### Artificial Intelligence: A New Beginning, or the End of Entrepreneurship?

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ERF – GCC High Level Policy Seminar – The potential of the fourth industrial revolution on the economic transformation of GCC countries

15 October 2024



### **Background reading**





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#### Late industrialisation and global value chains under platform capitalism

Wim Naudé<sup>2,1</sup>0

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#### Abstract

The digital (or 4th industrial) revolution has made industrialisation harder by being less consequential for structural transformation than was initially hoped. The rise of digital platform capitalism and its relation to global value chains (GVCs) is responsible for this. This paper explains why diminished expectations of the 4th industrial revolution are justified and how this is due to digital platforms as intellectual monopolies that are reconfiguring GVCs-and by this, making industrialisation harder. As such, the paper contributes to the research lacuna on the relationship between GVCs and digital platform capitalism. The implications for late industrialisation are identified, and broad recommendations for industrial policies are made.

Keywords Digitisation · Digital platforms · GVCs · Industrialisation · Competition policy

JEL Classification  $O25 \cdot O33 \cdot O14 \cdot L52$ 

#### **1** Introduction

The digital "revolution" that emerged out of the technology of World War II and grew in significance in the 1980s, first with the personal computer, then in the 1990s with the World Wide Web, and eventually in the 2000s with mobile connectivity, artificial intelligence (AI) and big data, has significantly boosted and reconfigured

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2 Springer

Check for

Available from Cambridge University Press at: https://www.cambridge.org/core/books/artificial-intelligence/339CA2EF1957A527D18F190375FC359F



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### This presentation

#### 1. What is AI and entrepreneurship?

- AI as outcome of the digital revolution
- The digital economy and digital entrepreneurship

#### 2. The potential of AI to revitalise entrepreneurship

- Productivity enhancement tools
- Cost decreases and dematerialization
- Innovation in the methods of innovation
- Business model innovation

#### 3. Why AI is not living up to expectations

- The failure of the 4th Industrial Revolution
- Al's scaling problem
- Al's democracy problem



# 1. What is AI and entrepreneurship?



### What is Artificial Intelligence?

AI = "any software technology with at least one of the following capabilities:

- **Perception** including audio, visual, textual, and tactile (e.g., face recognition),
- **Decision-making** (e.g., medical diagnosis systems),
- **Prediction** (e.g., weather forecast),
- Automatic knowledge extraction and **pattern recognition** from data (e.g., discovery of fake news circles in social media),
- Interactive communication (e.g., social robots or chat bots), and
- Logical reasoning (e.g., theory development"

(Vinuesa et al., 2020, p. 1).



### Definitions and origins of AI

### A short history of AI



Machine Learning refers to the use of algorithms and neural networks "in a narrow domain or application to make and improve predictions by 'learning' from more and more data about a specific domain" (LeCun et al., 2015).

Big data refers to the "explosion in the quantity (and sometimes, quality) of available and potentially relevant data, largely the result of recent and unprecedented advancements in data recording and storage technology" (Diebold (2012), cited in Favaretto et al. (2020, p. 1)).



#### The Science and Practice of AI What is Machine Learning?



### REVIEW

doi:10.1038/nature14539

#### **Deep learning**

Yann LeCun<sup>1,2</sup>, Yoshua Bengio<sup>3</sup> & Geoffrey Hinton<sup>4,5</sup>

Deep learning allows computational models that are composed of multiple processing layers to learn representations of data with multiple levels of abstraction. These methods have dramatically improved the state-of-the-art in speech recognition, visual object recognition, object detection and many other domains such as drug discovery and genomics. Deep learning discovers intricate structure in large data sets by using the backpropagation algorithm to indicate how a machine should change its internal parameters that are used to compute the representation in each layer from the representation in the previous layer. Deep convolutional nets have brought about breakthroughs in processing images, video, speech and audio, whereas recurrent nets have shone light on sequential data such as text and speech.

