Digital Transformation in the Service Sector

Insights from consultations with firms in wholesale, retail and logistics

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Canadian Economic Analysis

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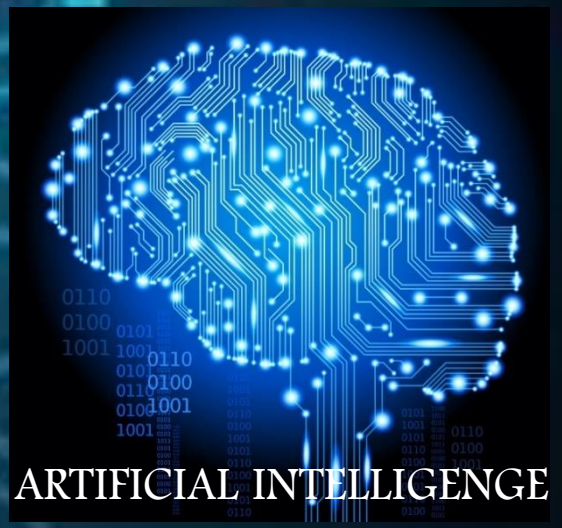
What is the digital economy?



Why do we (=central bankers) care?

The world's most valuable resource is no longer oil, but data

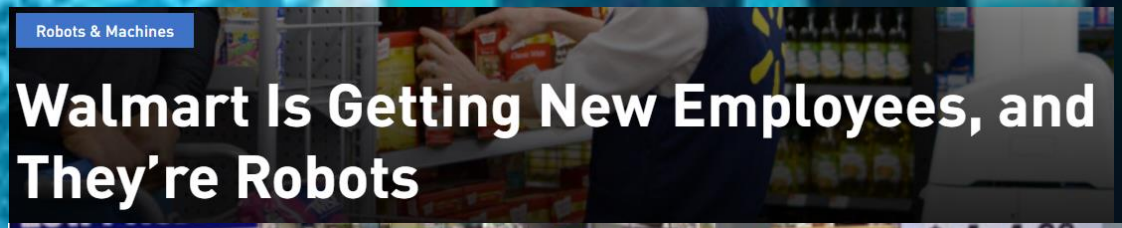
The data economy demands a new approach to antitrust rules

The Economist

SCIENCE | SMARTER THAN YOU THINK

Armies of Expensive Lawyers, Replaced by Cheaper Software

By JOHN MARKOFF MARCH 4, 2011 The New York Times



Walmart Is Getting New Employees, and They're Robots

America's Retail Stores Faster Th

→ Rue21 may be latest casualty as it prepares bank

→ Amazon is gobbling up most of the industry's onl

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What does all this mean for inflation?

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Digital Transformation

Inflation

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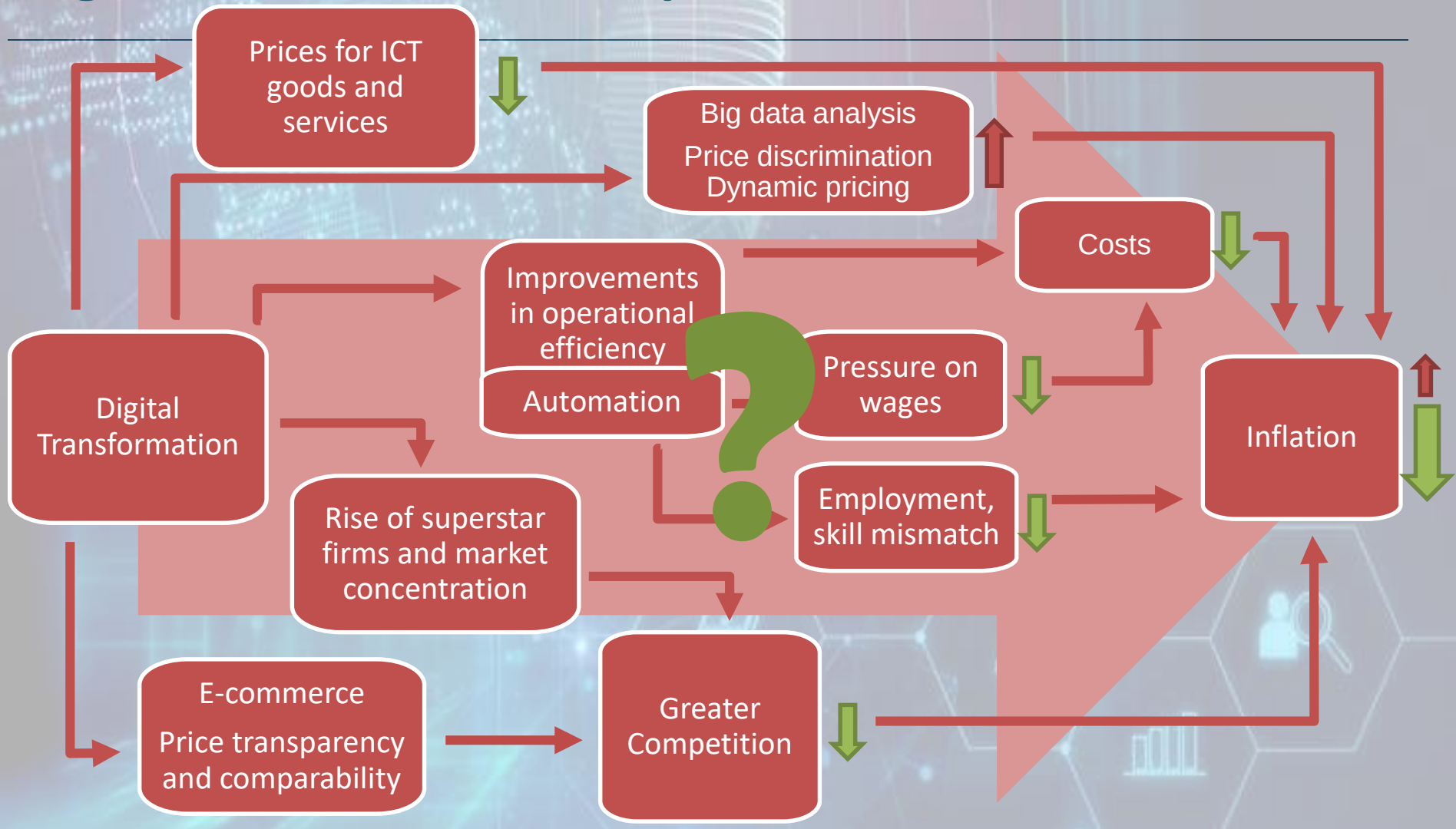
Digital transformation: Implications for inflation



Source: Adapted from Riskbank (2015) and Bank of Canada (2017)

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Some clues from surveying firms

