I.A.R.I.W

ESCoE ECONOMIC STATISTICS CENTRE OF EXCELLENCE

Office for National Statistics

Thursday 11 November

14.00-15.00: Session 2A: Management/Organisational Capital

Chair: Paul Mizen (University of Nottingham)

Jakob Schneebacher (Office for National Statistics) "Channels of Managerial Capital Accumulation – A Framework and New Evidence from UK Microdata"

Takafumi Kawakubo (London School of Economics) "Managing Expectations: How Better Managed Firms Make Better Macro and Micro Forecasts"
SLIDES NOT AVAILABLE

Wendy Li (Moon Economics Institute) "Online Platforms' Creative "Disruption" in Organizational Capital The Accumulated Information of the Firm"

Office for National Statistics

Channels of Managerial Capital Accumulation: A Framework and New Evidence from UK Microdata

A. Ardanaz-Badia, J. Martin, M. Morgan, J. Schneebacher

In collaboration with the Economic Statistics Centre of Excellence (ESCoE), with funding from ESRC grant ES/S012729/1

11 November 2021

Intangibles important, but hard to measure

- In this paper, focus on **managerial capital**
- Measure channels of accumulation jointly, **across UK surveys**
- Use a **direct measure** of management practices to validate
- Highlight **trade-offs** for researchers

Managerial investments varied and complementary

What we find:

- Managerial investments correlated, **clusters** of choices
- Benefits and costs of **firm vs. cell** level

What this paper does not provide:

- Causal evidence
- The last word on the topic

Managerial capital: a framework

1. **Invested**
    1. Direct purchases
    2. Own-account creation
2. **Inherited**
    1. Labour-embedded
    2. Capital-embedded
3. **Learnt**
    1. Vertical learning (supply chain)
    2. Horizontal learning (industry)

Managerial capital: a framework

1. **Invested**
    1. Direct purchases
    2. Own-account creation
2. **Inherited**
    1. Labour-embedded
    2. Capital-embedded
3. **Learnt**
    1. Vertical learning (supply chain)
    2. Horizontal learning (industry)

Roadmap

1. Managerial capital accumulation in UK microdata sources
2. The Management and Expectations Survey (MES)
3. Some preliminary results

UK microdata sources

Data sources

- Management and Expectations Survey (MES)
- Annual Purchases Survey (APS)
- Annual Survey of Hours and Earnings (ASHE)
- E-Commerce Survey
- Employer Skills Survey (ESS)

Managerial capital investment measures

1. **Invested**
    1. *Direct purchases:* Management consultancy services
    2. *Own-account creation:* Development of management software/systems, management training
2. **Inherited**
    1. *Labour-embedded:* % managers with degrees, % non-managers with degrees, proportion of managers, average annual pay, average manager pay
    2. *Capital-embedded:* Purchase or support of management software/systems, purchase of electronic invoicing systems

Difficult to do at the firm level for a single year

Surveys	*Matched observations*
MES 2016 - APS 2016	2,533
MES 2016 - E-Commerce 2017	782
MES 2016 - APS 2016 - E-Commerce 2017	536

Matched sample is small and selected

- Matched firms **not representative** of UK economy
- Difficult decisions when matching surveys not sampled at **ruref** level
- Tricky to built panel for **longitudinal** analysis

Instead, construct detailed industry-size cells

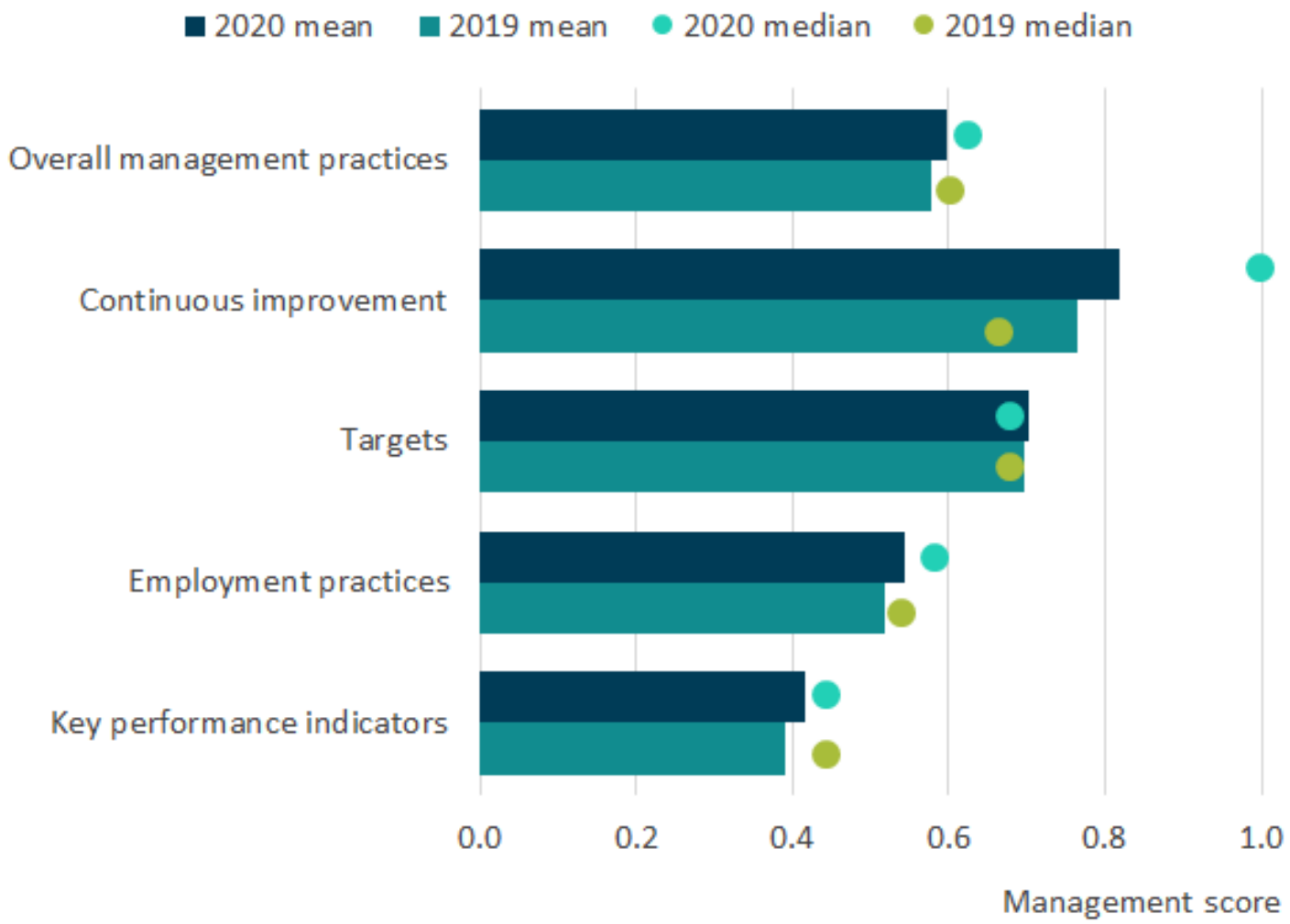
Explore three options:

