The digital economy, innovation and competition

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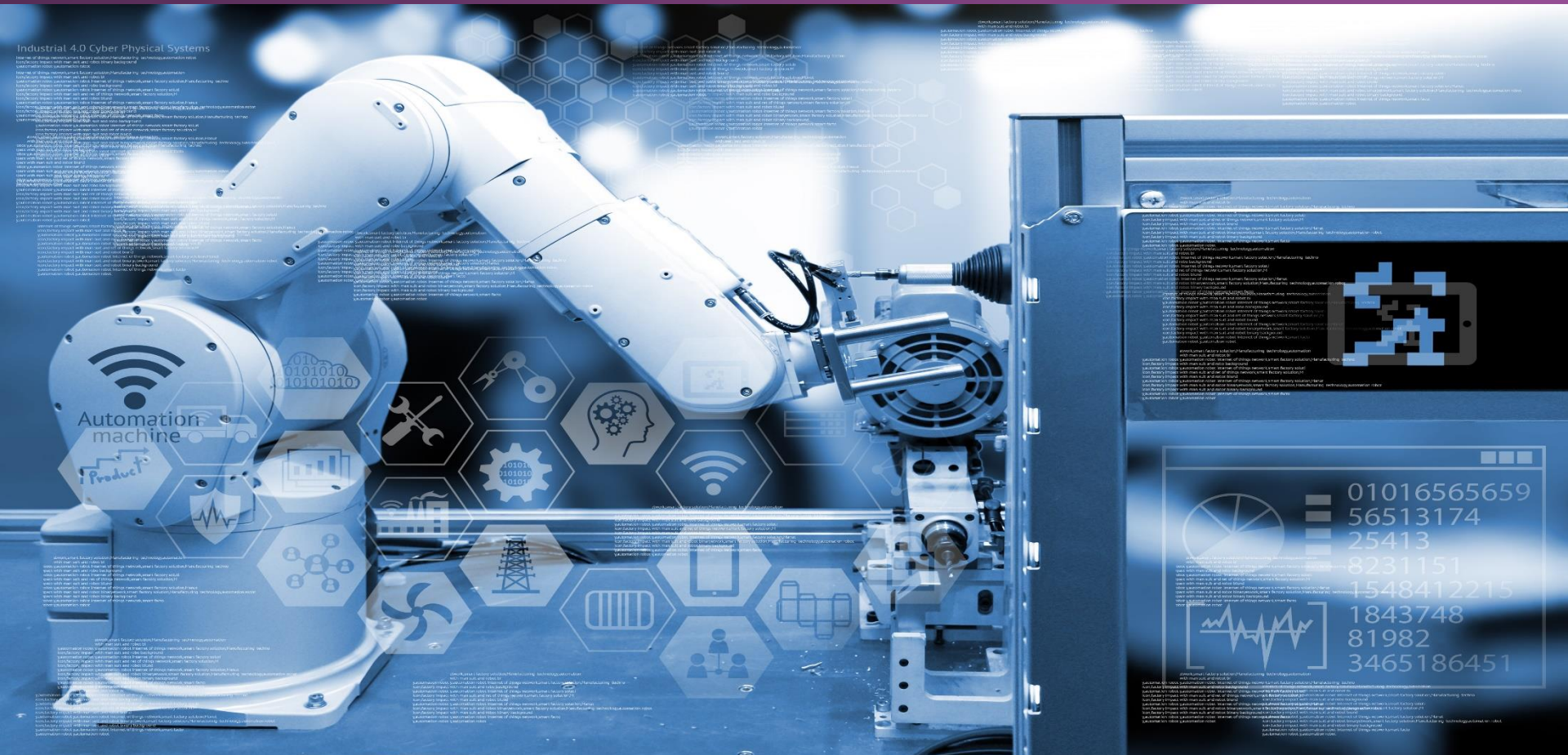
Agenda