achine-learning technology powers many aspects of modern society: from web searches to content filtering on social networks to recommendations on e-commerce websites, and it is increasingly present in consumer products such as cameras and

intricate structures in high-dimensional data and is therefore applicable to many domains of science, business and government. In addition to beating records in image recognition<sup>1-4</sup> and speech recognition<sup>5-7</sup>, it has beaten other machine-learning techniques at predicting the activsmartphones. Machine-learning systems are used to identify objects ity of potential drug molecules<sup>8</sup>, analysing particle accelerator data<sup>9,10</sup>,

What is a neural network? Watch https://youtu.be/aircAruvnKk

[19:13]

Example, watch : https://youtu.be/ZX2Hyu5WoFg



#### What is AI?





https://www.ibm.com/topics/natural-language-processing

#### Natural language processing

A branch of artificial intelligence (AI), NLP lies at the heart of applications and devices that can

- translate text from one language to another
- respond to typed or spoken commands
- recognize or authenticate users based on voice
- summarize large volumes of text
- assess the intent or sentiment of text or speech
- generate text or graphics or other content on demand



### What is Artificial Intelligence?

• Narrow AI

Domain specific. Driven by Machine Learning (ML) and Deep Learning.

- Generative AI
  - Transformer based (foundational) models / LLMs
- Artificial General Intelligence (AGI) Cross-domain applicability.
- Artificial Super-Intelligence (ASI)
  - Exceeding human intelligence.

Does not yet exist



### What is digital entrepreneurship?

• **Digital entrepreneur**ship is "the pursuit of opportunities based on the use of digital media and other information and communication technologies" (Davidson and Vaast (2010: 2).

• **Digital start-ups** are defined as new ventures that use IT in the role of a ubiquity, meaning that they leverage completely IT-driven and digital business models for their value creation and capture... These ventures use infrastructure management resources that are driven by IT; their customer interface regarding the ordering and delivery of the product or service is completely based on IT-mediated networks; and the value-creating product is a digital product or service (Bradley, Kim, Kim,& Lee, 2012; Huang & Sundararajan, 2010)." – from Steininger, 2018: 382.



# What are the digital economy and digital technology?

- The **digital economy** is "comprised of markets based on digital technologies that facilitate the trade of goods and services through e-commerce" (OECD, 2013, p. 5) or broader, is "an economy based on digital computing technologies" (Wikipedia)
- **Digital technology** is the representation of information in bits Goldfarb & Tucker, 2019



### Digital entrepreneurship is not new...

 $\equiv$  **WIRED** backchannel business culture gear ideas science security

KLINT FINLEY BUSINESS 01.30.2015 06:15 PM

#### Tech Time Warp of the Week: Return to 1974, When a Computer Ordered a Pizza for the First Time

Watch John Sherman use a voice synthesizer to place the first computer-assisted pizza delivery order in history.



[7:11]

Watch this at : https://youtu.be/94d\_h\_t2QAA



## Al is the outcome of the digital economy that started after WW2



### What is new is the role of Data

"...the successful companies will no longer be the ones that make that best products, but the ones that gather the best data and combine them to offer the best digital services" – The Economist, 2015



# 2. The potential of AI to revitalise entrepreneurship



### Productivity enhancement tools

#### Examples of Business Tools for SMEs and start-ups

- Meeting scheduling : <u>Evie</u>
- Marketing : Aiden AI
- Website design and development:
- Innovation and product design: Generative AI e.g Dall-E
- Personalising email content : Datasine
- Validating plans and strategy : <u>Attest</u>
- Work management tools: <u>Unito</u>
- Finance and accounts : Freeagent
- Business plan development : Bizplan
- Crowdsourcing:

Sell online with Shopify Trusted by over 1,000,000 businesses worldwide ChatGPT Drives down the cost of starting and running a business

**S** shopify

Promote lean start ups



### Cost decreases and dematerialization

The digital economy allows many costs to fall substantially and even approach zero.