- Two-digit SIC, four size bands
- Three-digit SIC, three size bands
- Three-digit SIC, four size bands

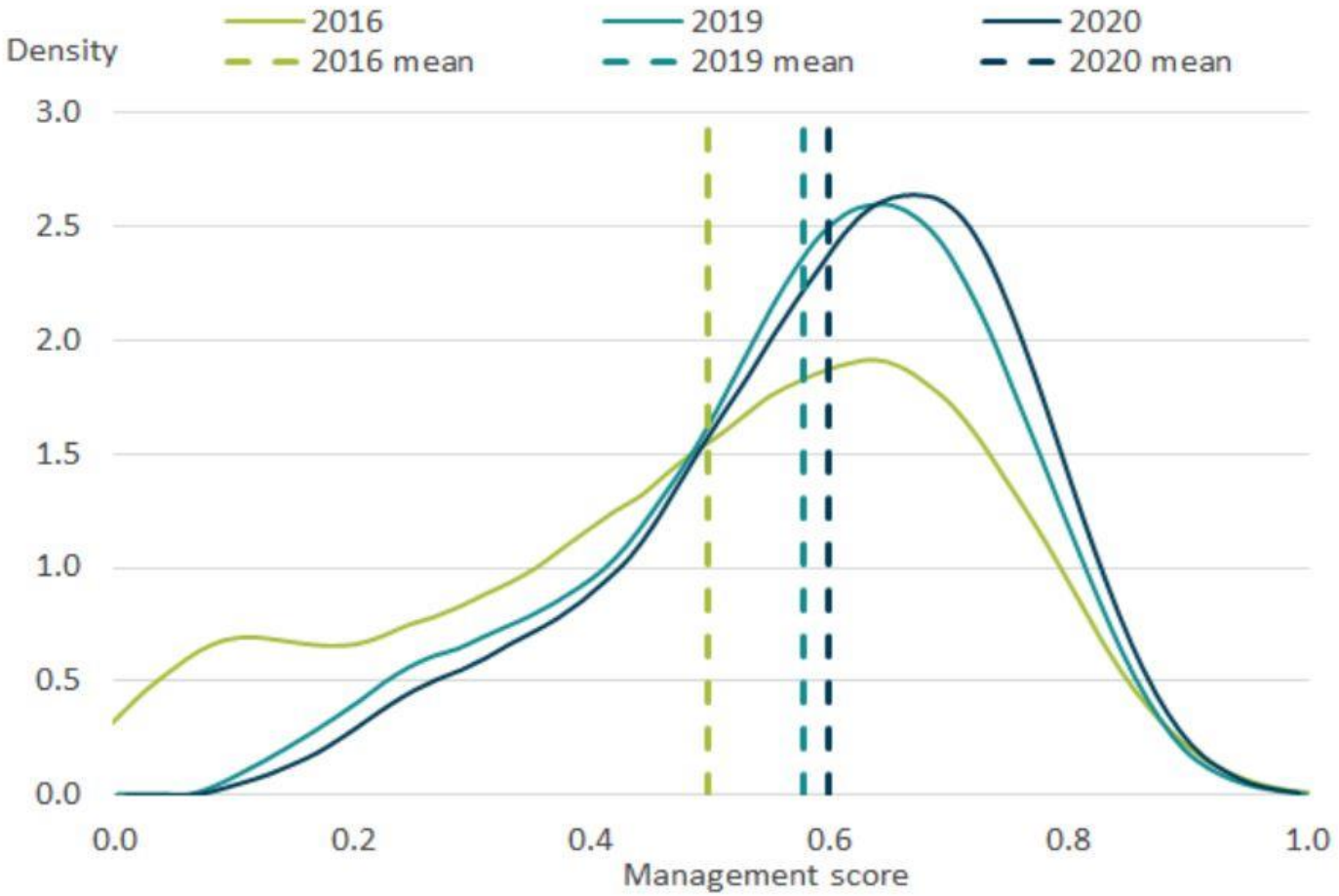
Management and Expectations Survey

Office for National Statistics

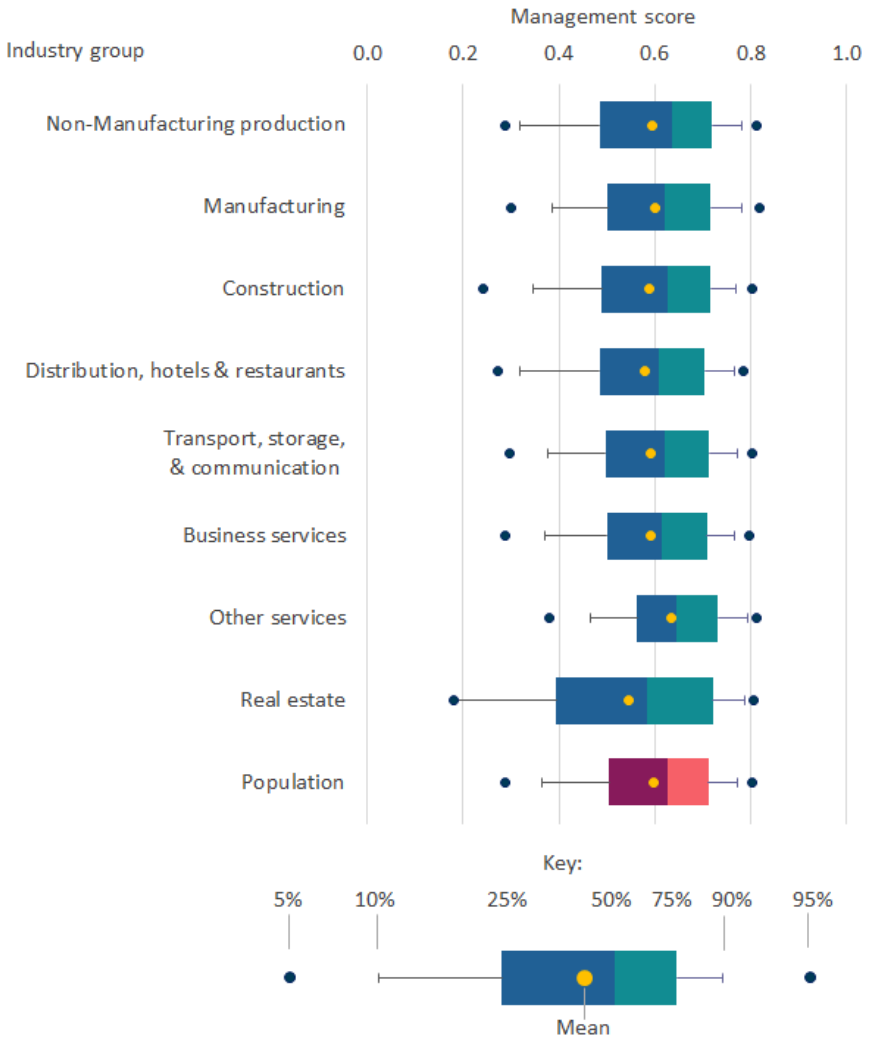
Management practices captured in MES



MES captures meaningful variation across time...



…and within and across industries



Preliminary results

Correlates of management practices, individual surveys

	(1)	(2)	(3)	(4)
	MES	ASHE	APS	E-comm
% managers with degree	0.0922**			
	(0.0407)			
% of managers	-0.296*			
	(0.155)			
% non-managers with degree	0.0972**			
	(0.0437)			
Annual pay (log)		0.160***		
		(0.0268)		
Senior managers annual pay (log)		0.0511**		
		(0.0255)		
% senior managers		-0.232***		
		(0.0878)		
Ratio management expenditure			0.909***	
			(0.185)	
Electronic or automated invoices				-0.00377
				(0.0483)
Maintenance of systems				-0.220
				(0.177)
Office software				0.283**
				(0.135)
Internal management systems				0.318***
				(0.0320)
External management systems				0.182***
				(0.0370)
Observations	294	273	294	239
R-squared	0.169	0.293	0.078	0.497
Industry Fixed Effects	Yes	Yes	Yes	Yes

Correlates of management practices, jointly

	(1)	(2)	(3)	(4)	(5)
% managers with degree	0.102***	0.126**	0.112**	0.108**	0.110**
	(0.0275)	(0.0525)	(0.0532)	(0.0521)	(0.0518)
% of managers		-0.126			-0.105
		(0.166)			(0.175)
% non-managers with degree		-0.0143	-0.0178	-0.00664	0.000921
		(0.0524)	(0.0509)	(0.0512)	(0.0536)
Annual pay (log)	0.0286	0.0203	0.0357	0.0387	0.0437
	(0.0256)	(0.0284)	(0.0291)	(0.0297)	(0.0322)
Senior managers annual pay (log)		0.0196	0.0156	0.0165	0.0148
		(0.0255)	(0.0256)	(0.0256)	(0.0256)
% senior managers			-0.177**	-0.182**	-0.167**
			(0.0797)	(0.0814)	(0.0770)
Ratio management expenditure	0.165	0.139	0.143	0.270*	0.270*
	(0.154)	(0.160)	(0.157)	(0.154)	(0.152)
Development management systems	0.0971*	0.0956*	0.0932*		
	(0.0517)	(0.0541)	(0.0529)		
Support management systems	0.253***	0.254***	0.261***		
	(0.0635)	(0.0691)	(0.0641)		
Electronic or automated invoices	-0.0198	0.00607	-0.00651	0.00692	0.00461
	(0.0602)	(0.0675)	(0.0665)	(0.0689)	(0.0692)
