

Rank	Company Name	Location
1	APPLE INC	United States
2	Microsoft Corporation	United States
3	Saudi Arabian Oil Company	Saudi Arabia
4	ALPHABET INC	United States
5	AMAZON.COM INC	United States
6	NVIDIA Corporation	United States
7	Berkshire Hathaway Inc.	United States
8	TESLA INC	United States
9	META PLATFORMS	United States
10	Visa Inc	United States
11	Tencent Holdings Limited	China and its regions
12	LVMH Moët Hennessy - Louis Vuitton, Société Européenne	Europe
13	Taiwan Semiconductor Manufacturing Company Limited	Taiwan Province of China
14	Exxon Mobil Corporation	United States
15	UnitedHealth Group Incorporated	United States
16	Johnson & Johnson	United States
17	WALMART INC	United States
18	JPMorgan Chase & Co.	United States
19	Novo Nordisk A/S	Europe
20	The Procter & Gamble Company	United States

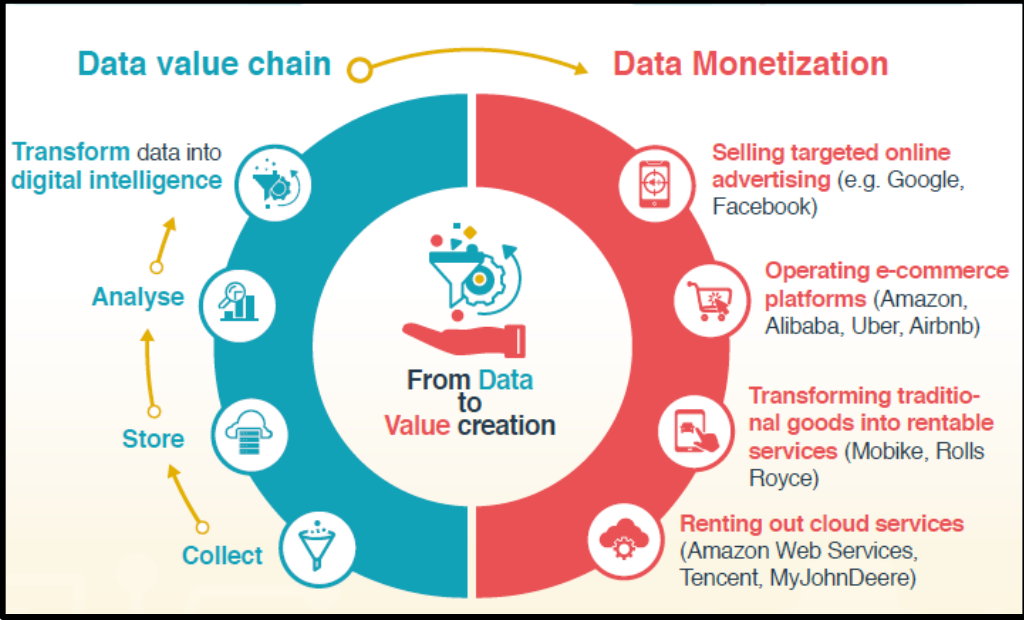
Evolution of competition and market concentration in the digital economy

Dr. Cecilia Rikap

(Senior Lecturer - City, University of London; CONICET; COSTECH, Université de Technologie de Compiègne)

 cecilia.rikap@city.ac.uk

 @CeciliaRikap



Source: UNCTAD (2019)

