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## Veritas Lecture 1:

# A Holistic Perspective on Innovation

# Today's Outline

- Introduction of Instructors and TAs
- Course Introduction
- Course Logistics
- Introduction of the Main Topics



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# Course Instructors

## Professor Dr. Edo Andriesse



- **Department of Geography**, College of Social Sciences, SNU
- PhD in 2008 in Human Geography,
  Utrecht University, The Netherlands
- Research Interests: Development Geography; Rural Development, Poverty reduction, Public Policy, Southeast Asia, Global South/Majority World

## Professor Dr. Bernhard Egger



- **Department of Computer Science and Engineering**,
  College of Engineering, SNU
- PhD in 2008 in Computer Science and Engineering,
  Seoul National University, South Korea
- Research interests: Parallel Systems, Runtimes, and Compilation Techniques for AI Systems

# Course Instructors

- **Professor Dr. Van Thinh Nguyen**
  - **Department of Civil, Urban and Environmental Engineering**, College of Engineering, SNU
  - PhD. (Dr.-Ing.) in 2000 in Computational Fluid Dynamics, Karlsruhe Institute of Technology, Germany
  - Research interests: Hydrodynamic, Hydrologic and Environmental Modelling; Climate Change Impact Evaluations; Computational Fluid Dynamics; Numerical Methods, Algorithm and Software Development



# Guest Lecturers

## Professor Dr. Jörn Altmann



- Department of Informatics, HSLU; until recently: **Technology Management, Economics, and Policy**, College of Engineering, SNU
- EngD 1996 in Computer Science from University Erlangen Nuremberg, Germany
- Research interests: Internet services; Economics of IT services; Systems and network management; Economics of cloud computing; Network science; Impact of technology on society, and Strategic-alliance-based group formation, federation, and collaboration; Governance in the times of the Internet

## Professor Dr. Sira Maliphol



- **Technology Management, Economics, and Policy**, College of Engineering, SNU
- PhD 2019 in Engineering (Technology Management, Economics, and Policy) from Seoul National University
- Research interests: Innovation (Eco)Systems; Innovation/Technological Capability Development; Future of Work; Trustworthy AI

# Teaching Assistants

- **Dr. Hong-June Park**
  - **Postdoctoral Teaching Fellow,** SNU College
  - PhD 2021 in Ethnomusicology (Anthropology), Concentration: Southeast Asia (Indonesia), UC Berkeley, USA



- **Junsung Yook**
  - **PhD candidate**
  - **Department of Computer Science and Engineering**, College of Engineering, SNU



- **Seunghwan Chung**
  - **MA student**
  - **Department of Geography**, College of Social Sciences, SNU





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# Teaching Assistants

- **Jihong Min**
  - **PhD candidate**
  - **Department of Computer Science and Engineering**, College of Engineering, SNU



- **Jungyoon Kwon**
  - **PhD candidate**
  - **Department of Computer Science and Engineering**, College of Engineering, SNU



# Course Introduction



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# Course Objective

The major objective of this course is to understand **who benefits from technological innovation and to provide a critical perspective of its impact on the individual, society, and the global community**.

In more detail: we want to understand

- **The dual nature of innovation**
  We study how innovation is not inherently positive or negative, but has both beneficial and detrimental effects on individuals, society, and the environment.
- **The ethical and social implications of technological advances**
  We investigate the ethical dilemmas and social challenges associated with artificial intelligence and surveillance technologies, particularly in terms of privacy, inequality, and civil liberties.
- **The geopolitical dimensions of innovation**
  We study the global dynamics of innovation, particularly the US – China rivalry.

# Course Concepts

The concepts explained in this course comprise a wide area, ranging from **information technology, the environment to social sciences**.