Maintenance of systems		-0.294**	-0.321**	-0.243	-0.237
		(0.140)	(0.150)	(0.153)	(0.148)
Office software		0.189*	0.213**	0.272***	0.269***
		(0.0968)	(0.103)	(0.104)	(0.102)
Internal management systems				0.244***	0.237***
				(0.0347)	(0.0385)
External management systems				0.160***	0.155***
				(0.0345)	(0.0357)
Observations	238	223	223	223	223
R-squared	0.587	0.611	0.618	0.587	0.588
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes

Clusters of managerial capital accumulation channels

	score	% managers with degree	% non-managers with degree	Proportion managers	Ratio management expediture	Development management systems	Support management systems	Annual pay (log)	Senior managers annual pay (log)	Proportion senior managers
A	0.68	0.76	0.82	0.20	0.02	0.89	0.94	10.43	10.98	0.16
B	0.66	0.28	0.19	0.13	0.02	0.92	0.96	10.24	10.87	0.12
C	0.64	0.63	0.64	0.22	0.10	0.79	0.83	10.26	11.02	0.14
D	0.60	0.18	0.14	0.12	0.03	0.82	0.90	10.04	10.63	0.14
E	0.60	0.40	0.33	0.20	0.02	0.69	0.74	10.22	10.74	0.18
F	0.48	0.19	0.15	0.16	0.01	0.45	0.51	9.74	10.21	0.13

Firm composition differs across clusters

	A	B	C	D	E	F
Average score	0.68	0.66	0.64	0.60	0.60	0.48
Non-manufacturing production	2.27	4.44	14.29	9.80	2.70	6.25
Manufacturing	15.91	66.67	21.43	49.02	18.92	40.63
Construction	0.00	4.44	0.00	3.92	16.22	6.25
Distribution, hotels and restaurants	0.00	4.44	0.00	15.69	5.41	25.00
Transport, storage & communication	45.45	6.67	7.14	7.84	18.92	6.25
Business services	34.09	6.67	57.14	13.73	29.73	12.50
Other services	2.27	4.44	0.00	0.00	0.00	3.13
Real estate	0.00	2.22	0.00	0.00	8.11	0.00
10-49	15.91	0.00	21.43	3.92	51.35	78.13
50-99	22.73	17.78	28.57	41.18	18.92	12.50
100-249	22.73	31.11	35.71	35.29	16.22	6.25
250+	38.64	51.11	14.29	19.61	13.51	3.13

Conclusion

A step towards better measurement of managerial capital

What we aim to provide:

- A transparent account of UK sources on **managerial capital** accumulation
- A validation exercise using **direct evidence** on management practices

We hope this enables others to:

- Investigate **causal** impact of channels, individually and jointly
- Construct **better proxies** where direct measures unavailable
- Address missing pieces in future **survey design**

