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Program Schedule for World Economic Forum (WEF) Young Global Leaders (YGL) Education Module

Our AI-Driven Future: Prospect and Pitfalls (Sep 2023)

Sep-17 Day 0 (Sun)	Sep-18 Day 1 (Mon)	Sep-19 Day 2 (Tue)	Sep-20 Day 3 (Wed)	Sep-21 Day 4 (Thu)	Sep-22 Day 5 (Fri)	Sep-23 Day 6 (Sat)
Conference Lodge	**LSK 3003**	**IAS 4042**	**LSK 3001**	**Business School Central**	**Day trip to Shenzhen**	
18:00 –19:30 Welcome Drinks (Optional)	09:00 – 09:05 **Welcome Remarks** *Prof. Naubahar Sharif*	08:30 – 10:00 **Mindfulness** *Ms. Katy Mok*	09:00 – 10:15 **AI for Health and Healthy Aging** *Prof. Bert Shi*	08:30 Coach pick-up @HKUST 08:40 @Crowne Plaza 09:45 – 11:00 **The role of Hong Kong as an IFC in driving Global Connectivity and Innovation** *Mr. Nicolas Aguzin*	08:00 Coach pick-up @HKUST 08:10 @Crowne Plaza 10:00 – 12:00 Visit to Huawei in Shenzhen 12:00 – 13:45 Lunch 13:45 Coach pick-up 14:30 – 17:30 Visit to Malong Technologies / Lab of VisionNav Robotics / DeepRoute.AI 17:30 Coach pick-up heading back to HKUST (Drop-off)	
	09:05 – 09:30 **Program Overview** *Ms. Miao Sun* *Prof. Donald Low*					
	09:30 – 10:15 **Deglobalization, Decoupling, and De-risking: The View from Asia** *Prof. Alicia Garcia-Herrero* *Ms. Vanessa Chan*					
	10:15 – 10:30 **Break**	10:00 – 11:30 **AI & Web3: Opportunities and Challenges** *Prof. Yang Wang*	10:15 – 10:30 **Break**	11:00 – 11:15 **Break**		
	10:30 – 12:00 **How do we Make Decisions in Risk and Uncertainty, and will AI be a Savior or Demon?** *Prof. Stephen Nason*		10:30 – 12:00 **AI & Art** *Prof. Yike Guo*	11:15 – 12:45 **Venture Capital Investments in AI** *Mr. K.O. Chia*		
	12:15 – 13:45 **Lunch**	11:45 Coach Pick-up 12:00 – 13:45 **Lunch hosted by HKUST President Prof Nancy Ip** 13:00 – 13:45 **The Global Race to Regulate AI** *Prof. Anu Bradford* 13:45 Coach Pick-up	12:15 – 13:45 **Lunch**	12:45 – 14:00 **Lunch**		
	14:00 – 15:30 **Economic Development in East Asia: What works (and what doesn't)** *Prof. Donald Low*		14:00 – 15:15 **Technology Development and Leapfrogging in the Greater Bay Area** Prof. Naubahar Sharif 15:30 Coach Pick-up	14:00 – 15:30 **Panel: Can Hong Kong reinvent itself as an innovation-driven economy?** *Prof. Anthony B.L. Cheung* *Prof. Hong K. Lo* *Mr. Gary Liu*		
	16:00 – 17:30 **AI for Good** ** Online** *Prof. Pascale Fung*	14:00 – 17:00 **Experiential Learning** (Tsang Shiu Tim Sports Center) *Prof. Tim Woo* 17:30 Coach pick-up	16:00 – 17:30 **Visit to Animoca Brands (Venue: Cyberport 3)** 18:15 – 19:15 **Company Visit to K11 Musea / New World Development**	15:30 – 16:15 **Diving into the AI Frontier: The Future of Work** *Prof. Harry Shum*		
		18:30 – 20:00 **Boat Trip** (Kwun Tong Pier to Central Pier)	19:30 – 21:30 **Dinner**	16:15 – 16:45 **Feedback and Closing Ceremony**		
	17:30 Coach pick-up 18:00 **Welcome Dinner** 21:00 Coach pick-up (back to HKUST)	20:15 Coach pick-up (back to HKUST)	21:30 Coach pick-up (back to HKUST)	17:45 Coach pick-up 18:30 – 20:00 **Exhibition Opening** @M+ Museum 20:15 Coach pick-up (back to HKUST)		

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Venue Information

HKUST Campus (the below map): **LSK=Lee Shau Kee Business Building** 3-4 **IAS=Lo Ka Chung Building, Lee Shau Kee Campus** 5-6

Business School Central: https://bmcentral.hkust.edu.hk/venue-information

Campus Map

http://publish.ust.hk/univ/maps/Campus_Map_Color.pdf

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Program Materials

Presentation materials (if any) will be uploaded to the program website for download, please scan the following QR code. ***Please refer to the program website for latest updates/changes (if applicable).***

Website link:

https://ipp.hkust.edu.hk/wef-ygl-education-module

Wifi Access

- Wi-Fi.HK via HKUST
- Detailed guidelines: https://itsc.hkust.edu.hk/services/general-it-services/wifi/wi-fi-services/configuration-wifihk

Adverse Weather Arrangement

When the Amber or Red Rainstorm Warning or Typhoon Signal No. 1 or 3 is in effect, all scheduled (including online) sessions will be held as usual.

When a Black Rainstorm Warning is in force, all (including online) sessions will be canceled. Those in progress will normally continue until the end. Stay indoors wherever you are and do not leave until the warning is canceled and the conditions are safe.

When a Typhoon Signal No. 8 is to be issued within 2 hours (pre-No. 8), all (including online) sessions will be canceled. Those in progress will normally continue until the end. Stay indoors in a safe place or return home if traffic and weather conditions permit.

If Signal No. 8 or a Black Warning is canceled

- **At or before 6:30am**, sessions (including online) starting from 8:30am and onwards will be held as scheduled
- **At or before 12 noon**, sessions (including online) starting from 2 pm and onwards will be held as scheduled, while sessions (including online) starting before 2 pm will be canceled.
- **At or before 4pm**, sessions (including online) starting from 6 pm and onwards will be held as scheduled, while sessions (including online) starting before 6 pm will be canceled.

If Signal No. 8 or above or a Black Warning is still in force at 4 pm, all (including online) evening sessions, if any, will be canceled.

Photography and Video Taking

Photographs and videos will be taken during the program for administrative, marketing, and other purposes. Please contact the organiser if you have any concerns.

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About the Speakers

Prof. Naubahar SHARIF (Lead Faculty)
Acting Head and Professor, Division of Public Policy
The Hong Kong University of Science and Technology

Naubahar Sharif (Ph.D., Cornell University, 2005) is Professor of Public Policy and Acting Head of the Division of Public Policy (PPOL) at The Hong Kong University of Science and Technology (HKUST). His research interests include science, technology and innovation (STI) policy in Hong Kong and within the 'Greater Bay Area' of Southern China; and the 'Belt and Road' initiative, and most recently mental health and wellbeing. In 2011, he completed the Executive Education program in Innovation for Economic Development at Harvard University. At HKUST, one of his undergraduate courses was awarded an honorary mention for the Common Core Excellence award 2022, he won the Interdisciplinary Programs Office's Teaching Excellence Award (in 2020), the School of Humanities and Social Science (SHSS) Best Teacher Award (twice, in 2009 and 2016). Naubahar has previously been awarded both 'Public Policy Research' (PPR) and 'General Research Fund' (GRF) grants by Hong Kong's Research Grants Council (RGC). He has served as co-principal-investigator for a cross-institutional 'Collaborative Research Fund' (CRF) grant also awarded by the RGC, as well as two 'Strategic Public Policy Research' (SPPR) grants awarded by Hong Kong's Policy Innovation and Co-ordination Office (PICO). Just over the most recent two years (2021 to 2023), he has been awarded over HK$22 million of funding for various mental health-related research and community projects including from the prestigious Hong Kong Jockey Club Charities Trust. He has had numerous research articles published in leading journals including Research Policy, Science and Public Policy, The China Journal, and Science, Technology and Human Values. From 2006–2010, Naubahar consulted for Hong Kong's Innovation and Technology Commission (ITC). Naubahar's research has had a demonstrable impact on business and his research was one of HKUST's few 'impact case study' submissions (sole-authored) for its 2020 Research Assessment Exercise (RAE). He frequently writes opinion pieces for local newspapers including the China Daily (Hong Kong Edition) and the South China Morning Post, and he has been featured in local print media as well as local television. Naubahar presently serves as a Member of the HKSAR Government Advisory Committee on Mental Health (2017-2023), as an Appointed Member of the HKSAR Government's Mental Health Review Tribunal, Honorary Professor at the University of Hong Kong (HKU), a Senior Advisor to The Joseph Needham Foundation for Science & Civilisation (Hong Kong), and as a Distinguished Research Fellow at a private independent school in Hong Kong.

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Prof. Donald LOW (Lead Faculty)
Professor of Practice, Division of Public Policy
Director, Leadership & Public Policy Executive Education
The Hong Kong University of Science and Technology

Donald is an accomplished writer, consultant and lecturer in economics and behavioral economics, decision-making and risk analysis, inequality and social policy, complexity in public policy, organizational behavior, and the politics and public policies of Singapore. He is currently Senior Lecturer and Professor of Practice in Public Policy at the Hong Kong University of Science & Technology, and director of Leadership and Public Policy Executive Education.

Donald is the editor of Behavioral Economics and Policy Design: Examples from Singapore (2011), a pioneering book which details how the Singapore government has applied ideas from behavioral economics in various policy domains. His best-selling 2014 book, Hard Choices: Challenging the Singapore Consensus, raises searching questions about the long-term viability of many aspects of governance in Singapore. Most recently, he co-authored PAP v PAP: The Ruling Party's Struggle to Adapt to a Changing Singapore (2020) with Cherian George. The book shows the extent to which the world's longest, popularly elected government has become entrapped by its past success and limited by its own mythologies. The book argues that a reformed PAP – one that is more comfortable with political competition and more open to social justice – is the city-state's best hope for security and prosperity after the pandemic.

**Listed in alphabetical order of last name*

Mr. Nicolas Aguzin
Chief Executive Officer, Hong Kong Exchanges and Clearing Limited (HKEX)

Nicolas Aguzin joined HKEX as Chief Executive Officer on 24 May 2021 from J.P. Morgan, where he was most recently Chief Executive Officer of J.P. Morgan's International Private Bank. Mr Aguzin has been based in Hong Kong since 2012.

From 2013 to 2020, Mr Aguzin was CEO, J.P. Morgan, Asia Pacific where he was responsible for all the firm's business across 17 markets. Mr Aguzin presided over some of the firm's major expansion efforts during the period, including establishing itself in China as one of the few international financial institutions with a full range of services and capabilities; including a fully-owned locally incorporated commercial bank, a majority-owned securities company, an asset management company and a futures and options company. Concurrent with his Asia CEO role, Mr Aguzin also ran J.P. Morgan's Investment Banking division in Asia. During his tenure the bank rose to become one of the leading investment banks in the Asia Pacific region.

Mr Aguzin joined J.P. Morgan in 1990 in Buenos Aires as a financial analyst. Between 1990 and 2005, he held a variety of roles in New York and Buenos Aires, and in 2005 he was appointed as CEO, Latin America. In 2008 and 2009, in addition to his responsibilities as CEO, Latin America and Head of Latin America Investment Banking, he served as Senior Country Officer for Brazil.

Mr Aguzin holds a bachelor degree in Economics from the Wharton School of the University of Pennsylvania in the US and is fluent in Spanish, Portuguese and English.

Prof. Anu Bradford
Henry L. Moses Professor of Law and International Organization
Director, The European Legal Studies Center
Columbia Law School

Anu Bradford is Henry L. Moses Professor of Law and International Organizations at Columbia Law School. She is also a director for Columbia's European Legal Studies Center and a Senior Scholar at Jerome A. Chazen Institute for Global Business at Columbia Business School. She is an expert on international trade law, European Union law, digital regulation, and comparative and international antitrust law. Bradford is the author of "The Brussels Effect: How the European Union Rules the World" (OUP 2020), which was named one of the Best Books of 2020 by Foreign Affairs. Her next book "Digital Empires: The Global Battle to Regulate Technology" will be published by the OUP in September 2023. Bradford was named Young Global Leader by the World Economic Forum in 2010. She grew up in Finland and lives in New York City.

