



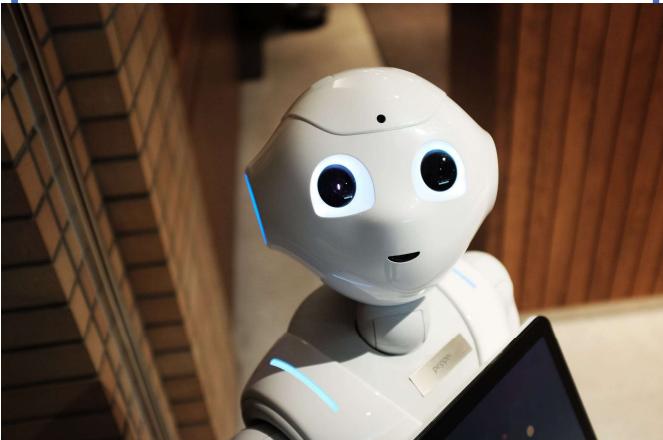
The Innovation Winter is Coming: Implications of the U.S.-China Trade War

Kimberly A. Houser, Assistant Professor
Oklahoma State University

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3473902

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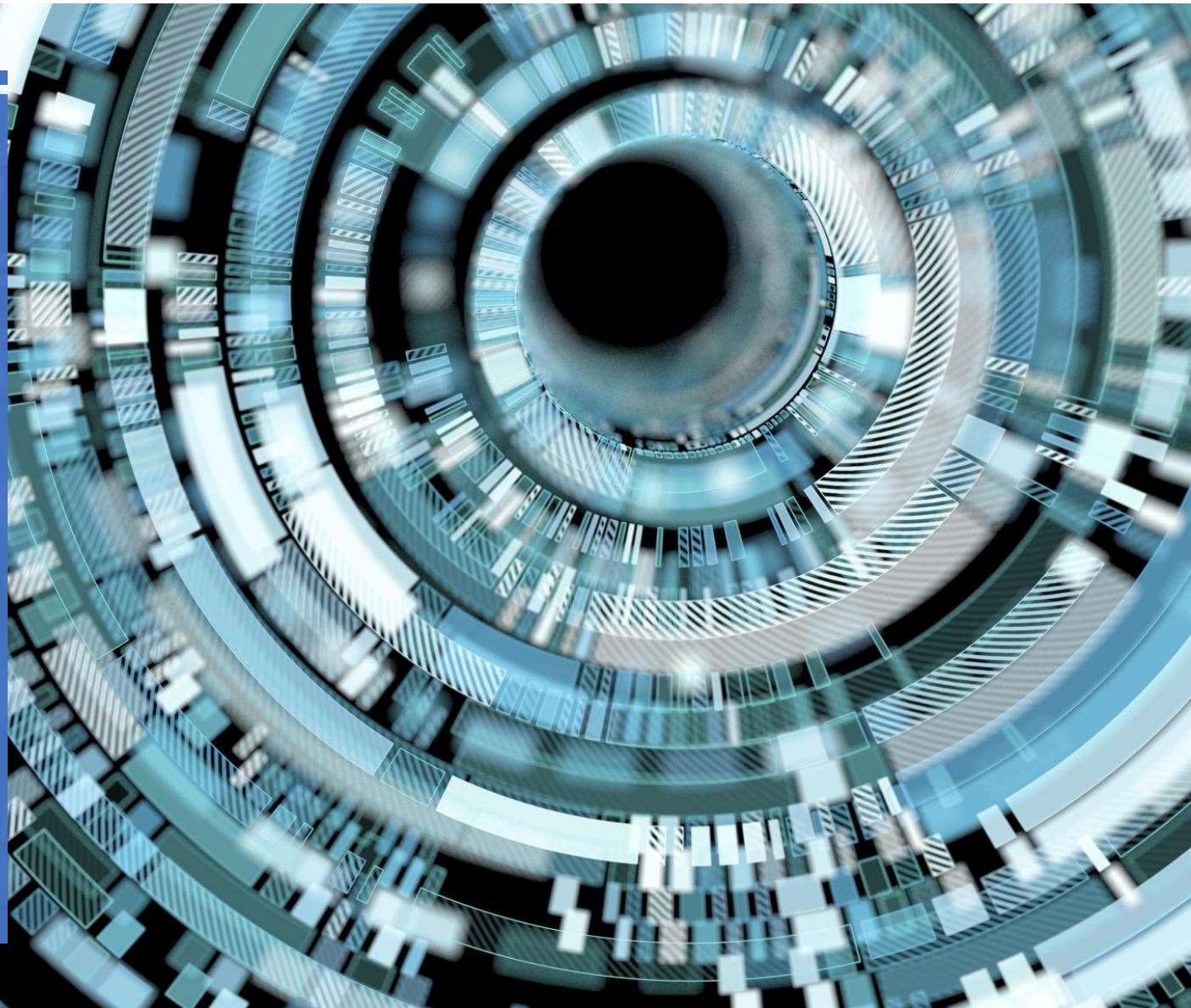
Artificial Intelligence (AI)