Big Tech

concentration: data + AI + infrastructure

Google	Amazon	Microsoft	Tencent	Alibaba
machine learning	machine learning	machine learning	neural network	neural network
neural networks	deep neural networks	speech recognition	convolutional neural network	recommender systems
speech recognition	neural network	data sets	social networks	reinforcement learning
Deep learning	genetic algorithm	training data	machine learning	user behavior
deep neural networks	data sets	neural networks	benchmark datasets	deep neural network
language model	cloud computing	video coding	training data	convolutional neural network
acoustic models	natural language	language model	Neural Machine Translation	social networks
approximation algorithms	speech recognition	social networks	image retrieval	data sets
learning algorithms	knowledge graph	search engine	big data	natural language
reinforcement learning	convolutional neural network	based approach	topic model	e-commerce platforms
training data	acoustic model	data center	attention mechanism	proposed algorithm
mobile devices	training data	image retrieval	representation learning	big data
recurrent neural networks	data centers	natural language	computer vision	search engine
natural language	predictive models	computer vision	target domain	attention mechanism
search engines	social media	deep neural networks	domain adaptation	Online Shopping
computer vision	computer vision	mobile devices	transfer learning	benchmark datasets
automatic speech recognition	approximation algorithms	data structures	feature learning	question answering
efficient algorithms	data streams	web search	reinforcement learning	network based
convolutional neural networks	learning algorithms	convolutional neural network	learning approach	display advertising
energy efficiency	sentiment analysis	learning algorithms	learning algorithm	user experience
data mining	object detection	programming language	search results	representation learning
voice search	Big Data	search results	face alignment	transfer learning
language processing	topic models	software engineers	face images	short text
computational cost	transfer learning	recurrent neural network	community detection	data analytics
cloud computing	word embeddings	approximation algorithms	learning methods	recurrent neural networks

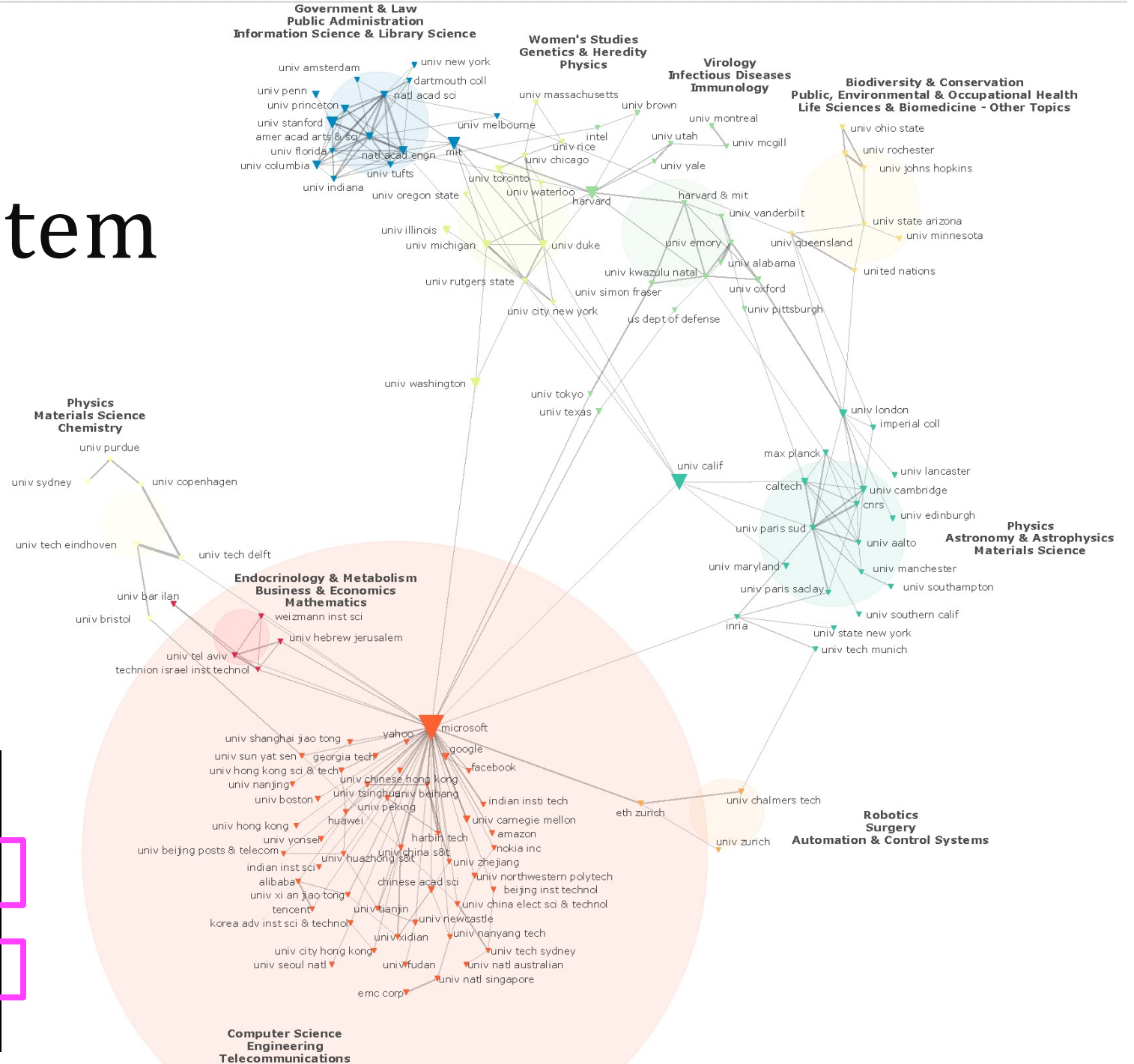
Source: Rikap and Lundvall (2021) – Web of Science