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Ms. Vanessa Chan
Head, Corporate Strategy, North Asia ServiceNow

Vanessa is a seasoned tech executive with over 15 years of experience in doing business in Asia. Vanessa has extensive experience in collaborating with board executives to develop and execute technology-focused transformational business strategies. She has been instrumental in a number of landmark partnerships between Chinese and Western technology firms, including a Joint-Venture.

Vanessa is currently the Head of Corporate Strategy for North Asia at ServiceNow, a US$7B+ SaaS company providing cloud-based digital workflow platform solutions for enterprise operations. Before joining ServiceNow, Vanessa was the Head of Go-to-Market Strategy and Operations for Google Cloud, North Asia. She led a team to drive operational excellence and the overall health of the whole sales cycle. Prior to Google, Vanessa was the Vice President of Business Development, Asia Pacific for IGT, the leading technology and content provider for all regulated gaming segments. She joined IGT in 2016 and was responsible for the overall growth of the Greater China business and Government Relations. In 2017, her role expanded to include the rest of Asia. Prior to IGT, Vanessa spent over 7 years at SAP and was most recently the Vice President of the Customer Office for SAP Greater China responsible for the continuous success of the Top 50 largest customers in the region. Vanessa started her career as a consultant at McKinsey & Company and Diamond Technology Partners.

Born and raised in Hong Kong, Vanessa holds an MBA from the University of Chicago Booth School of Business and an undergraduate degree in Chemical Engineering from the University of Pennsylvania. Vanessa was named “Influential Women in Gaming 2020” by iGaming Post and “Inspiring Business Women in APAC” by Argyll Scott. She is a frequent speaker on the topics of mental health, corporate well-being, Diversity, Equity, and inclusion.

Prof. Anthony B.L. Cheung, GBS, JP
Chair Professor of Public Administration,
Advisor & Former President, EdUHK;
Former Secretary for Transport and Housing, HKSAR

Anthony was the Secretary for Transport and Housing of the Hong Kong SAR Government from July 2012 to June 2017 and, in that capacity, also Chairman of the Hong Kong Housing Authority, Chairman of the Hong Kong Maritime and Port Board, and Chairman of the Hong Kong Logistics Development Council.

Before that he was the President of The Education University of Hong Kong (then known as The Hong Kong Institute of Education) (2008-2012). He laid the foundation for the Institute's retitling by championing an "Education-plus" vision.

After stepping down from ministerial office, Anthony re-joined the Education University in 2018 as Research Chair Professor of Public Administration and has since February 2023 become an Advisor (Public Administration) of the University.

Anthony holds a PhD degree in Government from The London School of Economics and Political Science, UK. His research has focused on governance, public administration, and public policy. He co-founded the Asian Association for Public Administration in 2010 and served as its President in 2012.

Anthony had served on many statutory and advisory bodies over the years. He was a Non-Official Member of the Executive Council (2005-2012), Chairman of the Hong Kong Consumer Council (2007-2012), and Member of the Legislative Council (1995-97). He is currently the Chairman of the Committee on Self-financing Post-secondary Education and Member of both the Education Commission and University Grants Committee. During 2017-18, he chaired a government task force to review self-financing post-secondary education.

Mr. K.O. Chia
President, HKVCA Institute
Advisor, HKUST Entrepreneurship Fund

Graduated as an electronics engineer, KO pivoted early into product management that subsequently lead him to multiple career shifts along his 40+ year journey. Consequently, he had diverse experiences as C-suite senior executive at a family office; U.S.- Asia silicon-valley style venture capitalist; part of a global technology startup entrepreneurial management team; and as a corporate executive in global US technology companies across Asia, Europe and U.S.

He holds an MBA from Strathclyde Business School, Scotland; Postgrad Dip in Management Studies from Edinburgh Napier University, Scotland; and BEng (Hons) from Sheffield University, England.
He serves as an Advisor to HKUST Entrepreneurship Fund; Advisory Board Member at CUHK School of Continuing Studies; Selection Committee Member of the Maycham Student Trust Scholarship Fund; Founding President of HKVCA Institute; and Senior Advisor to a fintech fund. He is also a Fellow of the HK Institute of Directors; a GlobalScot and is a certified Career Development Facilitator.

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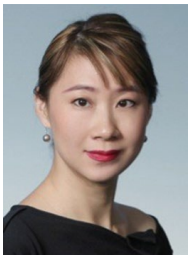

Prof. Pascale Fung

Chair Professor, Department of Electronic and Computer Engineering, HKUST
Director of Center for Artificial Intelligence Research

Pascale received her PhD in Computer Science from Columbia University in 1997. She received her MSc in Computer Science from Columbia in 1993 and her BS in Electrical Engineering from Worcester Polytechnic Institute in Massachusetts in 1988. Pascale is one of the founding faculty members of the Human Language Technology Center (HLTC) at HKUST.

Pascale was a research affiliate with AT&T Research Laboratories (formerly with Bell Laboratories) (Forham Park, New Jersey, Murray Hill, New Jersey) from 1993-1997. During 1991-1992, she was Associate Scientist at BBN Systems & Technologies (Cambridge, Mass.). She was a visiting researcher at LIMSI, Centre National de la Recherche Scientifique (France) in 1991. From 1989-1991, she was a research student in the Department of Information Science, Kyoto University (Japan).

Pascale is the co-editor of the Special Issue on Learning in Speech and Language Technologies of the Machine Learning Journal. She has been on the organizing committee of the Association of Computational Linguistics (ACL)' SIGDAT, and served as chair for the Conference on Empirical Methods in Natural Language Processing (EMNLP) in 1999, and co-chair of SemaNet 2002. She has served as program committee member of numerous international conferences and technical publications, including the conferences of the ACL, EMNLP, Workshop on Very Large Corpora, American Machine Translation Association, COLING, Computational Linguistics (journal), Machine Learning (journal), Machine Translation (journal), and has served as a reviewer for HK Research Grants Council. She is a Senior Member of the Institute of Electrical and Electronic Engineers and a Member of the ACL.

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Prof. Alicia Garcia-Herrero
Chief Economist for Asia Pacific at Natixis &
Senior Fellow, BRUEGEL &
non-resident Senior Fellow, East Asian Institute, National University Singapore
Adjunct Professor, Department of Economics, HKUST

Alicia García Herrero is the Chief Economist for Asia Pacific at French investment bank Natixis, and is an independent Board Member of AGEAS insurance group. Alicia also serves as Senior Fellow at the European think-tank BRUEGEL and as a non-resident Senior Follow at the East Asian Institute (EAI) of the National University Singapore (NUS). Alicia is also Adjunct Professor at the Hong Kong University of Science and Technology (HKUST). Finally, Alicia is and a Member of the Council of the Focused Ultrasound Foundation (FUF), a Member of the Board of the Center for Asia-Pacific Resilience and Innovation (CAPRI), a member of the Council of Advisors on Economic Affairs to the Spanish Government, a member of the Advisory Board of the Berlin-based Mercator Institute for China Studies (MERICS) and an advisor to the Hong Kong Monetary Authority's research arm (HKIMR).

In previous years, Alicia held the following positions: Chief Economist for Emerging Markets at Banco Bilbao Vizcaya Argentaria (BBVA), Member of the Asian Research Program at the Bank of International Settlements (BIS), Head of the International Economy Division of the Bank of Spain, Member of the Counsel to the Executive Board of the European Central Bank, Head of Emerging Economies at the Research Department at Banco Santander, and Economist at the International Monetary Fund. As regards her academic career, Alicia has served as visiting Professor at John Hopkins University (SAIS program), China Europe International Business School (CEIBS) and Carlos III University.

Alicia holds a PhD in Economics from George Washington University and has published extensively in refereed journals and books. Alicia is very active in international and social media. As a recognition of her thought leadership, Alicia was included in the TOP Voices in Economy and Finance by LinkedIn in 2017 and #6 Top Social Media leader by Refinitiv in 2020.

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Prof. Yike Guo
Provost &
Chair Professor, Department of Electronics and Computer Engineering, HKUST

Yike was appointed as the Provost of the Hong Kong University of Science and Technology (HKUST) with effect from 1 Dec 2022. He is concurrently a Chair Professor in the Department of Computer Science and Engineering.

Yike received his first-class honours degree in Computing Science from Tsinghua University in 1985 and obtained his PhD degree from Imperial College London in 1994. He has been a full Professor in the Department of Computing of Imperial College London since 2002. He was the Founding Director of the Data Science Institute at Imperial College London since 2014. In 2015 - 2020, Yike was appointed as Non-Executive Dean of the School of Computer Engineering and Science in Shanghai University and he is now the Honorary Dean of the School. Prior to joining HKUST, Yike was the Vice President (Research and Development) and the Dean of Graduate School at Hong Kong Baptist University since 2020.

Yike is a world leading computer scientist with research focuses on machine learning and data mining for large-scale scientific applications including distributed data mining methods, machine learning and informatics systems for biology, chemistry, geophysics, healthcare, environment, economy, finance, social media, creative design and art applications.

Yike is Fellow of Royal Academy of Engineering (FREng), a Member of Academia Europaea (MAE), Fellow of Hong Kong Academy of Engineering Sciences (FHKEng), Fellow of the Institute of Electrical and Electronics Engineers (FIEEE), Fellow of British Computer Society (FBCS), and Fellow of Chinese Association for Artificial Intelligence (FCAAI).

Yike has extensive experience in working with industries. He has led the development of start-up companies and worked with leading international companies such as GSK, Pfizer, Roche, KPMG, Huawei and BBC et al in large research projects and consulting services.

Yike has served on the editorial board of many first-tier journals. He is the editor-in-chief of Annual Reviews of Data Sciences (World Scientific), and the deputy editor-in-chief of CAAI Transections on Intelligent Systems (the official journal of CAAI), Machine Intelligence Research (Springer).

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President Nancy Ip
President
The Morningside Professor of Life Science, Division of Life Science,
Director, Hong Kong Centre for Neurodegenerative Diseases,
Director, State Key Laboratory of Molecular Neuroscience, HKUST

Nancy is currently The Morningside Professor of Life Science, and the Director of the State Key Laboratory of Molecular Neuroscience at The Hong Kong University of Science and Technology (HKUST). She received her PhD degree in Pharmacology from Harvard Medical School, after which she held the position of Senior Staff Scientist at Regeneron Pharmaceuticals Inc. in New York. Since joining HKUST, she has served as the Vice-President for Research and Development, the Dean of Science, Director of the Biotechnology Research Institute, and Head of the Department of Biochemistry.

As a highly accomplished researcher, Nancy has published over 260 papers with 18,900 SCI citations, and holds 44 patents. She has been elected to the Chinese Academy of Sciences, the US National Academy of Sciences, the World Academy of Sciences, and the American Academy of Arts and Sciences. She is also an elected Councillor for the Society for Neuroscience, and was the Senior Editor of the Journal of Neuroscience. Furthermore, she has been a member of the World Economic Forum Global Agenda Council since 2012, and is currently on the Global Future Council on the Future of Neurotechnologies and Brain Science. Nancy is also the recipient of numerous awards and honors including the National Natural Science Awards, the L'OREAL-UNESCO for Women in Science Award and the 10 Science Stars of China by Nature.

Mr. Gary Liu
Co-Founder & CEO, Terminal 3

Gary Liu is the Co-Founder & CEO of Terminal 3, a company building decentralized user data infrastructure that replaces centralized solutions which deprive users of privacy and saddle enterprises with compliance and security issues. Gary is also the Founder & Board Director of Artifact Labs which is on a mission to 'preserve and connect history' through the development of historical NFTs, and he is the Founding Chair of Web3 Harbour, an industry association dedicated to Web3 builders, investors, users, and leaders across Asia.