1. Digitalisation trends in OECD countries

2. The opportunities and challenges of digitalisation

3. Key findings from **competition** work on digitalisation

Increasing digitalisation in OECD Countries

The digital economy

- The digital economy is comprised of markets based on digital technologies that facilitate the trade of goods and services (OECD, 2012):
  - Online sale of goods and services (e-commerce):
    - **Tangible goods** (clothing, computer equipment, cosmetics)
    - **Services for offline consumption** (hotel bookings, tickets)
    - **Digital content** (videos, e-books, online courses)
  - Online marketing
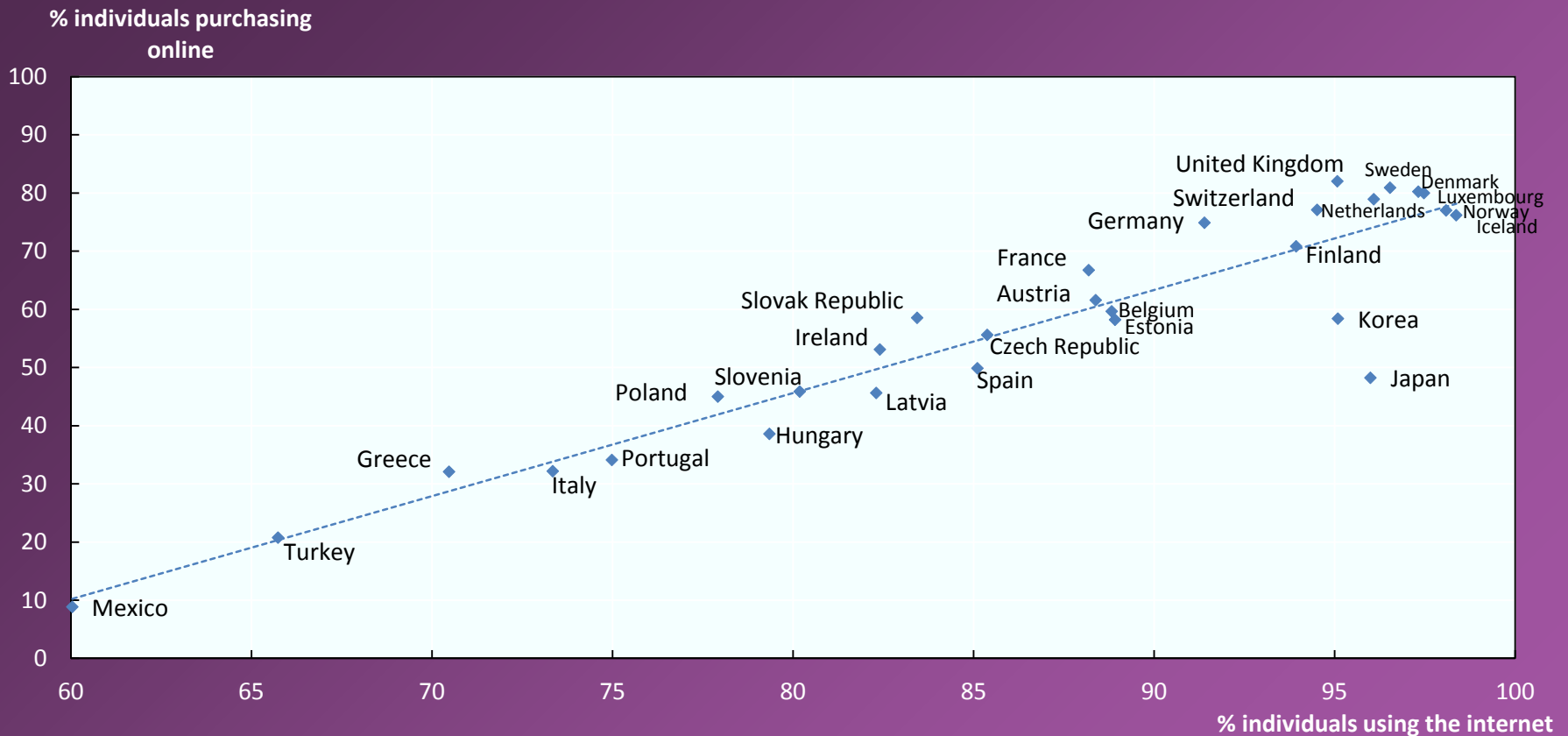 - Collection and processing of data
  - Payment systems

Growing access to information and communication technologies in OECD countries
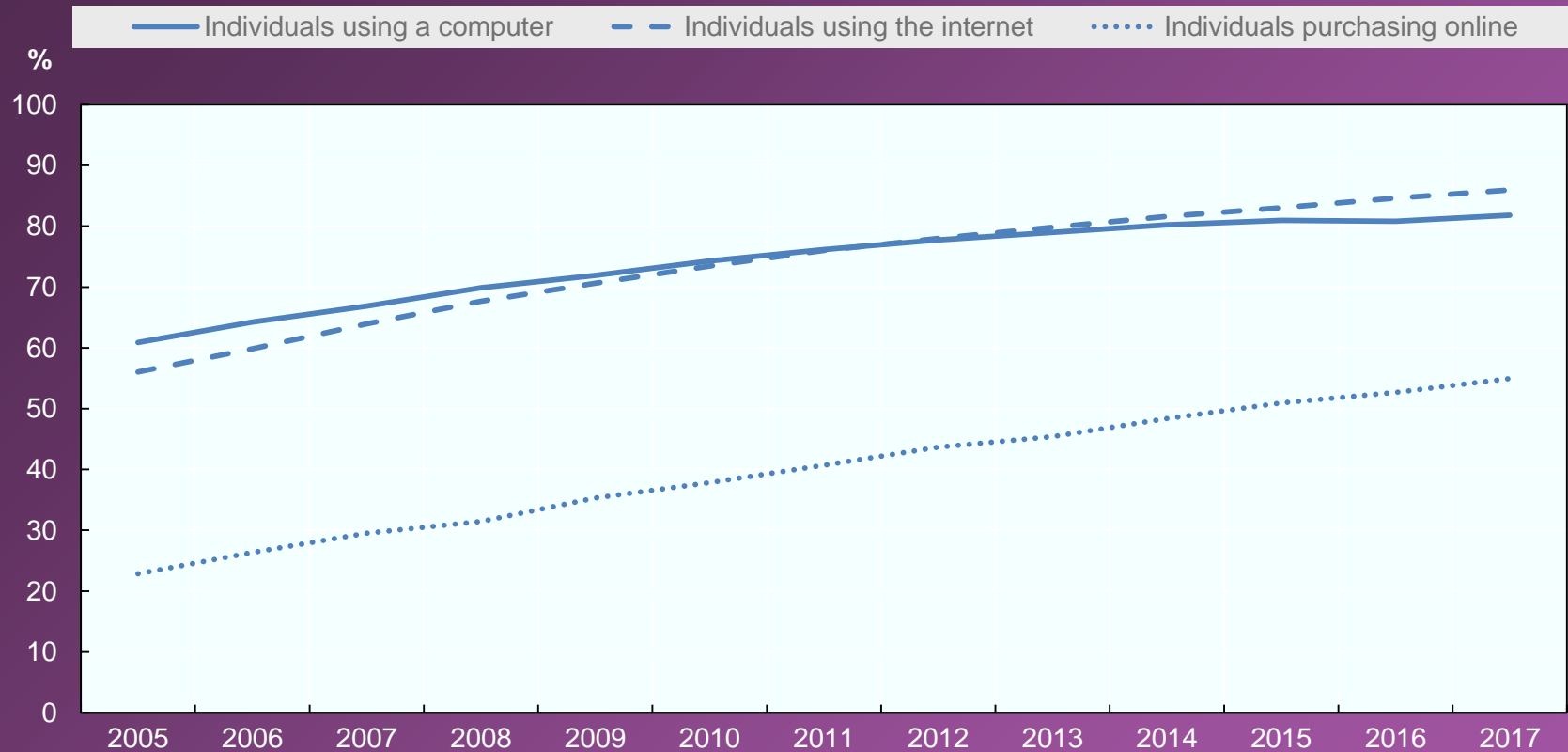
Positive correlation between internet penetration and e-commerce in OECD countries in 2017