University of Nottingham
UK | CHINA | MALAYSIA

Channels of Managerial Capital Accumulation – A Framework and New Evidence from UK Microdata

Anna Ardanaz-Badia, Josh Martin, Mika Morgan, Jakob Schneebacher

Discussion by Cher Li

IARIW-ESCoE Conference, 11 Nov 2021

Major strengths

- Important yet underexplored research question
- Nice analytical framework
- New empirical evidence from novel datasets: 2 waves of MES
- Empirics:
  - ✓Stock vs. flows
  - ✓Valuable data linking to incorporate other relevant sources of info on managerial capital
  - ✓Offers a fuller picture

Further considerations

- Unit of analysis: industry-size cells (c.a. 224-294 cells @SIC 2 digit, 4 size bands)

- Firm-level confounders important: controlling for size, age, multi-plant, multi-region, foreign ownership (MNEs subsidiaries) & intra-firm trade of management consulting services/transfer pricing

- Measurement: Kaizen/continuous improvement: e.g., quality management systems certifications e.g., ISO 9001

Further considerations

- Interpretation: quality vs. quantity of managers; -ve % managers (stock); -ve % senior managers (stock); -ve senior manager pay (flow); -ve maintenance of systems (flow)

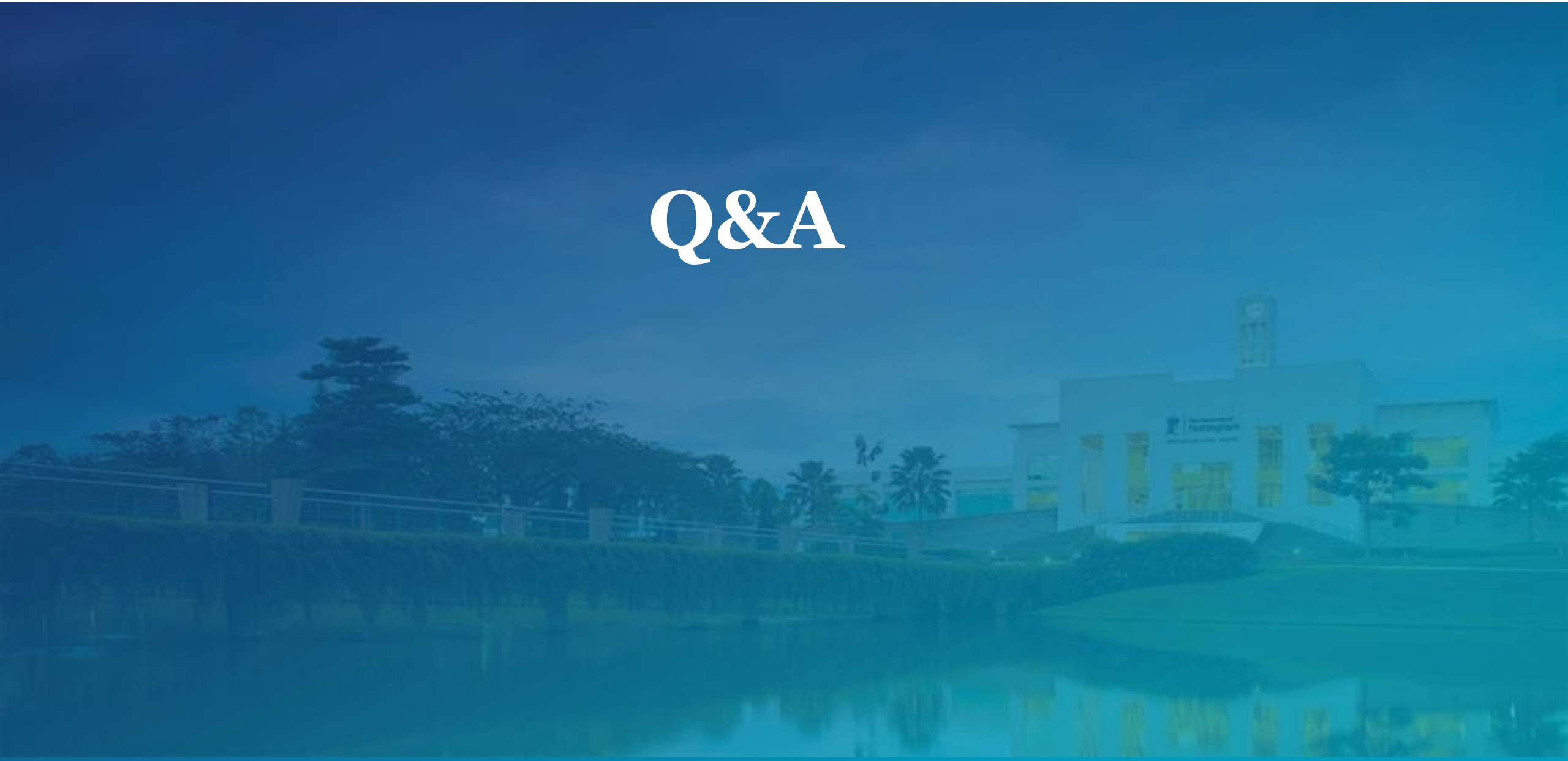
- Other missing pieces of the puzzle: spillovers through economic linkages (horizontal/vertical learning based on matching with UKIS data)

- The “So what?” question

- Future avenues: controlling for individual-level characteristics of managers (e.g., human capital, tenure, experience, educational background etc.); interaction with other intangible assets (e.g., IPRs); managerial capital at task level instead of SOC level

University of Nottingham
UK | CHINA | MALAYSIA

Thank you!



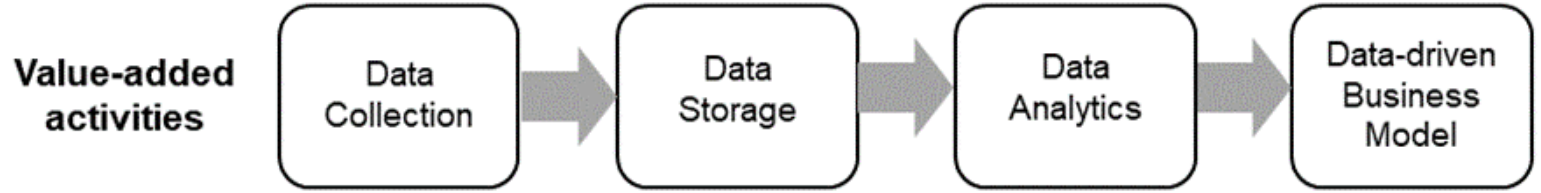
Online Platforms' Creative "Disruption" in Organizational Capital – The Accumulated Information of the Firm

Wendy C.Y. Li (Moon Economics Institute)
and P.J. Chi (UCLA)

Date: November 11, 2021

IARIW-ESCoE Conference on Intangible Capital

Data Value Chain



- Data in the stages of data collection and storage has little value.
- Data in the data analytics has some value, most of which is already captured by R&D.
- The majority of the value of data comes from the last stage: **data-driven business model**, a main part of **organizational capital (OC)**.
- OC can capture Big Tech's value of data empowered by the data network effect and the network effect of their platforms.

