



# 2023 Outlook: Technology

Presentation

March 2023

# Build strategy and manage risk through the lens of geopolitics and macroeconomics.

Understand the forces shaping the future of your organization

Assess their economic impact

Separate noise from signal

Find better options



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STRATEGIC INSIGHTS

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# Executive summary

## A renewed global focus on reshoring

- Macro headwinds to sector growth in 2023 with a rebound to start in Q4
- Major economies catching up on domestic production incentives
  - **Global players including Japan and the EU** look to compete in with the US through **sweeping industrial policy packages** similar to the US CHIPS and Science Act, Inflation Reduction Act, and Infrastructure Investment and Jobs Act.
  - **US** will continue to focus on implementing recent, landmark industrial policy. New export controls are likely but limited.

## Geopolitical jostling centers on a critical technology

- Chip industry cycle **bottoms in 2023, recovery in Q4**; falling consumer demand to lead to **contraction**
- US **export controls** will come into full effect in 2023; further rounds likely to be less aggressive
- **China's** response to US policy to be constrained, as growing advanced chip production will be costly, protracted
- Other players seek to make inroads: major suppliers looking to gain share as companies re-evaluate **geo footprint**
- Policies are already shifting supply chains for **advanced chips**, but most chip suppliers and consumers won't be impacted

## Policymaking to shore up domestic industry extends into the digital sphere

- Protecting **domestic digital economies** is a priority; data-driven compliance costs will increase
- Privacy remains top of mind for US regulators and **patchwork regulation** will get worse before it gets better
- Policy **playing catch up with AI** as regulators seek to address societal impact of emerging tech

## SECTION I

# Global trends

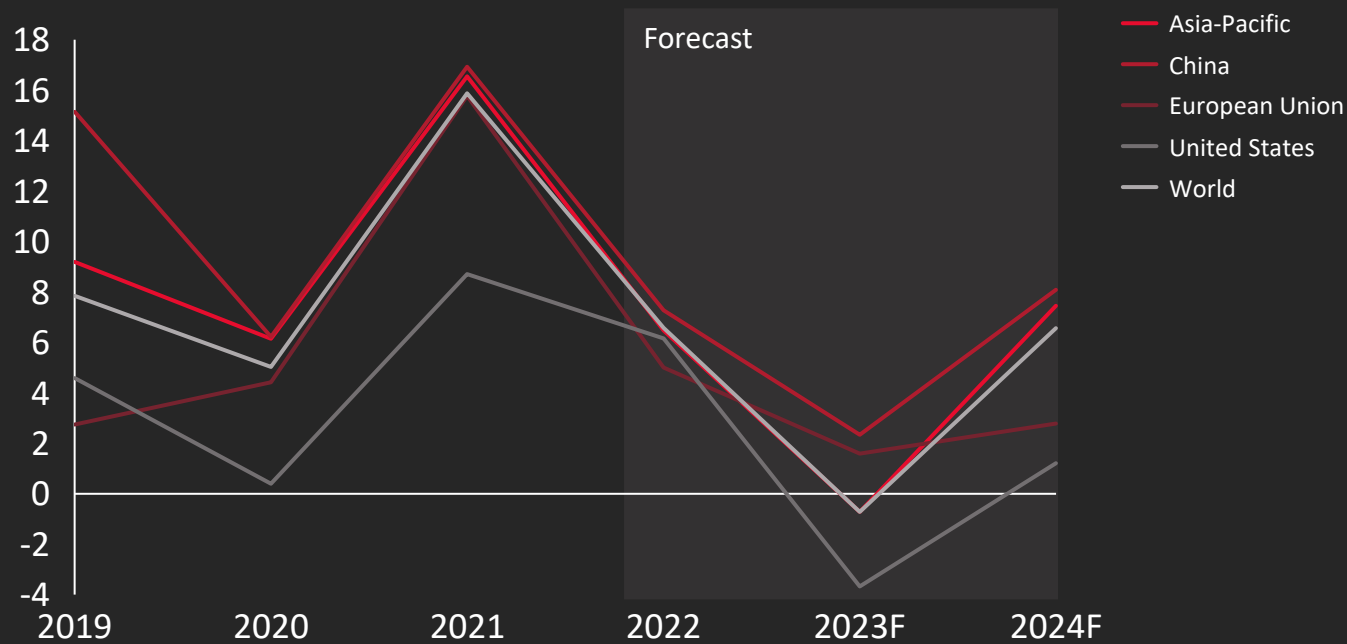
A renewed global focus on domestic industry