- Artificial intelligence in its most basic form is the ability of a machine to perform tasks that can be performed by humans
- It is a tool that can automate activities, extract knowledge from data, and make predictions

AI SPRING

- Big Data
- Increased Storage
- Cloud computing
- Speed

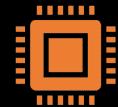


THE POTENTIAL IS ENORMOUS

- Detecting pathologies faster and more accurately than medical professionals
- Aiding disaster relief
- Smart cities, factories and homes
- Self-driving cars



AI + 5G = IoT



AI innovation, especially the Internet of Things (IoT), requires a universal telecommunication infrastructure with massive processing speed and reduced latency that the previous iterations are incapable of providing



Potential of IoT

Smart Factories
Smart Homes
Connected Medical Devices
Self-Driving Cars

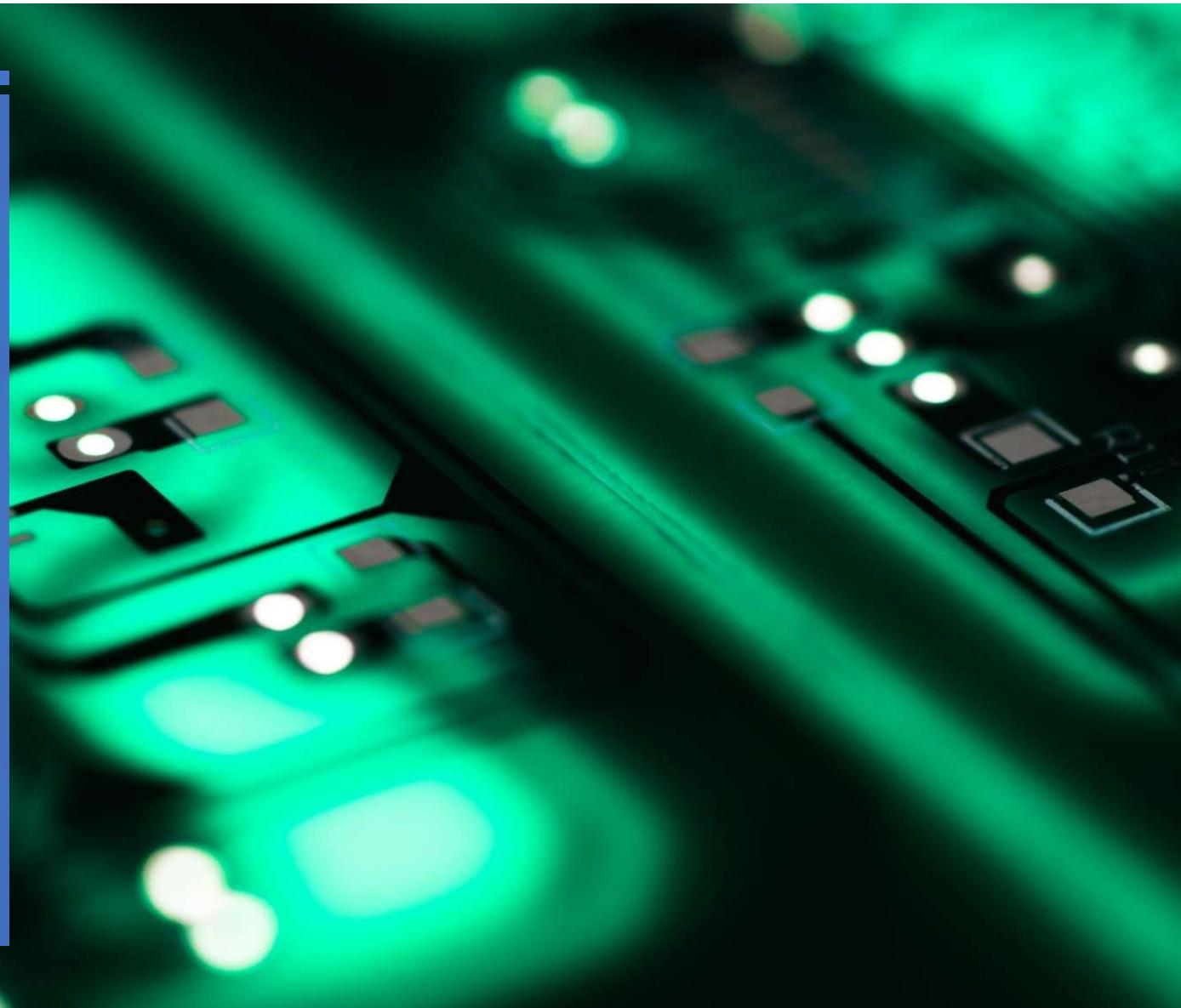


“5G will drive artificial intelligence, Internet of Things, and change the world forever.”

Marc Emmer, *This Technology Is About to Change the World—But No One Is Talking About It*, Inc.com (Aug. 10, 2019), <https://www.inc.com/marc-emmer/this-technology-is-about-to-change-world-but-no-one-is-talking-about-it.html>

AI INNOVATION

- The future of innovation requires a universal telecommunications structure with massive processing speed and reduced latency that previous iterations are incapable of providing
- The importance of 5G cannot be overstated



THIS IS ALL AT RISK

- U.S. government
 - Movement away from globalization
 - Instigation of trade war
 - Failure of 5G, AI and IoT policy



Globalization is international cooperation through advances in communication, technology and transportation

U.S. and China become interdependent

The diagram illustrates the relationship between Globalization, its purpose, and interdependence. It features three main text blocks arranged in a triangle. The top-left block defines Globalization as international cooperation through advances in communication, technology, and transportation. The top-right block states the purpose of Globalization is to encourage peace among nations through free trade and international organizations. The bottom block states that the U.S. and China become interdependent. Three curved arrows connect the blocks: a yellow arrow points from the Globalization definition to the purpose; a grey arrow points from the Globalization definition to the interdependence statement; and an orange arrow points from the purpose to the interdependence statement.

Purpose to encourage **peace** among nations through free trade and international organizations

Globalization

SHIFTING ROLES

- WWII – U.S. leader with the creation of NATO and WTO
- 1978 – China begins to open up market and permit privatization
- U.S. move away from globalization towards protectionism
- China filling the gap left by U.S.



Governmental Policy on AI and IoT

U.S.