Sample: chosen to understand retail prices and supply chain effects

- 42 firms+ industry associations + consulting companies

- **Questionnaire:** designed to learn about and understand impacts
  - Based on: existing surveys, literature on digitalization
  - Questions: broad, open ended; followed by specific, scales
- **Conduct of Survey**: face-to-face to allow interaction
  - 1h interviews
  - 2017Q3

Survey results - A few general insights

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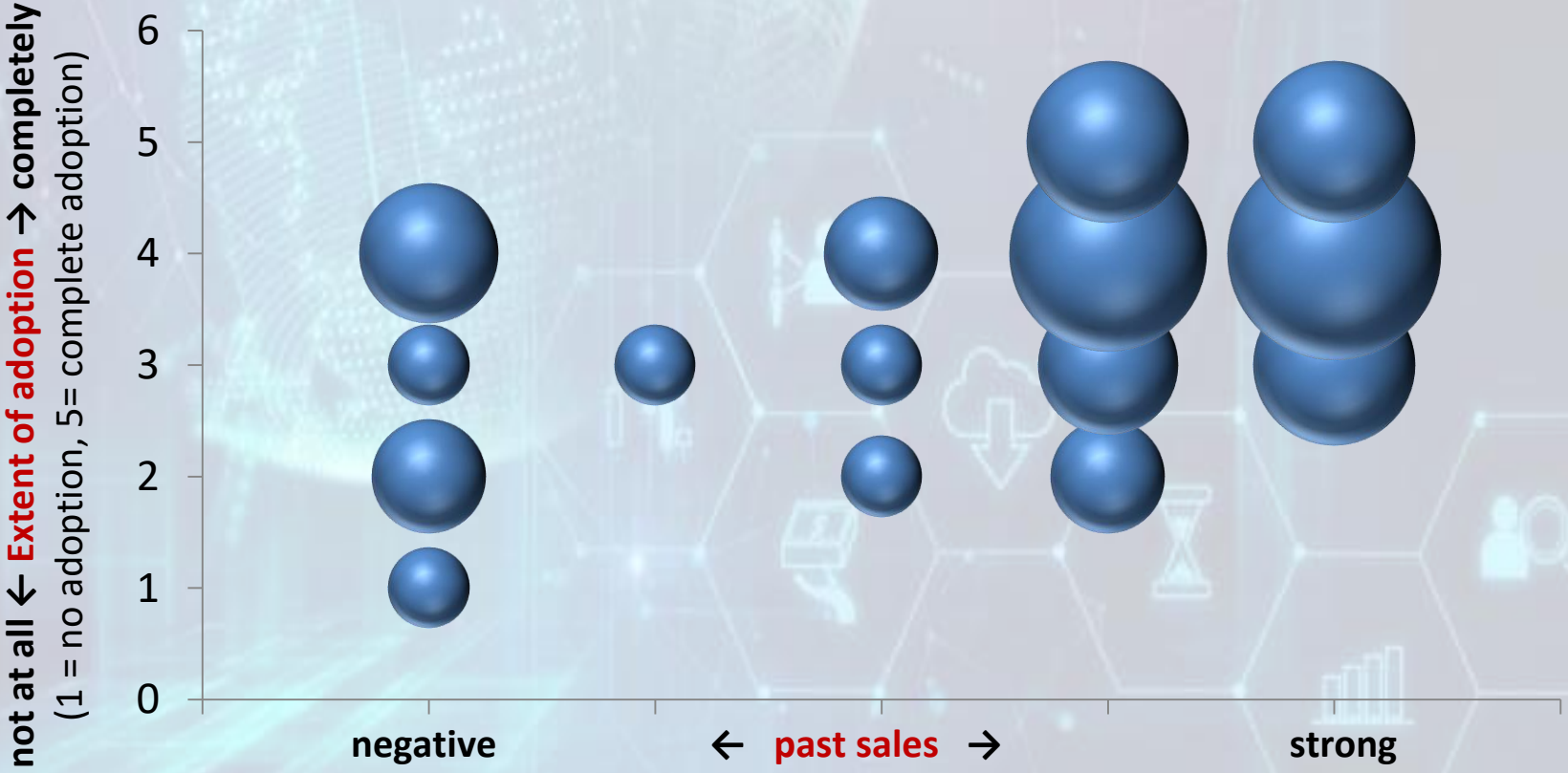
Survey results: Adoption of digital technologies

Adopting firms generally do better

Size of bubbles refers to number of firms



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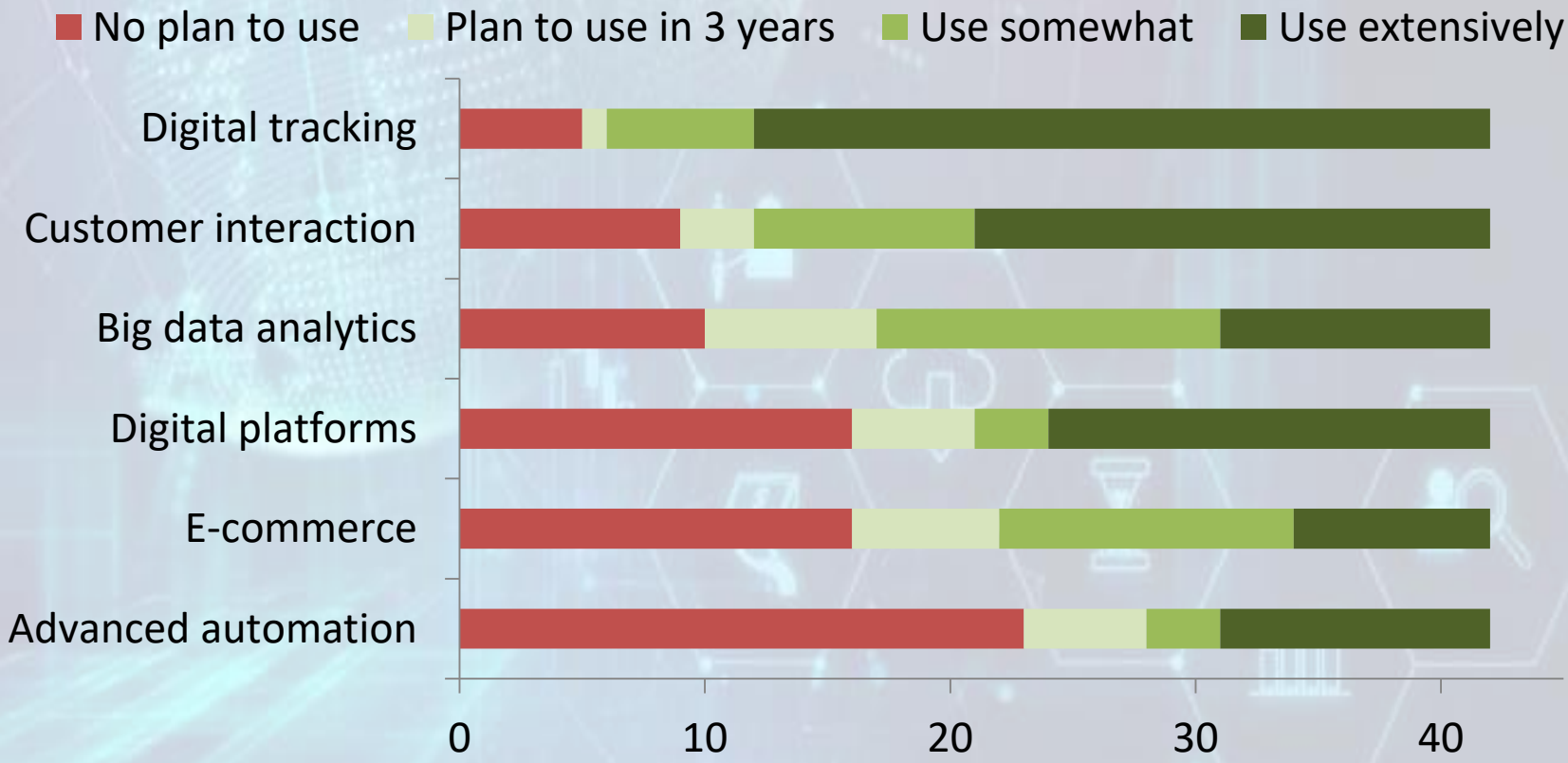
Survey results: Type of technologies