# Macro headwinds to sector growth in 2023

## Rebound to start in Q4

### High-tech industry growth

Growth, % yoy, real sales



### SHIFTING CONSUMER PATTERNS

Consumers are now shifting back to a more traditional balance of goods and services. In the US, this transition is about 60% complete.

### INFLATION TAKING A TOLL

Real disposable income is contracting in Western Europe; will increase only 1.7% in the US; and will grow in China, but from a low base in 2022.

### INTEREST RATES WEIGH ON CAPEX

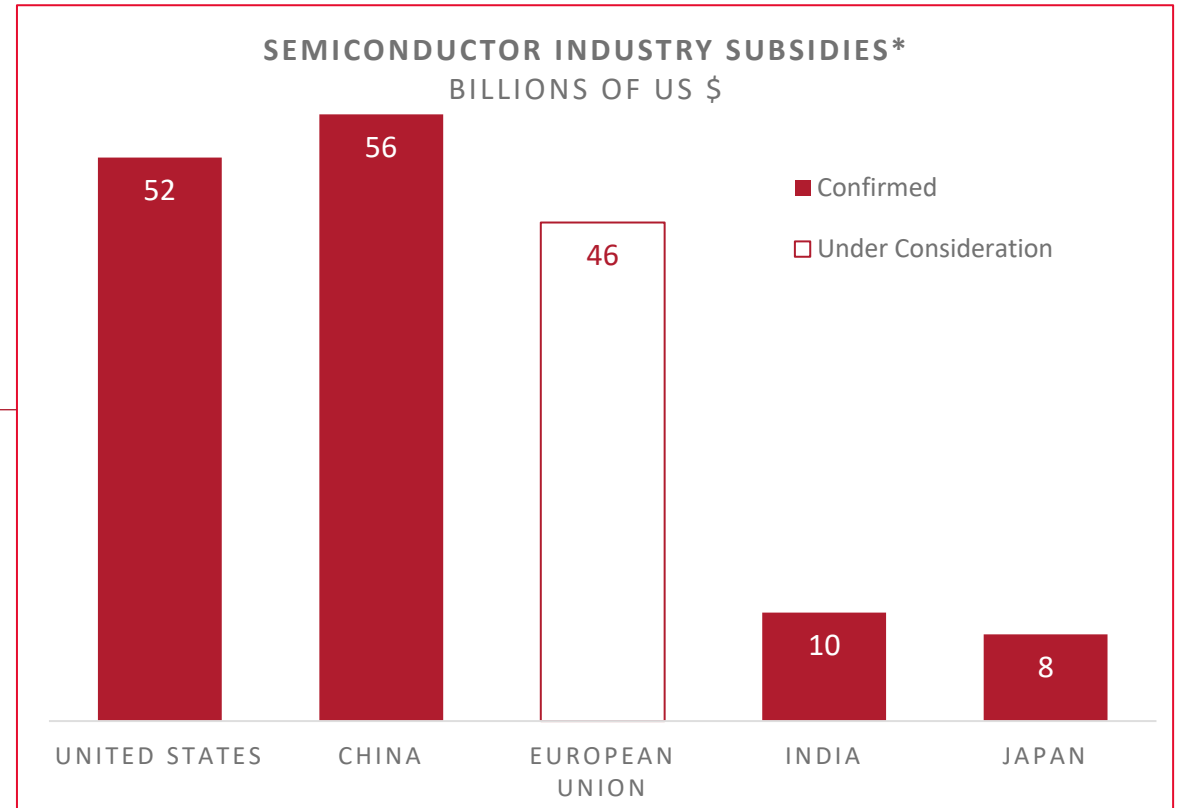
Growth in business capital expenditures will slow in 2023, reducing demand growth for high-end industrial machinery and instruments.