### Innovation in the methods of innovation



### Artificial Intelligence in Science

CHALLENGES, OPPORTUNITIES AND THE FUTURE OF RESEARCH

https://www.oecd-ilibrary.org/science-and-technology/artificial-intelligence-in-science\_a8d820bd-en



https://rovalsociety.org/-/media/policy/projects/science-in-theage-of-ai/science-in-the-age-of-ai-report.pdf



### Innovation in the method of innovation



AI solves 50-year-old science problem in 'stunning advance' that could dramatically change how we fight diseases, researchers say





- Harnessing network economies and demand economies of scale
  - Direct and indirect network effects
  - From supply economies of scale to demand economies of scale



- Facilitating Digital Platforms
  - "Digital platforms" = "information technology frameworks upon which different actors—i.e., users, service providers and other stakeholders across organizational boundaries—can carry out value-adding activities in a multi-sided market environment governed by agreed boundary resources and objects" (– Huttunen et al., 2019: p.5)



Network economies – example of Uber









Network economies + high fixed costs = monopolies = profit margins



"When Uber wants to add more cars to its platform, it just needs to attract new drivers to its network, not buy more cars. This costs the platform next to nothing".

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Source <a href="https://www.applicoinc.com/blog/network-effects/">https://www.applicoinc.com/blog/network-effects/</a>

7 of the world's largest 10 companies are based on digital platform business models.





### "Software is eating the world"



### Comparison of market capitalization of market leaders in the platform economy



Figure 6: Digital Economy Concentration





Source: United Nations (2019) "Digital Economy Report: Value Creation and Capture: Implications for Developing Countries 2019" United Nations Conference on Trade and Development UNCTAD. New York, New York. https://unctad.org/en/PublicationsLibrary/der2019\_en.pdf (Adaptation by Fundación Solón)



"Ultimately most firms will have no choice but to do business on somebody else's digital property, and to agitate for better terms if the owner gets too greedy. Call it the class struggle of platform capitalism."

– The Economist, 21-5-2016







### What happened to the digital revolution?

#### Economic Growth in Advanced Economies



#### Productivity Growth in Advanced Economies

Figure 1. Productivity growth has been on a declining long-term trend in most large economies Average labour productivity, annual growth rate



Note: Labour productivity is measured as GDP per worker due to data availability for the OECD aggregate. However, where data are available, trends in GDP per hour are broadly similar. The pandemic period is excluded due to the high volatility of output and labour (see below in footnote 16; also see Figure 3 for more recent and more detailed country-by-country data using hours worked based productivity). The OECD and Euro area are aggregated using GDP-PPP weights.

Source: OECD Economic Outlook 115 Database (June 2024).

https://www.oecd.org/en/publications/2024/10/reviving-productivity-growth\_936a1da3.html



# 3. Why AI is not living up to expectations



### The Failure of the 4th Industrial Revolution

| "4th IR" Technology     | Progress / outcomes so far   |
|-------------------------|--|
| Artificial Intelligence | "Machines are still very, very stupid. The smartest AI<br>systems today have less common sense than a house cat."<br>– Yan LeCun               |
| 3D printing             | a 1980s technology that has limited applicability  |
| ІоТ                     | Unlike the home environment where Wi-Fi is universal,<br>there is no standard for connecting distributed IoT<br>devices. – The Myth of the IoT |
| Renewable energy        | only a small proportion of total energy usedmuch as 30 years ago   |
| Connectivity            | voter manipulation, fake news, growing cybercrime, echo chambers, filter bubbles   |
| Metaverse               | What metaverse?  |
| Crypto                  | "Cryptocurrency is not merely a bad investment or speculative bubble. It's <u>worse</u> than that: it's a full-on fraud."                      |

### The Failure of the 4th Industrial Revolution



The so-called 4th Industrial Revolution is just a myth



### The Failure of the 4th Industrial Revolution

- NOTE:
- The 4IR  $\neq$  Industry 4.0 (Industrie 4.0)



### AI has a Scaling (energy) problem



• The Industrial Revolution has ultimately been driven by energy



### AI has a Scaling (energy) problem

• Growing GDP requires growing fossil fuel consumption





The 110 billion barrels of oil that were needed in 2018 to power the world economy is equivalent to more than **500 billion** human workers toiling day and night

– Nate Hagens



#### AI has a Scaling (energy) problem

The Global Economic Growth Take-off Since 1800 has ultimately been driven by energy, not technology

- Structurally, oil prices has been higher since the 1970s, which is also the start of the Great Stagnation
- Between 1980s-2007, western governments poured massive amounts of money into the financial system to keep costs of living for consumers down, and offshored manuf, until the financialisation lead to the global financial crisis of 2007-2009
- The "AI" revolution since ca 2007 has been accompanied by declining global economic growth rates (rising energy costs, inflation, interest rates, re-shoring)