Firms most often cite digital tracking and technologies to interact with customers

Number of firms



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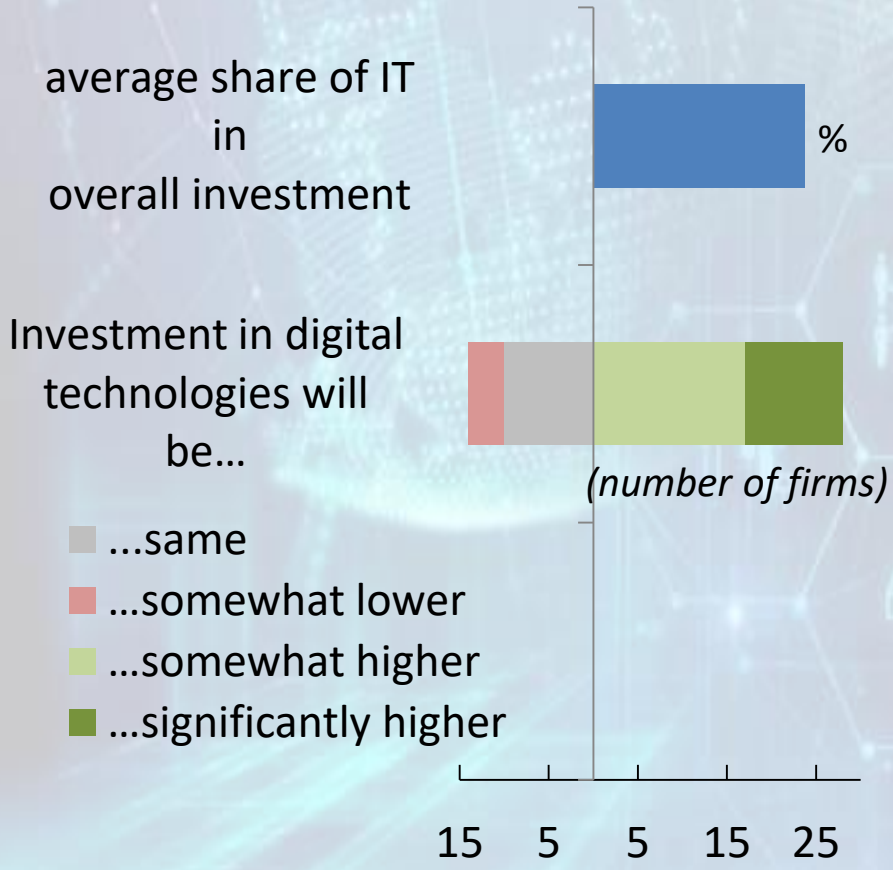
Survey results: Impact on investment

Firms plan to increase investment in IT



24% : share of IT in investment

67% plan to increase IT spending

- Spending on IT includes both
  - **Investment (capital):** IT goods, such as hardware
  - **Expenses:** IT services, such as cloud services, Software as a Service (SaaS), etc.
- Tendency towards more expenses

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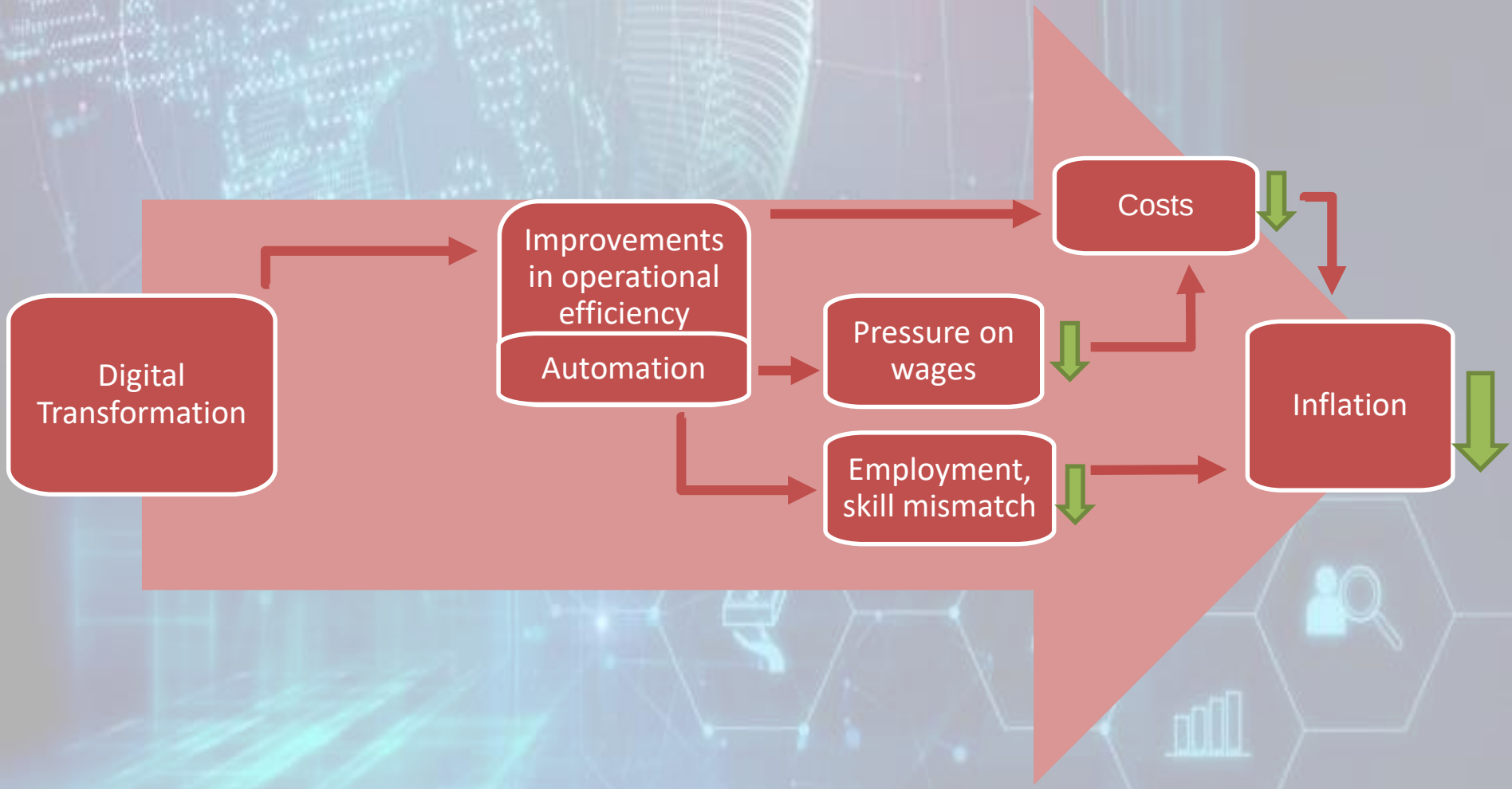
Digital transformation: Implications for costs