### RECOVERY AHEAD

Tech spending remains supported by long-term drivers and will rebound with the broader economy in late 2023 to early 2024.

# Major economies catching up on domestic production incentives

## US focus to remain on implementing recent, landmark industrial policy



\* Taiwan and South Korea – key players in the semiconductor industry- have also implemented industrial policy that seeks to attract new investment over the next decade through tax credits or partnerships; all of the countries listed here offer such investment incentives in addition to direct government subsidies

# Industrial policy isn't the only tool

## New export controls are likely, but will be limited

### UNITED STATES

- New export controls in 2023 will continue to focus on advanced technologies, seeking to constrain China's development of advanced semiconductors
- US companies should also expect investment restrictions on semiconductors and related products in China

### OTHER MAJOR ECONOMIES

- Recently confirmed export controls by Japan and the Netherlands were hard-won and are unlikely to be significantly expanded beyond their current scope
- The scope of the controls on China will be limited due to industry pushback and lack of willingness for additional cooperation from key US allies needed to ensure success of the controls

### CHINA

- China is considering new industrial policy options to shore up its advanced semiconductor manufacturing capabilities, but faces systemic roadblocks

## SECTION 2

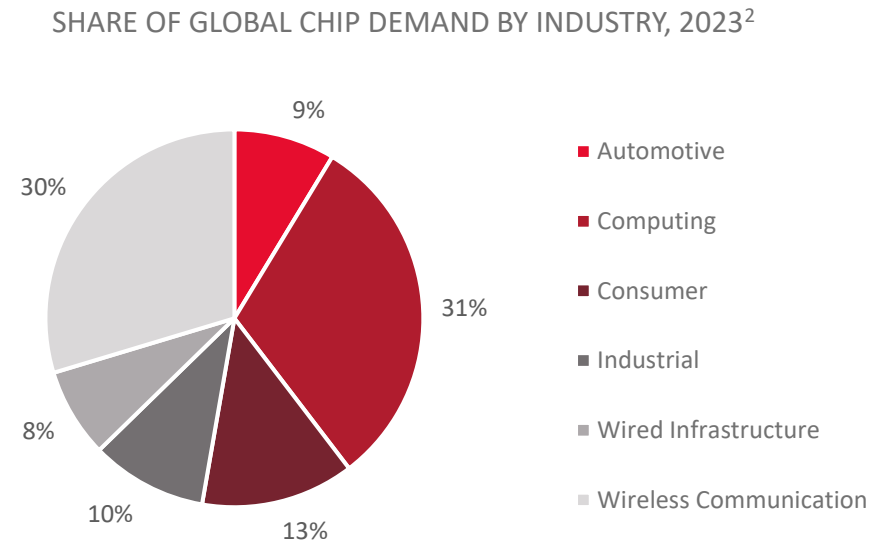
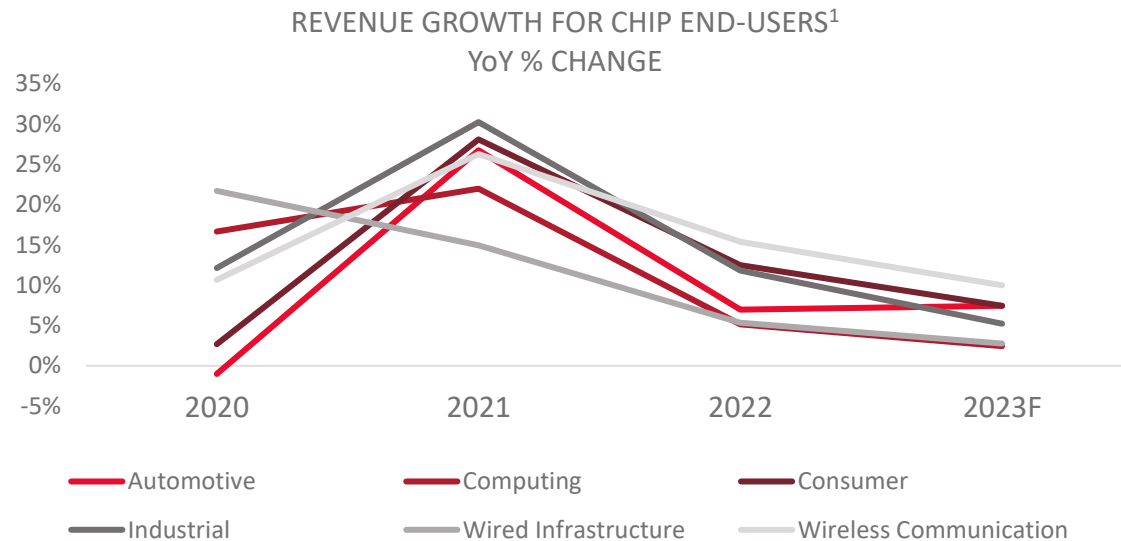
# Semiconductors