Source: Li et al. (2018)

What is the Value of Data?

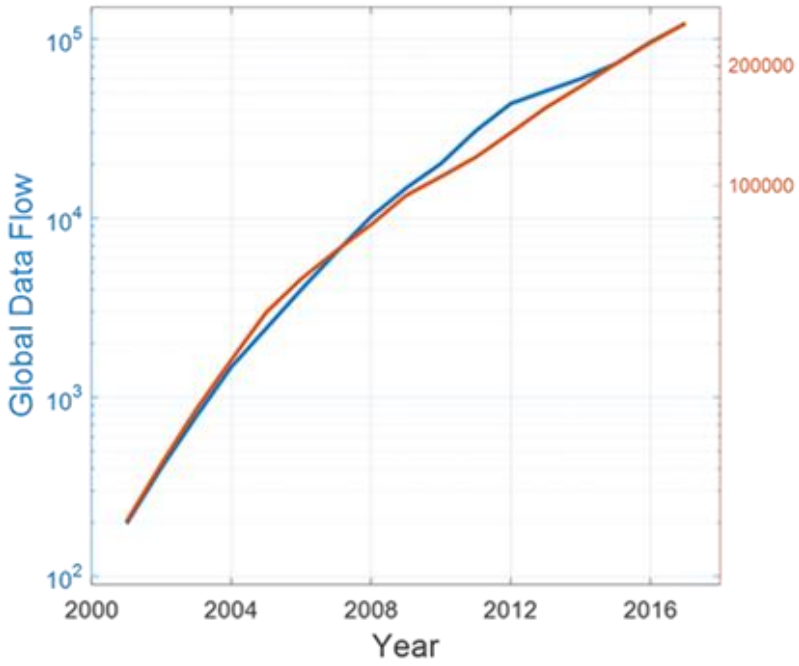
- **Definition** (Prescott and Visscher, 1980) Accumulated Information of the Firm
- **Operational Definition** (Lev and Radhakrishnan, 2005): firm-embodied/competitive advantage that cannot be completely codified, transferred to other firms, and imitated by other firms.
- **Information Pyramid**

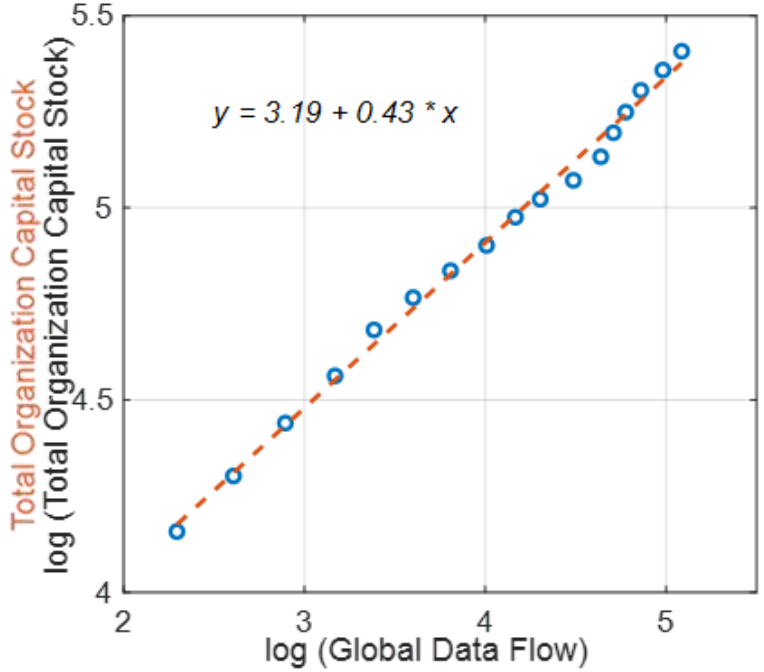
→ Knowledge guides firm how to produce, compete, and grow

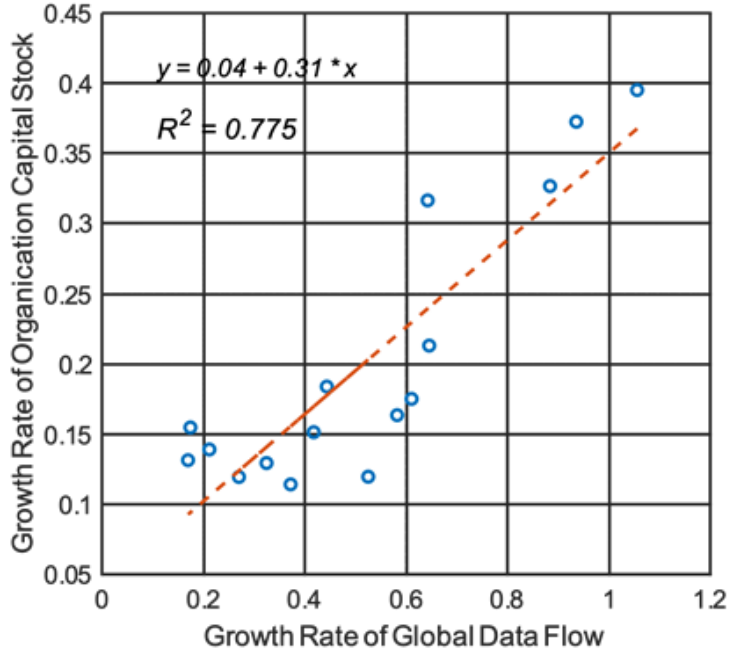
= Accumulated Information of the Firm ≡ Organizational Capital (OC)

The Measurement Conundrum: Explosive Global Data Flow vs. an Economic Value

(Solved!) The Measurement Conundrum: Explosive Global Data Flow vs. an Economic Value







Li's Law of Value of Data:

when the global data flow increases by five folds, Big Tech's value of data doubles.

Note: Big Tech companies include Microsoft, Amazon, Apple, Google, Facebook, Alibaba, and Tencent.