Source: Adapted from Riskbank (2015) and Bank of Canada (2017)

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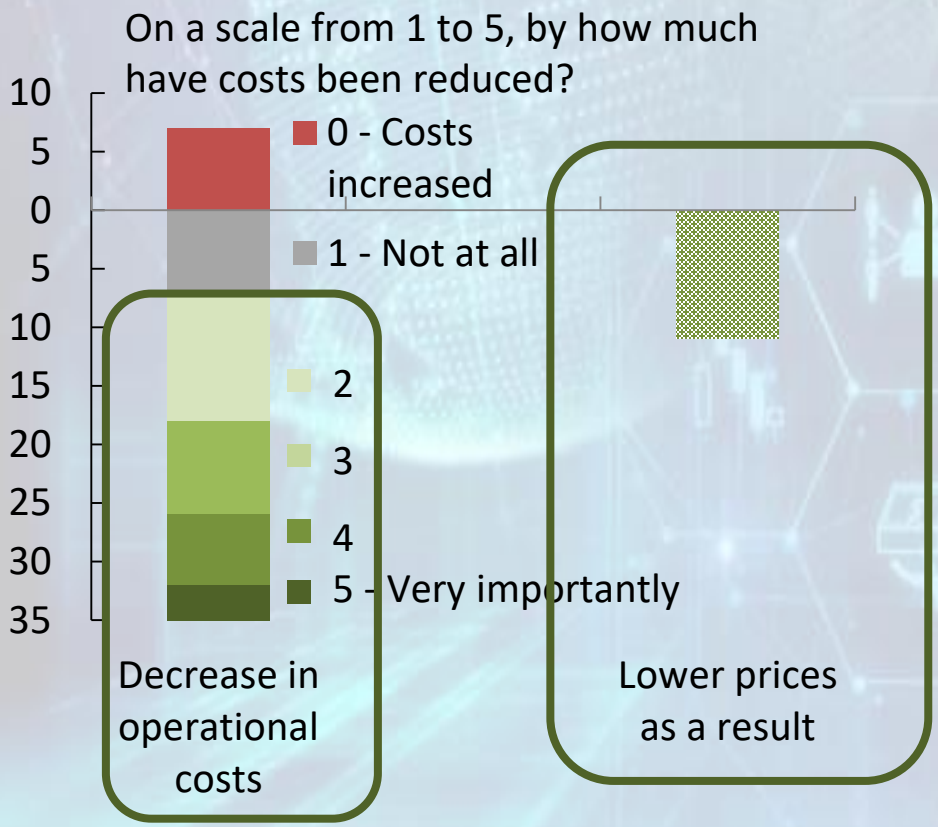
Survey results: Impact on prices – costs

Firms saw a modest reduction in operational costs

Number of firms



Increase in costs: firms still in installation phase, spending on IT outweigh gains

67% see a **reduction in costs** (often modest)

26% **pass on cost savings to their clients (i.e. downward pressure on prices)**

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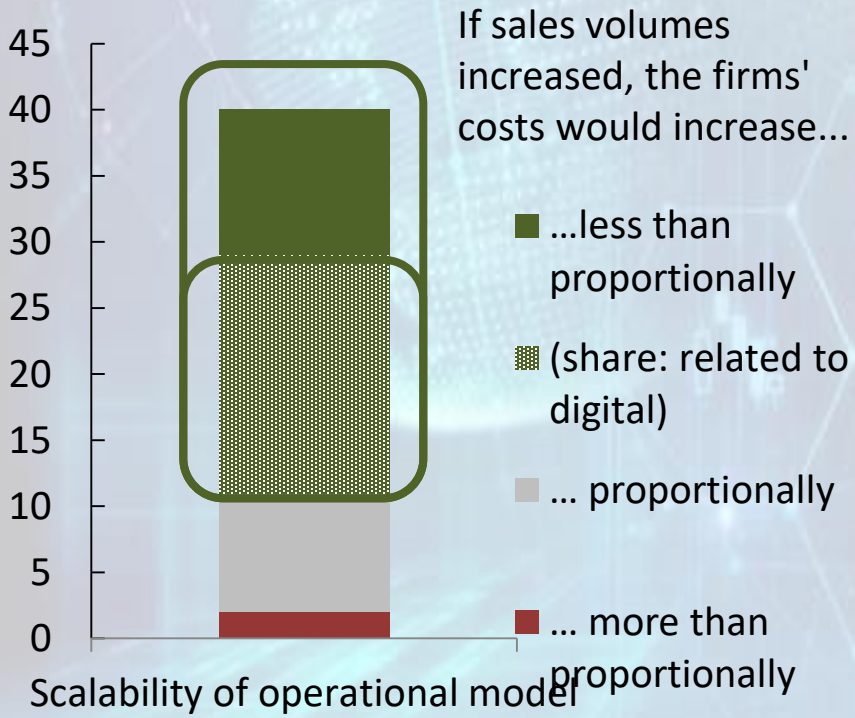
Survey results: Impact on prices – returns to scale