% individuals purchasing online (y-axis)

% individuals using the internet (x-axis)

Countries plotted: Mexico, Turkey, Greece, Italy, Portugal, Poland, Slovenia, Hungary, Latvia, Ireland, Slovak Republic, Spain, Czech Republic, Estonia, Belgium, Austria, France, Germany, Switzerland, United Kingdom, Finland, Netherlands, Norway, Iceland, Luxembourg, Denmark, Sweden, Korea, Japan

Share of individuals purchasing online by product category in OECD countries
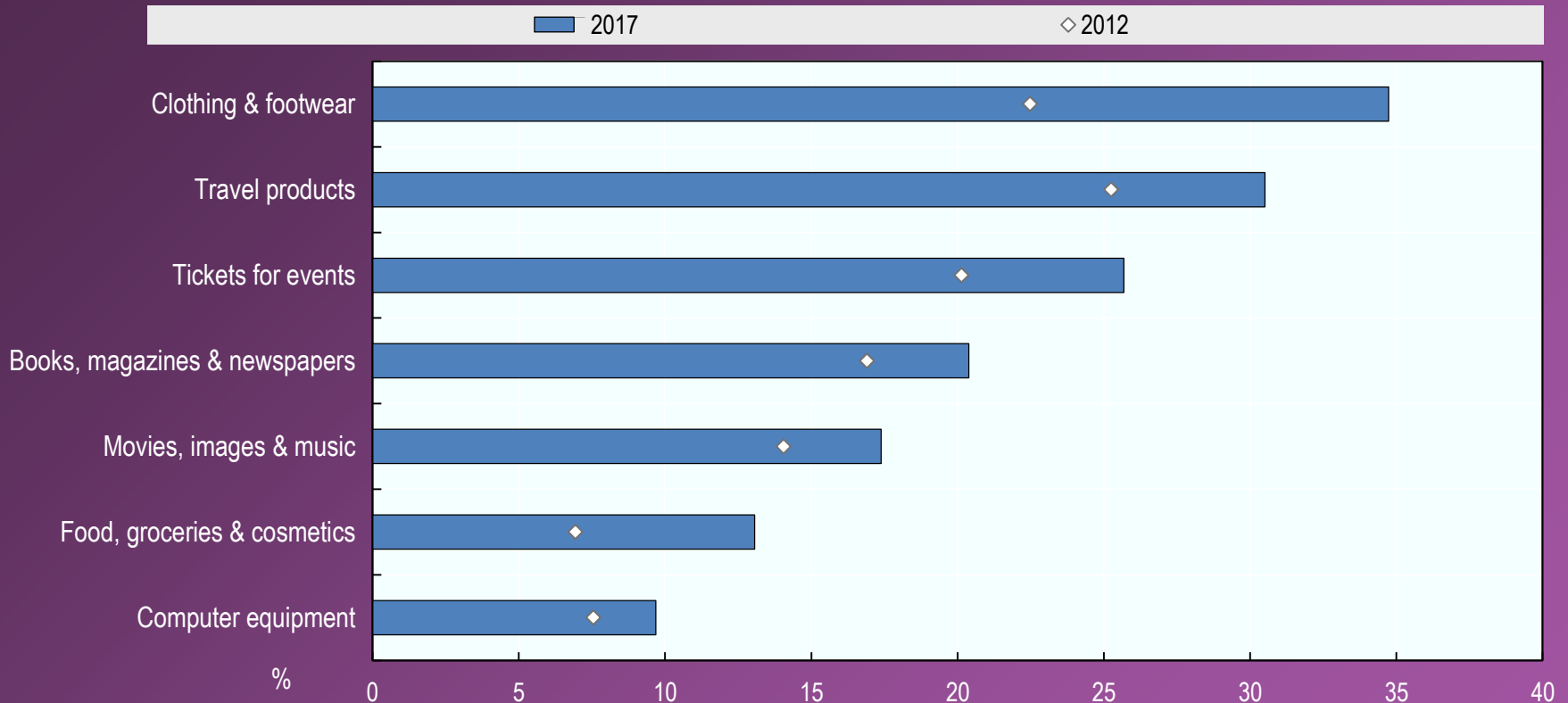
Legend: 2017 / 2012