In his previous role as CEO of the South China Morning Post, Gary oversaw an extensive transformation of the century-old publishing group, expanding its global audience reach and influence, establishing new revenue channels, and cementing SCMP as Asia's leading news media company. Previously as CEO of Digg, Gary spearheaded the New York startup's reinvention as a data-powered news platform. He was also Head of Labs at Spotify, after joining the company as Global Director of Ad Product Strategy. Gary has also worked at AOL and Google.

Gary is a World Economic Forum Young Global Leader, was previously the chairman of the WAN-IFRA Asia Pacific Committee and a member of INMA's global board. He has been featured across global news publications, including The Wall Street Journal, The Business Times, Business Insider, Nikkei Asian Review, and was a Tatler Asia honouree for the region's 'Most Influential' leaders.

Born in the United States, Gary grew up in Taiwan and New Zealand, before returning to America where he lived and worked for 20 years. He now lives in Hong Kong with his wife and son. Gary is an Economics graduate from Harvard University.

Prof. Hong K. Lo, JP
Dean, School of Engineering,
Chair Professor, Department of Civil and Environmental Engineering, HKUST
Director, Great Smart Cities Institute

Hong is Dean of Engineering, Chair Professor of Civil and Environmental Engineering, and Director of GREAT Smart Cities Institute at HKUST. Hong is an accomplished scholar in intelligent transportation systems, smart cities, and sustainability. He serves as the Founding Editor-in-Chief of Transportmetrica B: Transport Dynamics and Managing Editor of Journal of Intelligent Transportation Systems. He is also Director of the HKUST-MTR Joint Research Lab, leveraging AI and other technologies for transportation and urban mobility research. Hong was awarded the prestigious Triennial World Conference on Transportation Research (WCTR) Prize and HKUST School of Engineering Research Excellence Award. Hong is a Justice of the Peace (JP), Fellow of the Chartered Institute of Logistics and Transport (CILT), Fellow of The Hong Kong Institution of Engineers (HKIE), and Fellow of the Hong Kong Institute of Highway and Transportation (IHT).

Ms. Katy Mok

Mindfulness Trainer, Certified Counselor and Corporate Trainer
Trainer of Mindfulness based Cognitive Therapy Programme
Trainer of Mindfulness for Life Programme
Trainer of MYMind Advanced Mindfulness Programme
Mindfulness based Stress Reduction Programme
Mindful Leadership

Katy is a seasoned trainer in mindfulness, positive psychology, EQ, communications, personality and other psychology programmes.

From her past years of clinical practice, corporate training and academic teaching experiences, she frequently witnessed the significant transformations Mindfulness and Positive Psychology brought to individuals and groups. Numerous researches in the past 3 decades already proved that mindfulness based training can enhance our concentration, communication, relationships and be more emotionally stable.

With a solid foundation in counselling and coaching, she is resourceful in using evidence-based psychological interventions in training programmes including mindfulness, cognitive behavioral therapy, emotion-focused therapy and personality analysis to help people to manage their stress, their relationships and their lives in general. Her style is known to be experiential, creative and compassionate.

Prof. Stephen Nason

Professor of Business Practice, Department of Management, HKUST

Stephen has taught at HKUST since 1995, where is a faculty member in the Department of Management and the Director of the World Bachelor in Business Program. Stephen has taught in a wide range UG and post graduate programs at HKUST, including the full time, part time, executive, and company specific MBA programs. Most of his teaching revolves around Negotiations, Decision Making, Leadership and Teams, Critical Thinking and Presentations, and Organizational Transformation. He has received multiple teaching awards, including the Gale Medal for Distinguished Teaching, Franklin Prize for Teaching Excellence, and Best Ten Lecturers Award.

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Prof. Bert. Shi

Special Advisor to the Vice-President for Research and Development, HKUST
Professor, Department of Electronic and Computer Engineering
Director of Center for Aging Science
Associate Director of HKUST-HKSI Joint Center for Sports Science and Technology

Bert was appointed as Special Advisor to Vice-President for Research and Development (VPRD) with effect from January 1, 2023. Currently a Professor in the Department of Electronic and Computer Engineering (ECE), Bert. received his PhD in Electrical Engineering from the University of California, Berkeley in 1994 and joined HKUST as Assistant Professor in the same year. He was promoted to Associate Professor in 2001 and then to full Professor in 2008.

Having joined the University in its early years, Bert. has strong administrative experience serving the ECE Department and the School of Engineering. He was Acting Dean of Engineering (2022), Head (2015-2021) and Associate Head (2010-2014) of ECE, and Founding Director of the MSc Program in Electronic Engineering (2004). He has served on various executive committees, notably chairing the Curriculum Committee (2008-2010) during the ramp-up to the launch of the 3+3+4 curriculum. His administrative capability has been demonstrated by his outstanding leadership in successfully driving several endeavors at the Department, School and University levels.

Bert is an established scholar in the areas of neuromorphic engineering, computational neuroscience, and human-machine & human-robot interfaces, with a particular focus on the modeling and automated analysis of facial expressions and eye movements. His research group has developed top-ranked systems for emotion recognition and received top paper prizes at international conferences. He was elected a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) in 2001, becoming one of the youngest elected fellows as a testament to his international stature. He has a keen interest in how technology can open doors to a better understanding of human behavior and how to use that understanding to build technology that better supports humanity, which has led to joint research projects with faculty from all four schools of the university.

He has been active in providing professional services to the IEEE and to the academic community at large. He was a Distinguished Lecturer of the IEEE Circuits and Systems Society (CASS), chaired the IEEE CASS Technical Committee on Cellular Neural Networks and Array Computing, and served on the editorial boards of multiple professional journals.

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Prof. Harry Shum
University Council Chairman, HKUST
Adjunct Professor, Tsinghua University

Dr. Harry Shum is a Foreign Member of the US National Academy of Engineering and an International Fellow of the UK Royal Academy of Engineering. Dr. Shum currently serves as the University Council Chairman of Hong Kong University of Science and Technology (HKUST), Founding Chairman of International Digital Economy Academy (IDEA) and Adjunct Professor at Institute for Advanced Study, Tsinghua University.

Dr. Shum was previously the Executive Vice President of Microsoft Corporation. He led Microsoft Research, the world's premier computer science research lab. He was also responsible for driving the company's overall AI strategy and overseeing AI-focused products including the multilingual web search engine Bing and the next-generation AI chatbot Xiaoice.

Dr. Shum is one of the founding members of Microsoft Research China (later renamed Microsoft Research Asia) and served as the Managing Director and Chief Scientist of the research institute, helping to cultivate many world-leading computer scientists, tech experts and entrepreneurs over the years.

Prof. Yang Wang
Vice-President for Institutional Advancement, HKUST
Chair Professor, Department of Mathematics
Chair Professor, Department of Industrial Engineering and Decision Analytics
Director of HKUST The Big Data for Bio Intelligence Laboratory
Associate Director of HKUST Big Data Institute

Yang took office as Vice-President for Institutional Advancement of HKUST on October 1, 2020. He is also a Chair Professor of Department of Industrial Engineering and Decision Analytics and Department of Mathematics. He joined the HKUST as the Head of the Department of Mathematics in 2014 and he became the Dean of School of Science in 2016.

Yang is an internationally respected scholar with wide ranging research interests, having published over 100 research journal papers in both pure and interdisciplinary mathematics, many of which in top journals. During his tenure as Dean of Science and Head of Mathematics, Yang founded the HKUST Big Data Institute and launched the popular Big Data Technology MSc program.

Yang received his Bachelor's degree in Mathematics from the University of Science and Technology of China in 1983 and obtained his PhD degree in Mathematics from Harvard University in 1990. He started his academic career with the Georgia Institute of Technology in 1989 and then moved on to be the Department Chair and Professor of Mathematics at Michigan State University in 2007. He was also a Program Director at the National Science Foundation in the US between 2006 and 2007.

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AND TECHNOLOGY

Prof. Tim Woo
Associate Professor of Engineering Education, HKUST
Senior Lecturer, Department of Electronic and Computer Engineering
Director of Center for Global and Community Engagement
Associate Director of Academy for Bright Future Young Engineers

Tim received his BEng, MPhil and PhD degrees from the Hong Kong University of Science and Technology in 1995, 1997 and 2005, respectively, all in Electrical and Electronic Engineering. He received first prize in IEEE Student Paper Contest for Undergraduate Students (Hong Kong Chapter) and second prize in Varisty Competition in Electronic Design in 1994. He was a recipient of the Sir Edward Youde Memorial Fellowship in 1995 for his MPhil. studies in motion control.

He joined the Department of Electronic and Computer Engineering in January 1997, and is currently an Associate Professor of Engineering Education. He is active in professional bodies. He is a member of IEEE. He reviews various IEEE conference papers as reviewer regularly. He serves as treasures of the Information Theory Chapter, IEEE Hong Kong Chapter since 2006. He also served as local arrangement chairman for IEEE International Symposium on Electronic Design, Test & Applications (DELTA) 2008, and program committee of International Conference on ICT in Teaching and Learning since 2008.

Besides, he is active in community services and social services. He provides technical advices to organization committees and judges in several local design competitions for youth since 2007.

Tim also encourages and mentors students to join various design competitions with various design emphasis on creativity-driven, business-driven, application-driven objectives, etc. One of the aims of these design project competitions is being able to contribute to the wellbeing of society and fulfilling the social responsibility. Participants of these projects obtain valuable feedback from professional bodies, comments from target groups and obtain a wealth of hands-on-experience.

By participating these design competitions, our students have more opportunities to implement their knowledge into practical daily life products. They performed exceptionally well and won various prizes some of which are listed at: http://www.ee.ust.hk/ece.php/enews/student His current research areas include signal processing, wireless systems design, and tracking systems.

Session Synopses

18 September 2023, Monday (Day 1)

- **Deglobalization , Decoupling, and De-risking: The View from Asia** – Prof. Alicia Garcia-Herrero & Ms. Vanessa Chan

Prof. Alicia Garcia-Herrero:
The slowing of the globalisation process, appears to have started in 2008, at least for trade, global value chains and foreign direct investment. The deceleration in trade and FDI globally has been fuelled recently by the strategic competition between the US and China. COVID-19 has been a second very important factor pushing deglobalisation.

The deglobalisation of trade is happening in terms of value and volume of gross trade and also in terms of the importance of global value chains. In other words, there are signs of a reduction in the exchange of intermediate goods between countries as a way to exploit comparative advantage and specialisation gains.

Beyond trade, technology decoupling between the US and China is seen in reduced approvals for export licenses, limits on use of hardware and the attempts of outright bans on software.
International flows of people have seen sharper declines in the wake of COVID-19, which is recovering but far from completely given China's adoption of the dynamic zero-Covid strategy and the sheer size of its population.

Finally, the trend towards deglobalisation is much less evident for finance, with the exception of FDI, though increasing attempts to decouple particular types of financial flows are emerging, including pressure to delist Chinese companies from US stock exchanges and the imposition of sanctions for transactions with certain Chinese companies and individuals.

Ms. Vanessa Chan:
Technology is the backbone of our society and the economy; how technology companies evolve not only reflects policies that affect the industry, but also demands of their enterprise customers.

The tech industry can be broadly classified as hardware and software. Each of these is supported by complex, multi-layered supply chains and implementation ecosystems. Vanessa will bring her unique perspective drawn from her time with American (tech) companies with a large footprint in China. She will discuss how hardware and software companies might be affected differently by deglobalization and decoupling. Given that the software industry has no physical production, how might deglobalization and decoupling affect them? How would their customers be impacted in the short term and long term?

- **How We Make Decisions when there is Risk and Uncertainty and will AI be a Savior or Demon?** – Prof. Stephen Nason

We all make decisions, constantly, every day. And most of us think that most of the time our decisions are mostly pretty good, and at least somewhat rational. However, under certain conditions, like when there is uncertainty involved, our decisions become non-rational. And not just non-rational but non-rational in predictable ways. In this talk we will explore three ways our decisions deviate from rationality. We will end the talk with a discussion about whether Generative AI makes these sorts of decisions better or worse.