We address the following broader topics

- the concepts of innovation, platform economics
- poverty, inequality and the geopolitics of innovation
- energy demand, environment and climate change
- surveillance, social media, privacy, and AI

# Course Topics and Schedule

| Date | Topic | Main Instructor |
|---|---|---|
| Sep 4 | Course Introduction | EA, BE, VT |
| 11 | Technological innovation | JA |
| 18 | Digital transformation | JA |
| 25 | Chuseok (no class) | |
| Oct 2 | Geopolitics of innovation | EA |
| 9 | Reading week (no class) | |
| 16 | Migration and brain circulation | EA |
| 23 | Innovation eco-systems in East Asia *(in building 61, room 320)* | SM |
| 30 | Innovation and energy demand | VT |
| Nov 6 | Innovation and environment | VT |
| 13 | Innovation and climate change | VT |
| 20 | Technological innovation in IT: an overview | BE |
| 27 | IT innovation and society | BE |
| Dec 4 | People and AI – opportunities and dangers | BE |
| 11 | Group presentations | EA, BE, VT |
| 18 | Group presentations | EA, BE, VT |



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# Course Significance

The significance of the course lies in the paramount importance to **provide our societies with knowledge on the impact of technological development**.

This knowledge will help **start the long overdue discussion on**

- which innovation benefits society
- how technological developments should be applied to the benefit of all stakeholders in the innovation ecosystem



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# Course Logistics



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# Lecture Organization

| | |
|---|---|
| 12:30 – 13:20 | **Lecture** |
| 13:20 – 13:30 | Break |
| 13:30 – 14:20 | **Group discussion**<br>• Discuss lecture topic<br>• Prepare arguments pro and contra<br>• Prepare slides for debate |
| 14:20 – 14:30 | Break |
| 14:30 – 15:20 | **Debate**<br>• Two rounds of pro/contra debates between two groups<br>• Students not debating take notes and prepare questions for the plenary discussion<br><br>followed by the **Plenary discussion** |



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# Lecture Materials and Communication

- **SNU eTL** https://myetl.snu.ac.kr
- **Course website** https://myetl.snu.ac.kr/courses/310341
- **Information posted**
  - lecture slides
  - additional materials
- **Communication** Canvas boards on course website



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# Communication

- **Canvas Boards** Install the LearningX 2.0 app for students and enable push notifications. Links to popular app stores: Android iOS

  Tip: “What’s your school’s name?” → enter “SNU” or “서울대학교”

- **Email/SMS** Occasionally, we may use email or SMS to convey urgent information.

**Information sent via the Canvas Boards/SMS is considered read within 12 hours!**



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# Course Assignments

- Friday
  Lecture slides uploaded to eTL

- **Friday, during group discussion**
  Participate in discussion about group position, help with slides (individual task)

- **Friday, during plenary discussion**
  Explain and defend your group's position (individual task)

- **Before the next class**
  Update and amend debate and discussion slides (max. 10 slides) (group task)
  Send summary to your TA (PDF format) (group task)

- **Summary presentations (weeks 15 and 16)** (group task)
  Prepare summary of topic based on lecture summaries by all groups
  Present discussions, opinions, and your group's insight on the topic during class

# Course Grading

- **Grade**
  Pass/fail (S/U)
  Letter grade (A–F) only upon request (default grade: B0)

- **Breakdown**
  - Attendance 30%
  - Group discussions 40%
  - Plenary debates 30%


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# Introduction of the Main Topics



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# Impact of Technological Innovation

- **This course discusses different levels of impact of technological innovation**
  - On developing countries/Global South (Prof. Edo Andriesse)
  - On energy demand, the environment and climate (Prof. Van Thinh Nguyen)
  - On individuals and society (Prof. Bernhard Egger)

- **Guest lectures by**
  - Prof. Jörn Altmann on digital transformation
  - Prof. Sira Maliphol on innovation eco-systems in East Asia

