



# **CMI State of the Market: Early Indicators of COVID-19 Impact on Customers (Partner Version)**

As of April 10, 2020

Internal | SAP Employees and Partners Only



**Note: Due to fast-moving market conditions, CMI will update this document periodically, as warranted.**

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COVID-19 is a humanitarian crisis that is also creating an unprecedented business disruption. In response, CMI has developed this multi-dimensional analysis, which focuses on how COVID-19 will impact customers, their expected resiliency, and the post-pandemic challenges they will likely face.

CMI experts also analyzed 25 industries from a global perspective, assessing each industry's resiliency to COVID-19.

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#### Sources used:

- Cleveland Research
- Fitch
- The Economist
- GlobalData
- Gartner
- IDC
- McKinsey & Company
- FactSet
- Goldman Sachs
- Moody's
- IBISWorld

# Assumptions

## Note

Due to fast-moving market conditions, CMI will update this document periodically, as warranted.

**Timing:** Assumes an optimistic scenario where quarantines and government lockdowns are successful in mitigating the spread of the virus and “flattening” the curve by the end of Q2 FY20, resulting in a staged re-opening of communities by the end of Q3 FY20, and a beginning to business recovery in Q4 FY20.

**Global:** Reflects an aggregate (or averaged) global view, recognizing that each country is potentially on its own “curve” and some will rebound earlier than others.

**Macro Industry:** Reflects macro -industry categorization (macro SIC code), recognizing that within a macro industry there will be sub-industries that are impacted much differently than others, and there may be counter-growth trends at the sub-category level.

**GDP vs. IT:** Reflects the general impact to an industry’s total global economic output for the year (GDP), which may or may not trend similar to IT spend in that industry due to specific characteristics that either reduce or increase spending on specific IT-related capabilities during the rebound.

**Macroeconomic:** Assumes a mild economic recession, including massive short-term disruption to employment, but mitigation by government stimulus.

# COVID-19 Global Customer Impact\* by Industry Exposure

**RED** mostly shut down  
**ORANGE** mostly shut down with exceptions  
**YELLOW** mostly open with exceptions  
**GREEN** minimal disruption to normal operations

## Industry Exposure to COVID-19

## Themes Impacting Exposure

<p><b>Severe</b></p>	<p>Aerospace &amp; Defense            Automotive            Higher Education &amp; Research            Industrial Machinery &amp; Components            Oil &amp; Gas            Professional Services            Sports &amp; Entertainment            Travel &amp; Transportation</p>	<ul style="list-style-type: none"> <li>Large-scale, non-critical, labor-intensive manufacturing shutdown</li> <li>Dependence on physically present workforce, customers, students</li> <li>Greatest impact from travel restrictions, bans, and social distancing measures</li> </ul>
<p><b>High</b></p>	<p>Chemicals            Mill Products            Mining            Public Sector            Retail</p>	<ul style="list-style-type: none"> <li>Many industries have shut down with exceptions for essential services and products</li> <li>Impacted by up- and downstream supply chain disruption and volatile consumer purchasing</li> <li>E-commerce providing limited business continuity for retailers</li> </ul>
<p><b>Moderate</b></p>	<p>Banking            Consumer Products            Defense &amp; Security            Engineering, Construction &amp; Operations            High Tech            Insurance            Life Sciences            Utilities            Wholesale Distribution</p>	<ul style="list-style-type: none"> <li>Industries that have undergone or can undergo digitalization to maintain business operations</li> <li>Less exposure to supply chain disruption and have ability to adapt to critical needs</li> <li>Persistent customer demand for “essential” components</li> </ul>
<p><b>Minimized</b></p>	<p>Healthcare            Media            Telecommunications</p>	<ul style="list-style-type: none"> <li>Critical and in-need services</li> <li>Support human needs for health, connection, and remote work</li> <li>Focusing operations on COVID-19 response</li> </ul>

# Global Customer Resiliency to COVID-19 Disruption

**RED** mostly shut down  
**ORANGE** mostly shut down with exceptions  
**YELLOW** mostly open with exceptions  
**GREEN** minimal disruption to normal operations

## Short-Term Industry Exposure (Q2 FY20) Ability to Recover

Aerospace & Defense	Low
Automotive	Low
Higher Education & Research	Medium/High
Industrial Machinery & Components	Low
Oil & Gas	Low
Professional Services	Medium
Sports & Entertainment	Medium
Travel & Transportation	Low
Chemicals	Low/Medium
Mill Products	Low
Mining	Low
Public Sector	High
Retail	Medium
Banking	High
Consumer Products	Medium
Defense & Security	High
Engineering, Construction & Operations	Low
High Tech	Medium
Insurance	High
Life Sciences	Low/Medium
Utilities	High
Wholesale Distribution	Low
Healthcare	Medium
Media	High
Telecommunications	High

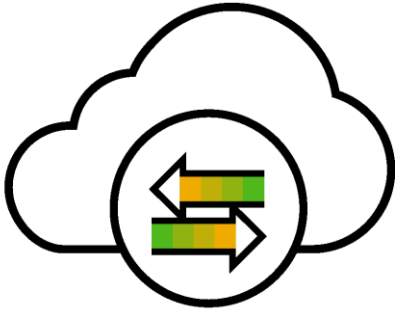
## Mid-Range (2H20)\*

Aerospace & Defense	Low
Automotive	Low
Higher Education & Research	Medium/High
Industrial Machinery & Components	Low
Oil & Gas	Low
Professional Services	Medium
Sports & Entertainment	Medium
Travel & Transportation	Low
Chemicals	Low/Medium
Mill Products	Low
Mining	Low
Public Sector	High
Retail	Medium
Banking	High
Consumer Products	Medium
Defense & Security	High
Engineering, Construction & Operations	Low
High Tech	Medium
Insurance	High
Life Sciences	Low/Medium
Utilities	High
Wholesale Distribution	Low
Healthcare	Medium
Media	High
Telecommunications	High

## Long-Term (2021 and beyond)

Aerospace & Defense	Low
Automotive	Low
Higher Education & Research	Medium/High
Industrial Machinery & Components	Low
Oil and Gas	Low
Professional Services	Medium
Sports & Entertainment	Medium
Travel & Transportation	Low
Chemicals	Low/Medium
Mill Products	Low
Mining	Low
Public Sector	High
Retail	Medium
Banking	High
Consumer Products	Medium
Defense & Security	High
Engineering, Construction & Operations	Low
High Tech	Medium
Insurance	High
Life Sciences	Low/Medium
Utilities	High
Wholesale Distribution	Low
Healthcare	Medium
Media	High
Telecommunications	High

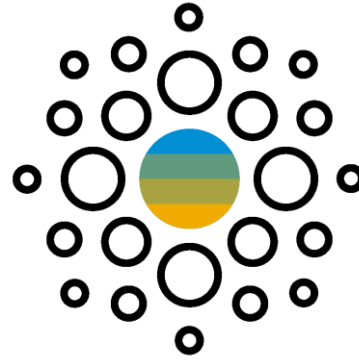
# CMI Perspective



## Expect customer demand for cloud solutions to accelerate at the expense of on-premises

What had been a regionalized cloud adoption trend will now become global and accelerate.

Expect customers to exchange on-premises projects for cloud ones that can provide continuity from future crises.