How to Measure?

- **Perpetual Inventory Method** (Hall, 1993)
  - Widely Adopted Measurement Approach for Intangible Capital
  - Key parameters you need (in addition to investment data):
    - Price Index: GDP Deflator
    - Depreciation Rate of Intangible Capital

e.g. Eisfeldt and Papanikolaou (2013), Falato et al. (2013), Peters and Taylor (2017), Brynjolfsson et al. (2018b)

→ **Key Problem: No Actual Estimated Depreciation Rate**
(One ad-hoc number for the depreciation of OC)

→ **Li and Hall (2020)**

Source Data

- Investment in organizational capital:

[Selling, General and Administrative (SG&A) Expense]

– [R&D Expense]

- Data used in the following example:
  1. The data cover key firms in the U.S. hospitality industries where public data are available.
  2. The data sources are firms' public income statements.
  3. The data cover years from 2002 to 2018.

Depreciation of Data vs. Depreciation of Value of Data

- The value of data is created through its utilization. New values of data can be created through data fusion and through data-driven business innovations. Data need not depreciate as long as one finds ways to use it.

- But the value of data created by firms may depreciate due to obsolescence and competition.

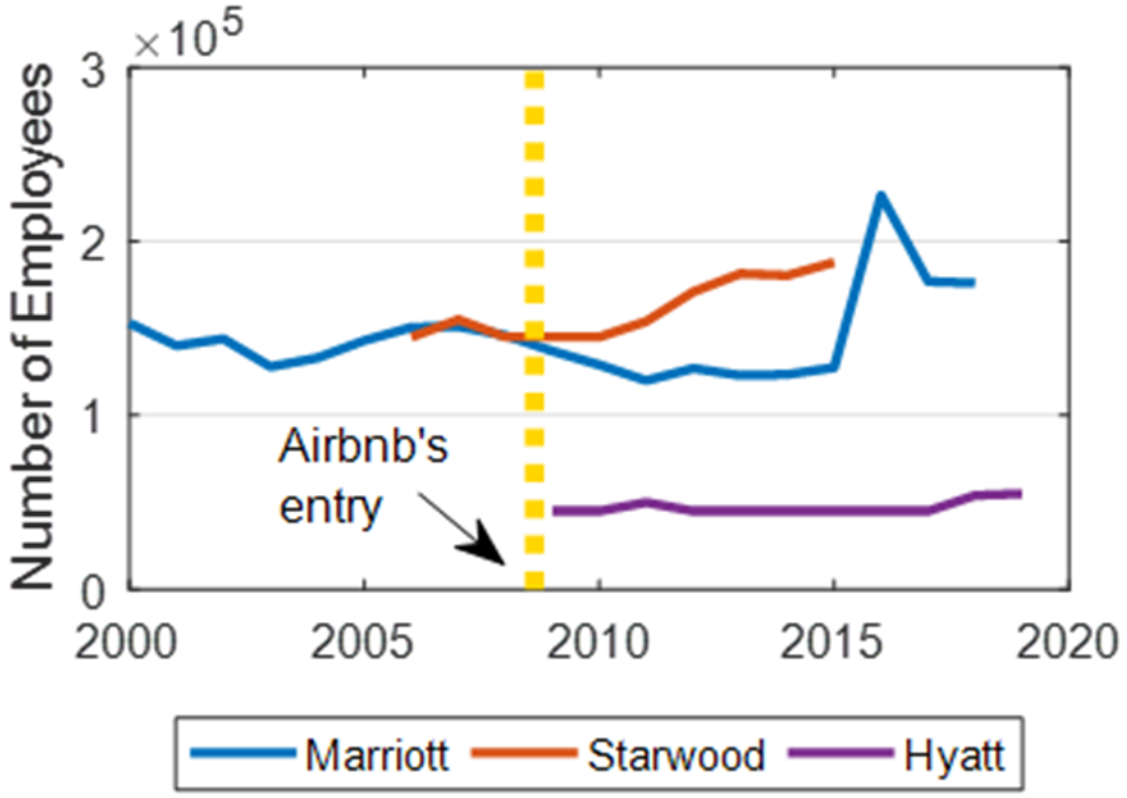
Depreciation of Organizational Capital

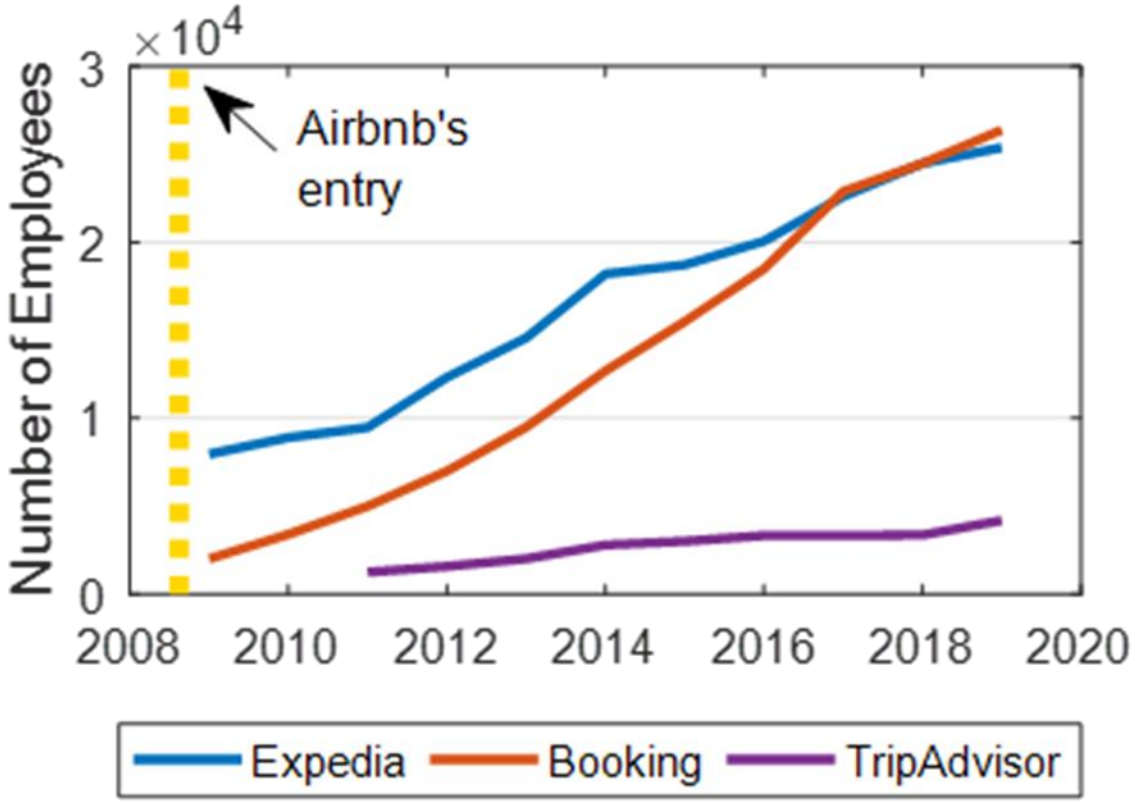
Firms	δ_OC [%]	Degree of Digitalization
	U.S. Hospitality Firms	
Hyatt	36%	Lower
Marriott	46%	Lower
Starwood	33%	Lower
	U.S. Online Travel Platform Companies	
Expedia	8%	Higher
Booking	19%	Higher
TripAdvisor	17%	Higher