Category	
Clothing & footwear	
Travel products	
Tickets for events	
Books, magazines & newspapers	
Movies, images & music	
Food, groceries & cosmetics	
Computer equipment	

% 0 5 10 15 20 25 30 35 40

The opportunities and challenges of digitalisation

Digitalisation has implications for competition

- Digitalisation leads to market integration, promotes international trade and enables new data-driven business models that promote competition, create **economic growth opportunities**, but also pose **new challenges**.

Opportunities

- ✓ Low prices
- ✓ New products
- ✓ Quality improvements
- ✓ Customisation
- ✓ Real-time supply
- ✓ Risk management
- ✓ Fraud prevention
- ✓ Consumer information
- ✓ Forecast

Challenges

- ✓ Rapid market changes
- ✓ Disruption of incumbents
- ✓ Temporary unemployment
- ✓ **Risk of market power**

Is there a risk of market power in digital markets?

- Evidence suggests a moderate increase in broad measures of concentration, at least in the US and Japan, though not in European countries (OECD, 2018).
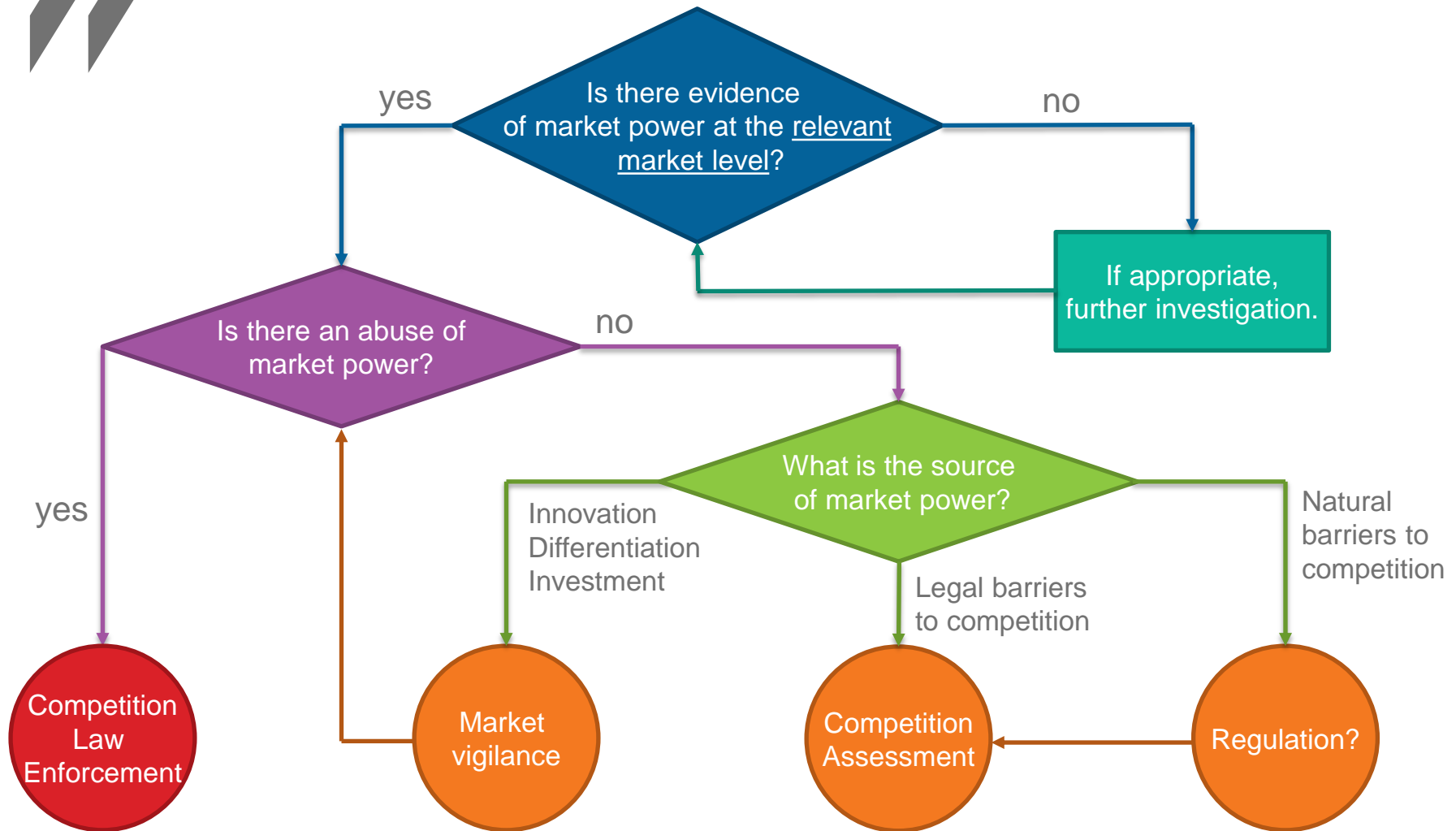
- OECD industry-level data shows that mark-ups have increased mostly in service industries (including high tech), particularly among "fringe" firms.