## Expect demand for digital transformation initiatives to accelerate

Customers will realize that the more digitalized their business, the more continuity they can ensure when facing future global crises.

Demand for multi-sales-bag competes will likely increase, necessitating a focus on larger customers with more resilient IT budgets.



## Expect customers to embrace new business models that favor automation and analytics

Supply chain/sourcing agility, contingent workforce management, and horizontal automation will become stronger business priorities.

Digitalization and automation will enable customers to both ensure continuity and remain competitive.

# Industry Perspectives

## Industries

- Aerospace & Defense
- Automotive
- Banking
- Chemicals
- Consumer Products
- Defense & Security
- Engineering, Construction & Operations
- Healthcare
- High Tech
- Higher Education & Research
- Industrial Machinery & Components
- Insurance
- Life Sciences
- Media
- Mill Products
- Mining
- Oil & Gas
- Professional Services
- Public Sector
- Retail
- Sports & Entertainment
- Telecommunications
- Travel & Transportation
- Utilities
- Wholesale Distribution



# Aerospace – COVID-19 Impact Estimates



## Key industry sub-categories

(Commercial + Military)

- Aircraft & Parts
- Guided Missiles & Space Vehicles
- Propulsion Unit Parts
- Space Vehicles
- Tanks & Components
- Navigation Equipment

## COVID-19 trends and dynamics

### Initial Factors:

- Drastically reduced workforce (shutdown)
- Complex, global supply chain dependencies
- High cash flow, capital cost pressures

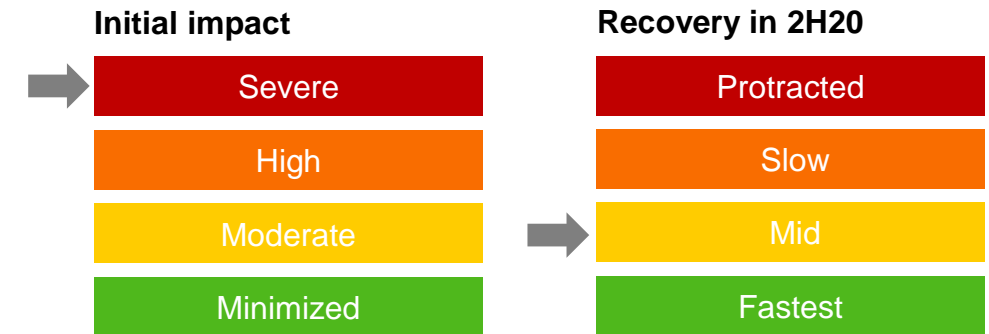
### Recovery Considerations:

- Structural demand destruction to airline industry
- Global government budget dislocation due to stimulus
- Furlough workforce creates skills dislocation and risk

## Post-crisis IT opportunities

- Flexible, modular, alternative manufacturing
- Supply chain management, new supply discovery
- Factory automation, reduced human labor risks
- Specialty skills, talent development, and continuity (HR)
- Cybersecurity, IP, risk management

## COVID-19 Estimated Industry Impact



# Automotive – COVID-19 Impact Estimates



## Key industry sub-categories

- Manufacturing & Retail Motor Vehicles
- Automotive Leasing
- Repair & Service Shops
- Farm Machinery & Equipment
- Industrial Trucks, Tractors, Trailers & Stackers

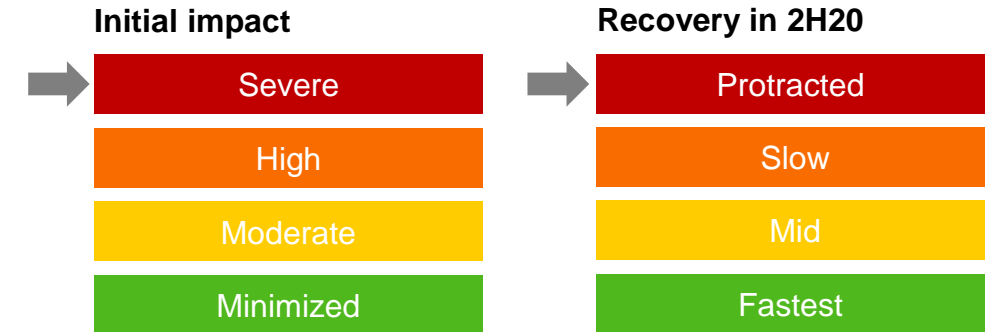
## COVID-19 trends and dynamics

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|---|---|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Production freezes occurring globally</li> <li>• After-market (maint. and repair) kept open/critical</li> <li>• Cross-border supply chain dependencies</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• China 1<sup>st</sup> to restart capacity, other countries dependent on safety</li> <li>• Unemployment shock creates demand shock for durable goods</li> <li>• Furlough workforce creates skills dislocation and risk</li> </ul> |
|---|---|

## Post-crisis IT opportunities

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|--|---|
| <ul style="list-style-type: none"> <li>• Digital, touchless dealership retail experience</li> <li>• Factory automation, reduced human labor risks</li> </ul> | <ul style="list-style-type: none"> <li>• Flexible, modular, alternative manufacturing</li> <li>• Automotive telematics (digital services, safety services)</li> <li>• Alternative business models (delivery, transportation, etc.)</li> </ul> |
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## COVID-19 Estimated Industry Impact





# Banking – COVID-19 Impact Estimates

## Key industry sub-categories

- Federal Reserve Bank
- Commercial Banks
- Brokers
- Investors
- Savings Institutions
- Tax Preparation
- Credit Reporting

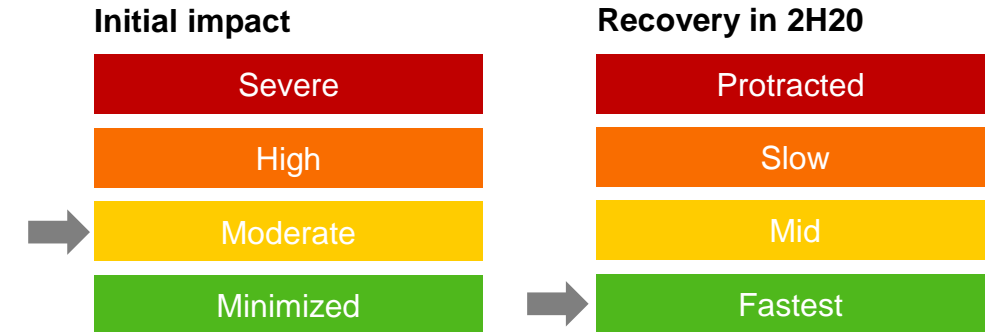
## COVID-19 trends and dynamics

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|---|--|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Largely operational; a critical service</li> <li>• Robust digital/online banking infrastructure</li> <li>• Branch office closures as safety requires</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Consumer credit already at all-time high pre-COVID</li> <li>• Potential wave of defaults, delayed loan payments, loan forbearance</li> <li>• Margin compression as federal reserves deploy stimulus</li> </ul> |
|---|--|

## Post-crisis IT opportunities

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|--|---|
| <ul style="list-style-type: none"> <li>• Accelerated digital banking innovation</li> <li>• Retail, branch experience transformation</li> </ul> | <ul style="list-style-type: none"> <li>• Consumer relationship/experience management</li> <li>• Big Data/analytics for risk management</li> </ul> |
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## COVID-19 Estimated Industry Impact