Microsoft's Innovation System

Source: Rikap (2023) - Web of Science (2012-2021)

- 120 countries but US in 73%. China follows (24.0%).
- Cities: Redmond (47.7%), Beijing (20.49%), Cambridge (17.4%) and Seattle (6.21%).

	Microsoft
Total scientific publications	15,170
Co-authored publications	13,242
Share of co-authored publications	88%
Total Patents	35,233
Co-owned patents	518
Shared of co-owned patents	1%
Knowledge appropriation indicator (share of co-authorship over share of co-ownership)	59.83



Frontier AI R&D

Top 14 AI Conferences (2018-2020)

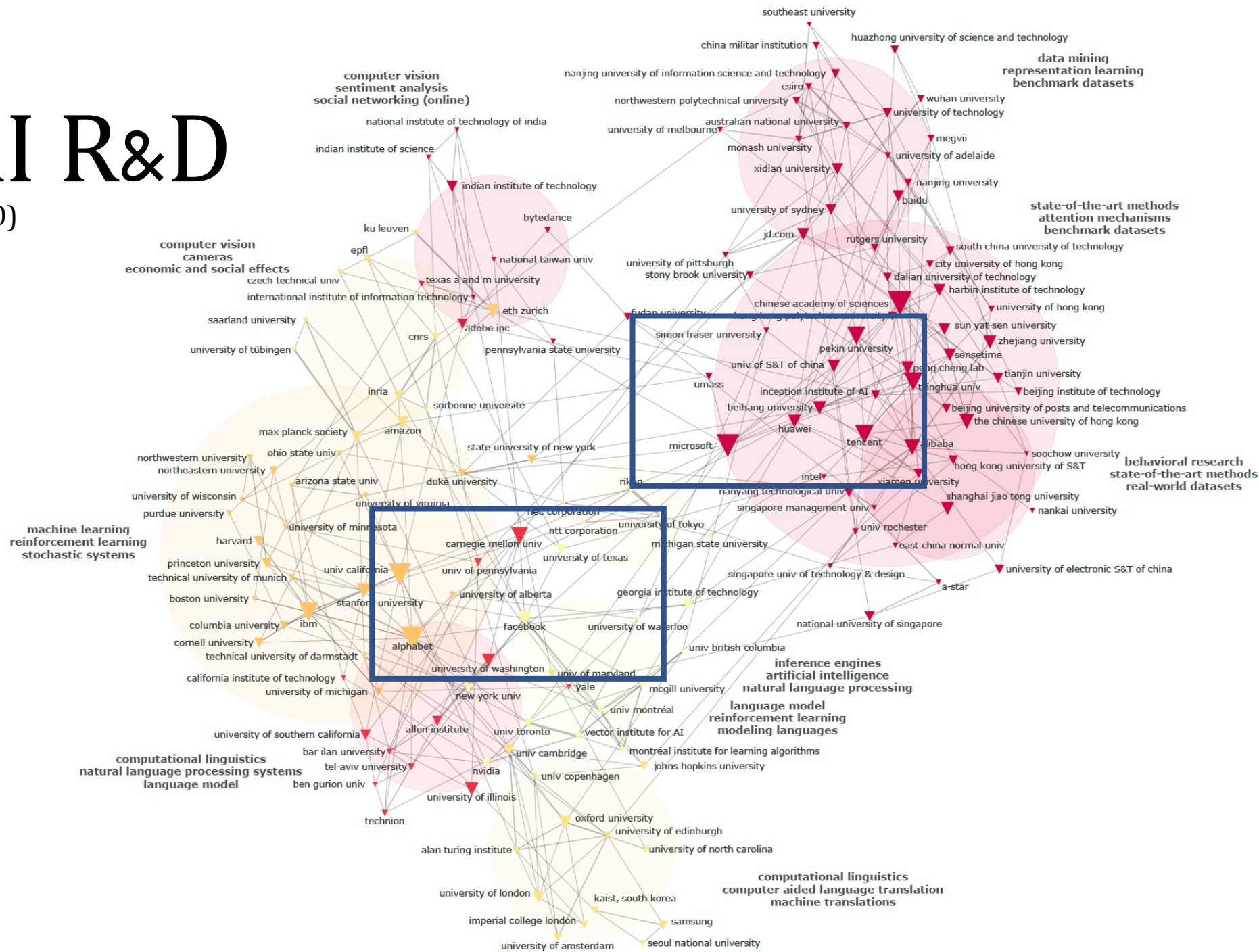
Source: Rikap (2023b) - Scopus

Double affiliations:

- Alphabet: 36
- Microsoft: 33
- Amazon: 13

Members in conferences committees:

- Alphabet: 22 (9 in NeurIPS)
- Microsoft: 7
- Amazon: 11



AI acquisitions and investments

	Microsoft	Amazon	Google
Technologies appearing in more than 1 acquisition	Machine Learning	Machine Learning	Machine Learning
	Software	Developer APIs	Analytics
	Mobile	Apps	Software
	Developer Tools		Computer Vision
	Natural Language Processing		Image Recognition
	Information Technology		Natural Language Processing
	iOS		Big Data
	Developer Platform		Internet
Total AI acquisitions since 2012	10	5	17
As top 5 investors in AI start-ups 2021	80	19	35