- **BUT**… Concentration at the aggregate or industry level is not a sufficient condition for concentration at the market level!
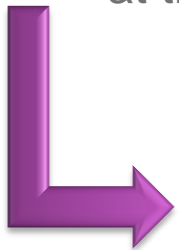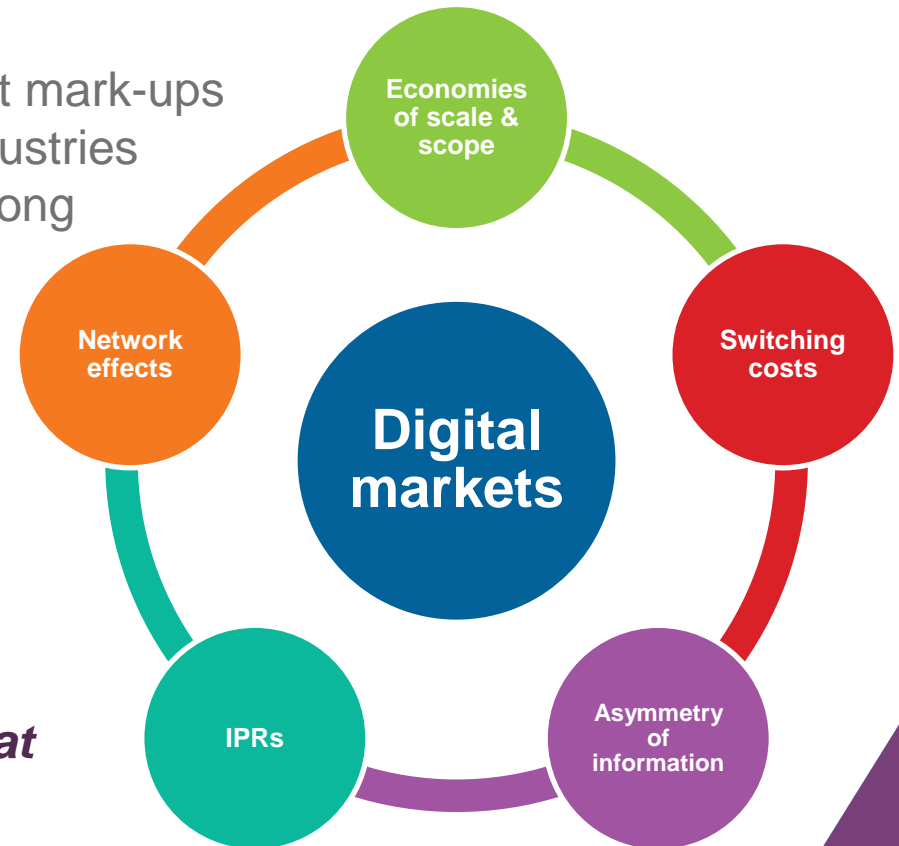
Do digital markets have structural characteristics that can lead to the creation of market power?

Digital markets

- Economies of scale & scope
- Switching costs
- Asymmetry of information
- IPRs
- Network effects

When does market power pose policy concerns?

Is there evidence of market power at the <u>relevant market level</u>?

yes → Is there an abuse of market power?

no → If appropriate, further investigation.

Is there an abuse of market power?

yes → Competition Law Enforcement

no → What is the source of market power?

What is the source of market power?

- Innovation / Differentiation / Investment → Market vigilance
- Legal barriers to competition → Competition Assessment
- Natural barriers to competition → Regulation?

Regulation? → Competition Assessment

How can firms abuse of market power in digital markets?

- From a competition law enforcement perspective, market power is not problematic if achieved through pro-competitive means (e.g. innovation).