# Chemicals – COVID-19 Impact Estimates



## Key industry sub-categories

- Plastics Materials
- Synthetic Rubber
- Cellulosic Fibers
- Paint
- Fertilizers, Mixing Only
- Pesticides, NEC
- Adhesives & Sealants
- Explosives

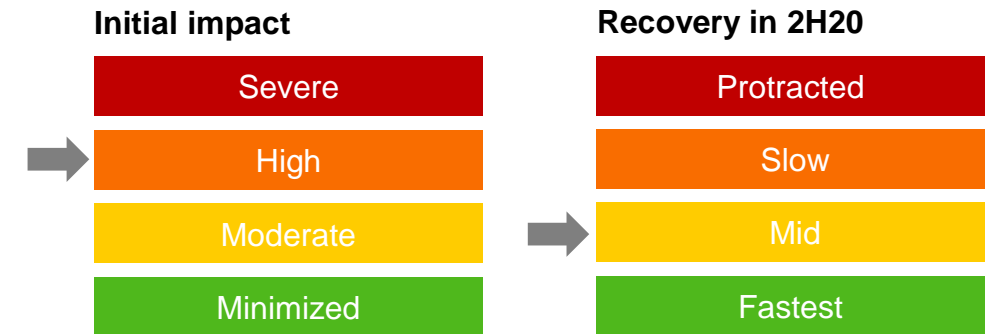
## COVID-19 trends and dynamics

- Initial Factors:**
- Demand drop for specialty chemicals; agriculture less impacted
- Recovery Considerations:**
- Selected COVID-related chemicals surging in demand (safety products)
  - Rising cost of source materials

## Post-crisis IT opportunities

- Discovery of substitute chemical use/buyers
- Elastic production (operating scalability up/down)
- Factory automation, reduced human labor risks
- Inventory management, supplier/buyer matching
- Supply chain analytics and cost optimization

## COVID-19 Estimated Industry Impact



# Consumer Products – COVID-19 Impact Estimates



## Key industry sub-categories

Producers of:

- Food & Drink (incl. farm products)
- Clothing
- Furniture & Appliances
- Cleaning Goods

## COVID-19 trends and dynamics

Initial Factors:

- Increased demand for essential goods (food, safety)
- Stable supply/delivery chains
- Sharp demand drop for most non-essential consumer spend items

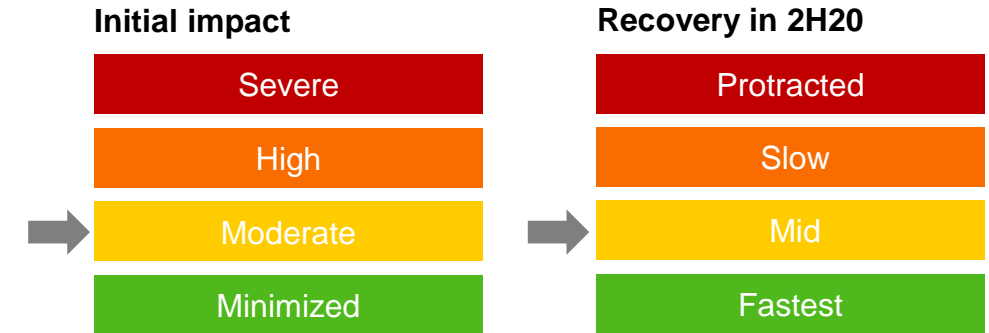
Recovery Considerations:

- Persistent inventory dislocations for selected high-demand items
- Suppressed demand for consumer non-discretionary and luxury goods
- New border logistics challenges

## Post-crisis IT opportunities

- Accelerated e-commerce, online
- New priority around direct (brand to consumer)
- Shift toward delivery/pickup
- Predictive demand/inventory management
- Product safety and wellness
- Cost reduction (sourcing, production, go to market)

## COVID-19 Estimated Industry Impact



# Civil Defense and Security – COVID-19 Impact Estimates



## Key industry sub-categories

(State/local government)

- National Security
- Police Protection
- Legal Counsel & Prosecution
- Correctional Institutions
- Fire Protection
- Public Order & Safety

## COVID-19 trends and dynamics

### Initial Factors:

- Many services considered critical emergency “first-responder”
- Critical administration services moving to virtual
- Safety issues rising

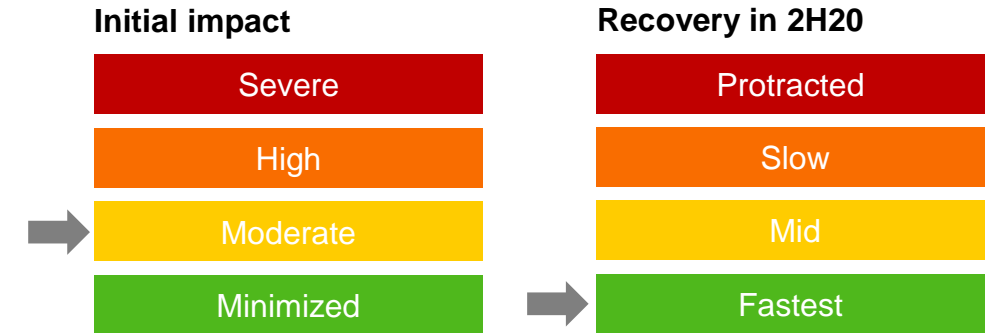
### Recovery Considerations:

- Workforce safety
- Available workforce; difficulty with large-scale staffing and training
- Financial budgets remain intact

## Post-crisis IT opportunities

- Digital/e-government/e-citizen initiatives
- Big Data/analytics to track, monitor, and respond to public health and safety issues
- Remote, virtual monitoring and tactical management of environments (drone, autonomous, etc.)
- Flexible “supply chains” of people and equipment across emergency service departments and jurisdictions

## COVID-19 Estimated Industry Impact



# Engineering & Construction – COVID-19 Impact Estimates



## Key industry sub-categories

- General Contractors
- Public Infrastructure
- Special Trade Contractors (incl. plumbing, electrical, painting, carpentry)
- Lessors of Real Property
- Real Estate Agents & Managers

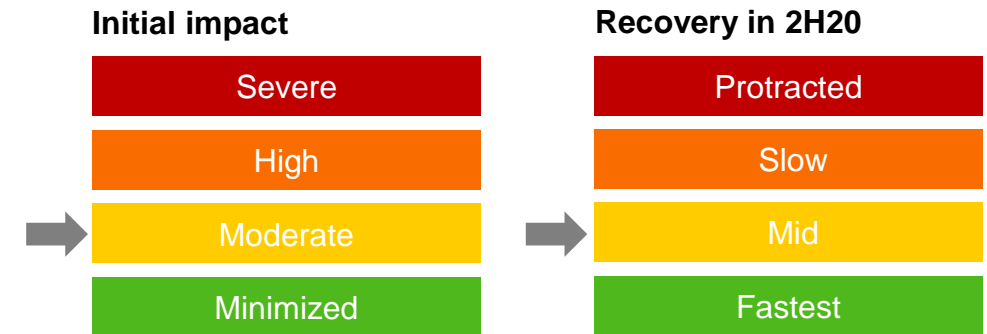
## COVID-19 trends and dynamics

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|---|---|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Lack of materials due to supply chain issues (in particular from China)</li> <li>• Revised safety and operating procedures</li> <li>• Slowdown in processing of building permits</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Project cancellations/reductions</li> <li>• Contract &amp; financial risk management</li> <li>• Residential sector correlated to economic recovery</li> <li>• Labor availability</li> </ul> |
|---|---|