Decrease in Science Funding

Lack of Understanding of
Technology

Underfunded Reactionary AI Policy

China

Belts and Roads Initiative

Made in China 2025

AI Development Plan

CHINA DESIRES TO BECOME A WORLD LEADER IN AI

- Long terms strategic plans
- Government support of its tech industry
- Support to emerging economies through building infrastructure
- Lock in markets for Chinese tech



BELTS AND ROADS INITIATIVE

- Goal: increase China's economic power by increasing exports and helping other countries build their infrastructure
- “Digital Silk Road” - China plans to connect 64 target nations with “fiber optic cables, international trunk passageways, mobile structures and e-commerce links”



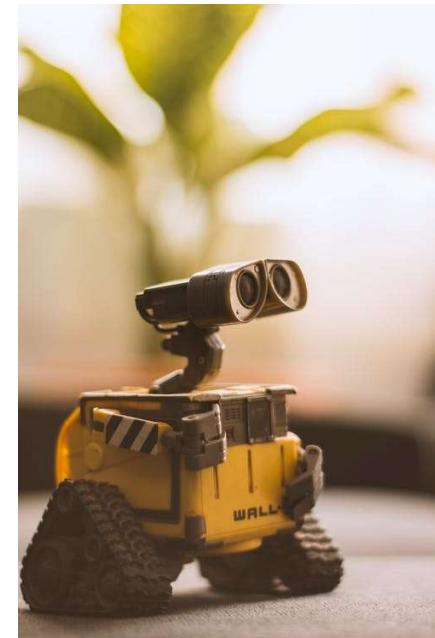
MADE IN CHINA 2025

- Goal: Shift from copycat manufacturer to high-tech products
- Huawei, Alibaba, Tencent and Baidu
 - Large scale local market
 - New middle class
 - Early adopters
 - Closed trade borders
 - Government subsidies