Source: Rikap (2023b) - Crunchbase



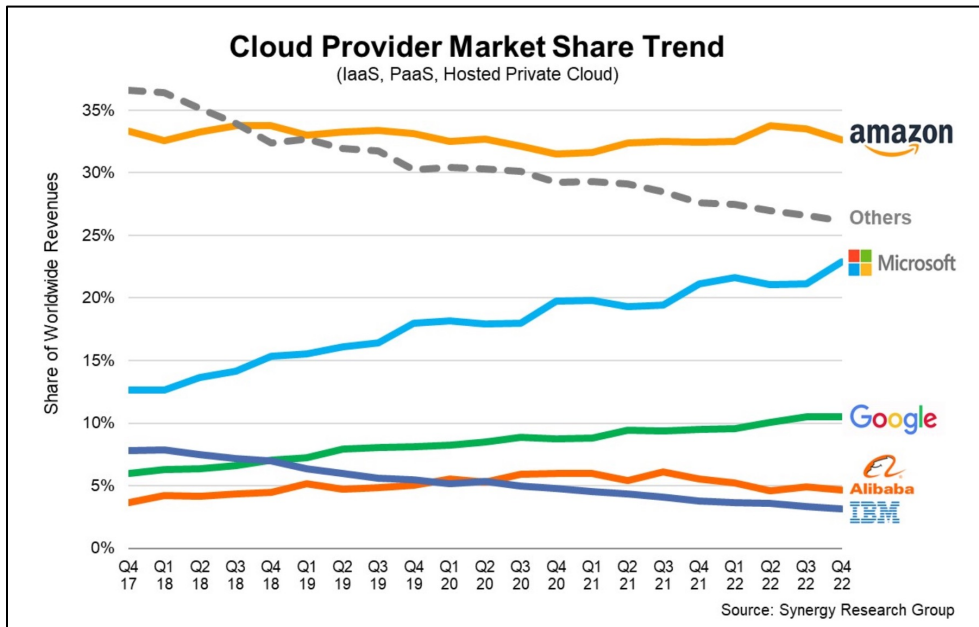
Microsoft

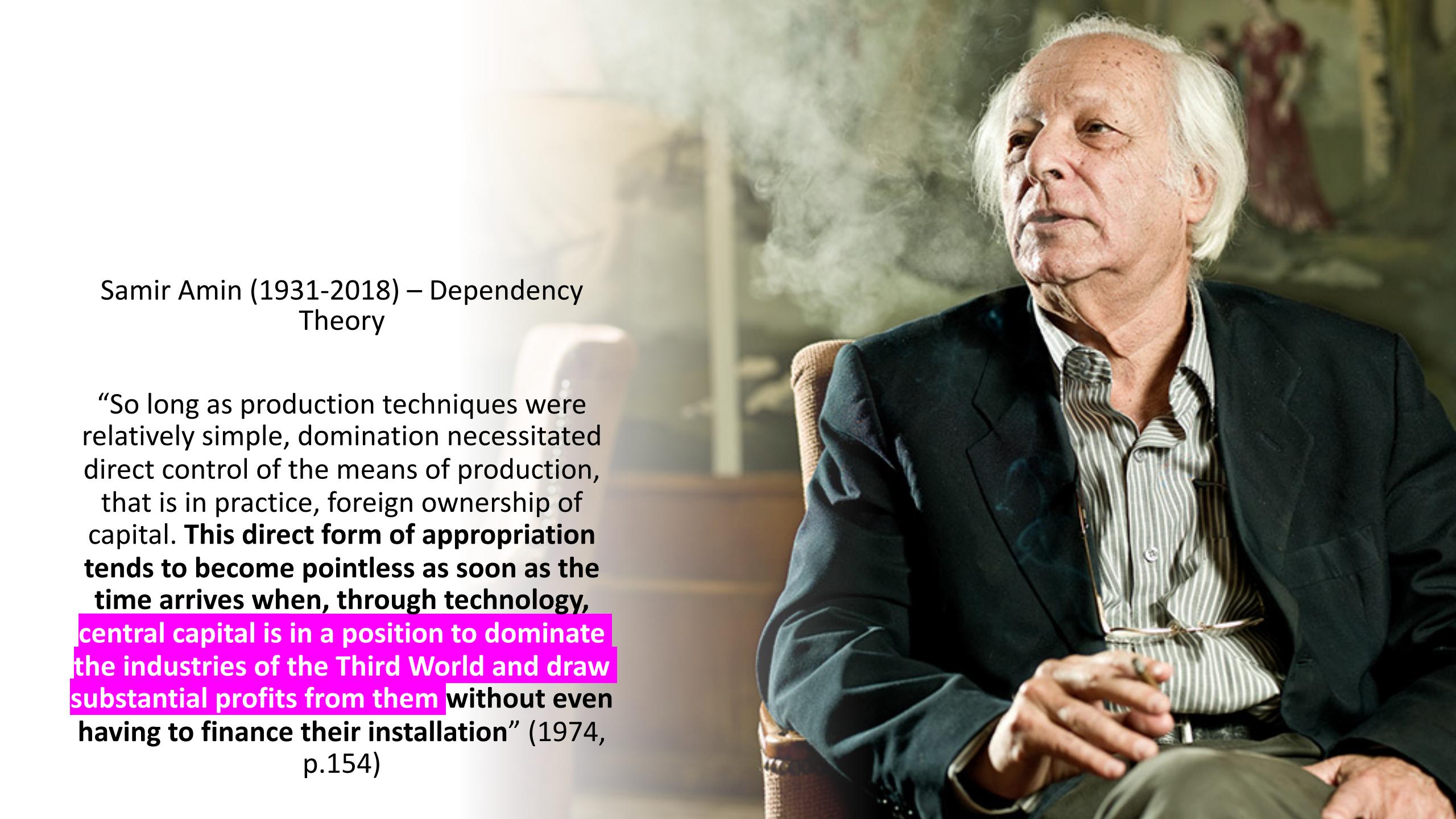
"We have 49% of this company and the agreement has certain stipulations, privilege access to developments. OpenAI, for example, also works with Salesforce, which is one of our biggest competitors, but that is not a problem because if Salesforce uses OpenAI we still win because we earn revenue there. (...) In AI we didn't have to hit rock bottom, we are at the forefront."