## Post-crisis IT opportunities

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|---|--|
| <ul style="list-style-type: none"> <li>• New regulatory requirements impacting design and build, combined with reimagined existing physical buildings in light of new occupancy laws</li> </ul> | <ul style="list-style-type: none"> <li>• Workforce management (health, safety)</li> <li>• Adoption of new technology (pre-fabrication, 3D printing, robotics)</li> </ul> |
|---|--|

## COVID-19 Estimated Industry Impact



# Healthcare – COVID-19 Impact Estimates



## Key industry sub-categories

- Offices & Clinics (incl. dentists, medicine, optometrists)
- Care Facilities
- Hospitals
- Laboratories
- Health & Allied Services

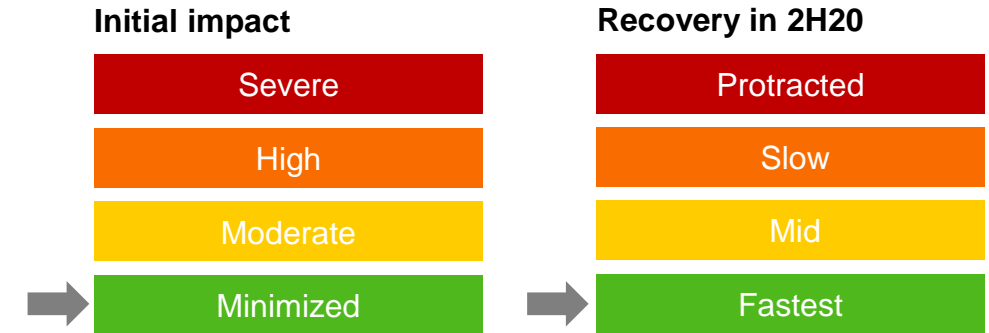
## COVID-19 trends and dynamics

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|--|--|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Crisis management for capacity and equipment (ventilators, PPE)</li> <li>• Non-traditional manufacturers to meet demand</li> <li>• Cancellation of elective surgeries</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• System capacity beyond COVID-19</li> <li>• Availability of critical healthcare personnel, safety of medical staff</li> <li>• Ongoing disruption of critical supply availability</li> </ul> |
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## Post-crisis IT opportunities

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|--|--|
| <ul style="list-style-type: none"> <li>• Digitalization – adoption of telemedicine, remote diagnostic devices/aids, digital records, insurance, and payment</li> <li>• Resource management and availability</li> </ul> | <ul style="list-style-type: none"> <li>• Increased global healthcare co-operation and dependencies, shared data strategies</li> <li>• Expedited R&amp;D/clinical trials, testing, tracking, compliance</li> <li>• Big Data, analytics-based decisions</li> </ul> |
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## COVID-19 Estimated Industry Impact





# High Tech – COVID-19 Impact Estimates



## Key industry sub-categories

- Computing
- Mobile
- Software
- Electronic Components
- IoT & Robotics
- \*Excludes IT Services

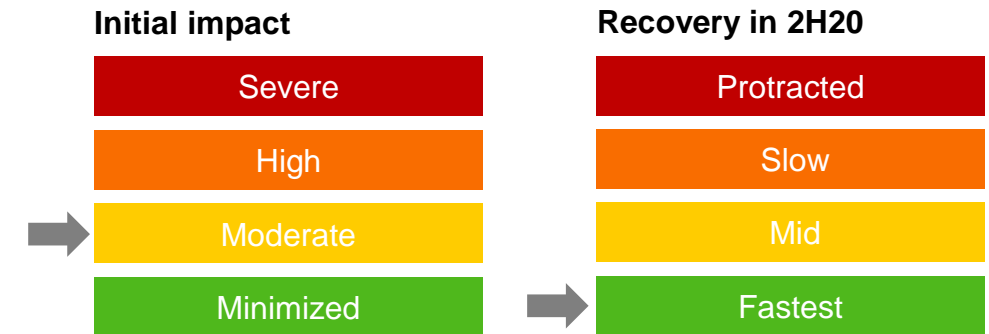
## COVID-19 trends and dynamics

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|--|---|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Parts shortage due to supply chain issues</li> <li>• Labor disruption to hardware manufacturing</li> <li>• Software related to collab. and comms. seeing spike in demand due to WFH</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Impact to global distribution of devices</li> <li>• Increased used of cloud software/alternate consumption models</li> <li>• Increased use of tech. to aid recovery resiliency of industries</li> </ul> |
|--|---|

## Post-crisis IT opportunities

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Growing role of cloud and software to drive automation initiatives in other industries</li> <li>• Automated manufacturing and testing</li> </ul> | <ul style="list-style-type: none"> <li>• New device innovation around WFH and remote workspaces (e.g., AR/VR, connectivity)</li> </ul> |
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## COVID-19 Estimated Industry Impact



# Higher Education & Research – COVID-19 Impact Estimates



## Key industry sub-categories

- Schools
- Colleges/Universities
- Technical Institutes
- Libraries
- Research Organizations

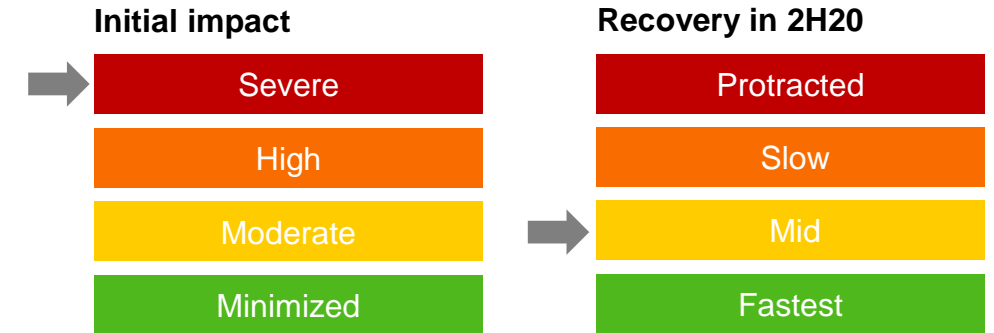
## COVID-19 trends and dynamics

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| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Significant impact due to school/college closures</li> <li>• Alternative delivery of essential school services (meals, child psychology, curricular activities, etc.)</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Investment/adoption of remote and e-learning</li> <li>• Impact to downstream academic outcomes, college graduate hiring</li> <li>• Reduced private school enrollment</li> <li>• Selective grants &amp; funding</li> </ul> |
|--|---|

## Post-crisis IT opportunities

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Remote and e-learning, alternative course development</li> <li>• Virtual student management</li> </ul> | <ul style="list-style-type: none"> <li>• Facility security &amp; cleanliness</li> <li>• Digitization of libraries</li> </ul> |
|---|--|

## COVID-19 Estimated Industry Impact





# Industrial Machinery & Components – COVID-19 Impact Estimates

## Key industry sub-categories

- Machinery Manufacturing
- Ship Building & Repairing
- Railroad Equipment
- Lab Furnishings
- Optical Instruments & Lenses
- Construction Equipment Rental