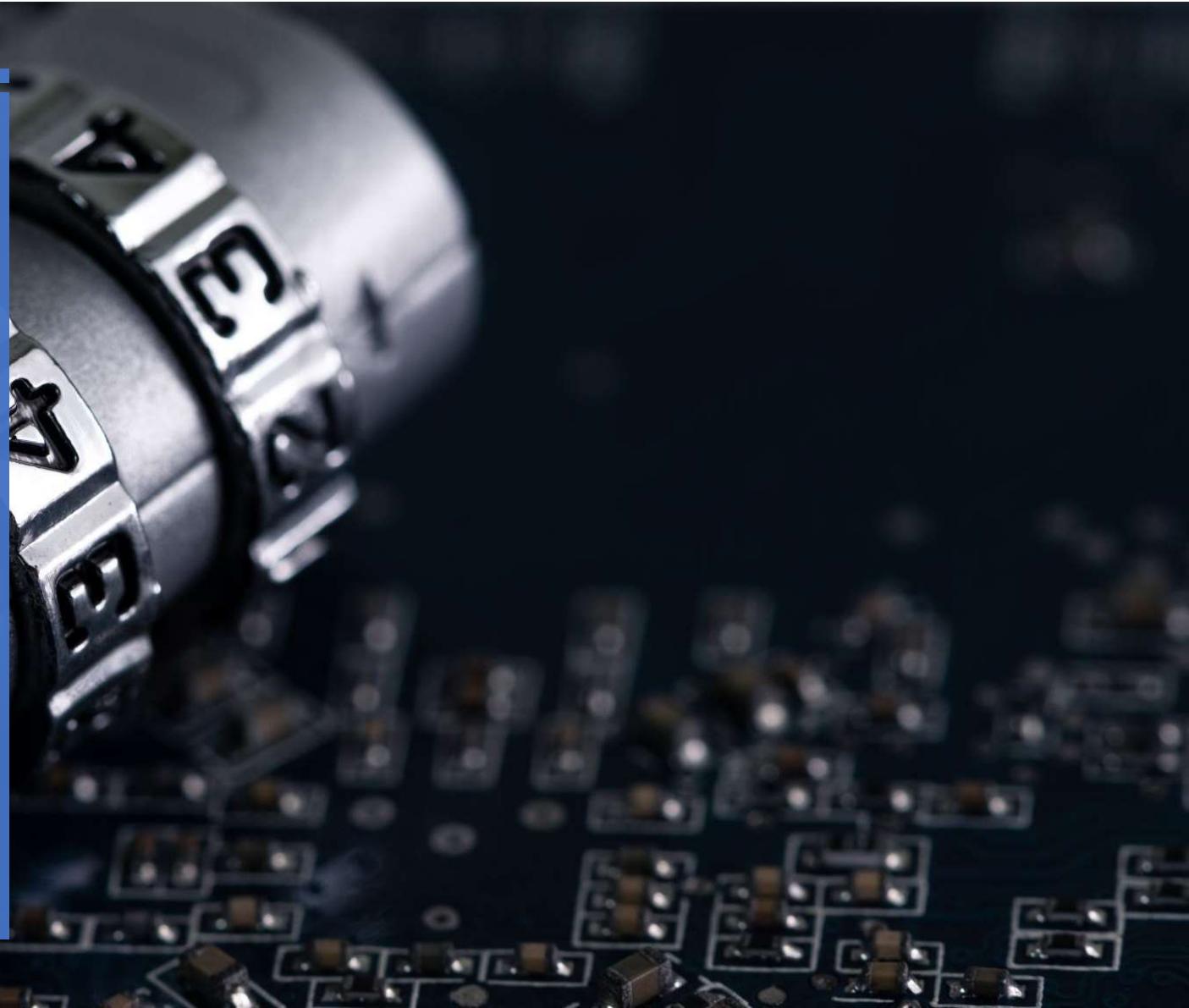
NEXT GENERATION AI DEVELOPMENT PLAN

- Goal: become world leader in artificial intelligence
 - strategic investment
 - purchases of foreign companies with needed technological know-how
 - billions in start-up funding from government
 - Desire to set global standards



U.S. MOVE TOWARDS PROTECTIONISM

- Repudiation of Open Trade
- Refusal to Fill Vacancies on WTO Appellate Board
- Institution of Unauthorized Trade Sanctions Against China



WHAT IS THE U.S. TRYING TO DO?



- Understanding that the U.S. has fallen behind in tech innovation, especially in 5G policy, the U.S. is attempting to curb the spread of Chinese tech throughout the world
- According to the Pentagon's advisory board:
 - Chinese equipment much less expensive than that which can be obtained from Europe
 - Of superior quality and functionality
 - Lack of interoperability
 - Questionable governmental help for upgrades to rural areas of the U.S. where there is less incentive to upgrade telecommunications from 4G to 5G because of the enormous costs without the accompanying benefit

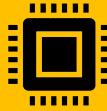
U.S. GOVT LACK OF COGENT 5G POLICY



China is the primary supplier of 5G networking equipment



Former U.S. based Lucent was merged with France's Alcatel and later bought out by Finland's Nokia



In 2010, Nokia purchased U.S. based Motorola leaving no major U.S. supplier of telecommunication hardware

EXECUTIVE ORDERS

- May 15, 2019 – U.S. companies banned from using Chinese telecom equipment
- May 16, 2019 – Huawei placed on banned entity list
- June 2, 2019 – China issues white paper denouncing the “unilateral and protectionist” measures
- Reason – to prevent Chinese from spying on U.S.

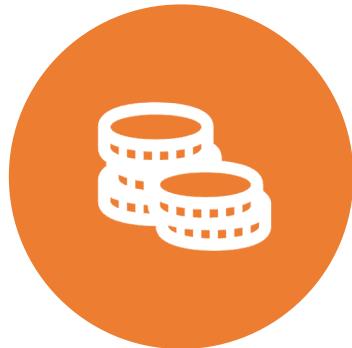
2018 FOREIGN RISK REVIEW MODERNIZATI ON ACT

- 2018 Foreign Risk Review Modernization Act was enacted to restrict Chinese investment in U.S. companies
- China invested \$3 billion in Silicon Valley start-ups in 2018 before FIRRMA went into effect