Most firms would see a decrease in cost per unit if volumes increased

Number of firms



69% operate an increasing returns to scale (IRTS) business model

43% link IRTS to digital technologies

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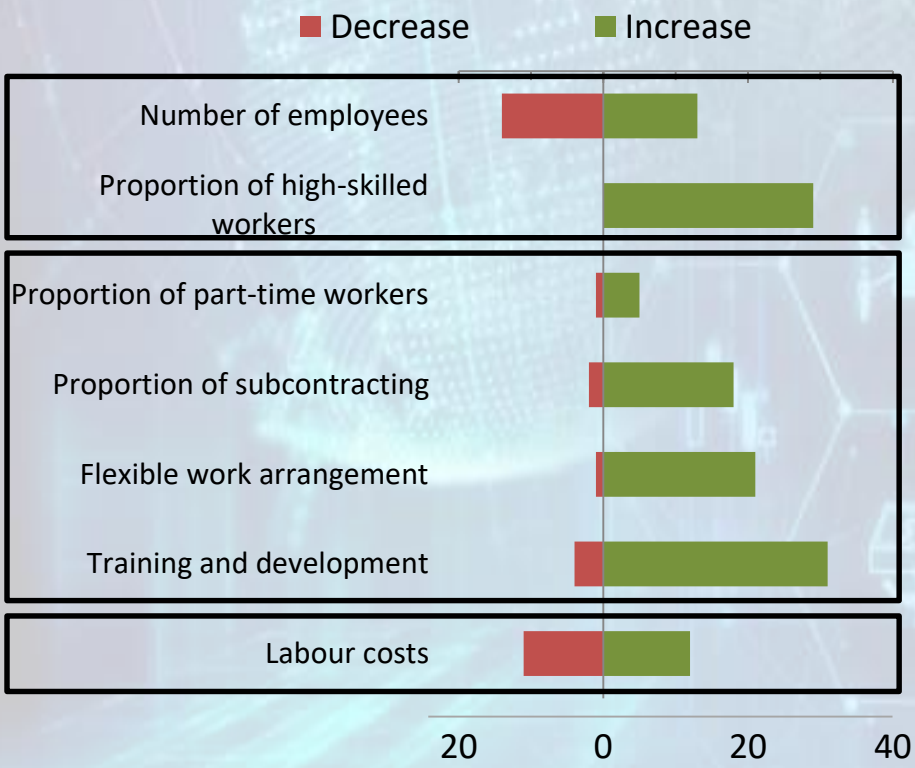
Survey results: Impact on employment

Digitalization transforms the workforce
Number of firms



- Effect on **employment ambiguous**
  - – Automation, efficiency
  - \+ Need for IT staff
- More flexible types and arrangements
- **Labour costs** effects ambiguous
  - – Automating low-skilled tasks
  - \+ High wages for IT professionals

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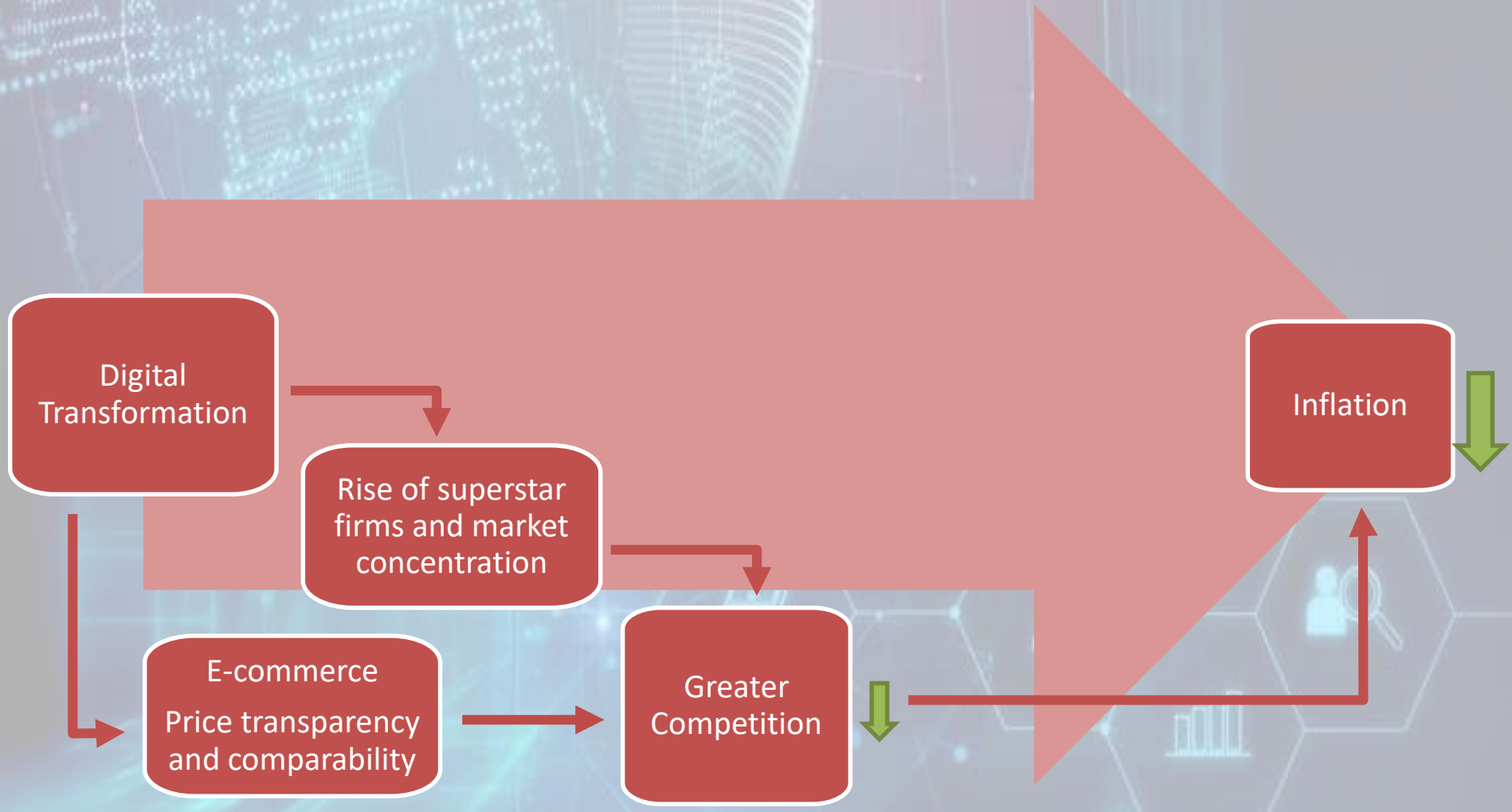
Digital transformation: e-commerce and competition



Source: Adapted from Riskbank (2015) and Bank of Canada (2017)