Geopolitical jostling centers on a critical technology



# Chip industry cycle bottoms in 2023, recovery in Q4

## Falling consumer demand to lead to contraction



### KEY POINTS

- Sales growth in end-use markets slows to 1.3% y/y, about the same pace as the global economy
- Our base case view sees weak growth for chips in 2023 as Western consumers continue to rotate away from consumer durables to services and the Chinese economy underperforms compared to consensus
- 2024 and beyond see countries seeking to increase their market share throughout the semiconductor production process for both economic and national security reasons

# US export controls will come into full effect in 2023

Further rounds likely to be less aggressive

## EXISTING CONTROLS HAVE ACHIEVED US GOALS

- Existing export controls seem to have set Chinese advanced chip development back at least a decade for now



## SOUTH KOREAN WAIVER EXPIRES IN OCTOBER 2023

- US export controls issued in October 2022 granted a one-year waiver to South Korean manufacturers operating in China; that waiver will expire and further stifle China's access to advanced chips

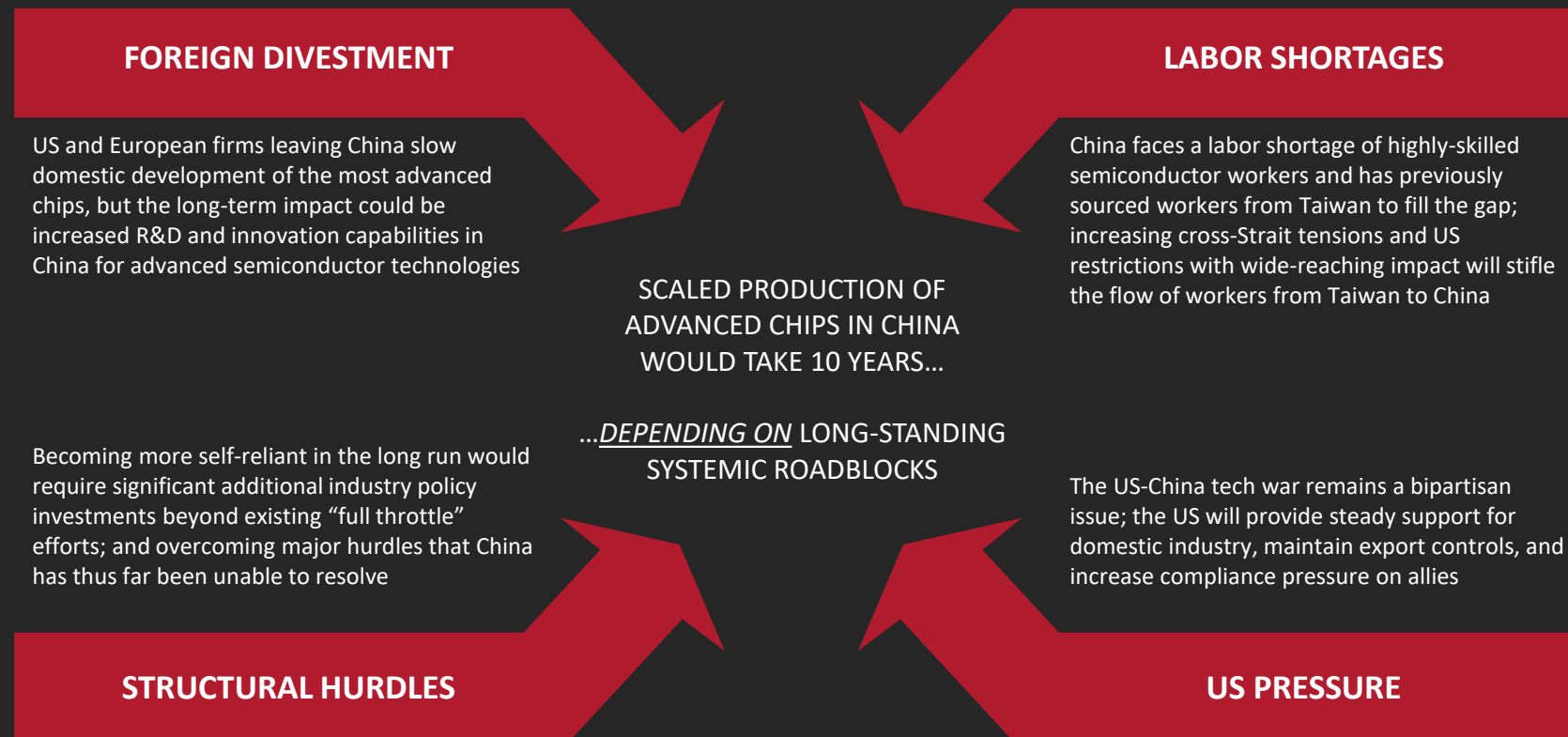


## FURTHER, LESS AGGRESSIVE ROUNDS ARE EXPECTED

- Further export controls on China focused on semiconductors may not be as wide-reaching due to private sector pushback and lack of US diplomatic capital to persuade allies who have thus far joined US efforts (Japan, the Netherlands)

# China's response to US policy to be constrained

## Growing advanced chip production will be costly, protracted



# Other players seek to gain market share

Major suppliers looking to gain share as companies re-evaluate geo footprint

## JAPAN AND SOUTH KOREA

- South Korea and Japan see an opportunity to take advantage of supply chain changes to gain market share by expanding existing capacities as companies move out of China and consider shifting production outside of Taiwan as a hedge against increased cross-Strait tensions

## TAIWAN

- Taiwan, the global leader in the industry, is simultaneously looking to maintain domestic dominance while taking advantage of other countries' subsidy programs to expand opportunities for Taiwanese chip companies abroad by opening new fabs