- However, there is a risk that firms engage in anti-competitive behaviour to **sustain** and **exploit** their market power over time:

Anti-competitive mergers	Abuse of dominance		Collusion
	Exploitative	Exclusionary	

Strategic acquisition of potential disruptors

Reduced competition in quality dimensions, (e.g. privacy and advertising)

Use of data, rankings and technology standards to exclude competitors

Use of algorithms to facilitate tacit collusion
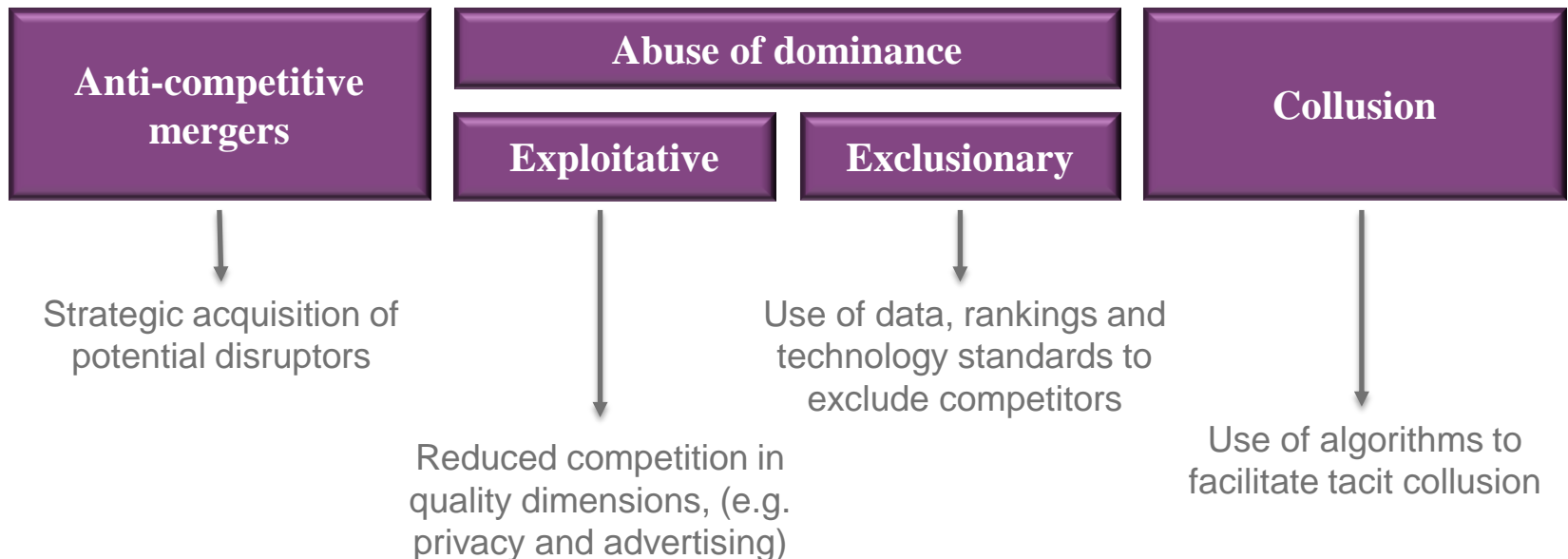
Key findings from competition work on digitalisation

a) Disruptive innovation

b) Big data and privacy

c) Mergers and innovation

d) Algorithmic collusion

Disruptive innovation

- Disruptive innovations are forms of innovation created **outside the value network** of established firms, introducing a different package of attributes from the one mainstream customers historically value.

- Usually disruptive innovators target low-end consumers in a first phase and reach mainstream consumers in a second phase.

	Sustaining Innovation	Disruptive Innovation	Incremental Innovation	Breakthrough Innovation
Definition	Within the value network	Outside the value network	New technological feature	Change of technological paradigm
Examples	• DVD / Blue-ray • Cell phone • Digital camera	• Streaming • Ride-sourcing • Online marketplace • Cryptocurrency	• Faster processor • Camera with greater resolution • New blockchain protocol	• Computer • Self-driving car • Machine learning • Blockchain technology

Disruptive innovations: challenges for competition

- As disruptive innovations can substantially reduce the market share of incumbents, there is a risk that the latter react with strategies to block the innovation.

Unilateral conduct	Acquisition	Regulatory incumbency
• Foreclose access to low-end consumer • Limit interface between the old and the new value network	• Horizontal mergers: risk that pipeline products are discontinued • Vertical mergers: risk that the merged identity reduces the ability of competitors to innovate	• Incumbents' call for applying existing regulations to new entrants even if the regulation is not well suited

However, some apparently anti-competitive behaviour can be driven by efficiencies and improve welfare (e.g. incumbents may acquire disruptors to speed up the deployment of innovation; regulations can impose unnecessary burdens on incumbents…)

Disruptive innovations: key findings

☑ In order to encourage disruptive business models, **competition authorities may seek approaches that emphasise dynamic efficiency** and innovation over static efficiency and price effects, for instance by seeking qualitative evidence from market surveys and establishing solid theories of harm.

☑ **Notification thresholds in merger control could be modified** to account for the value of the transaction or, alternatively, competition authorities may be given discrete power to review certain mergers, including acquisitions of potential disruptors.

☑ **Competition law enforcement procedures should be fast, transparent and tested in court** whenever possible. Interim measures may be preferable to commitments when there is the possibility of market disruption, as they can lead to a final infringement decision.

