RUYU CHEN

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PROFESSIONAL APPOINTMENT

Stanford Digital Economy Lab, the Stanford Institute for Human-Centered Artificial Intelligence — Palo Alto, CA, USA
Postdoctoral Fellow — *Jan 2022- Present*

EDUCATION

Cornell University, SC Johnson College of Business — Ithaca, NY, USA
Ph.D. in Applied Economics and Management — *Aug 2016- Dec 2021*
Graduate minor in Computer Science — *Aug 2018- Dec 2021*
Dissertation committee: Chris Formam (chair), Matt Marx, Aija Leiponen, Benjamin T. Leyden, Bart Selman

Renmin University of China — Beijing, China
B.S. in Agricultural and Resource Economics (with Honors) — *Sep 2010- June 2014*

University of Copenhagen — Copenhagen, Denmark
Exchange Program, Department of Mathematics and Department of Economics — *Aug 2012- Feb 2013*

RESEARCH INTEREST

Innovation, Economics of Digitization, Firm Strategy, Artificial Intelligence

WORKING PAPERS

IT and innovation: How did the Internet affect firms' reliance on science?
(Job Market Paper)
This paper examines how the Internet facilitates the utilization of science in industrial innovation. I find that the Internet enables firms to discover "hidden gems" – commercializable yet under-recognized scientific findings that have been published by *early-career* scientists, in *less prestigious* journals, and/or with *fewer academic citations* but with *higher forward patent citations*. I compiled a database that contains 541,568 patent citations that refer to scientific papers; these citations came from patents applied between 1992 and 2000 by 3,651 public firm locations (firm sites in a given metropolitan statistical area). I then identified the staggered adoption of basic Internet at these firms. I show that access to the Internet at firm locations is associated with a 9.3% increase in the likelihood of citing scientific papers, and up to 13.2% increase in the likelihood of citing "hidden gem" papers. These findings suggest that IT reshapes the process that firms use to source knowledge in innovation. By reducing search costs, IT enables firms to access scientific knowledge that previously had been less visible – and to discover and capitalize on its commercial value.

How does labor mobility affect business adoption of a GPT? The case of machine learning
(with Natarajan Balasubramanian and Chris Forman)
This paper investigates how worker mobility influences the adoption of a new general-purpose technology (GPT). Using data from over 153,000 establishments between 2010 and 2018, we observe establishment decisions to adopt machine learning. Taking advantage of state-level changes to the enforceability of noncompete agreements as an exogenous shock to worker mobility, we find that changes that facilitate worker movements are associated with a significant decline in the likelihood of adoption. Moreover,

the magnitude of establishment response depends upon characteristics of the establishment and the location in which it resides- in particular, establishment size and number of large establishments in the same industry-location. These results are consistent with the view that increases in worker mobility lead to greater risks for establishments that are contemplating adoption of a new GPT that involves significant downstream innovation.

Invited presentations:

- Workshop on Information Systems and Economics (WISE) (Virtual, 12/2020)
- Temple-CMU-NYU 2020 Conference on Artificial Intelligence, Machine Learning, and Business Analytics(Virtual, 12/2020)
- ISB 2nd AI & Strategy Consortium (Virtual, 01/2021)
- Wharton Innovation Doctoral Symposium (WINDS) (Virtual, 02/2021)
- 19th ZEW Conference on the Economics of Information and Communication Technologies (Virtual, 06/2021)
- AOM Symposium- Machine Learning, Artificial Intelligence, and Strategy: Emerging Research on the Importance of Complements (Virtual, 08/2021)
- 2021 NBER Economics of Artificial Intelligence Conference (Virtual, 09/2021)

The impact of high-speed railway on entrepreneurial firm dynamics: evidence from China
This paper investigates the impact of China's high-speed railway (HSR) expansion on its entrepreneurial activities using firm registration data between 2011 to 2015. I find that connecting to HSR benefits mega-cities, while has led to a reduction in new firm entry in smaller cities. To address the non-random railway station placement problem, I constructed an instrumental variable of a hypothetical HSR station network that is subject to global construction cost minimization. I also adopted a market access approach similar to Donaldson (2018), where I calculated the impact of HSR on each city by capturing the changes in all its market access using a reduced-form expression derived from general equilibrium trade theory. I demonstrate that non-connection-induced market access significantly increases firm entry in mega cities by 2% at an expense of reducing firm entry in Tier-3 and Tier-4 cities by up to 5%.