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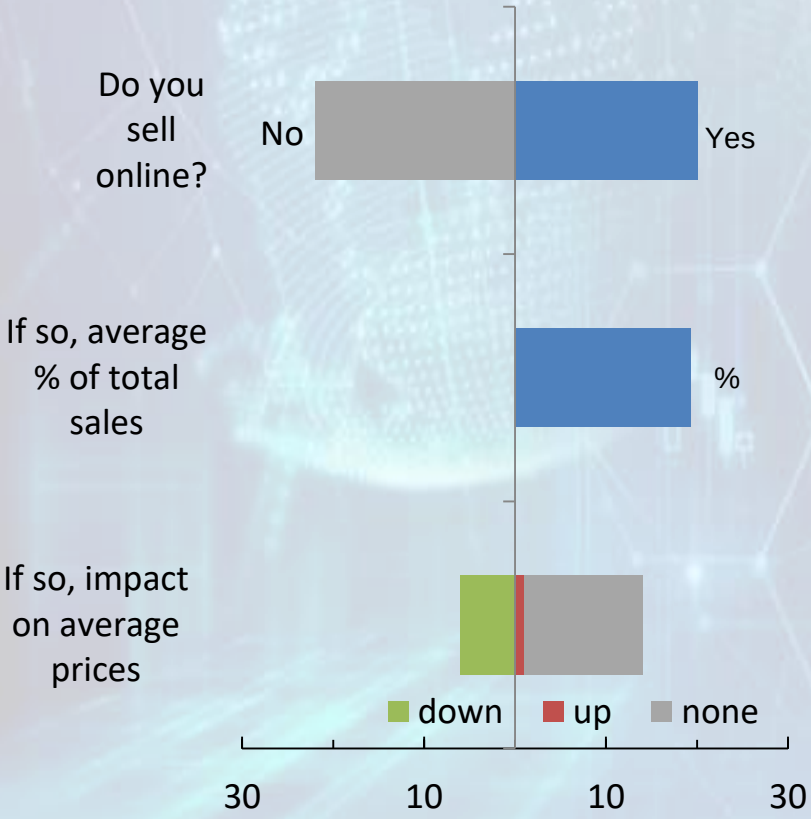
Survey results: Impact on prices – e-commerce

Chart 9: About half of firms sell online, with small negative direct price impact
(number of firms)



47% sell **online**

19% : average share of online sales in total sales

Most firms charge the same price online and in store

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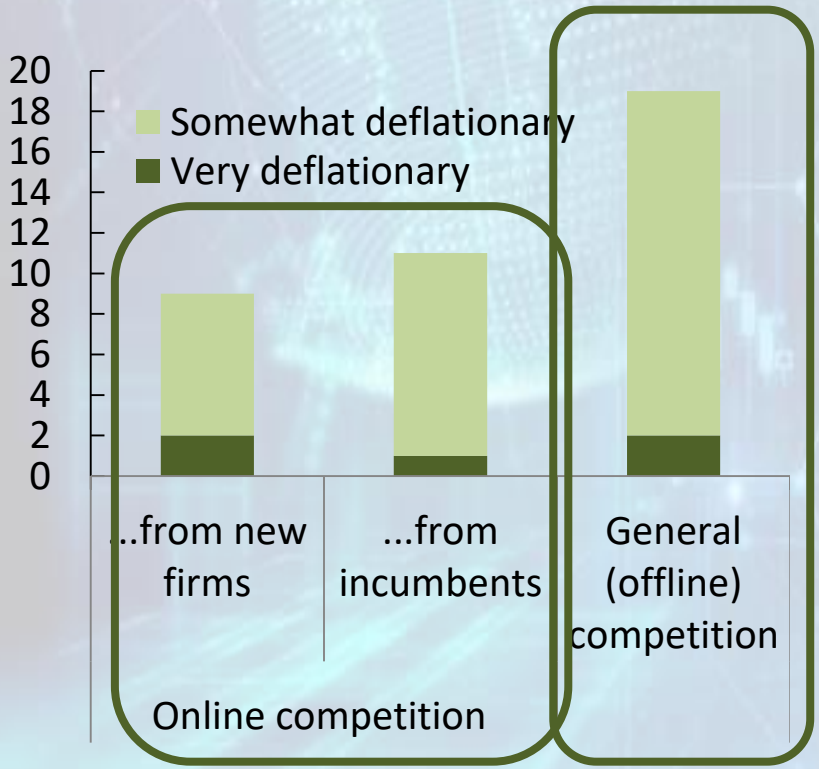
Survey results: Impact on prices – competition

Disinflationary impact from online competition no stronger than from offline

Number of firms



25% cite a downward impact on prices from **online competition**

- Impact from traditional (offline) competition is bigger

48% see downward pressure due to increased **price transparency and comparability** online

= Amazon effect

- Some mention price-matching and price-beating strategies

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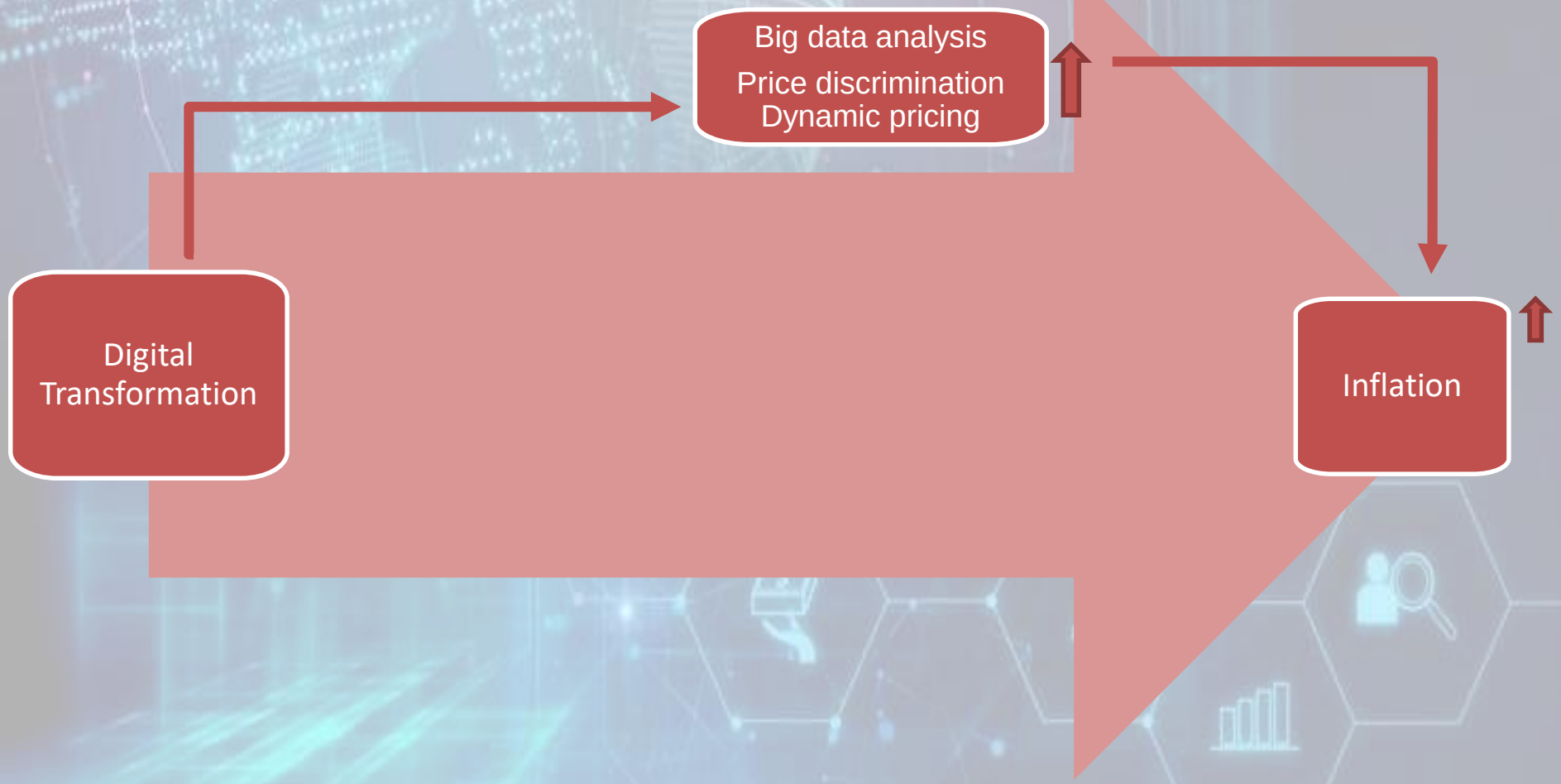
Digital transformation: big data and price strategies