## THE EUROPEAN UNION

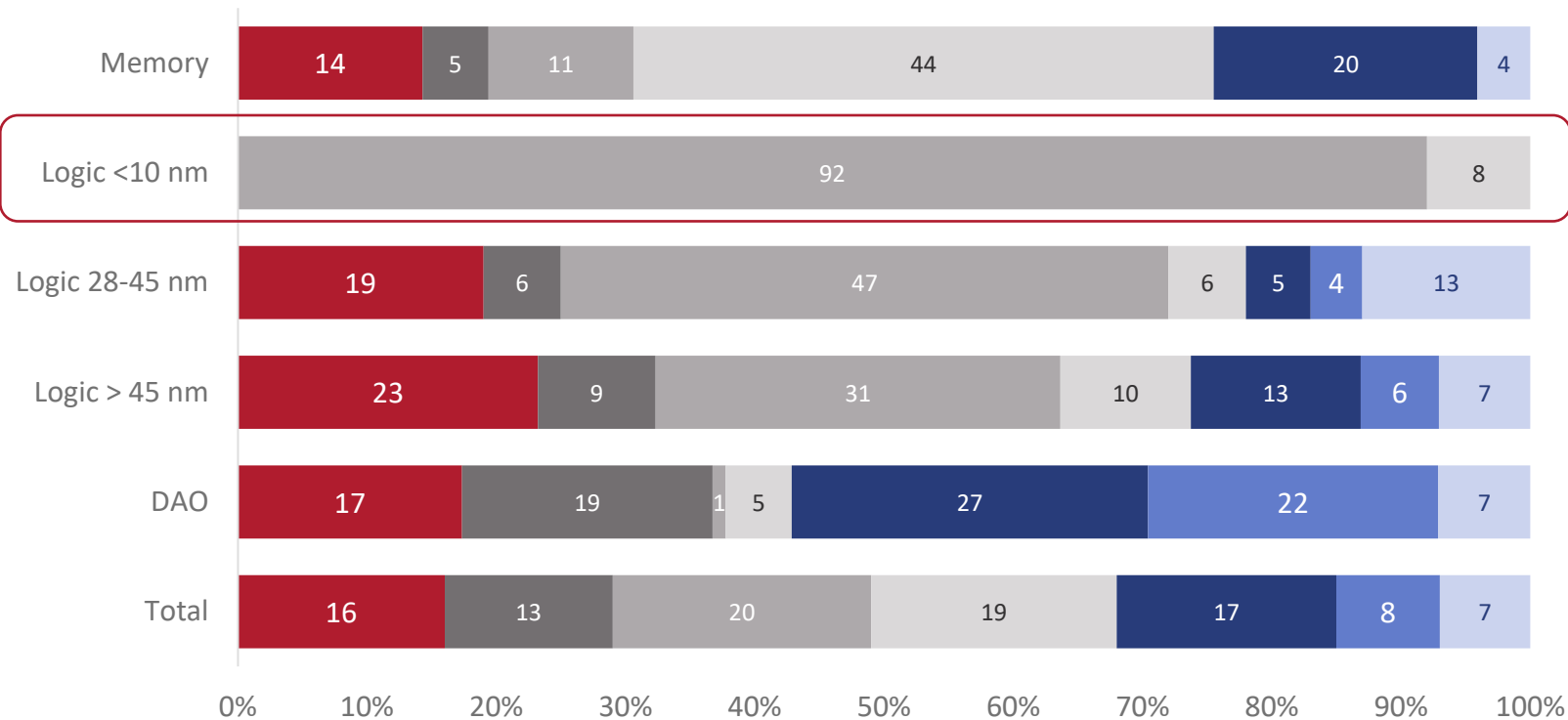
- The EU is motivated by the same national security concerns regarding capacity that drove US policy on this issue and is looking to open new fabs within the bloc

# Policies are already shifting supply chains for advanced chips

## But most chip suppliers and consumers won't be impacted

WAFER FABRICATION CAPACITY BY COUNTRY AND NODE SIZE, 2019

■ China ■ US ■ Taiwan ■ South Korea ■ Japan ■ Europe ■ Other



- The most advanced chips (under 10 nm) are impacted by export controls directed at China, but most are produced in Taiwan and South Korea