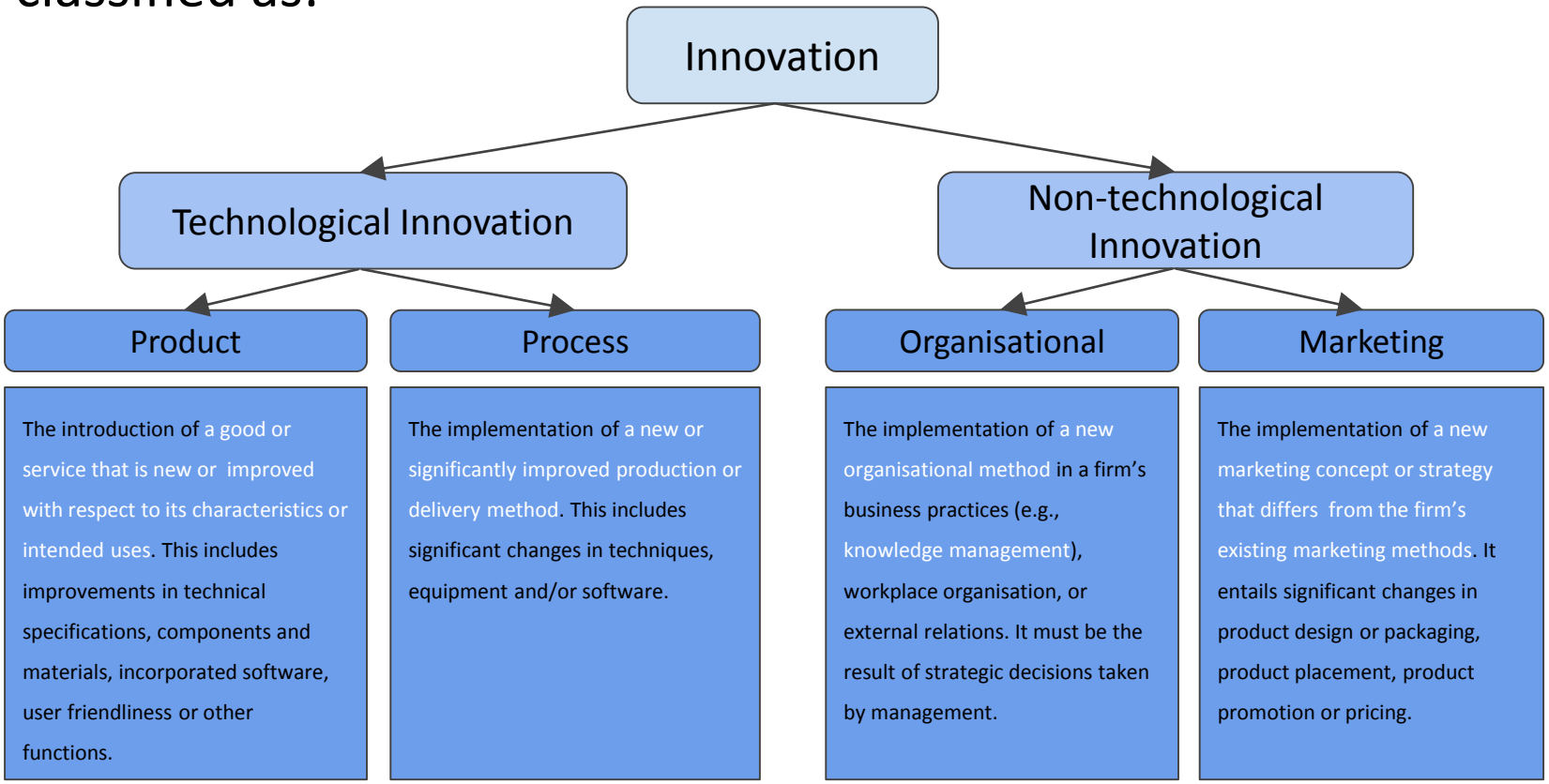


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# Impact of Technological Innovation on Firms and Society

**Prof. Jörn Altmann**

- Following OECD and Eurostat (2005), innovation activities can be classified as:






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# Impact of Technological Innovation on Firms and Society

**Prof. Jörn Altmann**

- As the goal of innovation needs to be sustainability of the environment, there are six dimensions that need to be addressed:
  - Dignity
  - People
  - Prosperity
  - Planet
  - Justice
  - Partnership




- Figure by Elsevier and SciDev.Net (2015) on sustainable development goals reproduces the figure of the United Nations (2015)
- United Nations (2015). The road to dignity by 2030: ending poverty, transforming all lives and protecting the planet
- Elsevier (2015) Sustainability Science in a Global Landscape, Elsevier and SciDev.Net.

