



**Australian Government**  
**Productivity Commission**

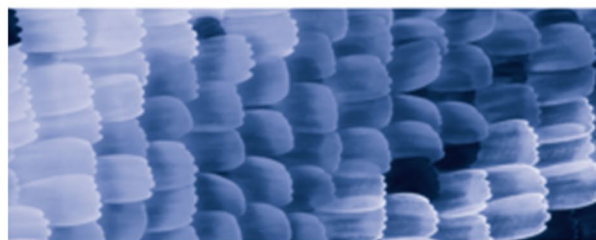
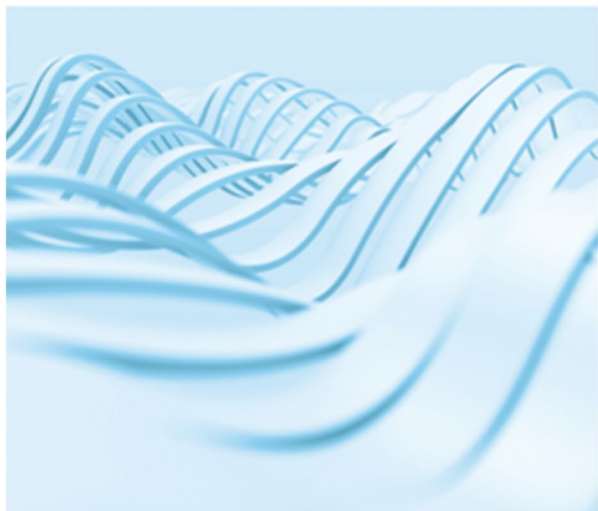
# **Barriers to Effective Adoption of Data and Digital Technologies**

CAER-PC Workshop, November 11, 2022

Catherine de Fontenay, Commissioner

## **5-year Productivity Inquiry: Australia's data and digital dividend**

Interim report



## **Head in the cloud: firm performance and cloud service**

Conference paper

Henry McMillan  
Tim Murray  
Catherine de Fontenay  
Ralph Lattimore

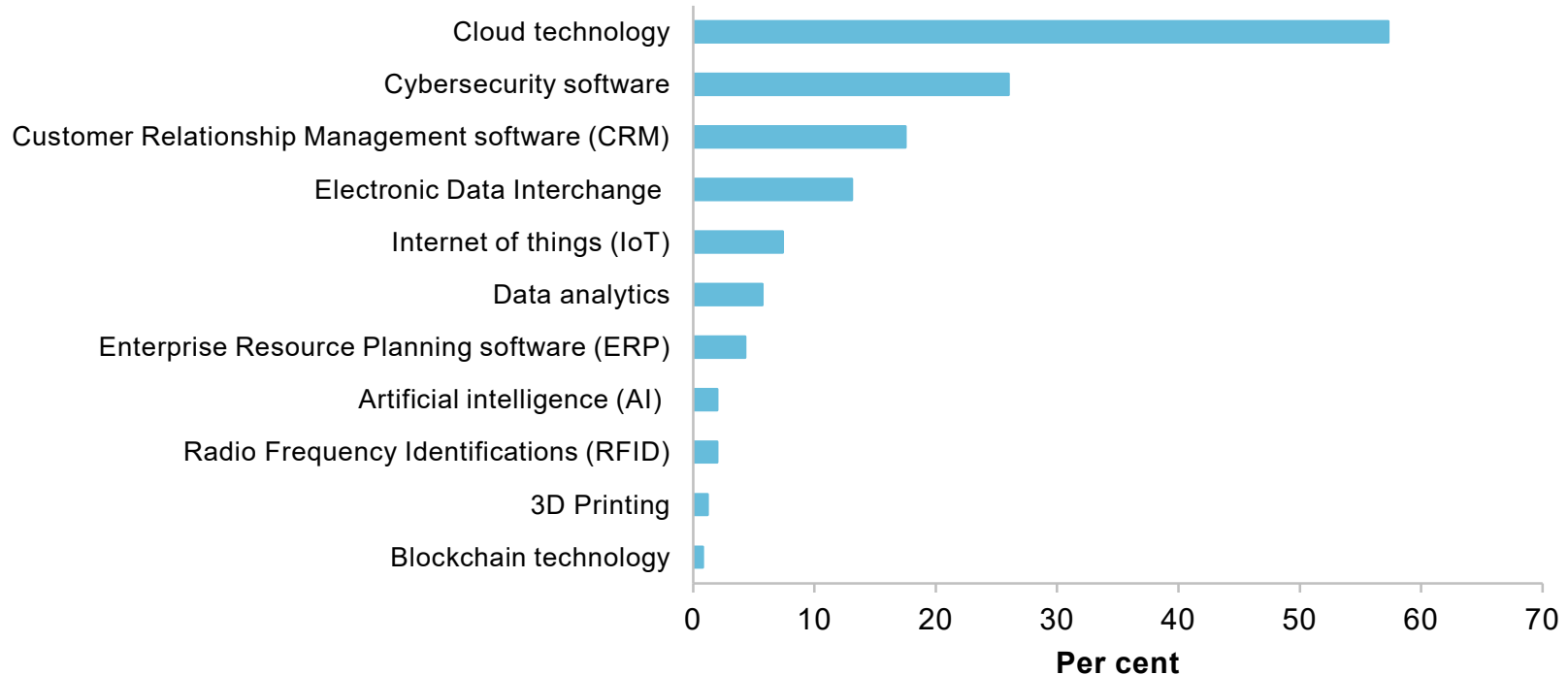
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the staff members and do not necessarily reflect  
the views of the Productivity Commission.