## COVID-19 trends and dynamics

### Initial Factors:

- Disrupted supply chain, including downstream demand, requiring alternate sourcing
- Social distancing hinders workforce

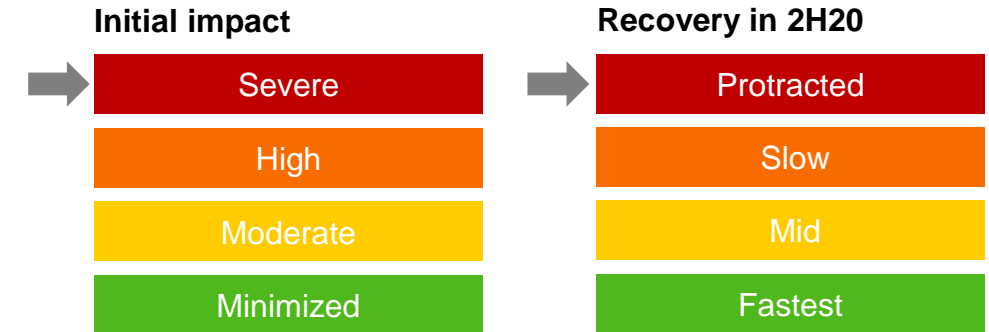
### Recovery Considerations:

- Correlated to macroeconomics for demand-side recovery
- China recovery
- Alternate contractual models

## Post-crisis IT opportunities

- Multi-purpose machinery and components
- Factory automation, reduced human labor risks
- Flexible, modular, alternative manufacturing
- Supply chain management, alternate supply discovery

## COVID-19 Estimated Industry Impact



# Insurance – COVID-19 Impact Estimates



## Key industry sub-categories

- Life Insurance
- Accident Insurance
- Medical Plans
- Fire Insurance
- Surety Insurance
- Pension, Health & Welfare Funds
- Insurance Carriers
- Insurance Agents

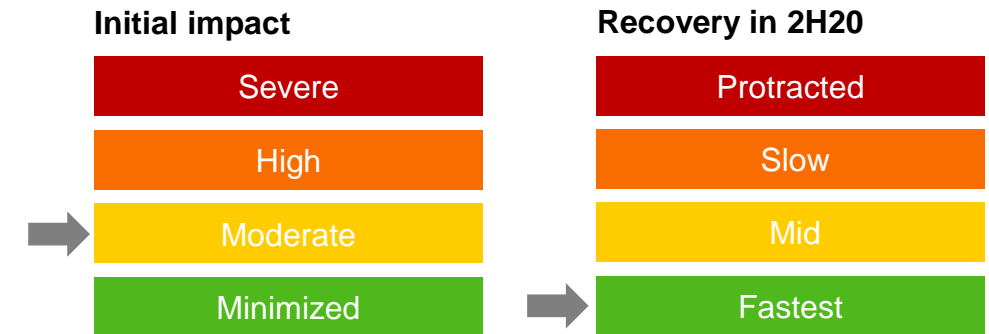
## COVID-19 trends and dynamics

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|--|--|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Spike in health, life, and supplemental insurance claims</li> <li>• Withdrawal/restrictions on travel insurance</li> <li>• Unemployment drives postponement of policies</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Impact to balance sheets of major insurers due to spike in health and life insurance claims</li> <li>• Increased premiums to reduce insurers' exposure</li> <li>• Impact to commercial insurance enrollment rates</li> </ul> |
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## Post-crisis IT opportunities

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Self-service, automation to aid claims processing efficiency</li> <li>• Increased use of data and analytics to assess risk</li> </ul> | <ul style="list-style-type: none"> <li>• Hyper-personalization and continuous monitoring</li> </ul> |
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## COVID-19 Estimated Industry Impact





# Life Sciences – COVID-19 Impact Estimates

## Key industry sub-categories

- Medical/Botanical Chemistry
- Pharmaceutical Preparations
- Surgical & Medical Instruments
- Dental Equipment & Supplies
- X-Ray Apparatus

## COVID-19 trends and dynamics

### Initial Factors:

- Attention redirect to COVID
- Impact of China
- Clinic trial disruptions
- Non-medical device vendors transition manufacturing

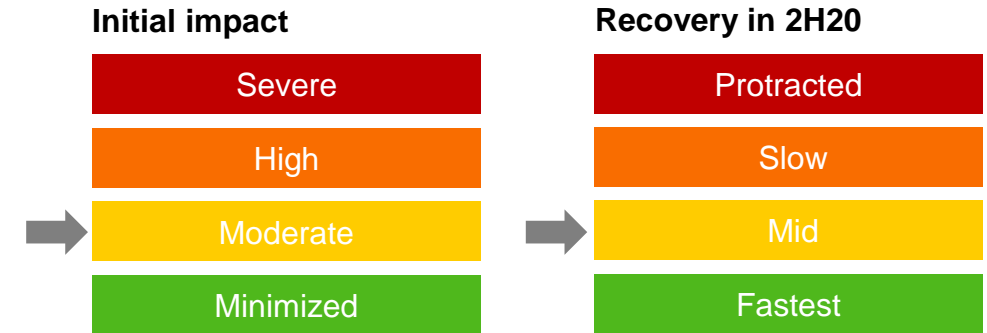
### Recovery Considerations:

- Raw materials supply flexibility
- Drug shortages
- Manufacturing flexibility outside of device industry

## Post-crisis IT opportunities

- Big Data and analytics, including virtual drug trial simulations
- Prioritize strategic investment around identifying next crisis
- Business model flexibility for non-industry manufacturers
- Not-for-profit business models
- New ecosystems and cross-collaboration among industry players

## COVID-19 Estimated Industry Impact





# Media – COVID-19 Impact Estimates

## Key industry sub-categories

- News Syndicates
- Book Publishing & Printing
- TV, Radio & Streaming Broadcasting
- Advertising Agencies & Services
- Movie & Video Production & Distribution

## COVID-19 trends and dynamics

### Initial Factors:

- Production delays
- Gaming/production content consumption increases

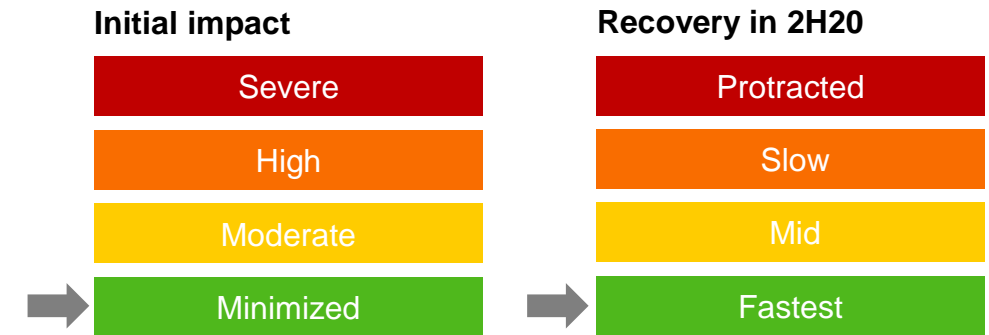
### Recovery Considerations:

- Accelerating decline for TV, live music events
- Focus on digital impacting workforce