Source: Adapted from Riskbank (2015) and Bank of Canada (2017)

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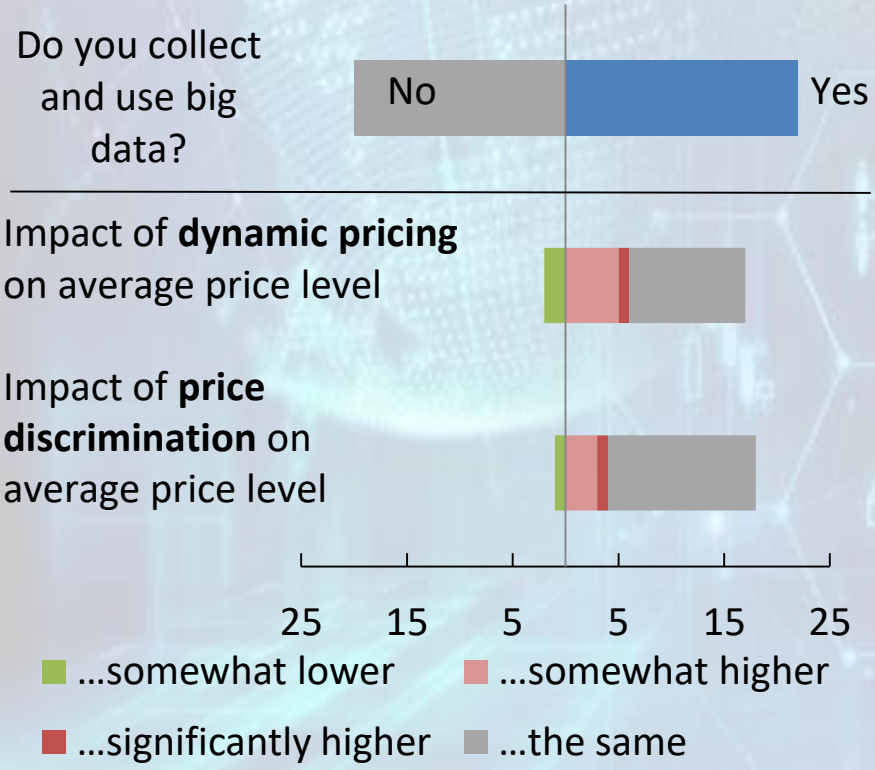
Survey results: Impact on prices – big data analysis

Few firms use big data for price strategies

Number of firms



52% : collect big data

- Few use it in their pricing strategies:
  - **Dynamic pricing**
  - **Price discrimination**

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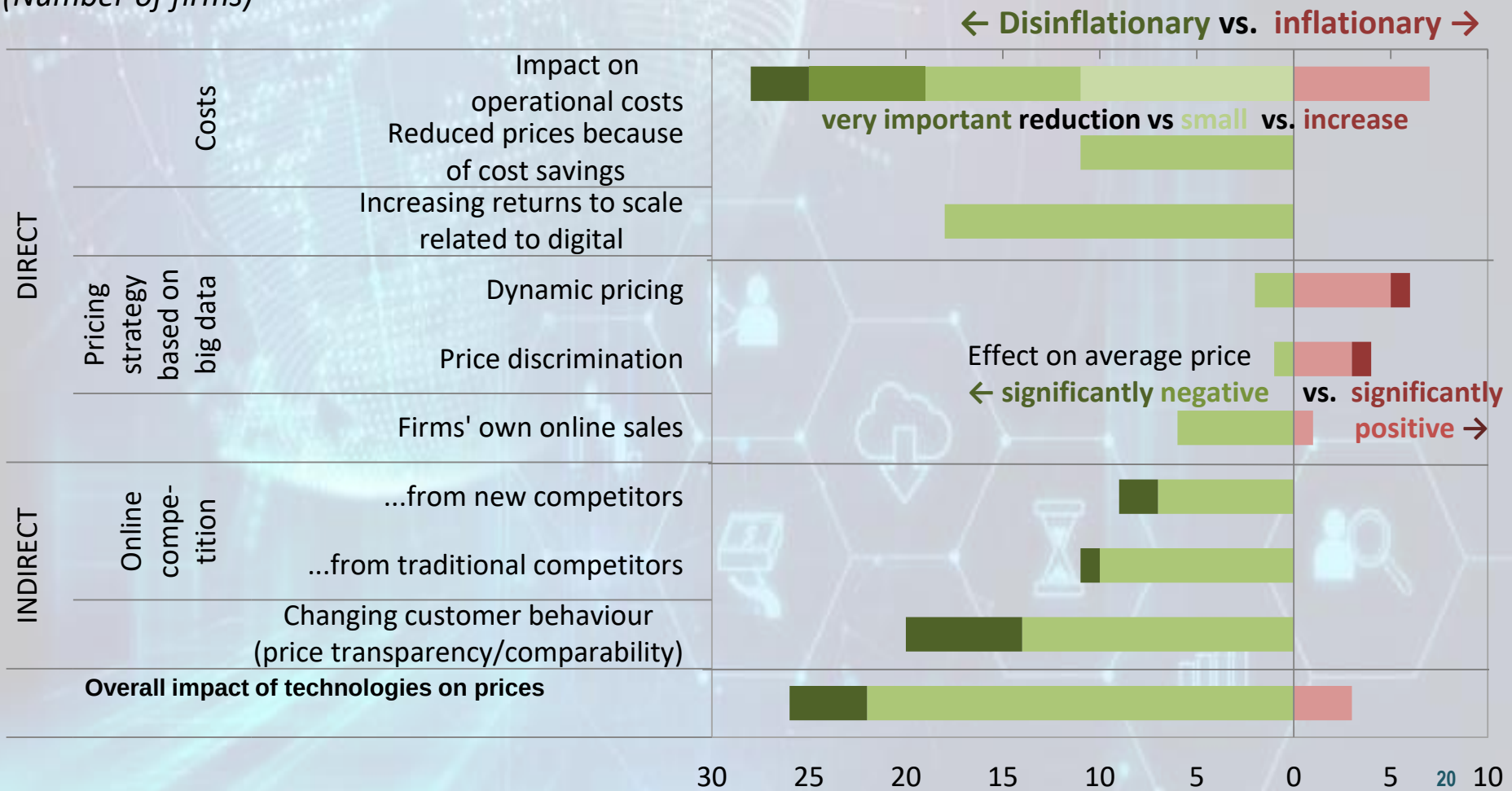
Summary of results: Impact of digital transformation on prices