WORK IN PROGRESS

What makes creators creative?
(with Jeremy Z. Yang and Pankhuri Malhotra)
This paper explores how influencers' personal network affects the knowledge creation in digital platforms. Built on a dataset that includes 1,601,074 Instagram posts by 38,113 Instagram influencers with 2,273,578 brand-mentions published between 2013 and 2019, we identified the dynamic network among those creators. We then propose an algorithm based on *temporal evolution of content similarities* using image embeddings to quantify the creativity of postings by category. The research goal is to understand the knowledge flows across social networks and the effects of network position of creators on knowledge creation in digital platforms.

AI adoption in the hospital industry: evidence from China
I collected data of the adoption of AI rehabilitation robots for stroke treatment among 476 hospitals in China with more than 200,000 patient visit records between 2014 and 2019. The research goal of this paper is to identify the key challenges in the adoption of robot at the organization level and to understand how patients, especially the elders, learn about AI treatment pathways in this digital age.

CONFERENCE PARTICIPATION

NBER Economics of Artificial Intelligence Conference — Toronto, *Sep 2019,* Virtual, *Sep 2021*
AOM Symposium- Machine Learning, Artificial Intelligence, and Strategy: Emerging Research on the Importance of Complements — Virtual, *Aug 2021*
19th ZEW Conference on the Economics of Information and Communication Technologies — June 2021
ISB 2nd AI & Strategy Consortium — Virtual, *Jan 2021*
Wharton Innovation Doctoral Symposium (WINDS) — Virtual, *Feb 2021*
Workshop on Information Systems and Economics (WISE) — Virtual, *Dec 2020*
Temple-CMU-NYU 2020 Conference on Artificial Intelligence, Machine Learning, and Business Analytics — Virtual, *Dec 2020*
NYU AI in Strategy Workshop — Online, *March 2021*
NBER Conference on Economics of Digitization — Stanford, CA, *March 2020*

TEACHING EXPERIENCE

Guest Lecturer:
Introduction to Business Regulation for Prof. Robert Karpman (Undergraduate) — *2019, 2018*
Entrepreneurship for Prof. Robert Karpman (Undergraduate) — *2019, 2018*
Teaching Assistant:
Strategy for Prof. Sarah Wolfolds and Prof. Daniela Scur (Undergraduate) — *Spring 2021*
Organizational Behavior for Prof. Kevin Kniffin (Graduate) — *Fall 2020*
Futures, Options and Financial Derivatives for Prof. Calum Turvey(Undergraduate) — *Spring 2020*
Environmental Economics for Prof. Shanjun Li (Undergraduate) — *Spring 2019*
Consumer Behavior for Prof. Brian Wansink (Graduate) — *Spring 2018*
Production Economics for Prof. Loren Tauer (Graduate) — *Fall 2017*

AWARDS

ICIS Doctoral Consortium Fellow — *2021*
NBER Digital Tutorial Fellow — *2020*
Cornell Johnson College of Business IET Small Research Grant — *2020*
Cornell Johnson College of Business PhD Research and Professional Fund — *2020*
Cornell Dyson Scholarship — *2017,2021*
China National Scholarship for Abroad Graduate Study — *2014*

SKILLS & OTHER

Software: STATA, Python, R, Matlab, and ArcGIS
Languages: Chinese (native), English (fluent)
Interests: Oil Painting, Cooking, Swimming, Travelling(backpack traveler in 34 European cities)

REFERENCES

Erik Brynjolfsson (Postdoc advisor)
Jerry Yang and Akiko Yamazaki Professor
Senior Fellow at the Stanford Institute for Human-Centered AI (HAI)
Director of the Stanford Digital Economy Lab
Stanford University
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Chris Forman (PhD Committee chair)
Peter and Stephanie Nolan Professor of Strategy, Innovation, and Technology
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Matt Marx (PhD Committee member)
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Benjamin T. Leyden (PhD Committee member)
Assistant Professor of Strategy and Business Economics
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Bart Selman (CS minor advisor, PhD committee member)
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Last updated: 01/2022