Changes in Depreciation Rates of Organizational Capital

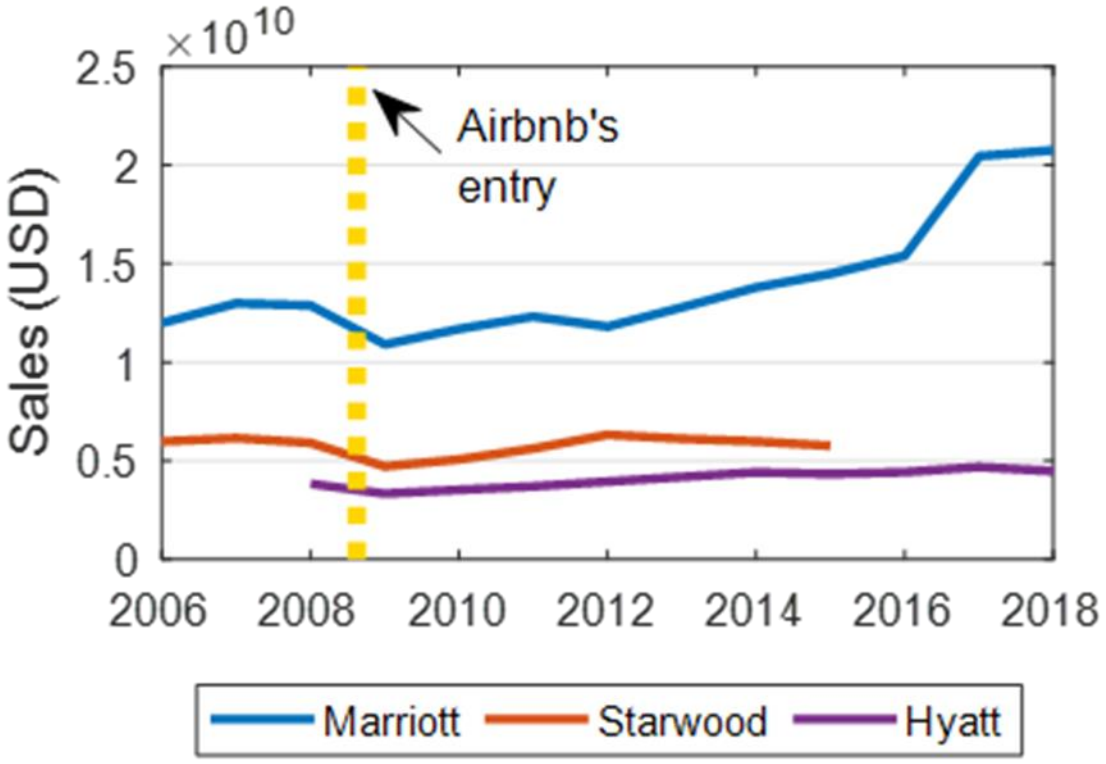
Firms	Entry Event	Entry Date	δ_OC
(US Traditional Hotels)			
Marriott	Series D, Airbnb	5/22/2014	Increase
Starwood	Series D, Airbnb	5/22/2014	Increase
Hyatt	Series D, Airbnb	5/22/2014	Increase
(US Online Travel Platform Companies: cover airlines tickets, rental car, and hotel rooms)			
Expedia	Series D, Airbnb	5/22/2014	Increase
Booking	Series D, Airbnb	5/22/2014	Decrease
TripAdvisor	Series D, Airbnb	5/22/2014	Decrease