- Common legacy chips used in everyday items like cars and IoT devices are not impacted by export controls
- But still likely to face pressure from diversification given:
  - Pressure to reshore to new fabs that ensure sufficient domestic capacity for national security
  - Need to hedge against geopolitical tensions impacting chip supplies

### SECTION 3

## Digital Regulation

Policymaking to shore up domestic industry extends into the digital sphere

# Protecting domestic digital economies is a priority

## Data-driven compliance costs will increase

### EUROPEAN UNION

- The EU seeks to foster the growth of European firms and benefit European players and cloud providers
- The Digital Markets Act (DMA) is set to be implemented in 2023
  - The DMA regulates the activity of a few very large platforms
  - It restricts platforms from prioritizing their own products or incentivizing customers to use the platform's products over other parties' goods and services

**\$7.8 Billion**

Cost of GDPR compliance for Fortune 500 firms annually

**91%**

Percentage of firms that had to hire in-house or external teams for GDPR compliance

**9/10**

Number of top-ranked countries for digital readiness and adoption that are in Europe or North America

### INDIA

- Working to develop its own approach to privacy and data
- Has considered strict data localization requirements in the last several years and will consider them again under a national privacy law
- Eventual policy may likely follow consensus found across global privacy laws while also including a strong focus on law enforcement access to data and localization of government data
- However, there is a "wild card" possibility as India could pursue a closed approach to technology regulation

**755 Million**

Second-most social media users globally

**33%**

Revenue Growth in eServices in 2022

**2.5x**

Growth in India's digital economy compared to overall economic growth in 2019

# Privacy remains top of mind for US regulators

## Patchwork regulation will get worse before it gets better

### STATE PATCHWORK

34 States have introduced 72 privacy bills since 2018<sup>1</sup>; 5 states have comprehensive privacy laws on the books

### NEW LAWS IN 2023

VA, CO, CT, and UT are all implementing new privacy laws this year with varied requirements and goals; CA law passed in 2018 is modeled on GDPR while UT law has a narrow focus on certain types of data

### FEDERAL INACTION

Lawmakers will continue to propose variations on privacy legislation, but the passage of a comprehensive federal privacy law in the US in 2023 is unlikely

### COMPLEXITY WITH LOOPHOLES

Complex, inconsistent state-level laws are difficult to comply with and to regulate; state-level laws vary widely in their requirements and goals with respect to balancing personal privacy and business needs

### STEEP OPERATING COSTS

Estimates vary widely, but the highest economy-wide forecast suggests GDPR-style regulations in the United States would cost the US \$200 billion per year; firm impacts depend on the type of business and reliance on data

### CONVERGENCE TO GDPR

EU laws serve as the current global standard; US federal policy is unlikely to supplant GDPR as a global standards-setter and is unlikely to be as comprehensive as GDPR



# Policy playing catch up with AI

Regulators seek to address societal impact of emerging tech

## GLOBAL EFFORTS TO REGULATE AI SYSTEMS

- 2023 will see regulatory efforts like the draft EU AI Act to mitigate the human biases integrated into AI systems and prevent societal harm in countries including the United States, India, South Korea, Brazil, Australia, and Singapore
- Similar to the development of privacy policies, US states are also proposing AI regulations at the state level that could cause patchwork compliance issues



## CORPORATE ACCOUNTABILITY

- For companies this means that they may be held responsible for how AI systems used in their businesses may impact customers, including cases where an AI system is trained on biased or bad datasets or is used in a manner that results in harm
- Regulators may seek to address risks of AI that are covered by existing legal protections, such as anti-discrimination laws, in ways that make compliance difficult and create legal uncertainty



## COMMERCIAL EXUBERANCE OUTPACES REGULATIONS

- Private capital will flow into AI and business applications will grow exponentially, particularly through incorporation of new tools like Chat GPT that use large language models
- Regulations will be slow to keep pace with the rate of change, raising the risk of policy whiplash

# Get in touch

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