## Post-crisis IT opportunities

- AI/ML-driven content recommendations
- Remote workforce management
- Content-streaming-first model
- Digital-only advertising model
- Broadcasting transformation

## COVID-19 Estimated Industry Impact





# Mill Products – COVID-19 Impact Estimates

## Key industry sub-categories

- Paper Mills
- Plastic Film & Sheets
- Steel Pipes & Tubes
- Furniture & Fixtures
- Textile Goods
- Glass Products

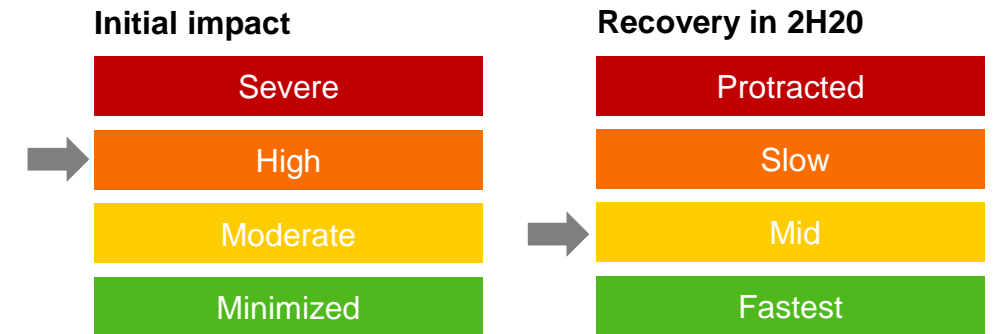
## COVID-19 trends and dynamics

- |   |  |
|---|--|
| <b>Initial Factors:</b>   | <b>Recovery Considerations:</b>  |
| <ul style="list-style-type: none"><li>• Selective products considered critical</li><li>• Reduced downstream demand</li><li>• Raw materials supply disruptions</li></ul> | <ul style="list-style-type: none"><li>• Volatile commodity pricing becomes norm</li><li>• Workforce management</li></ul> |

## Post-crisis IT opportunities

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Alternative &amp; optimized supply chain logistics</li><li>• Inventory management; capital expenditure rationalization</li></ul> | <ul style="list-style-type: none"><li>• Flexible manufacturing floors</li><li>• Alternative product strategies</li></ul> |
|--|--|

## COVID-19 Estimated Industry Impact



# Mining – COVID-19 Impact Estimates



## Key industry sub-categories

- Metal Ores & Mining Services
- Coal Mining
- Chemical & Fertilizer Mining
- Nonmetallic Minerals Services, Except Fuels

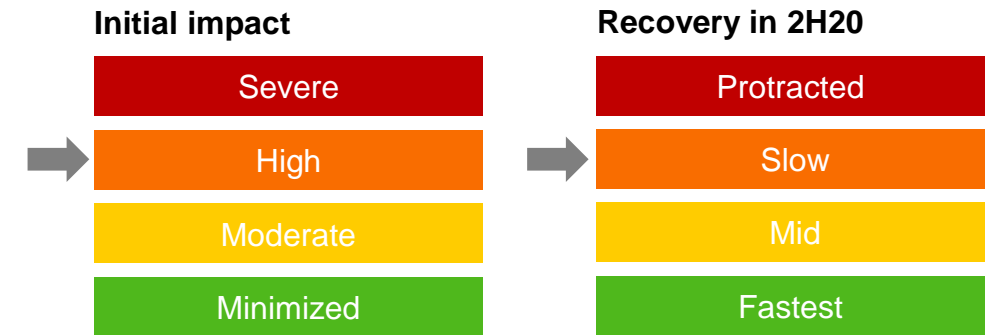
## COVID-19 trends and dynamics

- |  |   |
|--|---|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Asynchronous geographic reactions</li> <li>• Precious metal security</li> <li>• Muted demand in downstream supply</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Volatile commodity pricing becomes norm</li> <li>• Workforce management &amp; safety</li> </ul> |
|--|---|

## Post-crisis IT opportunities

- Inventory management more critical to maintain margins
- Blockchain protection of precious metals
- Contingent workforce management

## COVID-19 Estimated Industry Impact





# Oil and Gas – COVID-19 Impact Estimates



## Key industry sub-categories

- Petroleum & Natural Gas
- Drilling & Exploration
- Refining
- Pipelines
- Gas Stations
- Fuel Oil Dealers

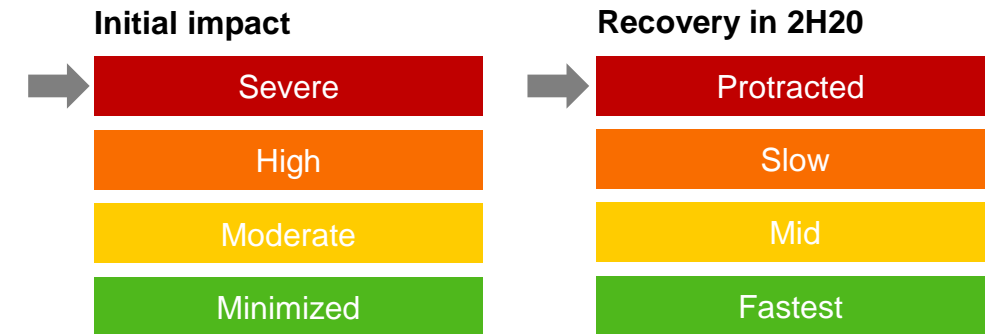
## COVID-19 trends and dynamics

- |  |  |
|--|--|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Bankruptcy for smaller shale producers</li> <li>• Steep demand declines</li> <li>• Upstream factory demand declines</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Acute recovery spikes supply and pricing</li> <li>• 12 month+ recovery in capital budgeting</li> </ul> |
|--|--|

## Post-crisis IT opportunities

- Supply chain analytics
- Cost optimization via AI/ML
- Supply consolidation
- Contingent workforce management

## COVID-19 Estimated Industry Impact



# Professional Services – COVID-19 Impact Estimates



## Key industry sub-categories

- IT Services
- Veterinary Services
- Consumer Services
- Goods Repair Shops
- Cleaning Services
- Consulting Services
- Legal Services
- Architectural Services

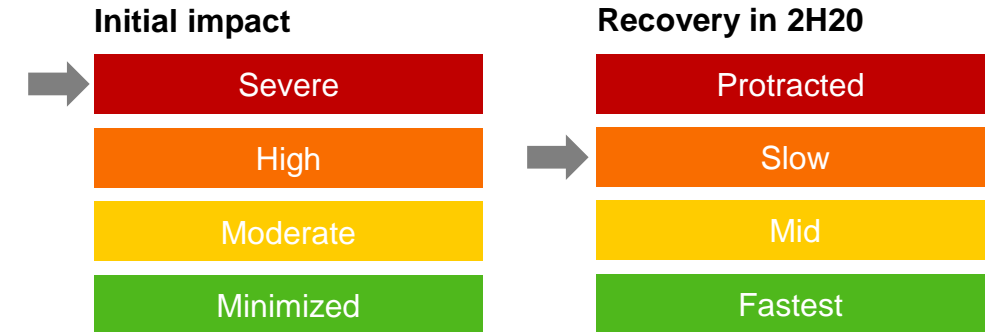
## COVID-19 trends and dynamics

- |   |   |
|---|---|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Employee health &amp; well-being</li> <li>• Bankruptcy for small firms</li> <li>• Delayed projects</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Demand for specialized services</li> <li>• Delay &amp; cancellation of services</li> <li>• Security services bright spot</li> </ul> |
|---|---|