#### AI has a Scaling (energy) problem

The Energy Problem is that

- 1. Use of fossil fuel energy leads to GHG emissions which causes catastrophic global warming
  - Even if all energy were "green" the extent of work done by the current amount of energy consumed on the planet leads to ecological overshoot (material footprint)
- 2. Fossil fuels are finite, and there are indications that we are reaching "peak oil" meaning higher and higher energy prices
  - Higher energy prices will reduce economic growth and trigger a zero-sum, conflict global economy. We already see this coming into being.
- 3. The world may not be able to switch over successfully to renewables rather as the supply of renewables increase this will just increase the total energy consumption of the world

FOR AI THE IMPLICATIONS ARE THAT 1) AI WILL BECOME COSTLY TO SCALE UP, AS IT REQUIRES MUCH ENERGY 2) IT WILL CONTRIBUTE TO GLOBAL WARMING 3) EFFICIENCY GAINS THROUGH AI WILL HAVE A JEVONS REBOUND EFFECT ON ENERGY CONSUMPTION



#### AI has a Scaling (energy) problem AI is contributing to ecological overshoot

World's Ecological Footprint vs Biocapacity (in gha), 1961-2022 2.5E+102E+10 **Ecological deficit** 1,5E+10 1E+10 5E+09 ᠂ᠳ᠈ᡩᡗ᠀᠋ᠱᢌ᠋ᠱ᠕ᡩ᠂ᡩ᠈ᡩ᠈ᡩ᠈ᡩ᠈ᡚᢀ᠈ᡩ᠈ᡩ᠈ᡩ᠈ᡩ᠈᠕᠉᠕᠉᠖᠉᠖᠉᠖᠉᠖᠉᠖᠉᠖᠈᠅᠕᠈᠅᠕᠉᠉ -Ecological Footprint -Biocapacity (gha) source : Global Footprint Network : https://data.footprintnetwork.org

**Ecological Footprint** = a measure of how much area of <u>biologically</u> <u>productive land and water</u> an individual, population, or activity requires to produce all the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management practices. It is measured in <u>global hectares</u>.



#### AI has a Scaling (energy) problem AI is an energy (and water )guzzler

The New York Times

#### A.I. Could Soon Need as Much Electricity as an Entire Country

Behind the scenes, the technology relies on thousands of specialized computer chips.



### By 2040, computers will need more electricity than the world can generate

So says the semiconductor industry's last ever communal roadmap

A Richard Chirgwin

Mon 25 Jul 2016 // 01:43 UTC

Without much fanfare, the Semiconductor Industry Association earlier this month published a somewhat-bleak assessment of the future of Moore's Law – and at the same time, called "last drinks" on its decades-old International Technology Roadmap for Semiconductors (ITRS).

The industry's been putting together the roadmap every two years since the 1990s, when there were 19 leading-edge chip vendors. Today, there are just four – Intel, TSMC, Samsung and Global Foundries – and there's too much road to map, so the latest ITRS – written last year and officially published this month – will be the last.

The group <u>recently suggested</u> that the industry is approaching a point where economics, rather than physics, becomes the Moore's Law roadblock. The further below 10 nanometres transistors go, the harder it is to make them economically.

That will put a post-2020 premium on stacking transistors in three dimensions without gathering too much heat for them to survive.

https://www.theregister.com/2016/07/25/semiconductor\_industry\_association\_international\_technology\_roadm ap\_for\_semiconductors/

https://www.nytimes.com/2023/10/10/climate/ai-could-soon-need-as-much-electricityas-an-entire-country.html



#### AI has a Scaling (energy) problem

#### AI is an energy (and water )guzzler

- According to the International Energy Agency, total electricity consumption from datacentres could double from 2022 levels to 1,000 TWh (terawatt hours) in 2026, equivalent to the energy demand of Japan
- The energy to train an LLM (eg Bloom) was enough to power the average American home for 41 years.
- A single query on *GenAI* <u>consumes</u> 2,9 watt-hours, almost ten times as much energy as a traditional Google query.