- **Economic Development in East Asia: What works (and what doesn't)** – Prof. Donald Low

In the decades after the Second World War, there have been only a handful of economies that made the transition from Third World to First – from developing countries to developed ones – in two generations. Most of these economies are in East Asia: Japan, South Korea, Taiwan, Hong Kong, Singapore, and probably, mainland China. In this session, Prof Low will explore the critical factors that enabled these economies to make the successful transition and avoid the dreaded middle-income trap. He will also discuss the relevance of these factors (for developing countries today) in an age of slower globalisation and technology decoupling, the fragmentation of global supply chains, and rapid advances in automation and AI.

- **Mindfulness Program** – Ms. Katy Mok

Stress and negative emotions may disrupt work performance and overall well-being. Supported by numerous studies in the past four decades, mindfulness practice is proven to be effective in enhancing emotional intelligence and focus, reducing stress, improving memory and lowering the risks of depression and anxiety.

Mindfulness means paying attention in the present moment non-judgmentally, in a bid to cultivate inner wisdom and compassion.

According to Jon Kabat Zinn, who developed mindfulness based stress reduction programme in the 70s, practicing mindfulness does not mean striving to achieve a special state nor being completely detached from what is happening around us. Through meditation practices and cultivation of mindfulness attitudes, we will no longer be living in the head and let our thoughts dominate our experiences in daily life. In each moment, there is seeing, feeling, tasting, touching, emotions, bodily sensations and other domains in which human intelligence arise. We are here to embrace them all in awareness so that we could navigate each moment with more clarity, equanimity and deeply connect with what is happening in each moment.

At the end of the workshop, participants will be able to understand the concept of mindfulness, develop mindfulness attitudes and experience several mindfulness practices for mood management and better communication.

- **AI & Web3: Opportunities and Challenges** – Prof. Yang Wang

AI and Web3.0 blend decentralized digital interactions with intelligent automation. Drawing from his extensive research on data analysis and machine learning, Prof Wang will explore the transformative potential these technologies hold for reshaping digital interaction and contributing to digital economy. The session will delve into the societal and technological implications of this fusion, highlighting both the opportunities for innovation and the responsibilities we share in shaping a fair and inclusive digital future.

- **The Global Race to Regulate AI** – Prof. Anu Bradford

There is a growing consensus among governments that AI needs to be regulated but no agreement on what that regulation should look like. Anu will discuss different approaches towards digital regulation generally and AI governance specifically, distinguishing between three competing regulatory models—the American market-driven model, the Chinese state-driven model, and the European rights-driven regulatory model. The US, China, and the EU are three leading technology and regulatory powers that can be viewed as “digital empires,” each advancing a competing vision for the digital economy while attempting to expand its sphere of influence in the digital world. Which digital empire will prevail in the contest for global influence remains an open question, yet their contrasting strategies are increasingly clear. In the midst of these unfolding regulatory battles, governments, tech companies, and digital citizens are making important choices that will shape the AI revolution and the future ethos of the digital society. Anu will lay out the choices we face as societies and individuals, explain the forces that shape those choices, and illuminate the immense stakes involved in making those choices.

20 September 2023, Wednesday (Day 3)

- **AI & Art** – Prof. Yike Guo

The convergence of art and artificial intelligence (AI) has opened up exciting new possibilities for creativity. In this talk, titled "When Art Meets AI," we will explore the transformative impact of AI on artistic expression. Through captivating examples and discussions, we will showcase how generative AI algorithms are used to generate stunning artworks, delivery professional performance, and design immersive installations. We will also delve into collaborative efforts that arise when humans and machines collaborate in the creative process. Join us as we delve into the dynamic relationship between art and AI, inspiring new perspectives on the future of artistic exploration.

- **Technology Development and Leapfrogging in the Greater Bay Area** – Prof. Naubahar Sharif

This presentation provides a deep dive into the evolution and promotion of technological development in Hong Kong and the Greater Bay Area (GBA). It details the unique characteristics of the 11 cities within the GBA, outlines the region's vision for the next decade, and discusses the national and local policies driving this growth. The challenges faced by the GBA in its tech-driven progress are also considered. To highlight the GBA's position on a wider scale, a comparative analysis of other major bay areas within China and globally is included. This comprehensive exploration offers valuable insights into the dynamic tech landscape of the GBA.

21 September 2023, Thursday (Day 4)

- **The Role of Hong Kong as an IFC in driving Global Connectivity and Innovation**
  – Mr. Nicolas Aguzin

As Asia's leading international finance centre, Hong Kong plays a key role in connecting the two-way capital flows between East and West. Now, as the world's digital transformation plays out at pace, Hong Kong has emerged as one of the world's leading new economy hubs, fueling the growth of companies of tomorrow. This deep-dive session with Nicolas Aguzin, Chief Executive Officer, Hong Kong Exchanges and Clearing Limited (HKEX), will explore Hong Kong's role in driving global connectivity and innovation and HKEX's latest developments in shaping global financial markets.

- **Venture Capital Investments in AI** – Mr. K.O. Chia

Venture Capital is perhaps the most common capital funding source for innovative growth companies enabled by technologies like AI. This session will highlight the venture capitalist's view in mapping the market opportunities and evaluating the various entrepreneurs/founders' business ideas. It will further discuss the venture capitalist's post- investment role in guiding the budding entrepreneurial startups through its developmental stages.

- **Panel Session**: **Can Hong Kong reinvent itself as an Innovation-driven economy?**
  Panelists - Prof. Anthony B.L. Cheung, Prof. Hong K. Lo & Mr. Gary Liu

<u>Prof Anthony B.L. Cheung:</u>
As a global financial centre, Hong Kong is not short of entrepreneurs and capital. As a hub of world-class universities, it is not short of top-notch researchers in science and technology. Yet, as of now, the city faces a bottleneck in the three principal factors of supply, namely: labour, land, and capital.

Policy packages have been rolled out by the current administration to lure external investment, attract foreign and mainland talent, and enlarge labour imports. Ambitious plans abound for new infrastructure, reclamation and a new Northern Metropolis, as well as expanding STEM education to support and nurture an innovation and technology hub.

To reinvent the city as an innovation-driven economy, we need more than money and talent. What has been lacking is a vibrant innovation ecosystem that provides conducive space for creativity and the right incentives. The market force is still primary. The question is whether private firms see sufficient prospect in innovation investments. The 'collective' (and risk pooling) nature of innovation requires the government to play a more proactive role in R&D and education.

Innovation is not just about promoting science and technology. A 'smart city' is not just a digital city. Innovation also entails social renewal and transformation. We need a new generation of talent with critical thinking and strong adaptability in a fast-changing world. The creative capacity to groom innovation calls for breaking boundaries and challenging paradigms and orthodoxies. An eco-system that is intellectually uptight and does not tolerate failures is not conducive to innovation.

Prof. Hong K. Lo:

Essential ingredients for innovation-driven economy, among others, include top talents, resources for R&D, contexts and regulations that enable implementation and experimentation, i.e., for the development from 0 to 1; and angel capital, infrastructure and markets for scaling up, from 1 to N. Using smart transportation as the context, this talk will share the experience of Hong Kong to shed light on the potential and barriers of developing an innovation-driven economy.

- **Diving Into the AI Frontier: The Future of Work** – Prof. Harry Shum

Embark on an exploration into the future of work as we navigate the dynamic landscape of artificial intelligence. This fireside chat features Prof Harry Shum, HKUST Council Chairman and a trailblazer in the realm of computer science. Drawing on his experience as the former Executive Vice President of Microsoft's Artificial Intelligence and Research Group, Prof Shum will illuminate the opportunities and challenges presented by an increasingly automated future. The session will offer a deeper understanding of the necessary skills and strategies of integrating AI responsibly into our work and lives.

18 September 2023
(Day 1)

香港科技大學
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AND TECHNOLOGY

Deglobalization, Decoupling, and De-risking: The View from Asia

by Prof. Alicia Garcia-Herrero &
Ms. Vanessa Chan

NATIXIS
CORPORATE AND INVESTMENT BANKING

NATIXIS Research Presentation

Deglobalisation in the context of US-China decoupling

Alicia Garcia Herrero – Chief Economist Asia Pacific
+852 3900 8680 – alicia.garciaherrero@natixis.com

September 2023

GROUPE BPCE

1

Roadmap to presentation

- De-globalisation in trade
- Global value chains
- US-China decoupling & Technology protectionism
- People to people globalization
- Financial deglobalization

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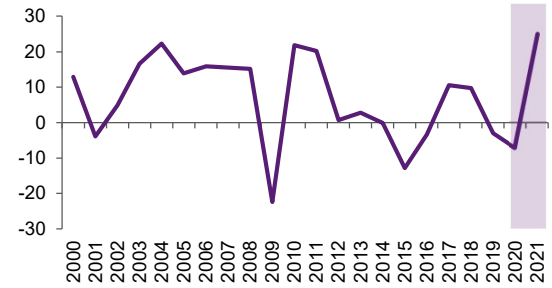
2

De-globalisation in trade

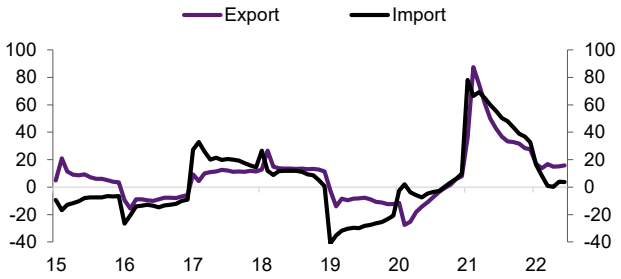
A slowing of global trade flows has been evident since the global financial crisis. Before the pandemic, the US-China trade war and a series of protectionist measures could be one reason. The trend has accelerated since 2019 Covid outbreak.

Global Trade Value (YoY %)



Source: UNCTAD, Natixis

China's trade in goods with US



Source: WIND

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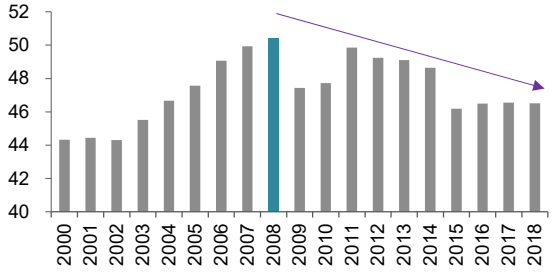
3

Global value chains (GVC)

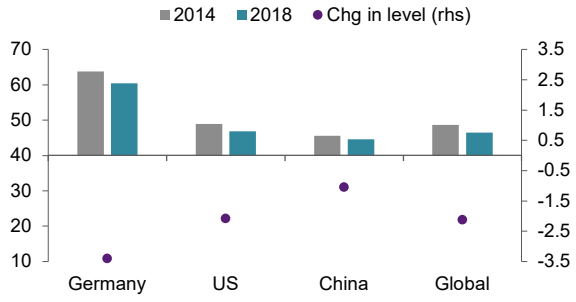
If GVC integration is measured by the value of intermediate goods that are either imported to be re-exported, there has been a net decline since 2008. The decline has been much more significant for Germany, than for the US and China.

World GVC Participation (%)



Source: UNCTAD-Eora database, Natixis
N.B. Results for 2016-2018 are forecasted by UNCTAD-Eora

GVC Participation (%)



Source: UNCTAD-Eora database, Natixis
N.B. Results for 2016-2018 are forecasted by UNCTAD-Eora

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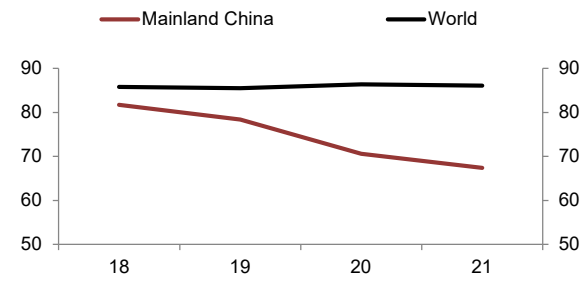
4

4

US-China decoupling & Technology protectionism

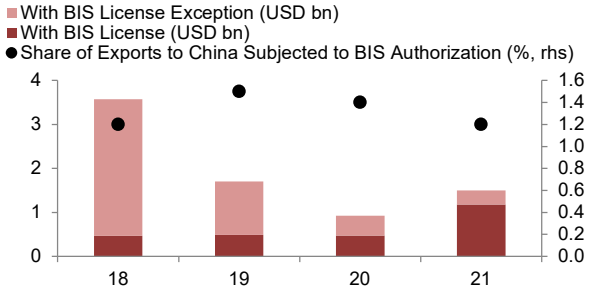
The geopolitical tension climbs over the years, approval rate of export licenses by the BIS for China declined. The good exported to China subjected to BIS authorization also fell, with more goods requiring license and no longer exemption.