## Post-crisis IT opportunities

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Remote working norm accelerates services consolidation</li> <li>• Low/no-touch services norm via automation</li> </ul> | <ul style="list-style-type: none"> <li>• Accelerated use of knowledge platforms and contingent labor</li> </ul> |
|---|---|

## COVID-19 Estimated Industry Impact





# Public Sector – COVID-19 Impact Estimates

## Key industry sub-categories

- Courts
- Space Research & Technology
- International Affairs
- Postal Services
- General Government
- Administration of Public Services
- Political & Religious Organizations

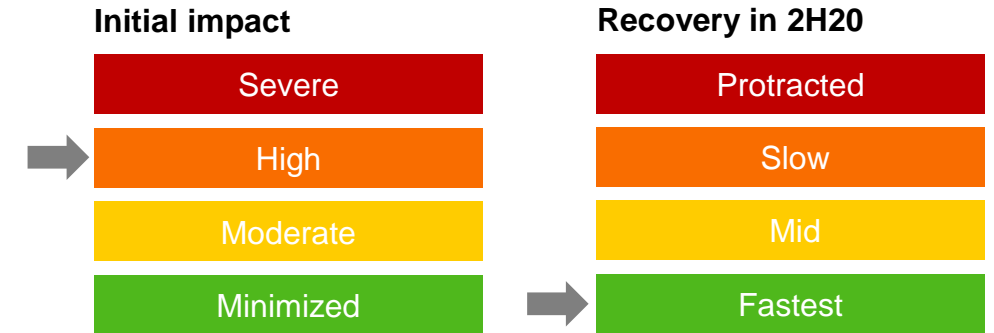
## COVID-19 trends and dynamics

- |  |  |
|--|--|
| <p>Initial Factors:</p> <ul style="list-style-type: none"> <li>• Federal and local laws activate relief efforts</li> <li>• Shortage of social workers</li> </ul> | <p>Recovery Considerations:</p> <ul style="list-style-type: none"> <li>• Short-term economic stimulus creates long-term debt and revised income projections</li> <li>• Increased focus on local physical and cybersecurity</li> <li>• Rethinking policy</li> </ul> |
|--|--|

## Post-crisis IT opportunities

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Smart city initiative prioritization, including Big Data and AI</li> <li>• Revamped urban planning</li> </ul> | <ul style="list-style-type: none"> <li>• Facility security/cleanliness</li> <li>• 5G-enabled real-time monitoring</li> <li>• Critical infrastructure resilience projects</li> </ul> |
|--|---|

## COVID-19 Estimated Industry Impact





# Retail – COVID-19 Impact Estimates

## Key industry sub-categories

- Grocery Stores
- Hardware Stores
- Department Stores
- Liquor Stores
- Clothing Stores
- Electronics Stores
- Drug Stores

## COVID-19 trends and dynamics

### Initial Factors:

- Storefront closures
- Increased e-commerce
- Consolidated and heightened grocery and staples demand
- Brand loyalty disruption

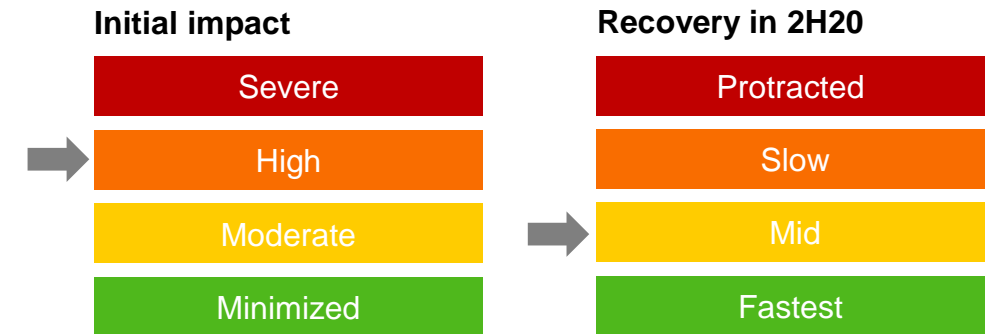
### Recovery Considerations:

- Small business bankruptcy
- Workforce rebuilding
- Supply chain & inventory intelligence

## Post-crisis IT opportunities

- E-commerce-first/only
- Digital-first customer engagement
- Delivery/pick-up distribution model
- Food safety assurances

## COVID-19 Estimated Industry Impact



# Sports & Entertainment – COVID-19 Impact Estimates



## Key industry sub-categories

- Movie Theaters & Theatrical Productions
- Museums, Art Galleries & Gardens
- Amusement Parks
- Professional Sports Teams & Venues
- Physical Fitness Facilities
- Actors & Entertainers

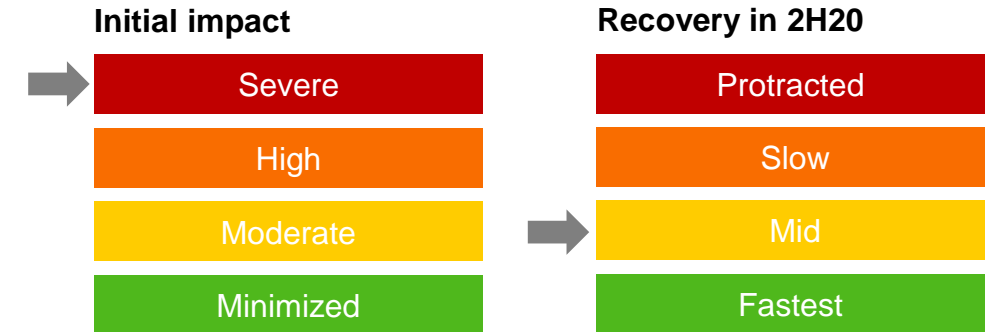
## COVID-19 trends and dynamics

- |   |   |
|---|---|
| <p>Initial Factors:</p> <ul style="list-style-type: none"> <li>• Events postponed; potential league season cancellations</li> <li>• Lost wages and venue revenue</li> </ul> | <p>Recovery Considerations:</p> <ul style="list-style-type: none"> <li>• Fight for consumer time &amp; money</li> <li>• Crowd avoidance</li> <li>• Virtual platform substitution</li> <li>• Contract &amp; risk management</li> </ul> |
|---|---|

## Post-crisis IT opportunities

- Reigniting customer loyalty
- Virtual events, including AR/VR
- Larger gaming population

## COVID-19 Estimated Industry Impact



# Telecommunications – COVID-19 Impact Estimates



## Key industry sub-categories

- Radio
- Telephone Communications
- Cable/Pay TV Services
- Communications Services