| World | Business | U.S. | Politics | Economy | Tech | Markets & Finance | Opinion  | Arts    | Lifestyle | Real Estate | Personal Finance | Health |
|-------|----------|------|----------|---------|------|-------------------|----------|---------|-----------|-------------|------------------|--------|
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| ÷     |          |      |          |         |      | Ads by            | Google   |         |           |             |                  |        |
|       |          |      |          |         |      | Send feedback     | Why thi  | s ad? ( | D         |             |                  |        |
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|       |          |      |          |         |      |                   |          |         |           |             |                  |        |
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|       |          |      |          |         |      |                   |          |         |           |             |                  |        |
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|       |          |      |          |         |      |                   |          |         |           |             |                  |        |

#### TECHNOLOGY | ARTIFICIAL INTELLIGENCE Follow

Artificial Intelligence's 'Insatiable' Energy Needs Not Sustainable, Arm CEO Says

Al models such as OpenAl's ChatGPT 'are just insatiable in terms of their thirst' for electricity, Haas said

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https://www.wsj.com/articles/artificial-intelligence-can-make-companies-greener-but-it-also-guzzles-energy-7c7b678?mod=article\_inline



#### AI has a Scaling (energy) problem Al is an energy (and water )guzzler

#### **Energy and Policy Considerations for Deep Learning in NLP**

Emma Strubell Ananya Ganesh Andrew McCallum College of Information and Computer Sciences University of Massachusetts Amherst {strubell, aganesh, mccallum}@cs.umass.edu

Consumption

#### Abstract

Recent progress in hardware and methodology for training neural networks has ushered in a new generation of large networks trained on abundant data. These models have obtained notable gains in accuracy across many NLP tasks. However, these accuracy improve ments depend on the availability of exceptionally large computational resources that necessitate similarly substantial energy consumption. As a result these models are costly to train and develop, both financially, due to the cost of hardware and electricity or cloud compute time, and environmentally, due to the carbon footprint required to fuel modern tensor processing hardware. In this paper we bring this issue to the attention of NLP researchers by quantifying the approximate financial and environmental costs of training a variety of recently successful neural network models for NLP. Based on these findings, we propose actionable recommendations to reduce costs and improve equity in NLP research and practice.

#### 1 Introduction

Advances in techniques and hardware for training deep neural networks have recently enabled impressive accuracy improvements across many fundamental NLP tasks (Bahdanau et al., sources, the high energy demands of these models 2015; Luong et al., 2015; Dozat and Manning, 2017; Vaswani et al., 2017), with the most computationally-hungry models obtaining the highest scores (Peters et al., 2018; Devlin et al., it is still limited to the equipment we have to pro-2019; Radford et al., 2019; So et al., 2019). As duce and store it, and energy spent training a neua result, training a state-of-the-art model now requires substantial computational resources which family's home. It is estimated that we must cut demand considerable energy, along with the associated financial and environmental costs. Research and development of new models multiplies these costs by thousands of times by requiring retraining to experiment with model architectures training to experiment with model architectures and hyperparameters. Whereas a decade ago most //bit.ly/28w0xWc; (2) car lifetime: https: //bit.ly/28w0xWc; (2) car lifetime: https: //bit.ly/28w0xWc; (2) car lifetime: https:

Air travel, 1 person, NY↔SF Human life, avg, 1 year 11,023 American life, avg, 1 year 36,156 Car, avg incl. fuel, 1 lifetime 126,000 Training one model (GPU) NLP pipeline (parsing, SRL) 30 78,468 w/ tuning & experiments Transformer (big) 192 w/ neural arch. search 626,155

CO2e (lbs)

1984

Table 1: Estimated CO2 emissions from training com mon NLP models, compared to familiar consumption.