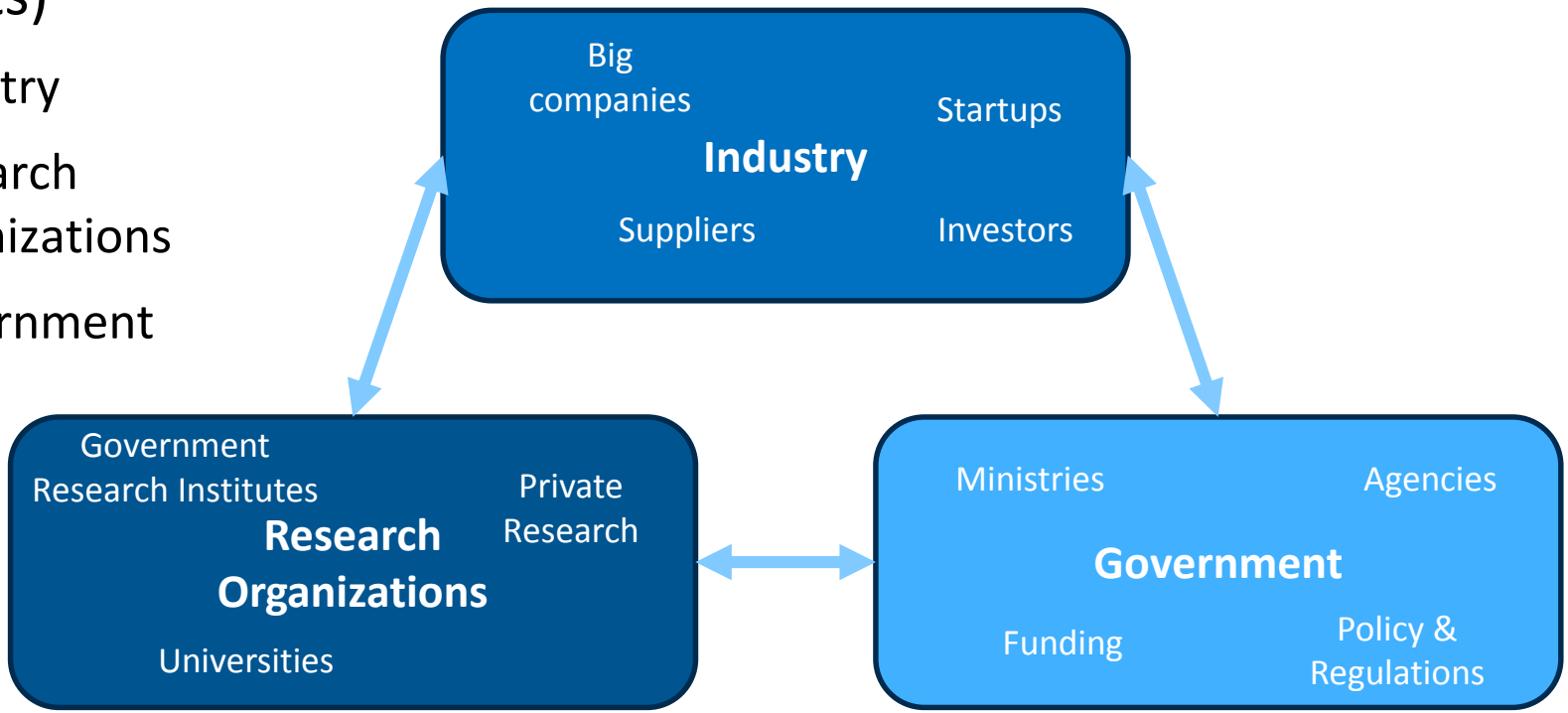


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# Innovation Eco-Systems

**Prof. Sira Maliphol**

- Innovation is driven by activities between different actors involving flows of different resources to create technology (artifacts)
  - Industry
  - Research organizations
  - Government






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# Impact of TI on Developing Countries

**Prof. Edo Andriesse**

**Broad questions:**

- How does the **geography of innovation** change in a multipolar world?
- Will low- and middle-income countries be able to **catch up in the next decades** or fall further behind the high-income countries?
- Should the Global North **support the Global South** to foster innovation capabilities?