Expanding their dominance

Entering new sectors that are sources of big data and other intangibles: healthcare, education, energy systems.

Deepening their monopolization of the digital technologies package through **the Cloud:** selling black-boxes as services + the customer does R&D for free (like ChatGPT)

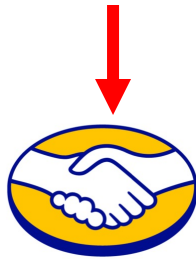


A photograph of Samir Amin, an elderly man with white hair, sitting in a brown leather chair. He is wearing a dark blue suit jacket over a light-colored, vertically striped button-down shirt. He is looking off to the right of the frame with a thoughtful expression. The background is a blurred interior space with a painting on the wall.

Samir Amin (1931-2018) – Dependency Theory

“So long as production techniques were relatively simple, domination necessitated direct control of the means of production, that is in practice, foreign ownership of capital. **This direct form of appropriation tends to become pointless as soon as the time arrives when, through technology, central capital is in a position to dominate the industries of the Third World and draw substantial profits from them without even having to finance their installation**” (1974, p.154)

But...

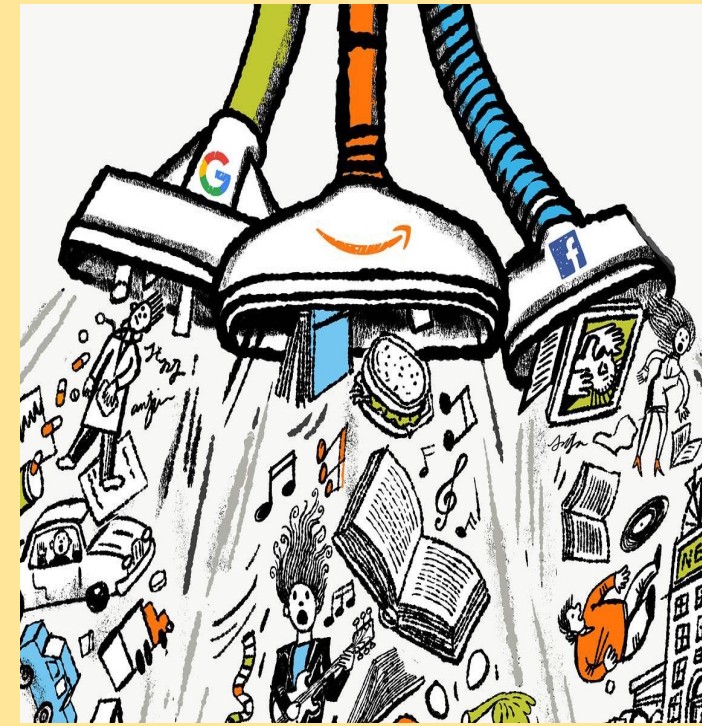


**mercado
libre**

Regional firms'
using marketplace
and e-payment

Debtors
(Mercado
Crédito)

Firms
participating in
its logistics
business



Data extractivism: a new layer in the IDL: net raw data providers that pay for digital intelligence and data-driven IM.

Knowledge extractivism: S&T from the peripheries monetized in core countries, usually by IM. (Acquisitions, GitHub contributors, blind knowledge transfer, AWS credits and other research agreements, research agenda setting)

Prerequisites for a more equitable distribution of gains

Prevent knowledge and data gatekeeping:

- AI must not learn from users & customers unless the model's weights are made public or the benefits distributed
- Capacity building: firm level indicators + interdisciplinary teams to understand & anticipate changes