# Adoption of data & digital technologies

- Steady growth prior to 2020
- Then acceleration: almost 9 in 10 Australian businesses adopted new technologies during COVID-19, mostly to support business continuity (PMC 2021).

# Foundation technologies more widely adopted

## Share of businesses using different ICTs, 2019-20

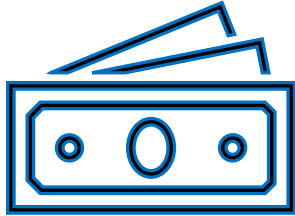


Weighted estimates as published by the ABS in its Characteristics of Australian Business 2019-20 publication.  
Source: ABS (*Characteristics of Australian Business*, Cat. no. 8167.0).

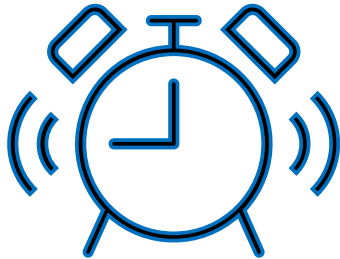
# General Purpose Technologies...potentially several!

- Software
- Digital platforms
- Cloud computing
- Artificial intelligence

→ Firms have investments underway to make some/all of these technologies work.



- **Inside the firm:**
  - Hiring ICT skills
  - Building/hiring managerial skills
  - Replacing existing technology or integrating with it



- **Outside forces:**
  - Other firms investing
  - Government investing (internet access and speed)
  - Government setting standards (digitised processes, data sharing rules)