# Impact of TI on Developing Countries

**Prof. Edo Andriesse**

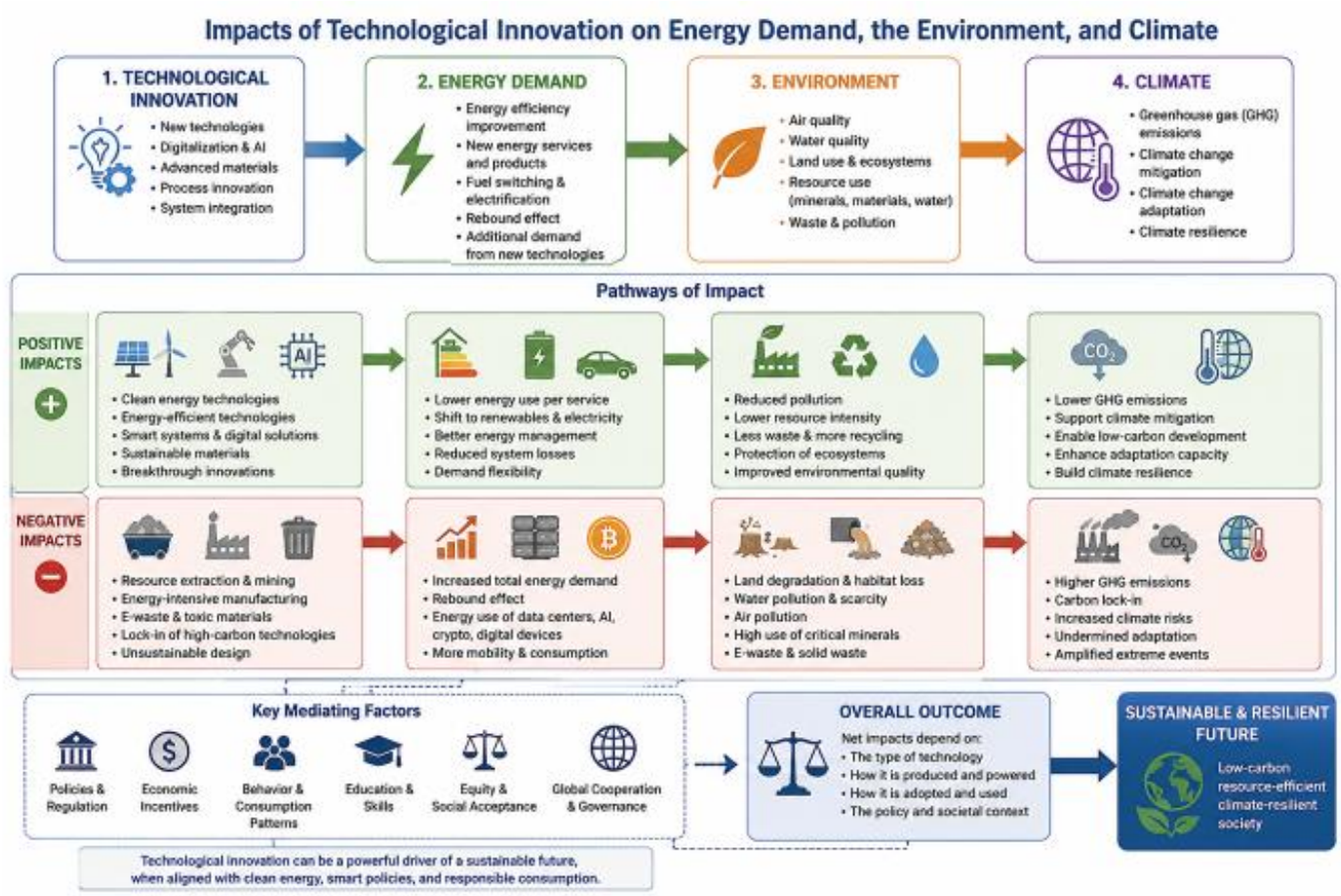
**Specific questions:**

- What is the **impact of geopolitics** on innovation trends and on innovation capabilities in Asian countries?
- What are the relationships between brain drain and innovation capabilities in the Global South? And does it make sense to facilitate international **brain circulation** in order to catch-up to innovation hubs like Shenzhen, Bangalore, and Silicon Valley?