US: Approval Rate for Export Licenses (%)



Source: Natixis, US Department of Commerce's Bureau of Industry and Security (BIS)

US: Export Licenses for Mainland China



Source: Natixis, US Department of Commerce's Bureau of Industry and Security (BIS)

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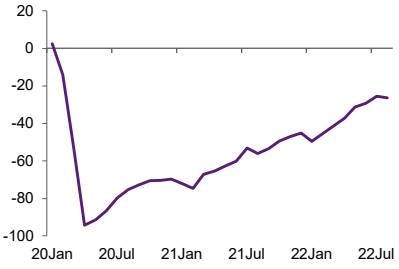
5

5

People to people globalization

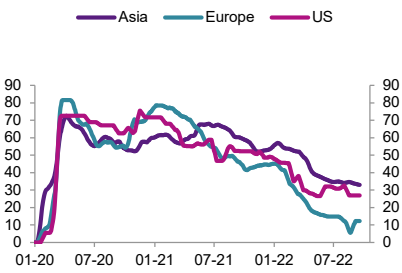
International aviation collapsed in 2020. Suppression measures have begun to ease since mid-2021, led by Europe and the US, and with Asia started to catch up recently. July data shows APAC airlines have only returned to 30% of 2019 on average, and Asia's recovery is expected to become quicker.

International flight passenger (% over 2019)



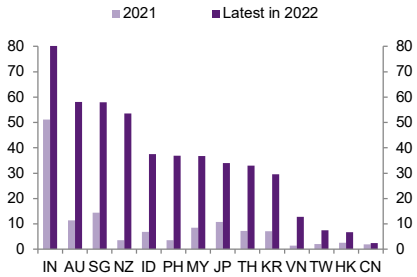
Source: Natixis, IATA

Covid-19 Stringency Index



N.B. Data as of October 3, 2022. 15 days moving average used. China (Mainland), Indonesia, India, Japan, South Korea, Malaysia, Philippines, Singapore, Thailand, Vietnam, Hong Kong and Taiwan are used as Asia proxies. Germany, UK and US are used as Europe proxies. Source: Natixis, OxCGRT

Asia's Airports: International Passenger (% of 2019)



N.B. Data as of July 2022 unless specified. Data as of June 2022 for Indonesia and the Phillipines. Source: Natixis, Various Airport Authorities

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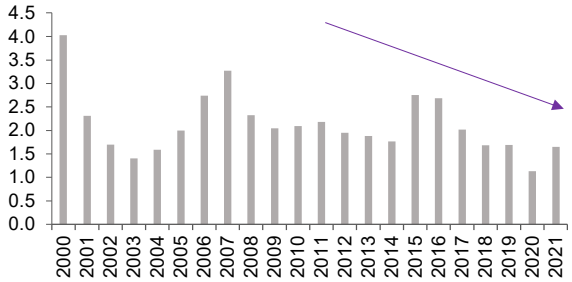
6

6

Financial deglobalization (1/2)

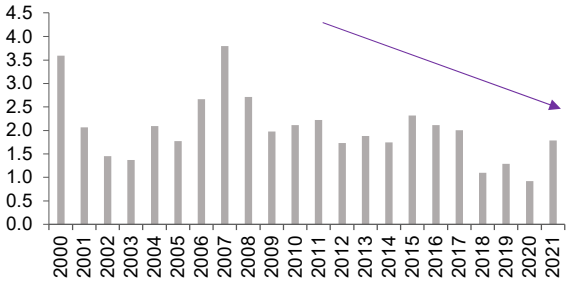
Increasingly, there are some early signs of financial deglobalisation. This has become more noticeable as the confrontation between the US and China has moved beyond trade with a growing number of conflicts in the financial sector.

World inward FDI flow (% to GDP)



Source: UNCTAD

World outward FDI flow (% to GDP)



Source: UNCTAD

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7

7

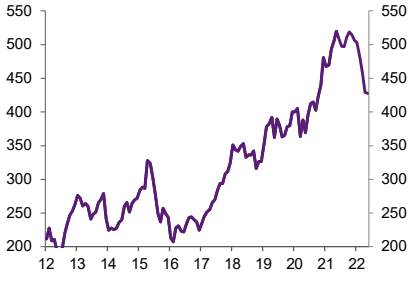
Financial deglobalization (2/2)

Deceleration in bilateral portfolio flows has been more notable between the US and China, at least in terms of holding of safe assets. The reduced ownership in Chinese assets is also seen by more foreign investors due to the loss of confidence.

China's holding of US treasuries (USD tr)

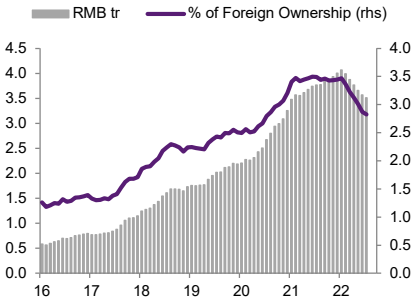
Source: TIC

US holding of Chinese long-term securities (USD bn)



Source: TIC

China: Foreign Bond Ownership



N.B. Data as of July 2020. Source: China Central Depository & Clearing, Shanghai Clearing House, CEIC

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8

8

Conclusions

- The slowing of the globalisation process, appears to have started in 2008, at least for trade, global value chains and foreign direct investment. The deceleration in trade and FDI globally has been fueled recently by the strategic competition between the US and China. COVID-19 has been a second very important factor pushing deglobalisation.
- The deglobalisation of trade is happening in terms of value and volume of gross trade and also in terms of the importance of global value chains. In other words, there are signs of a reduction in the exchange of intermediate goods between countries as a way to exploit comparative advantage and specialisation gains.
- Beyond trade, technology decoupling between the US and China is seen in reduced approvals for export licenses, limits on use of hardware and the attempts of outright bans on software.
- International flows of people have seen sharper declines in the wake of COVID-19, which is recovering but far from completely given China's adoption of the dynamic zero-Covid strategy and the sheer size of its population.
- Finally, the trend towards deglobalisation is much less evident for finance, with the exception of FDI, though increasing attempts to decouple particular types of financial flows are emerging, including pressure to delist Chinese companies from US stock exchanges and the imposition of sanctions for transactions with certain Chinese companies and individuals

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10

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Natixis Corporate & Investment Banking is part of
Global Financial Services, the global arm of Groupe BPCE

GROUPE BPCE

11

Deglobalisation and Decoupling: The View from Asia

Impact on technology companies

Vanessa Chan
Head of Corporate Strategy, North Asia, ServiceNow

Enterprise Tech Industry Overview

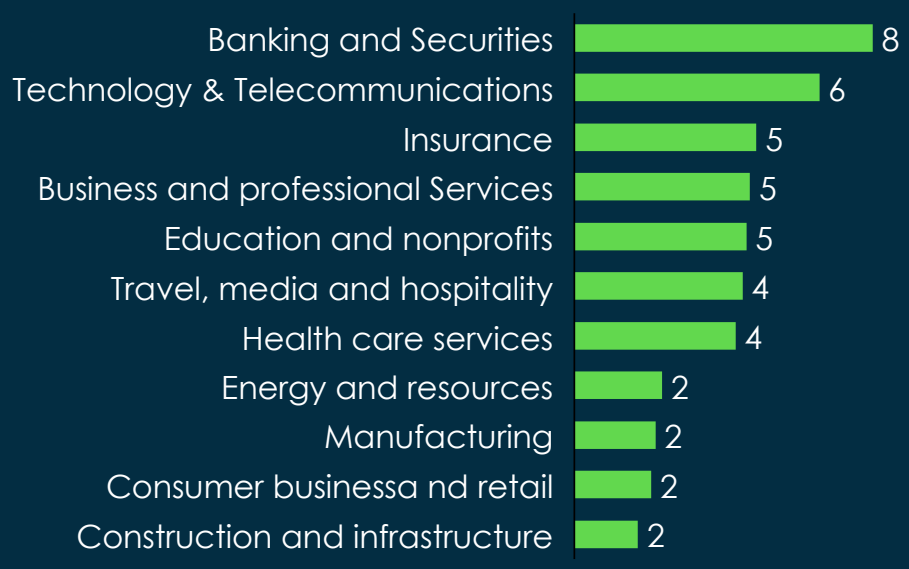
Software and Services

Infra-structure

Telco & Hardware

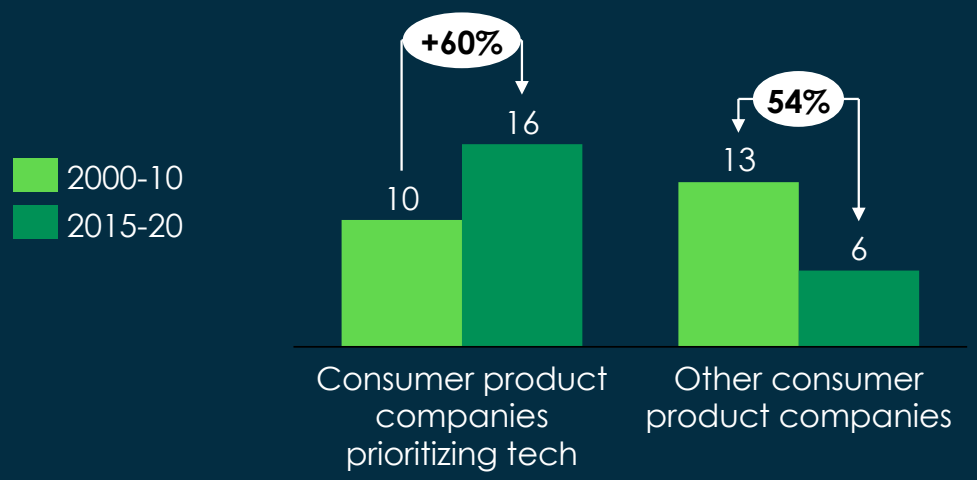
Technology is the Backbone of All Modern Enterprises and is a Key Indicator of Corporate Performance