# Adopting new technology is a slow, bumpy process!

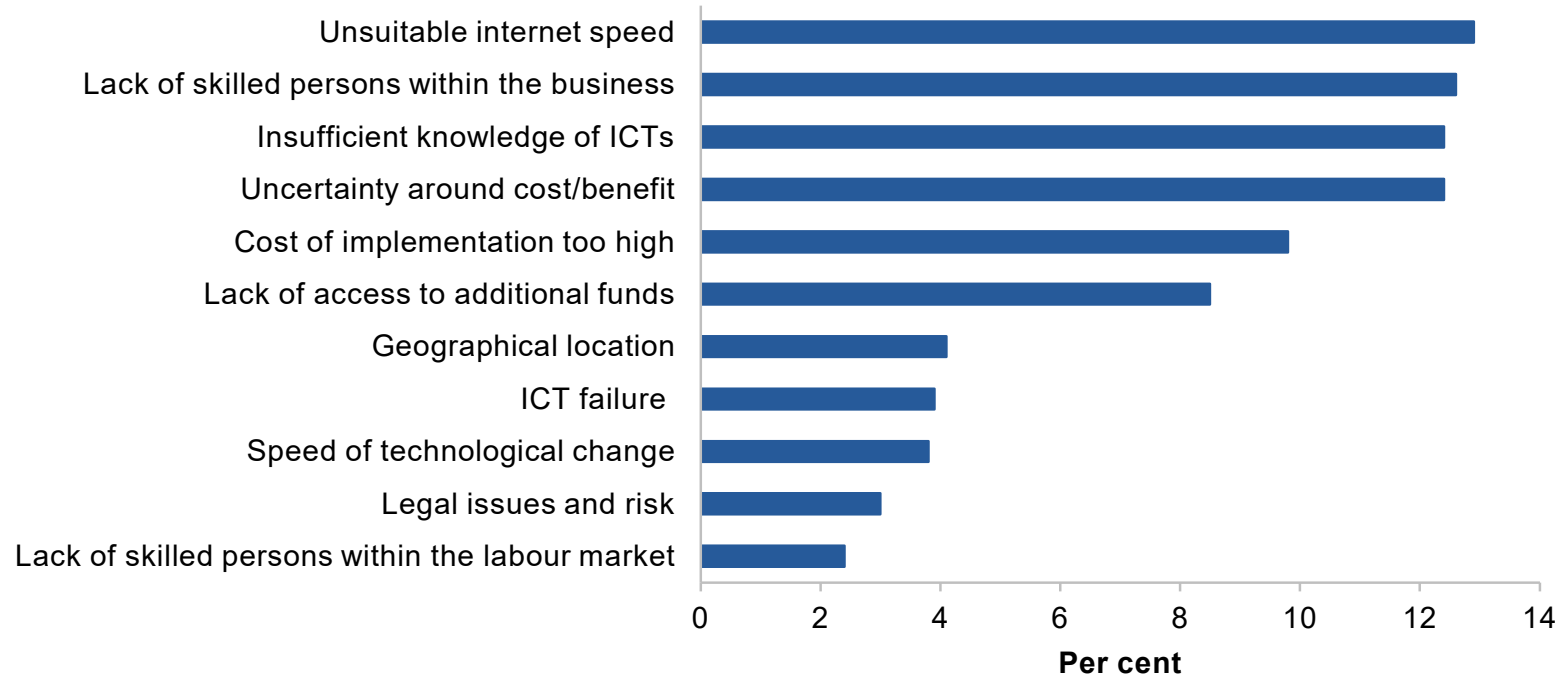
- Firms may not make the right investments
- Firms may not make investments in the right order

→ Similar to R&D!

→ Technology adoption is “Innovation for the 98%”

# A slow bumpy process...

## Share of businesses citing each factor as limiting their use of ICTs, 2019-20



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Source: ABS (*Characteristics of Australian Business*, Cat. no. 8167.0).



# Mistakes are made...

A survey of 1500 Australian SMEs (MYOB 2022)

- 59% of firms reported that adopted digital solutions were hindering them in some way
- 7 hours per week wasted due to lack of integration: manual data entry, consistency checks or fixing errors
- 42% of firms had given up on using some digital business solutions

→ Are firms

- ‘over adopting’?
- failing to integrate adopted technologies?

