Digital Economics: The Case of Artificial Intelligence

Matheus E. Leusin

Course Description

This module introduces students to foundational concepts in innovation economics within the context of digitalization. It explores the economic frameworks used to understand the emergence and development of transformative digital technologies, exemplified by Artificial Intelligence (AI). Students will engage with key principles of digital innovation, including the dynamics of disruptive technologies, the role of data and automation, and the societal implications of digital advancements. AI serves as a primary example, offering insights into specific concepts like machine learning (e.g., supervised and unsupervised learning) and the intersections of AI with other digital technologies. In addition to examining the economic and empirical approaches used to identify and measure digital innovations, students will discuss digital technologies' role in shaping political and social landscapes, including potential risks like surveillance and privacy issues. By the end of the course, students will gain a nuanced understanding of the challenges associated with digitalization-related empirical research, the distinct characteristics of AI as a pivotal digital technology, and essential concepts needed to pursue studies in innovation within the digital economy.

Contents (short)

- Introduction to digitalization and disruptive technologies
- Identifying and measuring digital innovations
- Digital technologies as economic drivers
- Knowledge and technology convergence in the digital era
- Digital innovation policy and governance.
- Social and political implications of digital technologies.
- Conclusions

Contents (long)

< Introduction

- Overview and main concepts (Russell and Norvig, 2010)
- Overview of digital transformation, with AI as an illustrative case.
- Technical introduction (how do machines actually "learn"; what is the underlying architecture; what can be done by machines and what cannot be done by machines (yet))

< How to identify and measure AI innovations

- Patent data, publication data, and other sources.

< Digital technology and AI

- Exploring how technologies reshape industries, create new markets, and influence economic growth (Furman and Seamans, 2018)
- Upsides and downsides of AI .

< "Digital" as a piece of knowledge

- What is knowledge and the role of knowledge relatedness (Breschi et al., 2003; Hidalgo, 2021; Hidalgo et al., 2007)
- How AI is linked to existing knowledge and how it is combined with other technologies (Bianchini et al., 2022; Leusin, 2022b)
- How digital technologies interconnect, building on existing knowledge to fuel further innovation (Antonelli et al., 2010; Teece, 2018; Yoo et al., 2012)
- AI and firms: who are the global leaders, and how AI is affecting firms (Leusin, 2022a; Zolas et al., 2021)

< Digital technologies and innovation policy

- Policy approaches and technological development.
- Policies that guide digitalization, including regulatory frameworks for digital tech adoption and development.
- How institutions affect innovations in general (Acemoglu and Robinson, 2012)

< Digital technologies and AI for automated surveillance, and problematic politics

- Surveillance, privacy, and censorship (Feldstein, 2021; Karpa et al., 2022; King et al., 2013; Roberts, 2018, 2020)
- Privacy, surveillance, and ethical challenges in the digital age.
- Automation, unemployment, and other risks (Acemoglu, 2021; Brynjolfsson et al., 2018; Korinek and Stiglitz, 2018)
- Surveillance in democracies (Büchi et al., 2022; Davis and Silver, 2004; Ziller and Helbling, 2021)
- Case study: Facial recognition in China (Beraja et al., 2021; Beraja et al., 2022; Kostka et al., 2021)

< Conclusions

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