Summary of survey questions on how digital technologies may affect prices

(Number of firms)



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Key takeaways and areas for future research

- Digital transformation puts some **downward pressure on inflation** via
  1. Operational efficiency and productivity gains
  2. Growing e-commerce and competition
- **Quantitative effect** difficult to discern and to disentangle from other trends such as globalization
- **Policy implications**: depends on whether impact is temporary, or structural. Question of "good disinflation"
- Lots of interesting work in the area to be done: understanding the sharing economy, the gig economy, manufacturing 4.0, etc.

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Additional Slides

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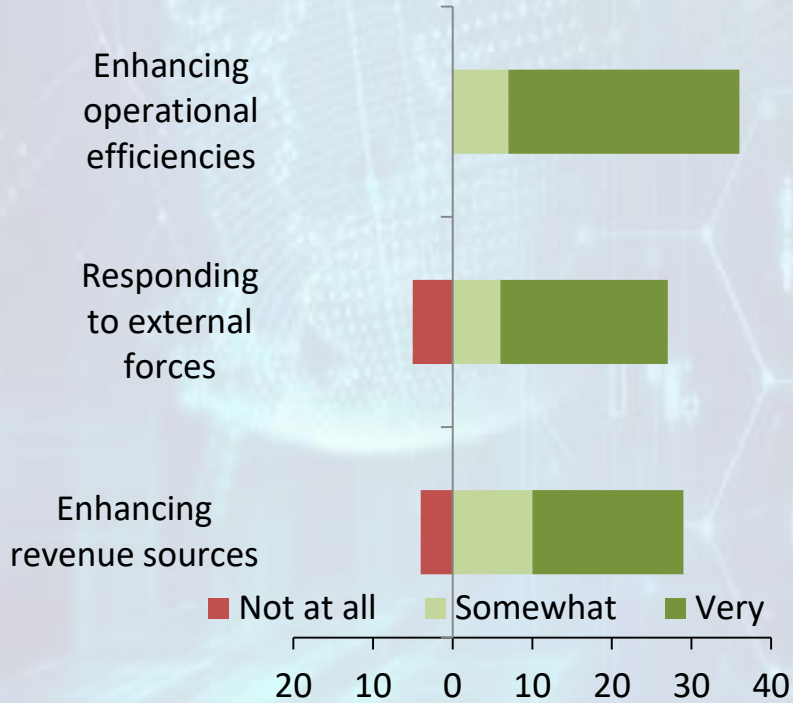
Survey results: why do firms invest in digital tech?

The main objective is to reduce costs
(Number of firms, relevance of objectives)



Note: The main objectives are not mutually exclusive.

86% : increase operational efficiency

64% : respond to external forces (customer demands, competition, regulation, etc.)

69% : incrase revenue sources

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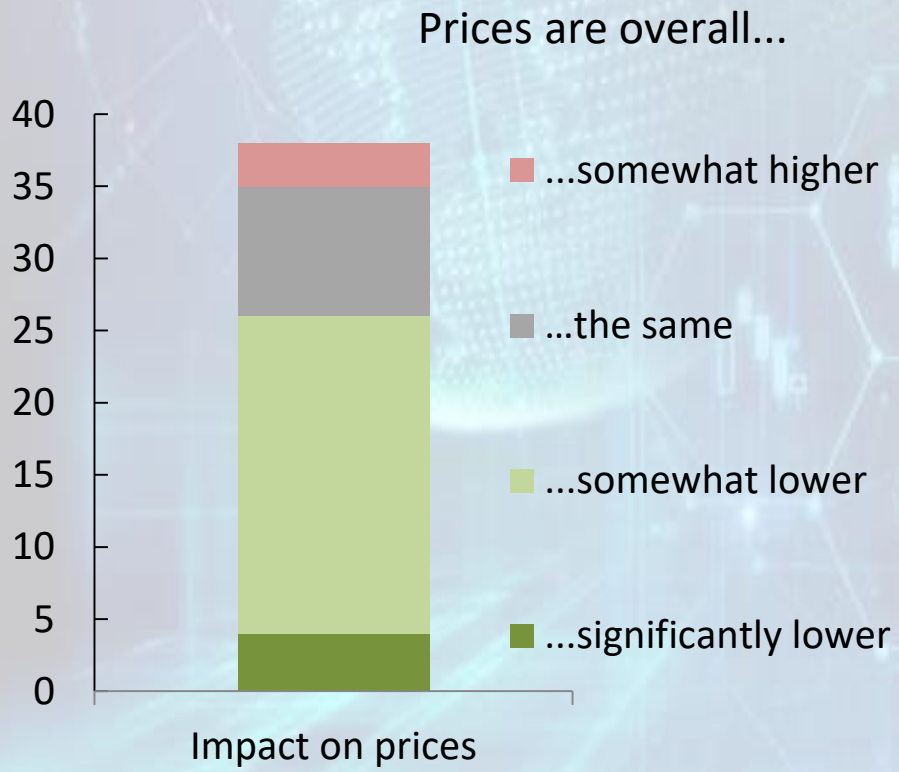
Survey results: Conclusion: overall impact on prices

Overall impact of digital technologies is viewed as somewhat disinflationary

Number of firms



- **Firms judge the overall impact to be disinflationary, on balance**
  - Retail sector overwhelmingly cites downward pressure
  - Most important factors: more-transparent pricing and increased competition
  - cost savings, operational efficiencies

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Key insights from the literature on digitalization and inflation

- **Direct impact:** falling prices of information and communications technology (ICT) goods and services
  - Small downward impact in advanced counties, but almost nil in Canada (limited competition in TelCo sector)
  - Prices fell earlier on this decade, not much recently
- **Reshaping traditional retail market structure and increasing (e-)competition**
  - Evidence in advanced economies that digital superstar firms become dominant
  - Amazon effect: increased competition, especially through e-commerce
  - limited empirical evidence; in Canada, e-commerce is small as of yet
- **Cost-efficient technologies should lead to increased productivity**
  - Little evidence so far in the statistics
  - Some benefits may yet to be reaped, i.e. future productivity gains could put downward pressure on prices