# Capabilities

→ Are firms

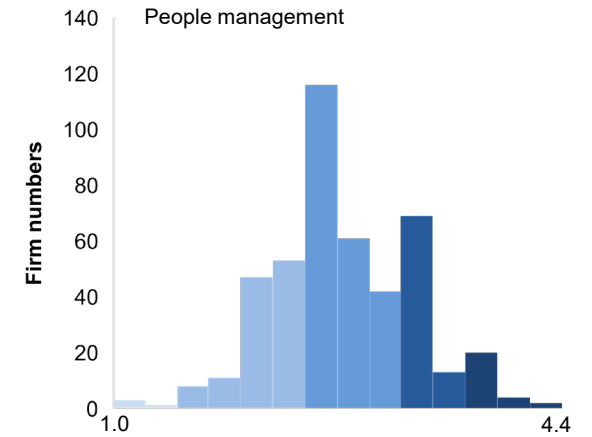
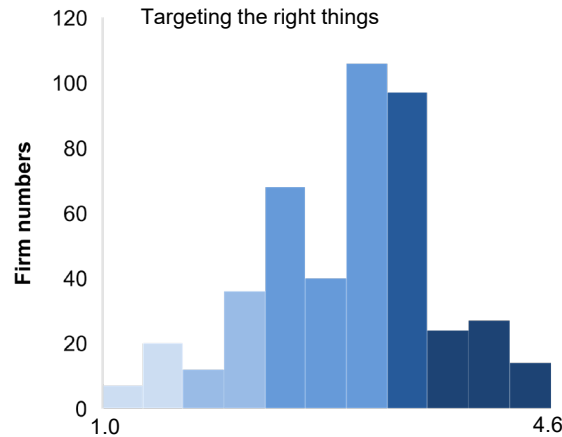
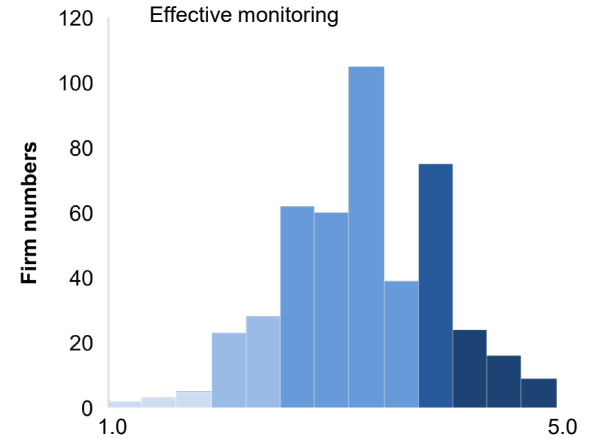
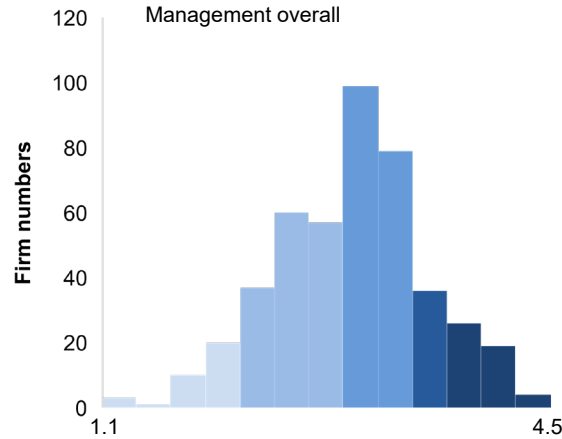
- 'over adopting'?
- failing to integrate adopted technologies?

Likely due to:

Shortages of IT skills

Shortages of managerial capability.

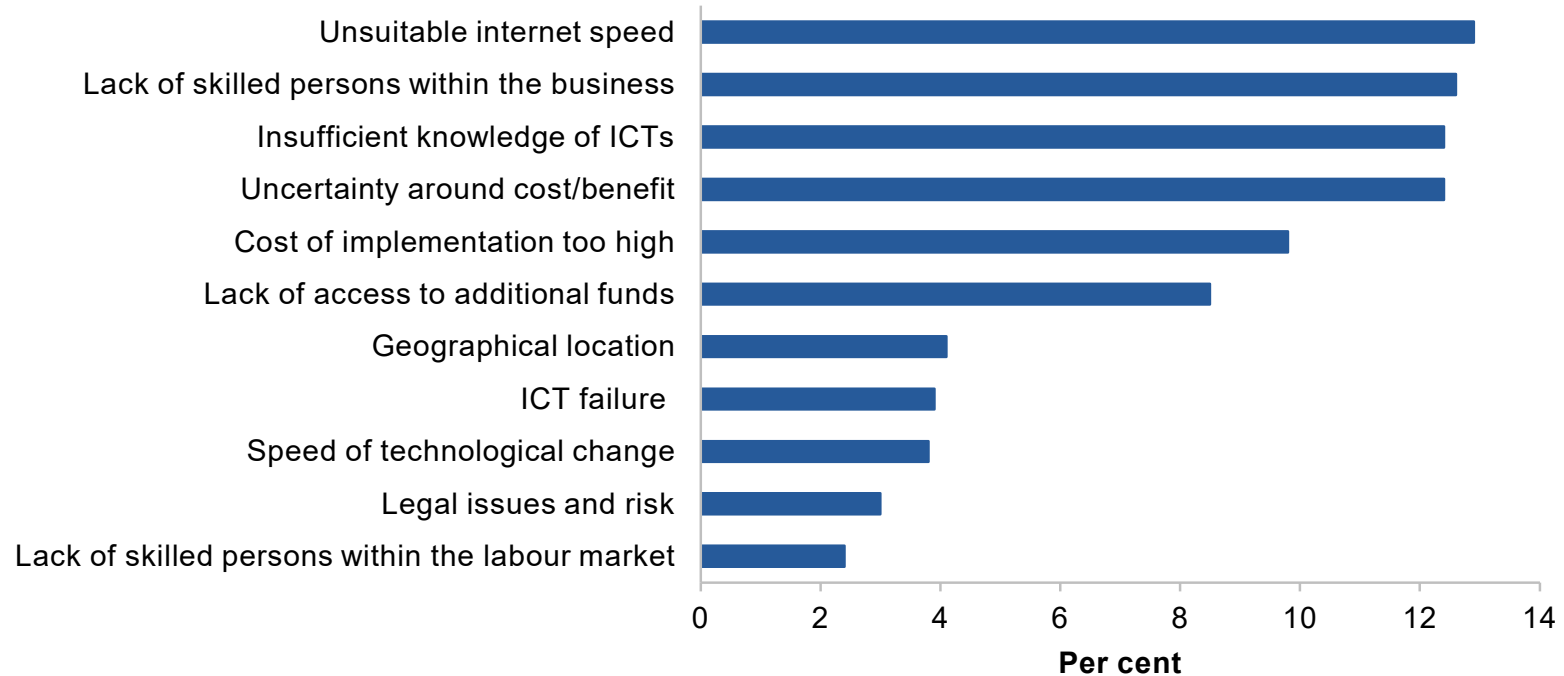
# Data from Australian manufacturing firms shows wide dispersion of managerial capability