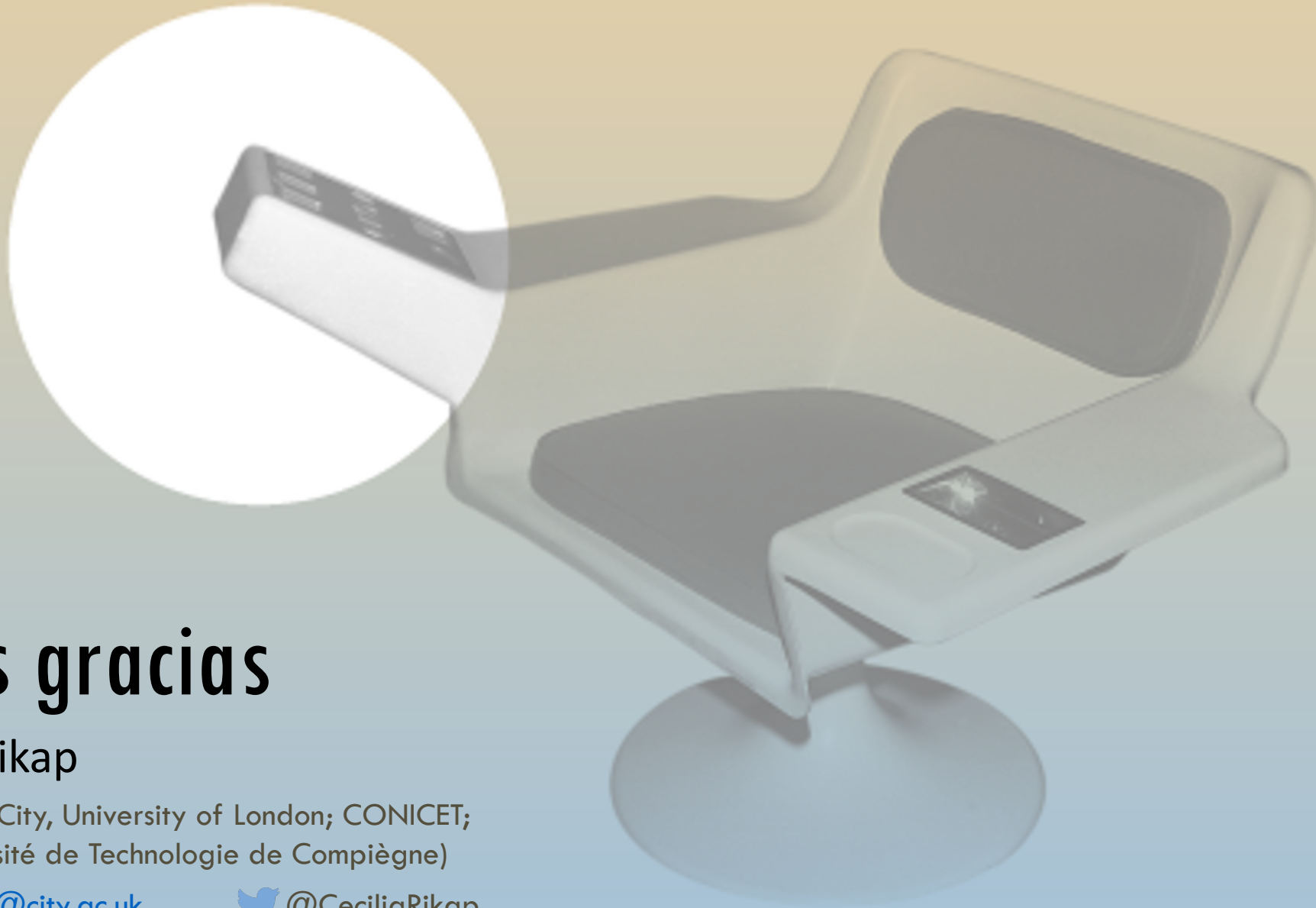
International regulation of the AI labour market.

- Improve working conditions in academia
- Limit double-affiliations
- Prevent industry from sitting in conferences' committees

1) Tax data capture (use DAU for proxies)

2) A truly public (globally connected) cloud: digital infrastructure

3) Public solutions for natural monopolies



Muchas gracias

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cecilia.rikap@city.ac.uk



@CeciliaRikap