HI-B RESTRICTIONS

- Buy American and Hire American Executive Order – placed additional burdens on visa seekers
- Amazon, Microsoft, Google and Intel are among the top employers of approved H-1B applicants
- More Chinese students are choosing the UK, Canada and Australia over the U.S. for their studies
- U.S. tech companies may need to move their research labs abroad

TRADE WAR HARMS



ECONOMY



DEMOCRACY



AI INNOVATION



ECONOMY

- The current U.S. trade policy is a complete abdication of the past role America played in globalization and economic security
- Exports from the U.S. to China have declined 31.4% in 2019 due to tariffs
- The five largest tech companies in the U.S., Microsoft, Amazon, Apple, Facebook, and Alphabet, lost a combined \$162 billion in market value as a result of the continuing trade war between the U.S. and China
- Increase in Chinese exports to non-U.S. countries - BRI worth in bilateral trade currently falls between \$500 billion and \$1.4 trillion
- In terms of economic loss to the U.S., leading economist have reported that consumers have paid the entire \$68.8 billion in President Trump's tariffs
- 4% loss in GDP for the EU due to destruction of supply chains



DEMOCRACY

- By engaging in unilateral acts rather than using international dispute resolution mechanisms, the entire democratic process is at risk
- Leaving China to set standards will result in the global implementation of eastern values
- The more the U.S. retreats, the larger role China can play
- The roll out of the 5G infrastructure is slowing down
- Components will not be interchangeable requiring counties to choose a side
- China has already established a center in Brussels to work on 5G standards effectively leaving the U.S. out



INNOVATION WINTER

- The U.S. government has repeatedly demonstrated its lack of understanding of technology and has moved away from funding R&D leaving it to private industry drive this field. Google, for example, spent three times as much on the development of AI alone as the federal government's entire spending in 2017
- In the 1960s, around 70 percent of total R&D was federally funded, with 30 percent coming from the private sector. Now those figures are reversed
- Disruption in supply chains means tech companies must find new trading partners or develop their own components
- European countries choosing to ban Huawei will slow down the installation of their 5G infrastructure by 2 to 5 years
- No more research collaboration between Chinese and American scholars
- Reduction in investment in AI companies in the U.S.

- The U.S. feud with Huawei risks bifurcating 5G's rollout into two distinct blocs—nations that embrace Chinese 5G and those that reject it wholesale—hampering global connectivity and hurting the bottom lines of companies forced to choose.
- Technology consultant Stephanie Hare says the lack of trust between the world's No. 1 and No. 2 economies means every other country is being forced to choose sides, based on its own interests. "There can be no sitting on the fence here."

TECHNOLOGICAL BIFURCATION

U.S. IS HARMING ITSELF AND THE REST OF THE WORLD

- The U.S. cannot afford to miss out on AI's potential to deliver \$13 trillion to the global economy. The U.S.-instigated trade war not only threatens the global economy and endangers democracy, it will likely cause an innovation winter – hindering future developments in AI.
- There is a very real danger that should the U.S. and China continue with this decoupling, the result could be a bifurcated internet, the development of technology on two divergent tracks, and a 5G infrastructure with non-interchangeable components requiring the rest of the world to choose a side.
- Although the damage from the trade war is likely to be long-term, if the U.S. does not learn how to exist in a world with a new balance of power, it will suffer the most from the coming innovation winter.



“The war for global leadership in artificial intelligence and machine learning is well underway, and the US is poised to lose perhaps the most important technology war in its history.”

Steve Andriole, *Artificial Intelligence, China And The U.S. - How The U.S. Is Losing The Technology War*, FORBES (Nov. 9, 2018, 12:10 P.M.), <https://www.forbes.com/sites/steveandriole/2018/11/09/artificial-intelligence-china-and-the-us-how-the-us-is-losing-the-technology-war/#2a567e616195>



Any comments on 5G status
and Huawei are appreciated.

Thank you!
Kimberly Houser, Asst. Prof. Oklahoma State University