Average IT budget as a percentage of revenue



Source: Deloitte Insights

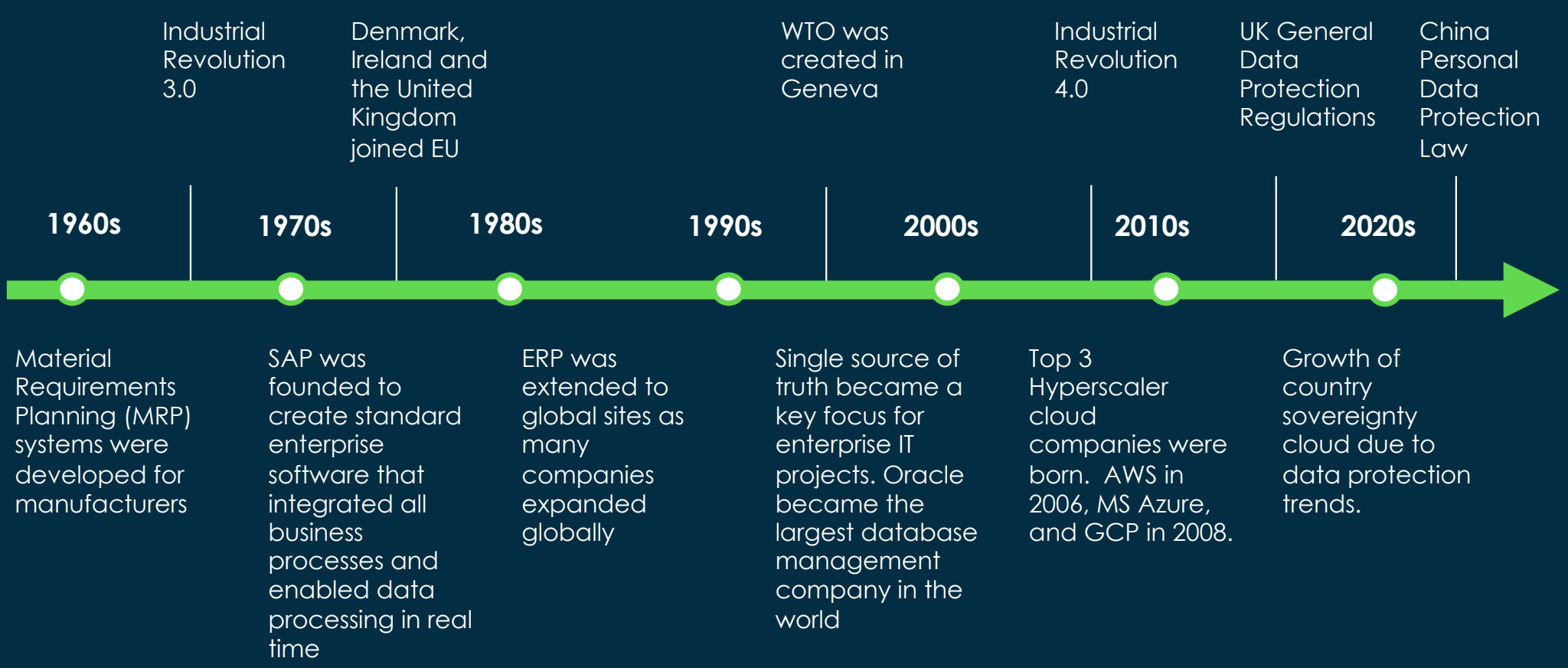
Tech-savvy companies in consumer products are outperforming peers that invest less in technology



	Consumer product companies prioritizing tech		Other consumer product companies	
Average Tech keywords in annual reports	51	115	12	40

Source: Bain & Company

Technology Trends Mirror Global Economic and Political Changing Realities Over Time



servicenow

Thank you

Deglobalisation, De-coupling, and De-risking: The View from Asia

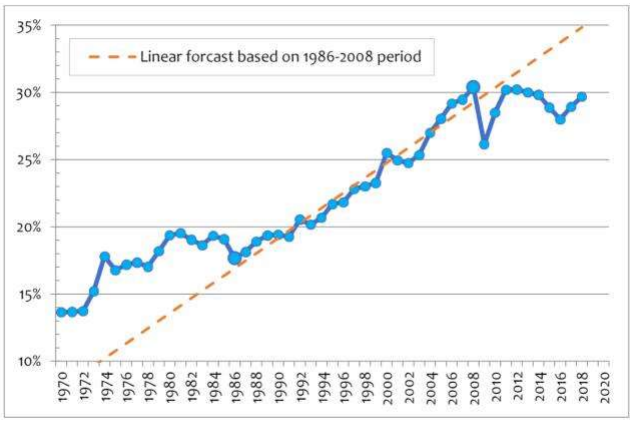
Donald Low
Senior Lecturer and Professor of Practice
Director, Leadership and Public Policy Executive Education
Former Director, Institute for Emerging Market Studies

1

The World after the Pandemic

- Slower trade growth since the global financial crisis

Chart 1. World Trade over World GDP (1970-2018)



Source: World Bank's World Development Indicators (link)

Trade Secrets Supply chains + Add to myFT

Will coronavirus pandemic finally kill off global supply chains?

With worldwide goods trade in freefall, companies and governments have many lessons to learn

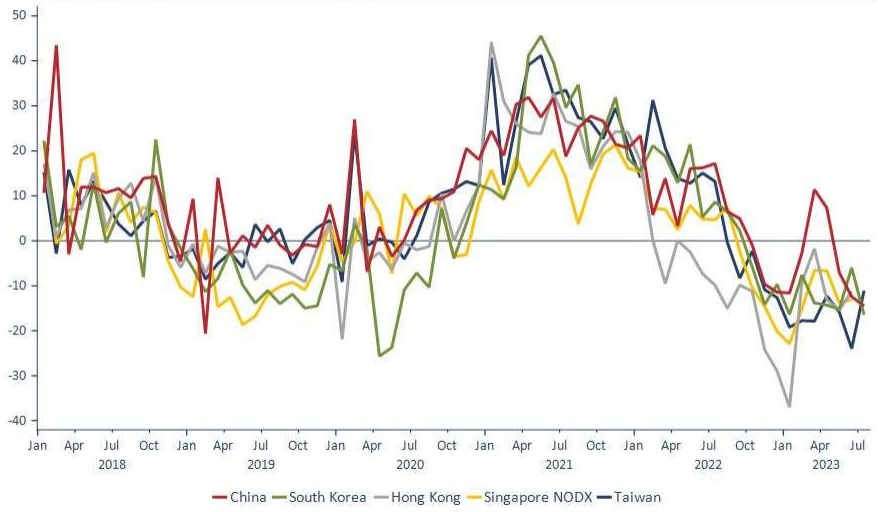
Moving parts: Globalisation and world-encompassing supply chains are once again under threat, this time from the coronavirus pandemic © Reuters

2

Export growth across Asia, including China, has moved into negative territory over the past several months

LANDFALL STRATEGY GROUP

Export (goods) growth, %, January 2018 – July 2023



Source: Macrobond; National sources; Landfall Strategy Group calculations (www.landfallstrategy.com).

3

Is decoupling occurring?

Finance and economics | Rising tigers, hidden dragon

How America is failing to break up with China

The countries' economic ties are more profound than they appear

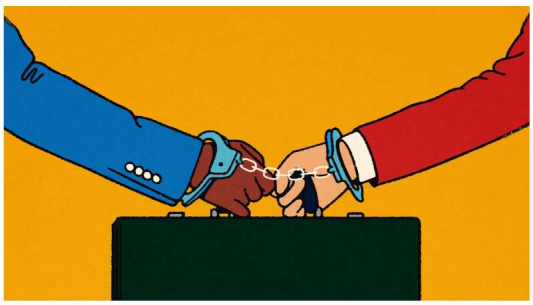


IMAGE: ALBERTO MIRANDA

Aug 8th 2023 | SINGAPORE

Save Share Give

Leaders | Costly and dangerous

Joe Biden's China strategy is not working

Supply chains are becoming more tangled and opaque

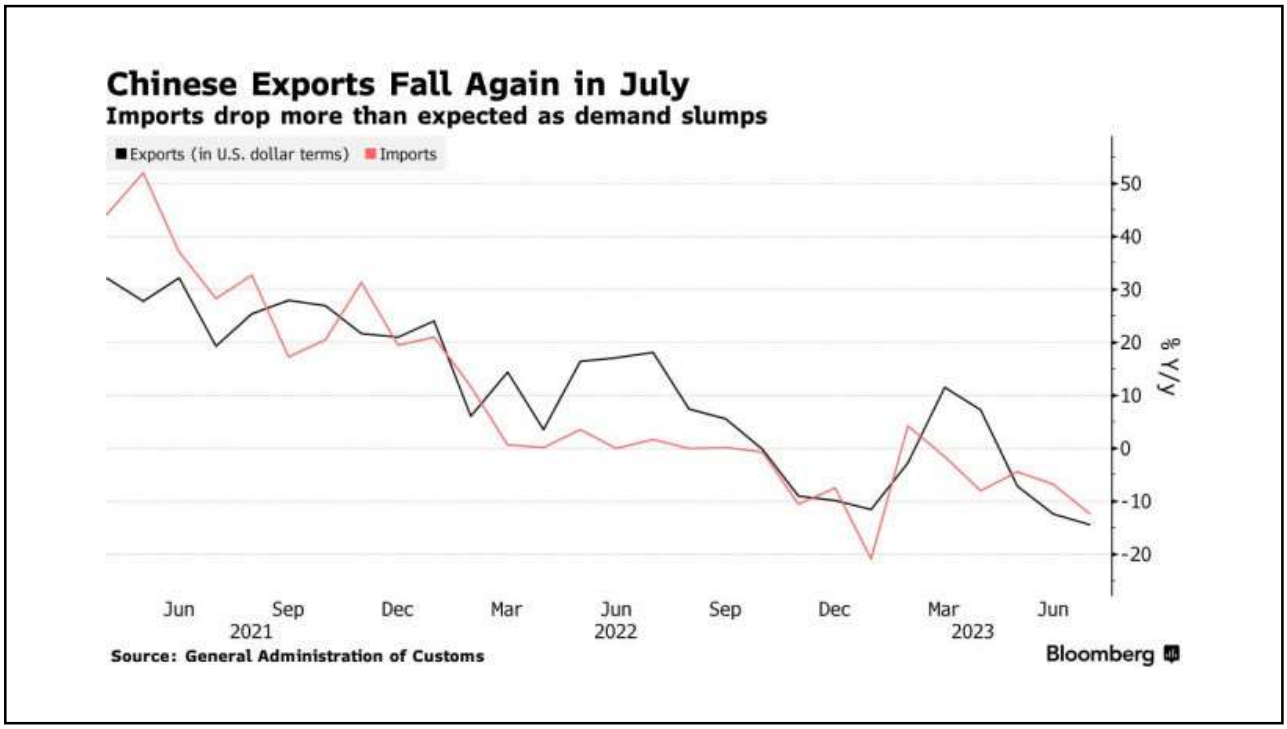
IMAGE: LIAM EISENBERG

Aug 10th 2023

Save Share Give

"America may be redirecting its demand from China to other countries. But production in those places now relies more on Chinese inputs than ever. As South-East Asia's exports to America have risen, for instance, its imports of intermediate inputs from China have exploded. China's exports of car parts to Mexico, another country that has benefited from American de-risking, have doubled over the past five years…Supply chains have become more complex, and trade has become more expensive. But China's dominance is undiminished."

4


Chinese Exports Fall Again in July
Imports drop more than expected as demand slumps
Exports (in U.S. dollar terms)
Imports
50
40
30
20
10
0
-10
-20
% Y/Y
Jun
Sep
Dec
Mar
Jun
Sep
Dec
Mar
Jun
2021
2022
2023
Source: General Administration of Customs
Bloomberg