☑ Whenever disruptive innovations render regulations obsolete, **regulations should be assessed and reviewed** in order to achieve the policy objective using alternatives that are less restrictive to competition.
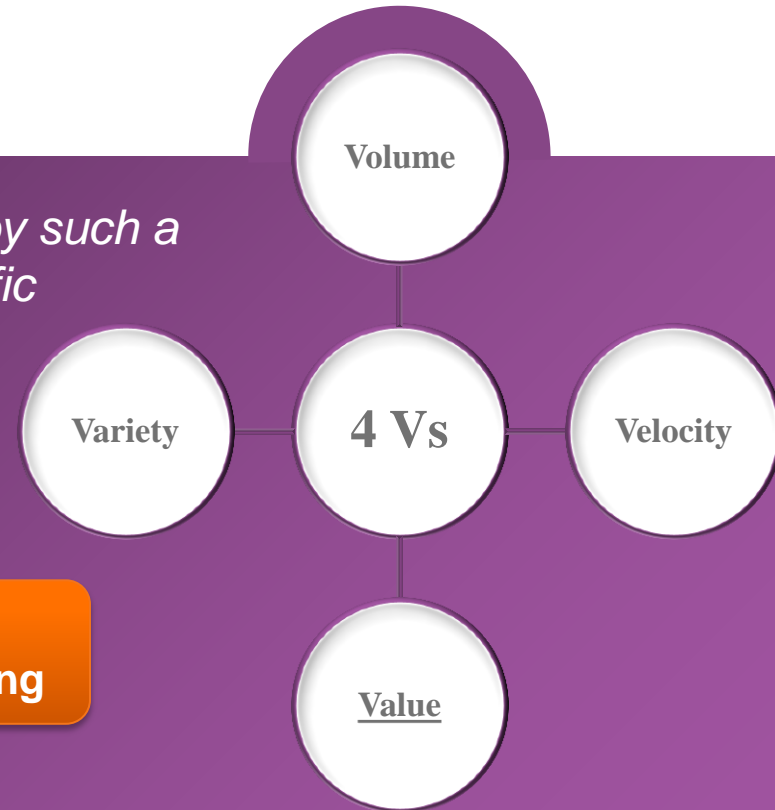
Big Data and Privacy

"*Big Data is the information asset characterized by such a high volume, velocity and variety to require specific technology and analytical methods for its transformation into value.*"

De Mauro et al (2016)

Volume

Variety

4 Vs

Velocity

Value

Users → Data → Ad Targeting

Data → Service Quality

Ad Targeting → Investment

Investment → Service Quality

Service Quality → Users

Big data: challenges for competition

- Despite generally having pro-competitive effects, the collection and processing of big data can also pose some challenges for competition in at least two ways:

1. Data can be used as an input or asset to foreclose rivals

- Mergers motivated by the acquisition of complementary or substitutable data holdings

- Exclusionary unilateral conduct:
  - Refusal to supply
  - Tying
  - Forced free-riding
  - Discriminatory leveraging

What characteristics should data assets have to deserve an antitrust intervention?

2. Data can affect quality dimensions of competition

- Big data can affect multiple product characteristics:
  - ✓ Product innovation
  - ✓ Customisation
  - ✓ Privacy
  - ✓ Target ads

- Big data as a source of horizontal differentiation across firms?

What product characteristics are relevant for competition policy?

Big data: key findings

☑ Traditional antitrust tools can address many data-related anti-competitive practices, especially through mergers and abuse of dominance cases. Yet, as big data does not systematically cause harm, competition authorities should always support their actions with evidence of harm to the competitive process.

☑ When data is an important input or asset, competition authorities may consider the risks of foreclosure and design remedies accordingly. Extreme remedies such as requirements to share inputs should be carefully weighted and used only when there are no less intrusive alternatives.

☑ The impact of data on quality dimensions of competition, such as privacy, should only trigger an antitrust action if there is evidence that (1) consumers value privacy rights and (2) competition takes place on privacy dimensions. Still, such quality elements may increase the level of subjectivity of competition law enforcement.

☑ Failures in digital markets may require some form of regulatory response in order to promote market trust. Due to the commons goals of competition law enforcement, data protection and consumer policy, effective responses to such failures may benefit from a close dialogue and cooperation between agencies.

Mergers and innovation

"…a merger between firms with competing lines of research is likely to affect the incentives to invest in research, leading to either delay, reorientation, or discontinuation of lines of research or pipelines at the discovery stage."

European Commission, *Competition Merger Brief* (2017)

- Innovation may be a key dimension of competition in a wide, and increasing, range of markets.

- Understanding the effect of a merger on innovation **capacity** and **incentives** is therefore key.

Innovation – theoretical foundation

- Mergers can increase firms' capacity to innovate while potentially reducing their ability to innovate

Innovation capacity gains from mergers

- Combination of complementary R&D assets

- Obtaining scale

- Increasing appropriability

VS

Reductions in post-merger innovation incentives

- Reduced incentives due to lessened rivalry, product cannibalisation

- The challenge for competition authorities is understanding which effect will be determinative

Innovation – evidence to consider

How important is innovation to the merging firms and to consumers?

Which firms are undertaking, or could undertake, relevant innovation?