NLP models could be trained and developed on a commodity laptop or server, many now require multiple instances of specialized hardware such as GPUs or TPUs, therefore limiting access to these highly accurate models on the basis of finances. Even when these expensive computational resources are available, model training also incurs a substantial cost to the environment due to the energy required to power this hardware for weeks or months at a time. Though some of this energy may come from renewable or carbon credit-offset reare still a concern since (1) energy is not currently derived from carbon-neural sources in many locations, and (2) when renewable energy is available, ral network might better be allocated to heating a carbon emissions by half over the next decade to deter escalating rates of natural disaster, and based on the estimated CO2 emissions listed in Table 1,

Sources: (1) Air travel and per-capita consumption:

#### 3645

Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics, pages 3645-3650 Florence, Italy, July 28 - August 2, 2019. ©2019 Association for Computational Linguistics

#### Carbon emissions......

| Consumption                                   | CO <sub>2</sub> e (lbs) |
|---|-------------------------|
| Air travel, 1 person, NY $\leftrightarrow$ SF | 1984                    |
| Human life, avg, 1 year                       | 11,023                  |
| American life, avg, 1 year                    | 36,156                  |
| Car, avg incl. fuel, 1 lifetime               | 126,000                 |

#### Training one model (GPU)

| NLP pipeline (parsing, SRL) | 39      |
|-----------------------------|---------|
| w/ tuning & experiments     | 78,468  |
| Transformer (big)           | 192     |
| w/ neural arch. search      | 626,155 |

Table 1: Estimated  $CO_2$  emissions from training common NLP models, compared to familiar consumption.<sup>1</sup>



#### AI has a Scaling (energy) problem

AI is an energy (and water )guzzler

- Training GPT-3 in Microsoft's state-of-the-art U.S. data centers directly evaporate 700,000 liters of clean freshwater
- Google's self-owned data centers alone directly withdrew 25 billion liters and consumed nearly 20 billion liters of scope-1 water for on-site cooling in 2022
- By 2027, AI data centres will require almost **7 billion** cubic meters of water, more than that of Denmark in a year.
- ChatGPT-3 needs to "drink" a **500**-milliliter bottle of water for a basic conversation of 20 to 50 inquiries.
- Google's large-language models, LaMDA, used a **million liters** for training alone.
- 1.1 billion people worldwide lack access to water, and a total of 2.7 billion find water scarce for at least one month of the year.

#### Forbes

FORBES > INNOVATION > AI

#### AI Is Accelerating the Loss of Our Scarcest Natural Resource: Water



Water, our No. 1 resource, is rapidly depleting and AI is accelerating this risk. GETTY

#### http://arxiv.org/pdf/2304.03271

https://www.wsj.com/articles/artificial-intelligence-can-make-companies-greener-but-it-also-guzzles-energy-7c7b678?mod=article\_inline https://www.forbes.com/sites/cindygordon/2024/02/25/ai-is-accelerating-the-loss-of-our-scarcest-natural-resource-water/



### AI's democracy problem



The Nature of the Neoliberal Capitalist Order

#### The Grow-or-Die Golden Rule:

The modern global economy has come to resemble not a circular flow of income and goods - as typically depicted in introductory economics textbooks - but an upward-moving growth spiral.

This reflects that the system has a built-in growth imperative: it is either growing or shrinking, but there is nothing in-between – it is grow or die (collapse).

As an ideology, economic growth is a core tenet of **neoliberalism**, "capitalism on steroids" (Monbiot and <u>Hutchison</u>, 2024, p.9), of which <u>Hayek (1944, 1960)</u> was an intellectual founder.



AUTHOR OF THE COLOR OF MONEY



#### The Nature of the Neoliberal Capitalist Order

#### The Grow-or-Die Golden Rule:

- Obstacles to perpetual growth are consumers becoming satiated and their income share declining.
- Hence, entrepreneurs have resorted to actions like marketing, innovations to keep customers buying and loyal, agitating for lower taxes ....
- .... and expanding globally when a local market becomes saturated.
- The Luxemburg thesis implies that capitalism would collapse if this "rapacious" growth spiral were to be stopped
- Given that the system has, in effect, been globalized after centuries of colonialism and imperialism, the only way to prevent a collapse is to keep expanding into new territories
  - – e.g. to tokenize all of nature, mine the ocean floor and mine asteroids as these are amongst the few extraction zones still available ...