Worst practice  Best practice

# Are firms aware of managerial skills shortages?

## Share of businesses citing each factor as limiting their use of ICTs, 2019-20



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# Example: Cloud computing

## Possible benefits:

Access to scalable services

- Eliminates need for lumpy investment
- Can cope with surge in demand

Lower cost (scale economies, competition across locations)

Enabling new innovations

- New software
- New forms of collaborating

# Data

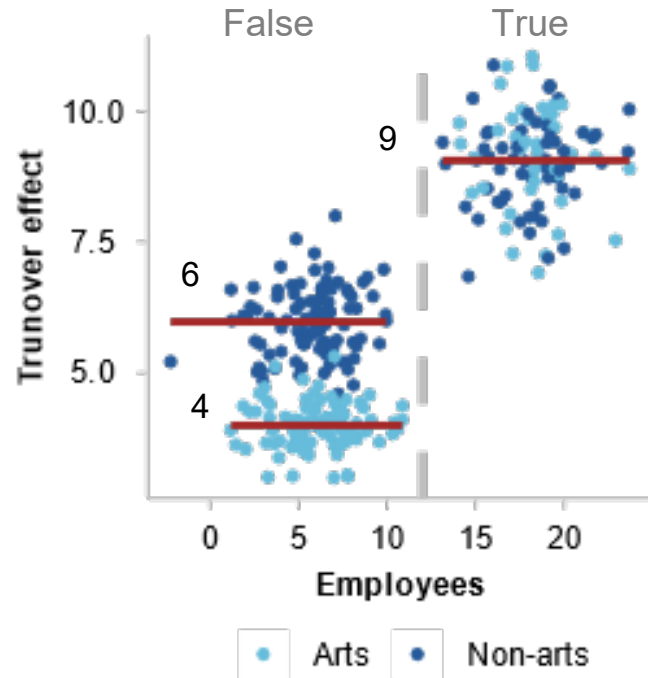
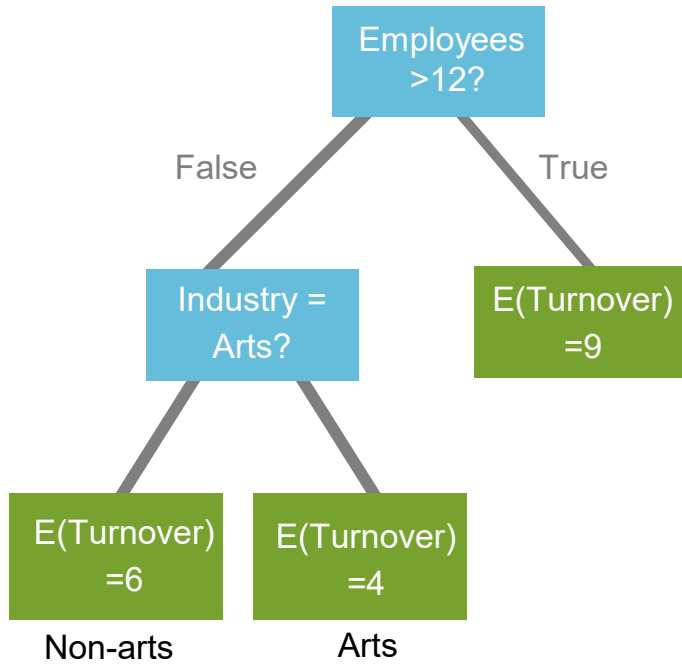
## Business Characteristics Survey (2013-14, 2015-16, 2017-18)