5

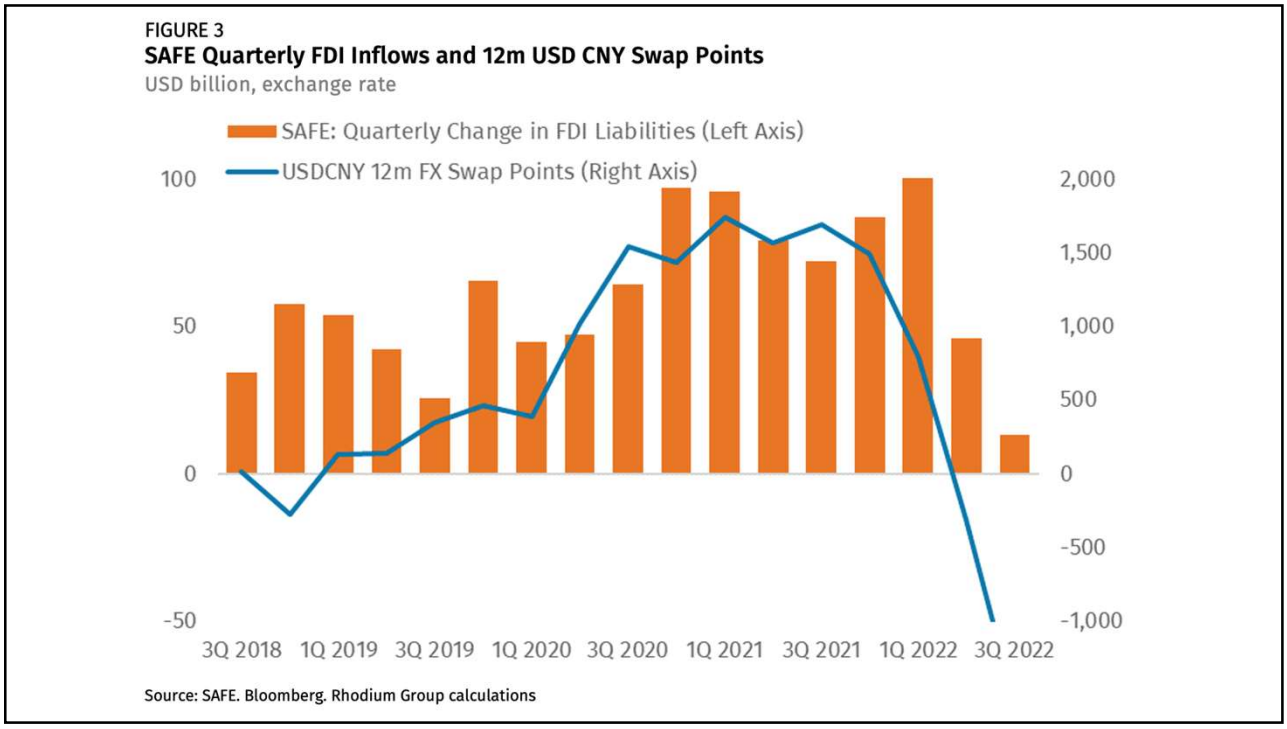


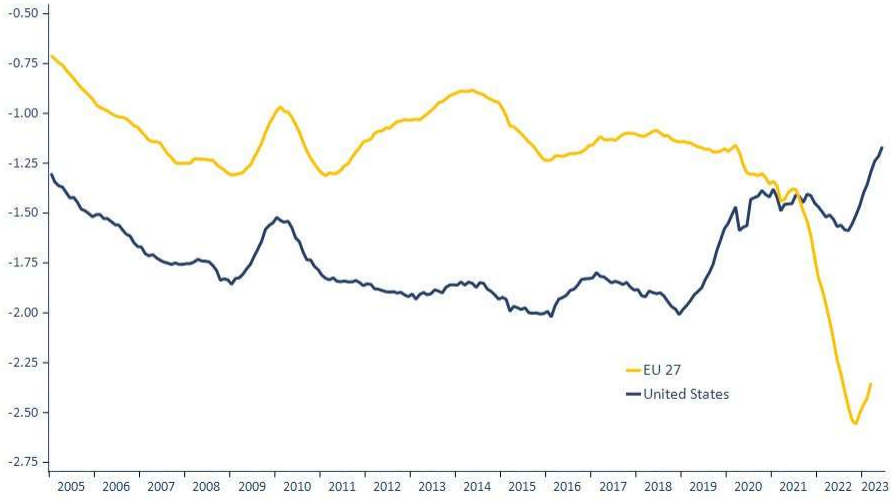
FIGURE 3
SAFE Quarterly FDI Inflows and 12m USD CNY Swap Points
USD billion, exchange rate
SAFE: Quarterly Change in FDI Liabilities (Left Axis)
USDCNY 12m FX Swap Points (Right Axis)
100
50
0
-50
2,000
1,500
1,000
500
0
-500
-1,000
3Q 2018
1Q 2019
3Q 2019
1Q 2020
3Q 2020
1Q 2021
3Q 2021
1Q 2022
3Q 2022
Source: SAFE. Bloomberg. Rhodium Group calculations

6

The US trade deficit with China is reducing sharply; the EU's trade deficit with China expanded substantially through Covid, and sits at high levels

LANDFALL STRATEGY GROUP

Trade deficit (goods) with China, % of GDP, 12 month rolling, January 2005 – June 2023



Source: Macrobond; Eurostat; Census Bureau; Landfall Strategy Group calculations (www.landfallstrategy.com).

7

Longer-term factors behind slower globalization and decoupling

- Rising inequality in the rich world since the start of the neoliberal era (i.e., 1980); uneven distribution of the fruits of growth; financialization has mainly benefitted the rich.
  - This has increased the appeal of nationalist-populist parties that promise to bring jobs home and restore economic vitality.
  - Growing antipathy against MNCs and global banks
- Perception that offshoring/outsourcing has hurt large segments of the working and middle classes in many developed countries.
  - Efficiency gains from globalization and specialization have *not* trickled down to the masse.
  - Insufficient redistribution in much of the rich world; welfare states have been under attack for more than 40 years.
  - Spurred some efforts at re-shoring/nearshoring, even before Covid-19 hit.

8

9

Longer-term factors behind slower globalization and decoupling

- Longer term effects of Covid-19
  - Disruptions to global supply chains have raised concerns about resilience and ensuring reliable supply of critical goods. More efficient, more globalized supply chains may have reduced resilience and security of supply.
  - Pandemic exacerbated the trade and technology conflicts between US and China that started *before* Covid-19.
  - Chinese authorities have also mobilized public sentiment against western governments, while pursuing an isolationist, zero-Covid policy.
  - China itself practises a form of economic nationalism. It no longer views foreign firms and technology transfers as essential; its dual circulation strategy seeks to reduce China's reliance on foreigners and foreign know-how.

10

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Economic Development in East Asia: What works (and what doesn't)

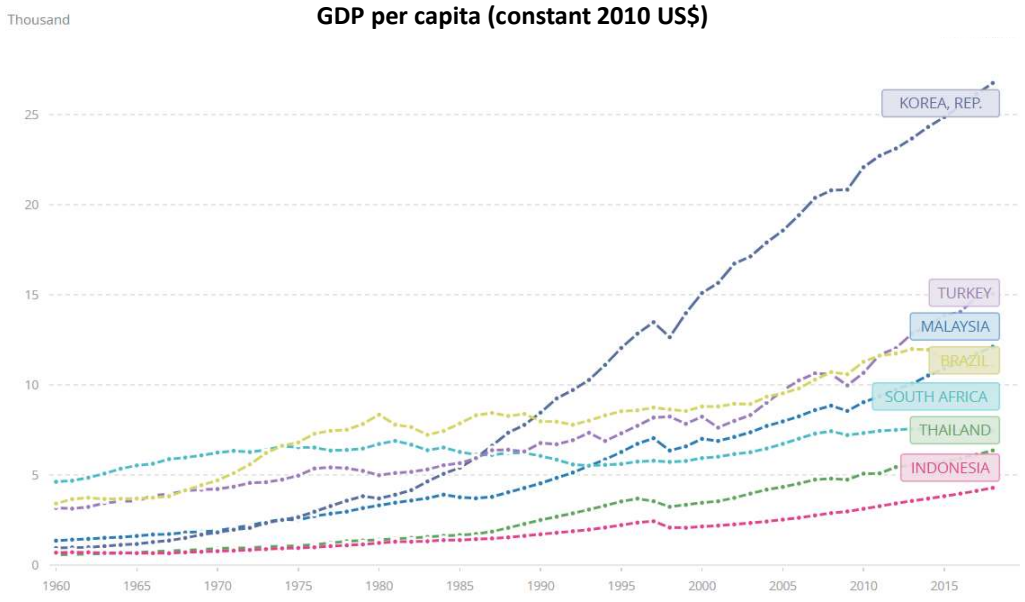
by Prof. Donald Low

Economic development in East Asia: What works (and what doesn't)

Donald Low
Senior Lecturer and Professor of Practice in Public Policy
Director, Institute for Emerging Market Studies
Hong Kong University of Science & Technology

1

GDP per capita (constant 2010 US$)

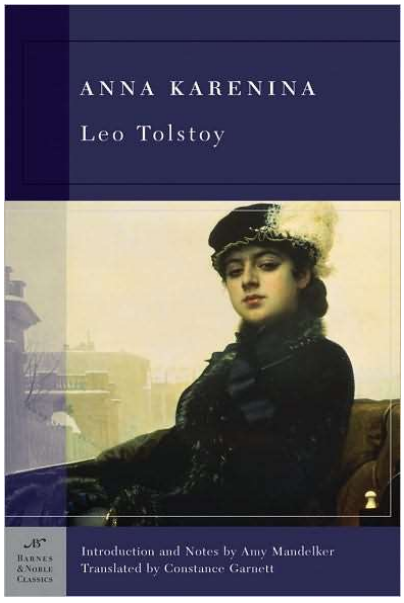


2

The Middle-Income Trap (MIT)

- The World Bank (2012) found that of the 101 middle-income (MI) economies in 1960, only 13 had graduated to high income (HI) status by 2008.
  - Japan, South Korea, Taiwan, Hong Kong, Singapore
  - Spain, Portugal, Ireland, Greece
  - Israel, Mauritius, Equatorial Guinea, Puerto Rico
- Felipe et al (2012) define countries in the MI trap as those that remained at:
  - $2,000-$7,500 for over 28 years; and
  - $7,500-$11,500 for over 14 years
- Kharas and Kohli (2011) argue that today's middle-income countries are caught in a *developmental nutcracker*; they are "unable to compete with low-income (LI), low-wage economies in manufactured exports and unable to compete with advanced economies in high-skill innovations."

3

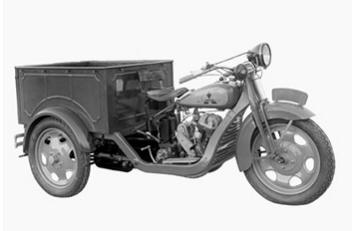


"Happy families are all alike; every unhappy family is unhappy in its own way."

4

Centrality of Land Reform

- Studwell (2013) argues that the post-war miracle economies of Northeast Asia succeeded by following a recipe with just three basic ingredients:
  - **Land reform** combined with agricultural extension services
  - State-led, **export-driven industrialization**, combined with the requirement for firms to compete domestically
  - **Financial repression** to limit the outflow of scarce capital and to ensure that capital is allocated to productive uses, especially agriculture and export-oriented manufacturing
- In Japan, South Korea and Taiwan, feudal estates were broken up and divided among small famers, who also received cheap credit and agronomic advice and training.
- Smallholder farming, while less efficient than mechanized farming (in terms of yields per farmer), was superior in terms of utilizing available labor to *maximize yield*.
- Land reform, by maximizing yields, serves a number of developmental goals:
  - Farmers have more money to spend on local manufactures
  - Higher food output reduces the leakage of scarce foreign exchange on imports
  - Farmers' savings can be recycled into export-oriented manufacturing
  - Countryside becomes a "laboratory for capitalism"; many successful industrial firms started out by selling manufactured goods to farmers (e.g. Toyota, Mazda, Hyundai, Haier, Huawei, Great Wall Motor, Wanxiang)



5

Meanwhile, in MIT countries…

- Land reforms that didn't go far enough, and agricultural policies which favored large agribusinesses and plantation owners over smallholders and tenant farmers.
- Industrial policies that did not impose export discipline or domestic competition between firms and failed to ensure technology learning and develop the country's technological capacity.
- Premature financial liberalization that dissipated the nation's developmental capital and led to the Asian financial crisis.
- Lack of investment in human capital and the absence of upgrading coalitions necessary for R&D and the transformation of the economy into a productivity and innovation-led one.

6

Industrial Policy

- **Why does a developing country need to industrialize?**
  - A country cannot sustain development on agriculture and commodities alone. The next phase of development has historically revolved around manufacturing.
  - Manufacturing is critical to rapid growth of poor countries because it allows countries to mitigate their lack of skilled workers through the use of easy-to-operate machinery. (In contrast, it's much harder to teach unskilled workers to work in ICT or financial services.)
  - Machines allow manufacturing sector to 'scale up' its production much more than in services, which are much less amenable to rapid productivity growth.
  - Trade in manufacturing is much greater than trade in services, which tend to be more domestic in orientation (with the exception of ICT and to some extent, financial services).
  - Trade is also essential to economic development; it allows poor countries to learn productive skills from more advanced economies and acquire new technologies.

7

Should governments engage in industrial policy?

Leave it to the private sector

- An economy should focus on its "natural" comparative advantages.
- Avoid industrial targeting: governments run into severe *informational* and *incentive* problems when they try to pick winners (public choice theory).
- Industrial policy increases the risks of government corruption and misallocation of resources, and often encourages rent-seeking behaviors from domestic firms.
- Export subsidies and import tariffs insulate domestic producers from competition, reducing incentives for them to be efficient and innovative.
- Hence, governments should invest only public goods and "sector-neutral" infrastructure.