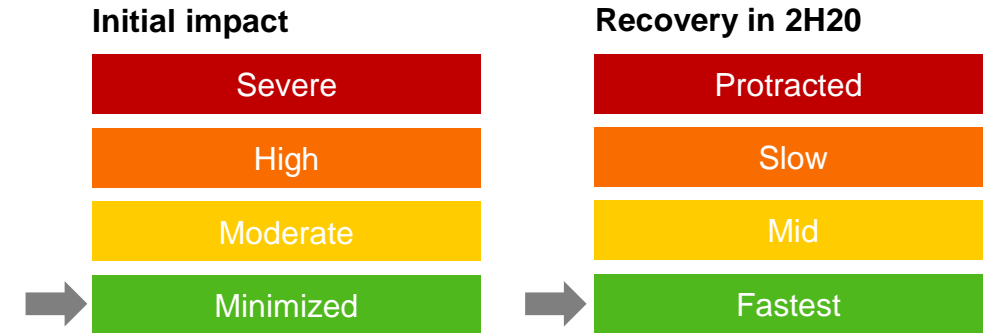
## COVID-19 trends and dynamics

- |  |   |
|--|---|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Residential connectivity demand spike</li> <li>• Virtual events &amp; socialization</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Demand elasticity back to pre-crisis levels</li> <li>• Capacity will enable next-generation concepts like smart cities, IoT, AI-based engagement</li> </ul> |
|--|---|

## Post-crisis IT opportunities

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Transition to 5G</li> <li>• Rating, charging &amp; billing management</li> <li>• Revenue assurance</li> </ul> | <ul style="list-style-type: none"> <li>• Broadband access accelerates as government investment priority</li> <li>• Network analytics</li> </ul> |
|--|---|

## COVID-19 Estimated Industry Impact



# Travel & Transportation – COVID-19 Impact Estimates



## Key industry sub-categories

- Transportation Services (incl. air, rail, ferries, bus, taxi, car rental)
- Restaurants & Bars
- Hotels
- Warehousing & Storage
- Trucking
- Freight & Cargo Handling

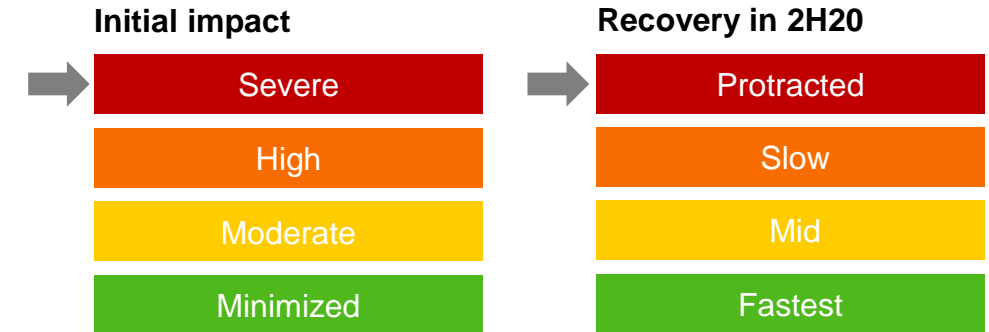
## COVID-19 trends and dynamics

- Initial Factors:**
- Travel bans stall transportation & hotels
  - Social distancing upsets restaurants & bars
- Recovery Considerations:**
- Crowd avoidance persists
  - Small business bankruptcy
  - Workforce rebuilding
  - Storage & freight norms altered

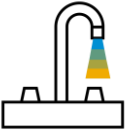
## Post-crisis IT opportunities

- Food safety assurance
- Facility security/cleanliness
- Flexible demand planning and intelligent pricing
- Increased regulatory compliance
- Low/no-touch experiences, including automation/ delivery

## COVID-19 Estimated Industry Impact



# Utilities – COVID-19 Impact Estimates



## Key industry sub-categories

- Electric Power & Services
- Gas Transmission & Distribution
- Water & Sewage
- Refuse & Street Cleaning

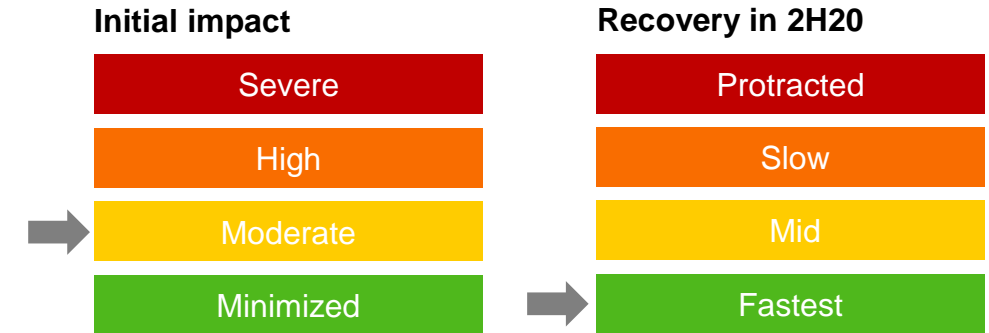
## COVID-19 trends and dynamics

- |   |   |
|---|---|
| <p><b>Initial Factors:</b></p> <ul style="list-style-type: none"> <li>• Commercial/residential demand shift</li> <li>• Workforce health &amp; safety</li> </ul> | <p><b>Recovery Considerations:</b></p> <ul style="list-style-type: none"> <li>• Demand rebalancing</li> <li>• Alternate energy</li> <li>• Adoption of smart home technologies to control consumption</li> <li>• Pricing elasticity</li> </ul> |
|---|---|

## Post-crisis IT opportunities

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Plant and last-mile automation</li> <li>• Flexible service demand management</li> </ul> | <ul style="list-style-type: none"> <li>• Meter data management</li> <li>• Environmental protection</li> <li>• Big Data, analytics, and IoT to match supply and demand</li> </ul> |
|--|--|

## COVID-19 Estimated Industry Impact







# Wholesale Distribution – COVID-19 Impact Estimates

## Key industry sub-categories

- Wholesale suppliers between producers & consumers of goods, including food, drink, clothing, machinery, equipment, hardware & materials

## COVID-19 trends and dynamics

### Initial Factors:

- Supply disruption
- Demand rebalancing towards direct-to-consumer

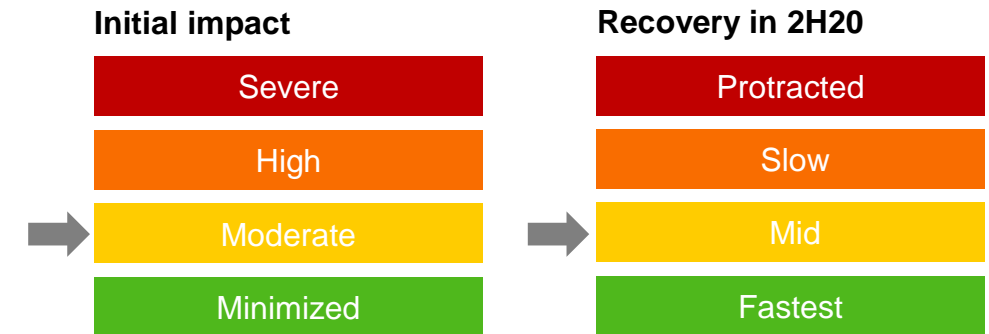
### Recovery Considerations:

- Alternative sourcing identified
- Permanently altered distribution norms
- Just-in-time re-evaluation

## Post-crisis IT opportunities

- Packaging and transport auditability
- Vendor evaluation and risk management
- Blended B2B and B2C distribution marketplaces

## COVID-19 Estimated Industry Impact



# Thank you.



## Additional Documents

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