- Large sample (11,989 firms)
- “Paid cloud computing”
- Many other characteristics: remoteness, industry, size,...
- Too many characteristics to include interaction terms in OLS
- ➔ use causal forests to group similar firms

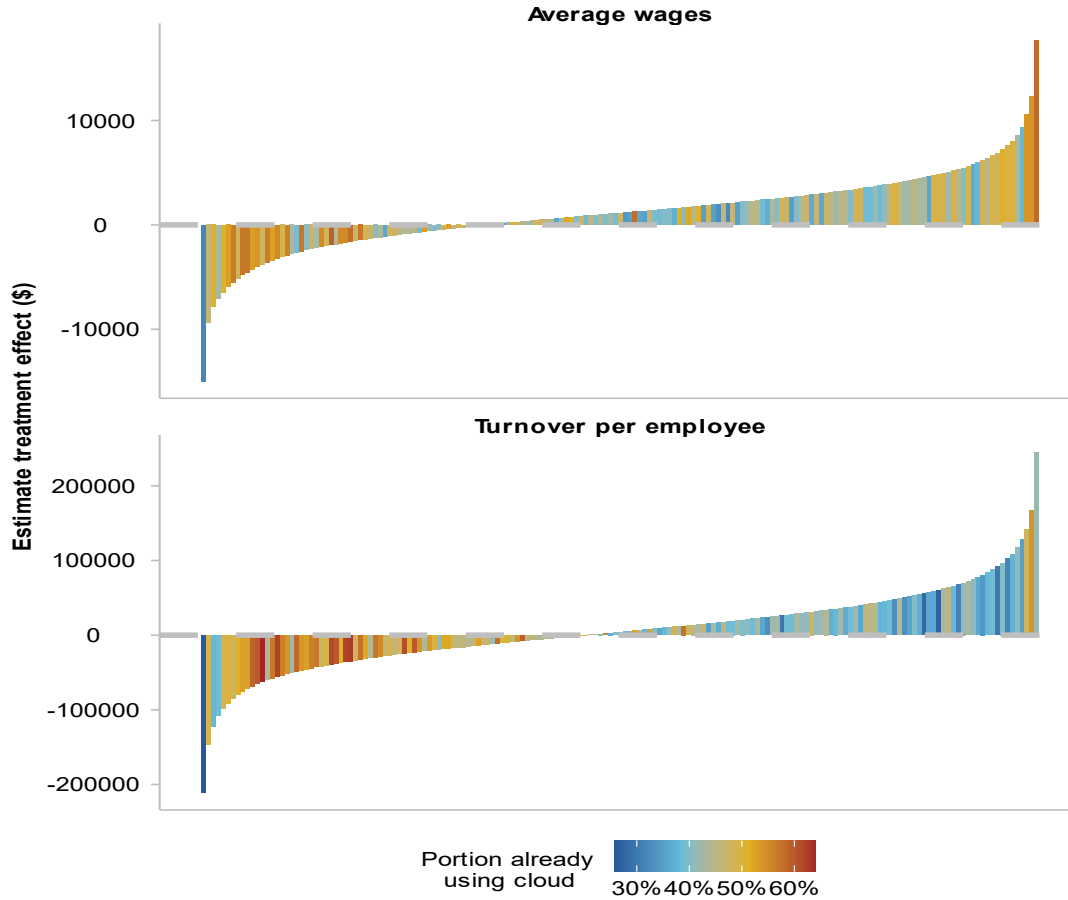
## Linked to firm tax data through the Business Longitudinal Analysis Data Environment (BLADE)

- Imperfect outcome measures: Turnover per FTE and average wages

# Causal forests



Final branch in each tree is “**Adopt / Don’t adopt cloud computing**”





# Policy implications?

How do we encourage adoption but reduce mistakes?

- Over adopting:
  - Advice from “trusted advisers” (accountants, etc.)
  - Guidance from suppliers, customers, partners
  - Guidance from industry associations
- Poor implementation: raise awareness of managerial capability
  - ATO Small business benchmarking
  - Soft skills information from industry associations



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