# Impact of Technological Innovation on Energy Demand, the Environment, and Climate

**Prof. Van Thinh Nguyen**

- Technological innovation can have **both positive and negative impacts on energy demand, the environment, and climate**.






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# Impact of Technological Innovation on Energy Demand, the Environment, and Climate

**Prof. Van Thinh Nguyen**

## Technological Innovation → Changes in Energy Demand → Environmental Impacts → Climate Impacts

However, the overall outcome depends strongly on how the technology is developed, powered, regulated, and adopted. Technological innovation alone does not automatically reduce environmental or climate impacts; it must be combined with appropriate energy policies, sustainable resource management, and changes in consumption patterns.

1. The debate on innovation and energy demand splits into two broad camps, with a lot of nuance in between.
2. Innovation can either enhance environmental outcomes or exacerbate environmental pressures.
3. The key question is not just how fast technology advances, but whether it is directed toward rapid, large-scale emission reductions while limiting unintended consequences.



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# Impact of Innovation in Information Technology

**Prof. Bernhard Egger**

## Privacy in the Age of Data Collection

**“No privacy, no problem. I have nothing to hide.”**

- Really not?
- Cookies, Fingerprinting, and Do Not Track.
  How we are being tracked, and how can we minimize our digital footprint.

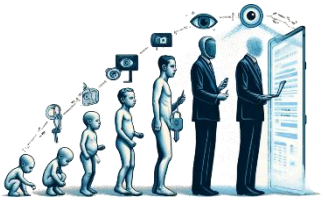





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# Impact of Innovation in Information Technology

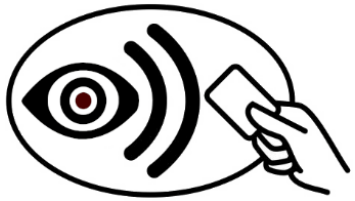
**Prof. Bernhard Egger**



## The Effect of AI on Individuals and Society

- The age of abundance: we will not have to work anymore!
  **But – do we want that?**
- Economical, individual, and societal cost of AI

## The Age of Service Platforms

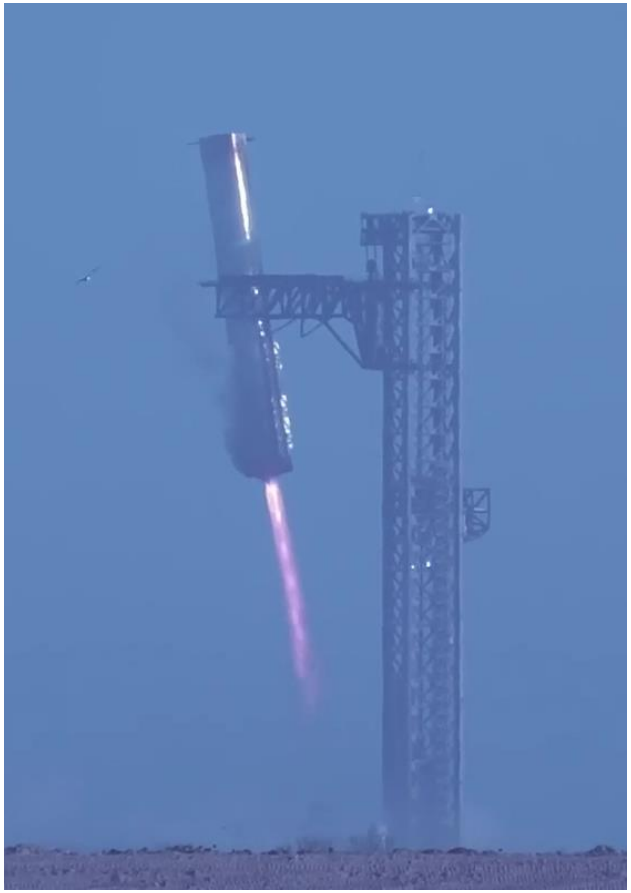


- From convenience to control
- Social credit scores and central bank digital currencies



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# A Holistic Perspective on Technological Innovation



SpaceX Starship Booster Catch




Armed Robot Dogs