#### The Nature of the Neoliberal Capitalist Order

- Al, coming at the end of the Digital Revolution, is one of the last "extraction zones" in the digital economy that is still available ---although it too is running out
- Hence, the Tech Industry has been building moats around the market, solidifying their monopolistic/oligarchic rule, tapping government support, and promoting hype and hysteria in the industry, lest consumers and investors and government support wanes

### Techno-Feudalism Is Taking Over

#### Jun 28, 2021 | YANIS VAROUFAKIS

The claim that capitalism is being toppled by a new economic model comes on the heels of many premature forecasts of capitalism's demise, especially from the left. But this time it may well be true, and the signs that it is have been visible for a while.

"Today, the global economy is powered by the constant generation of central bank money, not by private profit. Meanwhile, value extraction has increasingly shifted away from markets and onto **digital platforms**, like Facebook and Amazon, which no longer operate like oligopolistic firms, but rather like private fiefdoms or estates."

https://www.project-syndicate.org/commentary/techno-feudalism-replacing-market-capitalismby-yanis-varoufakis-2021-06



Extracting value from digital platforms – rent extraction

"Ultimately most firms will have no choice but to do business on somebody else's digital property, and to agitate for better terms if the owner gets too greedy. **Call it the class struggle of platform capitalism.**"



– The Economist, 21-5-2016



#### The Grow-or-Die Rule of Capitalism drives them to exploit ever new markets



The Secretary-General of the African Continental Free Trade Area,(AfCFTA), Wamkele Mene, has disclosed that e-commerce giants, Google and Amazon, have approached the Secretariat for investment in AfCFTA.



Only 8 countries so far have ratified the African Union Convention on Cyber Security and Personal Data Protection



Nevertheless, every country wants to "lead the AI race" - wasting money in the process



"The race to become the global leader in artificial intelligence (AI) has officially begun...No two strategies are alike, with each focusing on different aspects of AI policy: scientific research, talent development, skills and education, public and private sector adoption, ethics and inclusion, standards and regulations, and data and digital infrastructure." – Dutton, 2018

2018-07-13 | Politics + AI | Tim Dutton

EU Lobbying groups have proposed that the EU invest 100 billion euro of public money to create a "competitive AI industry" of its own.....

https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd



#### AI has become a side-show – the extraction value is limited

"In no part of the field have the discoveries made so far produced the major impact that was then promised".

• - Lighthill Report (1973) : Artificial Intelligence: A General Survey

"Eighteen months after the introduction of generative AI to the world, not one truly transformative - let alone cost-effective- application has been found."

• – Jim Covello, Goldman Sachs (2024)

"Hundreds of millions of people have tried ChatGPT, but most of them haven't been back. Every big company has done a pilot, but far fewer are in deployment.[...]most people who tried it didn't see how it was useful [....] why do most people say, in effect, 'very clever, but not for me' and wander off, with a shrug?"

• - Benedict Evans (2024)

OpenAI may be bankrupt in a month: given its huge loss, it has been estimated that it needs at least \$5 billion in new capital annually to survive.

• OpenAI generates up to \$2 billion from ChatGPT and around \$1 billion from LLM access fees, but these barely cover its operational costs.



#### AI has become a side-show: bubbles and bottlenecks

#### AI Bubble:

- Al technology is exceptionally expensive, and to justify those costs, the technology must be able to solve **complex** problems, which it isn't designed to do. *Jim Covello*
- Most human work is too complex to outsource to AI cost-efficiently, GenAI will affect less than 5% of all human tasks Daren Acemoglu
- Tech companies would have to earn **\$600 billion per year** to justify their current level of investment in AI, which is about six times the revenue projected for the AI industry in the best-case scenario -Sequoia Capital analyst *David Cahn*

#### AI Bottlenecks:

- The limited supply of Nvidia chips is a bottleneck for A.I. growth, leaving companies large and small <u>scrambling to</u> <u>source their own supply</u> of chips. *New York Times, 10-10-23*
- Regulatory Backlash
- Energy (see previous slides)
- Water (see previous slides)



#### Al is often implicated in these Dystopias, somewhat unfairly, and also to distract



The Nature of the Neoliberal Capitalist Order

- Al, coming at the end of the Digital Revolution,
- and
- The increasing stagnation of western economies,
- is one of the last "extraction zones" in the (digital) economy that is still available ---although it too is running out



#### The "tech bro's" have a democracy problem

Gil Duran / July 22, 2024

#### DARK REALM

#### Where J.D. Vance Gets His Weird, Terrifying Techno-Authoritarian Ideas

Yes, Peter Thiel was the senator's benefactor. But they're both inspired by an obscure software developer who has some truly frightening thoughts about reordering society.



