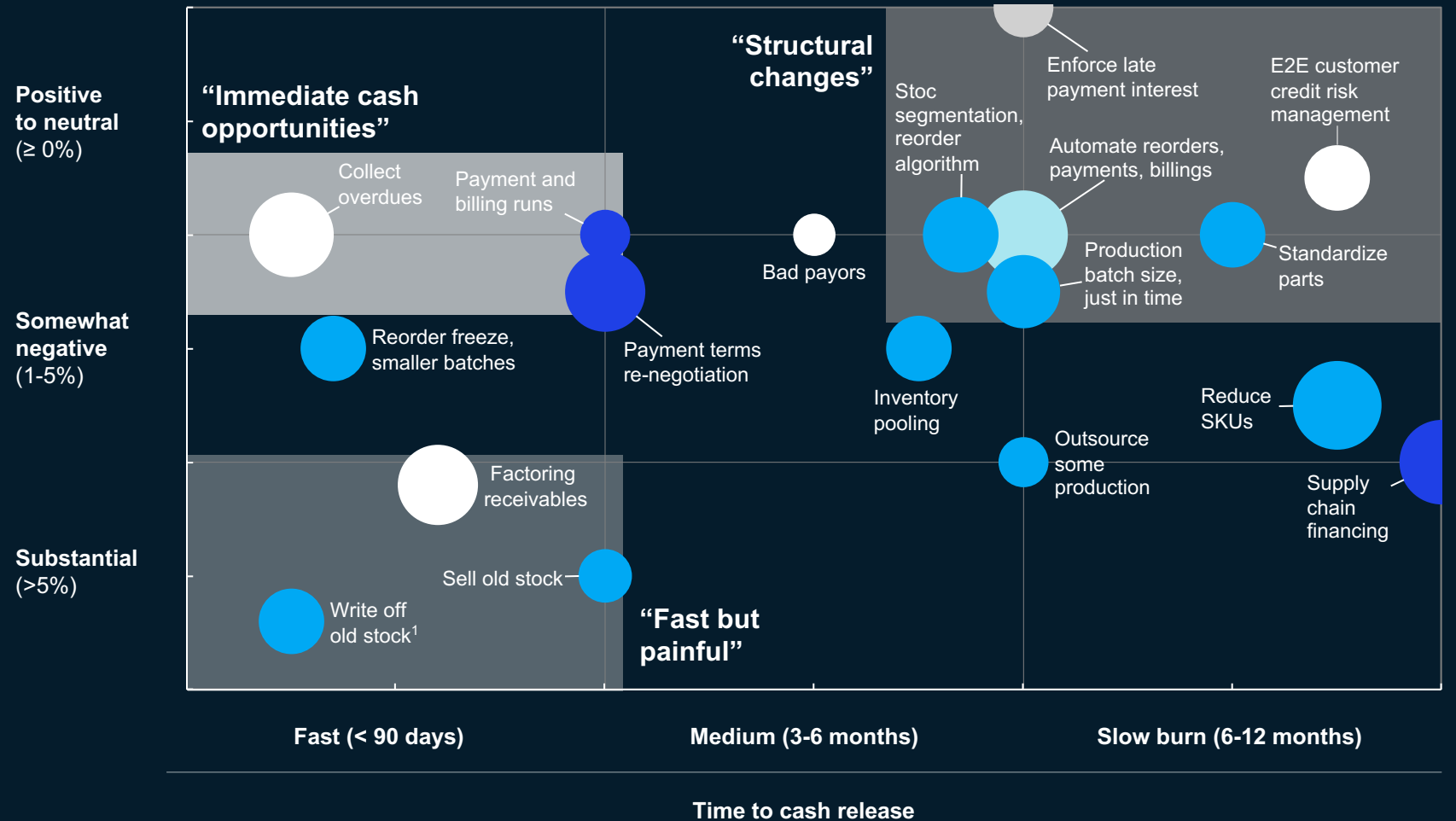
5: Example cash management dashboard: Prioritization of initiatives related to cash

Not Exhaustive

Typical EBIT impact (% of cash release)

Bubble size represents typical cash impact

● Receivables ● Inventory ● Payables ● Cross-cutting



1. No cash release

6: Example resilience scorecard: Outside-in perspective & select benchmarks

“Inside assessment” would reveal “strengths & weaknesses” in Co 1’s resilience

DISGUISED EXAMPLE

	Marker of resilience	Metric (outside-in metrics)	Metric performance					Rank
			Co 1	Co 2	Co 3	Co 4	Co 5	Co 1
Through cycle interventions: Revenue	Track record of growth	Short-term Sales growth, 2018-2020 CAGR %	-10%	5%	10%	-5%	5%	
		Long-term Sales growth, 2013-2020 CAGR %	-5%	5%	10%	5%	15%	
Through cycle interventions: Costs	Starting point of cost structure & track record of margin improvement	Gross Profit/Sales %, 2020	25%	10%	30%	15%	20%	
		SG&A/Sales %, 2020	6%	7%	9%	8%	5%	
		R&D/Sales, 2018-2020 avg	10%	8%	4%	6%	2%	
		Long-term Adj EBITA margin delta, 2020 vs 2013 %pts	2%	-5%	10%	-5%	2%	
		Long-term TRS track record	Long-term TRS, 2013-2020 avg (also revenue contribution indicator)	10%	-5%	10%	5%	25%
Sharp Digital	[...] N/A outside-in measurement							
Unlock Balance Sheet	Healthy Balance Sheet with sufficient headroom	(Net debt and pension + OPEB) /market cap, 2020	0.5	0.2	(0.2)	(0.5)	0.2	
		(Net debt and pension + OPEB) /EBITDA, 2020	1.5	0.5	(1.0)	(2.0)	0.5	
Band of Leaders	C-suite and Board having diversity of background and relevant experience of leading businesses through a downturn	% of C-suite leaders who have been in C-suite roles during last recession	50%	40%	20%	50%	45%	
		% of Board members who have been CEOs of F-1000 companies during major crisis events/ downturns	30%	20%	0%	0%	10%	
		% of C-suite leaders who have a different background from the CEO	100%	70%	85%	75%	30%	
Organization Simplification	Lower Org complexity	FTE per Sales (# Employees per \$M USD), 2020 (outside-in indicator)	1.0	1.2	1.5	1.5	1.8	
Resilience Nerve Center	Early, disciplined decisions in the past – indicator of a nerve center driven approach	Short-term change in Adj EBITA, 2020 vs. 2018 %pts	0%	-5%	5%	-5%	5%	
		Change in (Net debt and pension + OPEB) /EBITDA, 2020 vs. 2018 %	0%	50%	-10%	90%	-50%	

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