What is the nature of rivalry among firms in terms of innovation? How does it relate to rivalry in current product markets?

What is the rationale for the merger, and its impact on innovation capacity?

Practical challenges

- Identifying when non-price effects are important
  - Free services, regulated prices, frequent product turnover

- Considering price and non-price competition together

- Determining at what stage of a merger review to consider non-price effects

Mergers and innovation: key findings

☑ The extensive research regarding the impact of mergers, and competition generally, on innovation has somewhat mixed conclusions. It is possible for mergers to either improve market innovation, through improvements in scale and the combination of complementary assets, or to harm market innovation, by affecting incentives and generating unilateral effects.

☑ The overall effect of the merger will depend on: the type of innovation activity being undertaken; the structure of associated product markets; the nature of innovation rivalry in the market; and the ability of firms to appropriate the benefits of innovation.

☑ Potential analytical approaches to assessing innovation effects include defining innovation markets, considering whether a merger would constitute a significant impediment to industry innovation, and analysing the impact of the merger on firms' incentives and ability to innovate.

☑ Sound evidence gathering can help understand innovation conditions in the marke. Internal firm strategy documents, including those relating to the rationale for the merger, can play a particularly important evidentiary role.

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Algorithms and collusion

"An algorithm is an unambiguous, precise, list of simple operations applied mechanically and systematically to a set of tokens or objects. (…) The initial state of the tokens is the input; the final state is the output."
Wilson and Keil (1999)

Algorithmic collusion consists in any form of anti-competitive agreement or coordination among competing firms that is facilitated or implemented through means of automated systems.

Artificial Intelligence

Machine Learning

Deep Learning
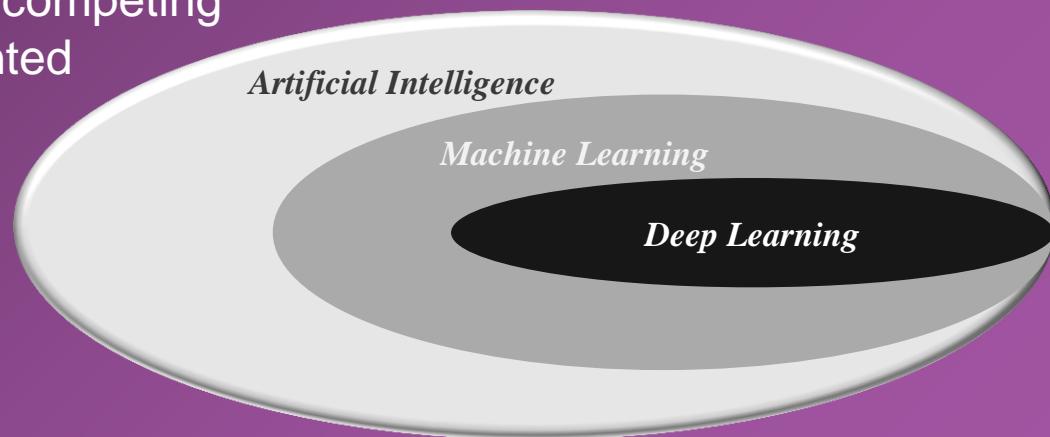
Algorithms and collusion: challenges for competition

Algorithms affect the likelihood and stability of collusion:

Relevant factors for collusion	How algorithms affect collusion?
Number of firms	±
Barriers to entry	±
Market transparency	+
Frequency of interaction	+
Demand growth	0
Demand fluctuations	0
Innovation	–
Cost asymmetry	–

Algorithms facilitate tacit collusion, by eliminating the need of explicit communication:

Offer	Acceptance
Firm intermittently sets a higher price for brief seconds (costless signal)	Competitor increases price to the value signalled
Firm programs algorithm to mimic the price of a leader	Leader increases the price
Firm publicly releases a pricing algorithm	Competitor downloads and executes the same algorithm
Firm sets automatic price cut whenever competitor's price is below a threshold	Competitor keeps the price above the threshold

In a perfectly transparent market where firms interact repeatedly, when the retaliation lag tends to zero collusion can always be sustained as an equilibrium strategy.

Algorithms: key findings

☑ Competition law is currently well suited to address instances where algorithms are used as an ancillary tool to implement a wider collusive arrangement. Even if the presence of advanced technologies makes the analysis more complex, agencies can nevertheless rely on existing competition rules to establish an infringement.

☑ If algorithms enable pure forms of tacit collusion that are not covered by antitrust rules, there could be a need in the future to revisit traditional antitrust concepts and tools. However, as the magnitude of the problem is currently largely unknown, it might be premature to conclude for the existence of an enforcement gap.

☑ Some traditional antitrust tools can be adapted to reduce the risk of algorithmic collusion, including merger control, market studies and the imposition of remedies to prevent the use of algorithms as facilitating practices. Additional approaches include collective actions by consumers and regulatory interventions.

☑ In general, the use of regulatory solutions to address the risks of algorithms could hinder investment and innovation, pose substantial enforcement costs and have limitations in their effectiveness. If regulation is deemed necessary, a possible alternative would be to audit the data used by the algorithm.

Thank you

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