BRENDAN SMIALOWSKI/AFP/GETTY IMAGES

Campaign On Digital Ethics 🖬 • Jul 31 • 4 min read

### Trump and the Tech Bros: A Threat to Democracy

:



By Kavisha Pillay

The U.S. election is now less than 100 days away. What initially seemed like a clear path to a second term for Donald Trump no longer appears certain, given Kamala Harris's entrance as the presumptive Democratic Party nominee. While Harris is busy rallying support and endorsements from the likes of Charli XCX, the Obamas, and Beyoncé, Trump has found his cheerleaders among the tech elite.

Tech moguls such as Elon Musk (Tesla, X), Peter Thiel (former CEO of PayPal), and venture

"In addition to providing tens of millions of dollars in direct funding to Donald Trump and other campaigns, the unchecked influence of tech billionaires in politics threatens to undermine the principles of accountability, transparency, and fairness in technology governance. If the rules are written by those who prioritise profit and power over public good, the digital rights of individuals and communities will be at serious risk. "

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"What does your country make? Oh, guns, tanks and bombs, not much else."





#### The "tech bro's" and the end of the world

"We must guard against the acquisition of unwarranted influence, whether sought or unsought, by the militaryindustrial complex. The potential for the disastrous rise of misplaced power exists and will persist."

- President of the USA, Dwight Eisenhower, 1961

#### 1944 : Walter Oakes:

"AS World War II enters its climactic stage, it becomes increasingly clear that this is not the "War To End All Wars." [...] World War III is not only a distinct possibility, it is inevitable as long as the world's social structure remains one of capitalist imperialism."





Walter J. Oakes, Toward a Permanent War Economy?, Politics, February 1944.

#### The "tech bro's" and the end of the world

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Foster, J.B. and McChesney, R. (2014). Surveillance Capitalism: Monopoly-Finance Capital, the Military-Industrial Complex, and the Digital Age, Monthly Review, 66(3):1-31.



#### The "tech bro's" and the end of the world



Unleasing Economic Warfare

"The United States imposes three times as many sanctions as any other country or international body, targeting a third of all nations with some kind of financial penalty on people, properties or organizations. They have become an almost reflexive weapon in perpetual economic warfare" – Washington Post, 2024



https://www.washingtonpost.com/business/interactive/2024/us-sanction-countries-work/

#### The "tech bro's" and the end of the world



Militarization in the USA and Europe, relative to the World

#### Unleasing Kinetic Warfare

The USA, who spends more on its military than the rest of the world put together.

### In 2022 total world military spending exceeded US\$2,2 trillion

Tuft University's Military Intervention Project (MIP) shows that over 100 military interventions, a quarter of all U.S. military interventions ever, took place after 1999.

"It's very economic exploitation of the world population, as well as its own, has left the U.S. imperial system open to attack, producing ever greater attempts at control. These are signs of a dying empire." - Foster and McChesney (2014:30)

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#### AI is being hijacked The "tech bro's" and the end of the world – the permanent warfare economy





https://www.972mag.com/cloud-israeli-army-gaza-amazon-google-microsoft/

The "tech bro's" and the end of the world - the permanent warfare economy



https://www.972mag.com/lavender-ai-israeli-army-gaza/



#### The "tech bro's" and the end of the world - the permanent warfare economy





https://time.com/6691662/ai-ukraine-war-palantir/

AI is being hijacked The "tech bro's" and the end of the world

If war is not impossible, every advance in scientific technique means an advance in mass murder

-Bertrand Russell, 1952





# Conclusion : the hijacking of the digital revolution is accelerating the use of AI for destructive entrepreneurship

"The digital revolution must be demilitarized and subjected to democratic values and governance, with all that entails. There is no other way."

-Foster, J.B. and McChesney, R. (2014). Surveillance Capitalism: Monopoly-Finance Capital, the Military-Industrial Complex, and the Digital Age, Monthly Review, 66(3):1-31.