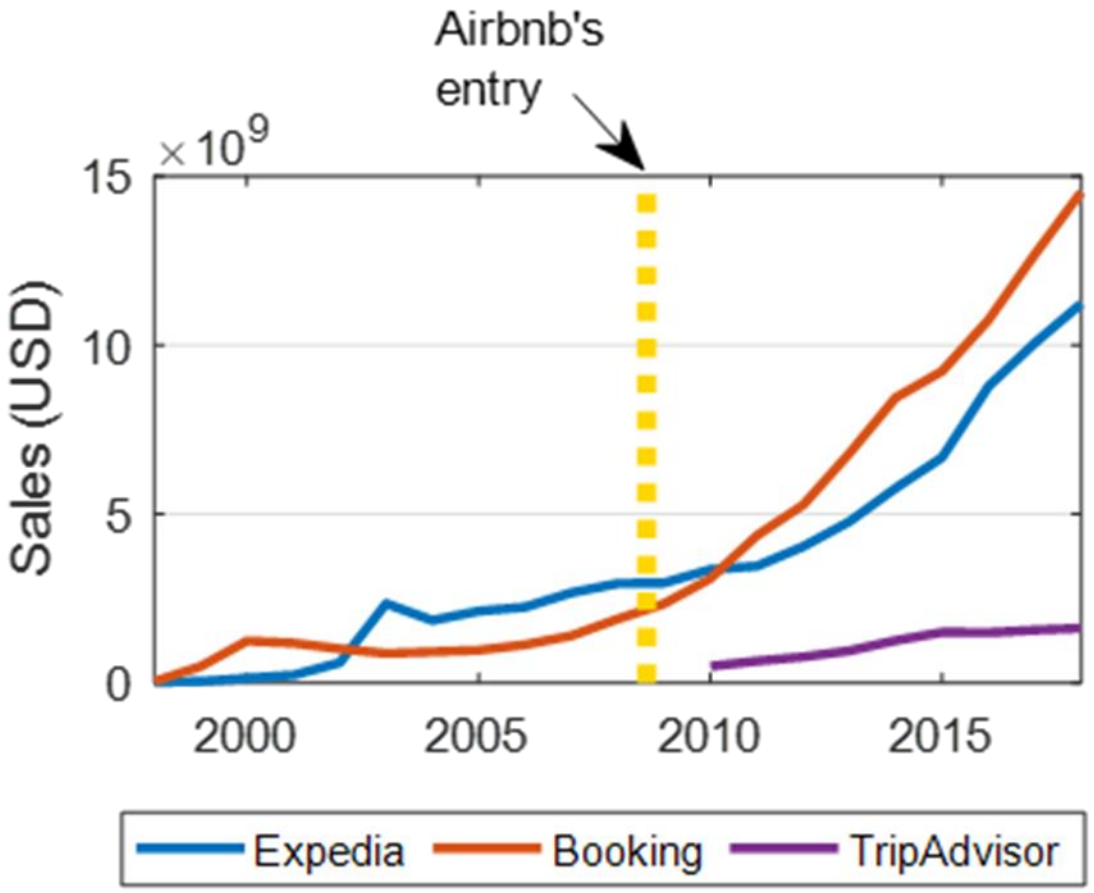
Firm-level Employment



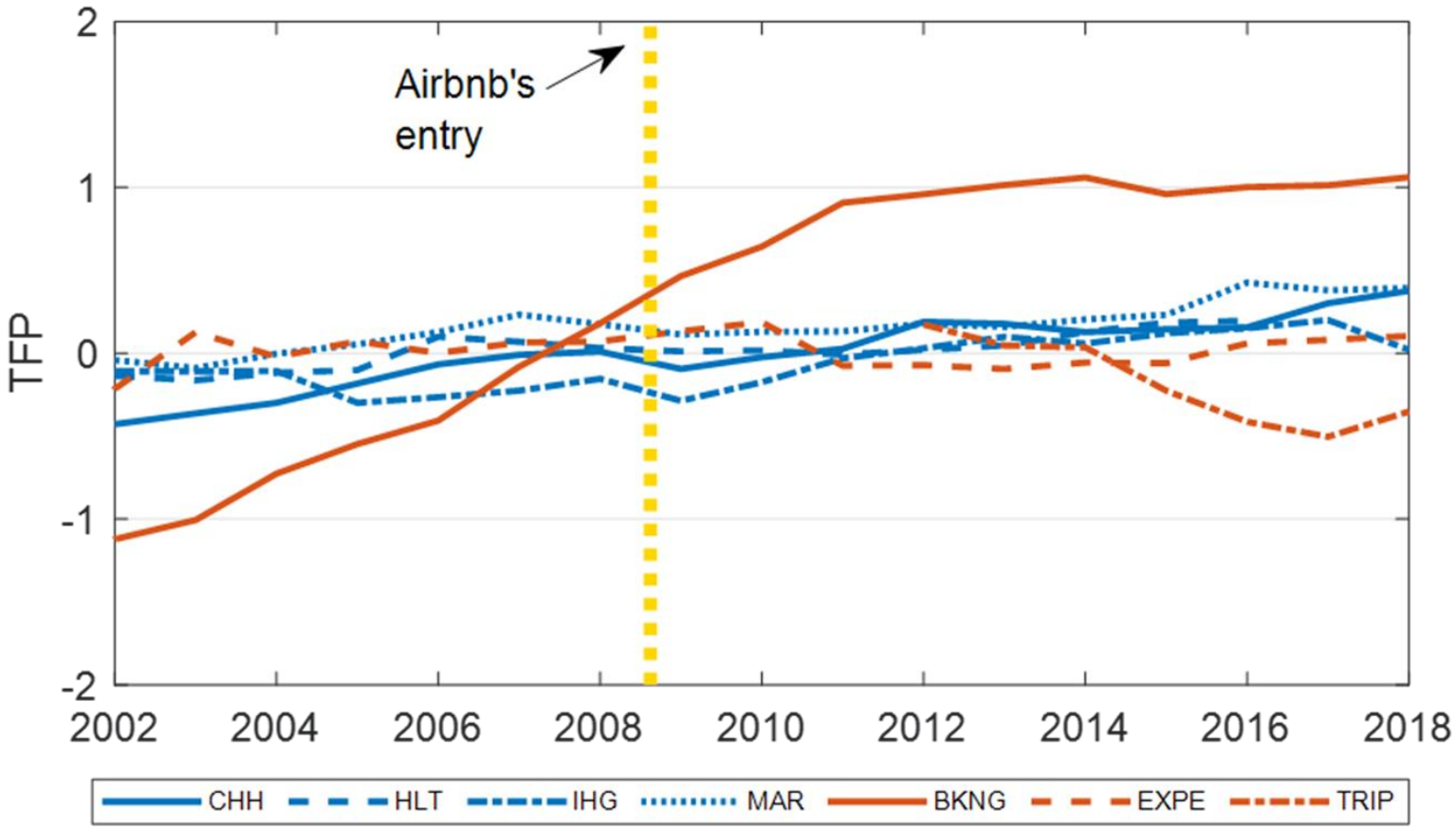


Firm-level Output





Firm-level Total Factor Productivity Level



Approach:
Imrohoroglu and Tuzel (2015)

Conclusions

- Data can have a tremendous value, and this value is measurable.
- Law of Big Tech's value of data
- The depreciation rate of OC is an early detector of the threat from online platforms or new business innovations

    depreciation speed of business models

    effectiveness of digital transformation

Discussant

Online Platforms' Creative "Disruption" in Organizational Capital – The Accumulated Information of the Firm

IARIW-ESCoE Conference on Intangible Assets

London

Chander Velu

11 November 2021

IfM MANAGEMENT TECHNOLOGY POLICY

UNIVERSITY OF CAMBRIDGE

Discussion points on Li and Chi's Paper

- Key strengths
  - The novel approach to measuring the impact of investment in organizational capital by incumbent firms as a result of the entry of online platforms
  - Studying the impact of digitization/digital transformation on organizational capital investments by incumbents is insightful
  - No immediate impact on TFP is unexpected

- Areas for improvement
  - Complement the SG&A spend with a detailed event study using annual reports, industry reports and press articles to examine
    - what did the incumbents do in response to online entrants? – Need to innovate BMs when providing complementary online services e.g., Blockbuster
    - did they increase capital spending to build capabilities in online data?
  - Alternative measures of digitization using reported initiatives (e.g., patent or word count) – digitization vs digital transformation
  - TFP for incumbents are relatively unaffected by entry of new online platforms – examine the mark-up of the incumbents to see if their market power is affected