Public sector must lead

- An economy can create its own comparative advantage; without state promotion/support, certain industries/markets would not emerge.
- Industrial policy can develop capabilities in new growth areas and enable economic diversification.
- Without government support, promising new industries cannot survive against global competition (infant industry argument).
- New industries often require *specific* inputs that can only be provided by the state, or the benefits of "discovery" cannot be fully internalized (externalities argument).
- Spillovers, network externalities and other coordination failures impede the growth of new industrial clusters.

8

Industrial Policy

- Manufacturing firms are nurtured by the state in two ways: **protection** and **subsidy**. Industrial policy has been pursued widely but has seldom produced results in developing economies.
- The challenge for industrial policy is to align the goals of domestic entrepreneurs with national developmental goals (i.e., industrialization, export competitiveness, expand and deepen the country's technological capabilities.)
- *How* industrial policy is pursued and implemented matters far more than the fact that it is pursued. Governments in northeast Asia mostly succeeded in nurturing domestic industry while those in Southeast Asia failed miserably.
- So why did northeast Asia governments succeed in industrial policy while those in Southeast Asia mostly failed?

9

Industrial Policy in Northeast Asia

- In northeast Asia, industrial policy succeeded because of:
  - **Export Discipline**: Continually testing and benchmarking domestic firms that enjoy subsidy and market protection by forcing them to export their goods and face global competition. Without export discipline, "development policy has become a game of charades, with local firms (pretending) they have been achieving world-class standards without having to prove it in the global marketplace."
  - "In southeast Asia, the energies of entrepreneurs were directed towards fooling politicians rather than exporting… They also drained away their nations' developmental capital, redirecting much of it into excessive real estate development that culminated in the real estate bubbles associated with the Asian financial crisis."




10

Industrial Policy in Northeast Asia

- The second factor was **competition between domestic firms** and the willingness of industrial policymakers to cull those firms that did not measure up. "In Japan, Korea, Taiwan and China, the state did not so much pick winners as weed out losers." In contrast, industrial policy in Southeast Asia often meant giving concessions or licenses to monopolistic local firms.

- Competition between firms meant that industrial policy **weeded out losers** rather than picked winners. This helps to explain the large businesses that grew without significant state support, e.g., Sony and Honda in Japan, Samsung in Korea, HTC and Acer in Taiwan.

- The third difference in northeast Asia was the relatively high level of **embedded autonomy of the developmental states** and the extensive **bureaucratic support** given to manufacturers which exported successfully, e.g. domestic market protection (via import tariffs), access to subsidized credit and foreign exchange (so as to import capital inputs), and support for technology acquisition.

- Key role of agencies which combined industrial and foreign trade policy decisions, e.g., MITI in Japan, EPB in Korea, IDB in Taiwan and the NDRC in China.

11

Meanwhile, in MIT Economies…

- Inadequate or non-existent land reforms that contribute to vast wealth and income inequalities, as well as spatial inequality
- Some were partially successful in industrialization, but industrial policies often lacked export discipline, and often did not require firms to compete with one another.
- Reliance on FDI to drive industrialization resulted in weak indigenous technological capacity and created cleavages between local and foreign businesses, between formal and informal labor, impeding subsequent upgrading efforts.
- Premature financial liberalization that led to excessive real estate development, financial speculation, and inadequate investments into developmentally useful but privately less profitable activities
- Inadequate investments in STEM education and R&D. Upgrading coalitions and institutions are weak or non-existent.

12

Economic development in Southeast Asia

Malaysia

- Dr Mahathir was unique among Southeast Asian leaders in his commitment to industrialise his country based on the northeast Asian experience.
- But there wasn't sufficient understanding of the critical prerequisites of successful industrial policy – that state support must be combined with **export discipline** and a hard-headed willingness to **cull losers**.
- Malaysia's mistakes:
  - Failed to impose export discipline;
  - Rarely employed the private sector to lead industrial investments and did not create competing enterprises.
  - The state picked winners but did not enforce competition to weed out the weak.
  - Mixed industrial policy with affirmative action objectives.
  - Inadequate investments in education and technological upgrading; bureaucracy wasn't strengthened
- Domestic entrepreneurs went into "distributive" sectors – commodities, power generation, real estate and finance – instead of the productive sectors.

13

Economic development in Southeast Asia

Indonesia

- Suharto was influenced by Mahathir's Look East industrialization policies in the 1980s
- But like Malaysia, the state imposed no export discipline and very little domestic competition
- There was also insufficient pressure to push firms up the technological ladder so local manufacturers were entirely dependent on foreign firms for technology.
- While manufacturing is about 20 percent of GDP, much of it is low value-added or done through joint ventures to serve the domestic market.

14

Economic development in Southeast Asia

Philippines

- After the war, the Philippines continued to rely on its agricultural sector. The Filipino elite built up its estates and plantations while fiercely opposing any political effort to make entrepreneurs manufacture for export.
- There were no businesses subject to genuine export discipline for the Philippine National Bank formed to fund Filipino development to lend to.
- From the 1950s, the Philippines became "east Asia's IMF and World Bank junkie", with more programmess and efficiency plans foisted on it than any other state in the region to prevent its financial system from collapsing.
- Privatisation of the banking system was a typical prescription of the international financial institutions. But the banks became the personal piggy banks of the oligarchic, plantation-owning families, with the costs of their misadventures picked up by the state.
- Marcos came to power in 1965 promising land reform and industrial development but did neither. Preferential credit did not have any special focus on exports, nor was there an industrial strategy that would lead to exports.
- In the latter years of Marcos' rule, the banks of his leading cronies funded their own families' assets, almost all of which exported only commodities. They contributed nothing to industrialisation (unless one counts beer and rum production).
- Under Marcos, Philippines ran up large foreign debts, which did not go into building up industrial capabilities, but to real estate development, vote-buying, and non-productive imports.



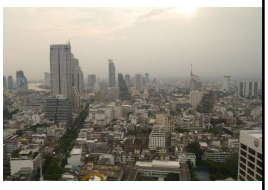
15

Economic development in Southeast Asia

Thailand

- Pursued import substitution policies from 1950s to 1980s
- Competent bureaucracy, orthodox fiscal and monetary policies
- No pressure on protected manufacturers to export; depended on domestic market
- ISI based on low import tariffs on components and high tariffs on finished goods. While this led to assembly joint ventures with foreign firms, there was little technological learning.
- Thailand was the world's fastest growing economy in 1987-96 but this did not signify long-lasting economic development.
- A real estate boom began in the late 1980s as a result of financial liberalization and accelerated markedly in the 1990s.
- As the asset bubble inflated, Thailand acquired an annual current account deficit of 5-8% of GDP. This alone was enough for currency traders to take short positions against the Thai baht, precipitating the Asian financial crisis.
- Thailand suffered the worst initial economic contraction of any country in east Asia. The IMF insisted on the anti-spendthrift, anti-inflationary medicine it had developed in Latin America in the late 1980s. But since Thailand's problem was not with inflated government budgets, expenditure cuts and tax rises sent the economy into tailspin, contracting 14% in domestic currency terms between 1996 and 1998.
- The IMF's star pupil saw its growth forecast plunge from 3.5% to -7% in just a year. It was not until 2003 that Thailand regained its 1996 GDP.





16

Where the living is easy

1

Rent-seeking sectors included in index

- Casinos
- Coal, palm oil and timber
- Defence
- Deposit-taking banking and investment banking
- Infrastructure and pipelines
- Oil, gas, chemicals and other energy
- Ports, airports
- Real estate and construction
- Steel, other metals, mining and commodities
- Utilities and telecoms services

Generating rent

1

Billionaire wealth from crony sectors
As % of GDP

Sources: *Forbes*; IMF; *The Economist*

Economist.com

17

The crony-capitalism index

3

Billionaire wealth as % of GDP, 2016
Ranked by crony-sector wealth

Sources: *Forbes*; IMF; *The Economist*

*Includes territories

Economist.com

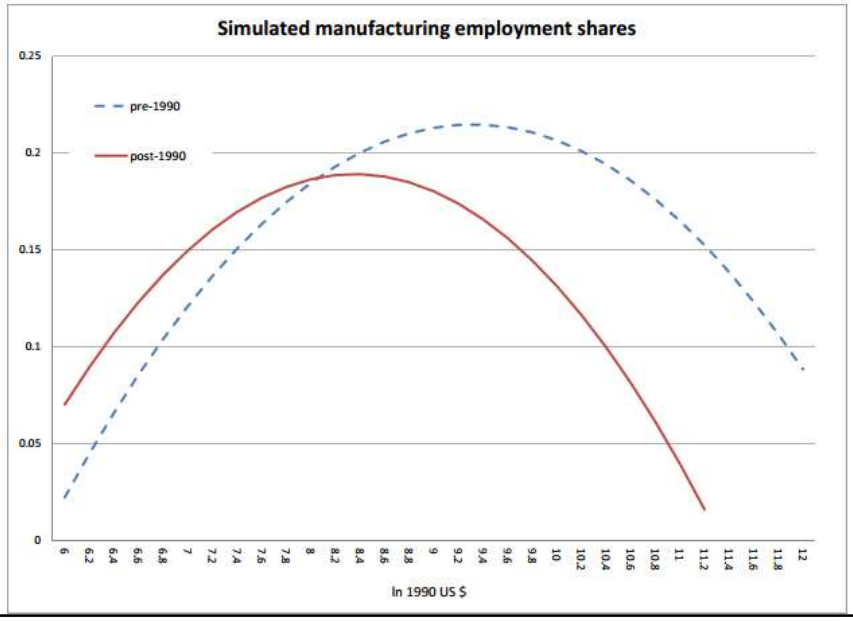
18

Lessons from East Asia

- Unlike their Northeast Asian counterparts, Southeast Asian governments **failed to industrialize successfully and develop indigenous technological capabilities**. As their firms can easily make money domestically in protected environments, they were unwilling and unable to compete globally.
- The unwillingness of their governments to create domestic competition also created serious **principal-agent problems**. The energies of their entrepreneurs were directed at fooling politicians and rent-seeking rather than at manufacturing and exporting. They directed the countries' capital at the sectors with the highest financial returns, i.e., real estate, finance, commodities, power and utility concessions.
- Long-lasting **economic development is different from short-term GDP growth** and is dependent on technological and industrial development. Short-term GDP growth can be generated by real estate and stock market booms, fuelled by consumer lending and spending, but these invariably end badly – as the Asian and global financial crises demonstrate vividly.
- Centrality of **state direction in the allocation of capital**: The successful Asian developing state **points financial institutions at the necessary export-oriented infant industry policies**. The state also closes off the possibility that finance will look to alternative opportunities, or that foreign capital inflows will disrupt its plans.

19

Premature deindustrialization



20

THANK YOU

21

20 September 2023
(Day 3)

香港科技大學
THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

AI & Art

by Prof. Yike Guo

When Art Meets AI

Yike Guo

郭毅可

Provost
The Hong Kong University of Science and Technology

Director
Hong Kong Generative AI Research and Development Centre

AI : Building a Human-like Machine

Like human to think
Prediction & Reasoning

Like human to hear
Acoustic Speech Recognition (ASR)

Like human to see
Computer Vision (CV)

Like human to talk
Text-To-Speech (TTS)

Like human to act
Robotics

Like EXPERT to teach
Smart Education

Like EXPERT to trade & invest
Smart Trading & Investing

Like EXPERT to make medicine
iDrug

We Are Towards Future AGI

Specialized models:
One model solves one specific problem

DL Theory Breakthrough
Deep Confidence Networks
2006

ImageNet Competition
1000 classes, 1 million data
2012

Go Games
AlphaGo 4:1 Lee Sedol
2016

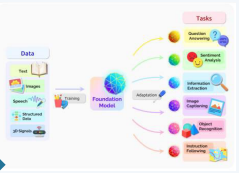
AlphaFold
Recorded accuracy in protein structure prediction
2021

2011
Large-scale speech recognition
Switchboard Errors Reduced by 9%

2014
Face Recognition
LFW recognition rate of 99%, surpassing humans

2019
Texas Hold'em
First Surpassed humans in complex multi-player games

Foundation models:
One generative model for multiple tasks and modalities



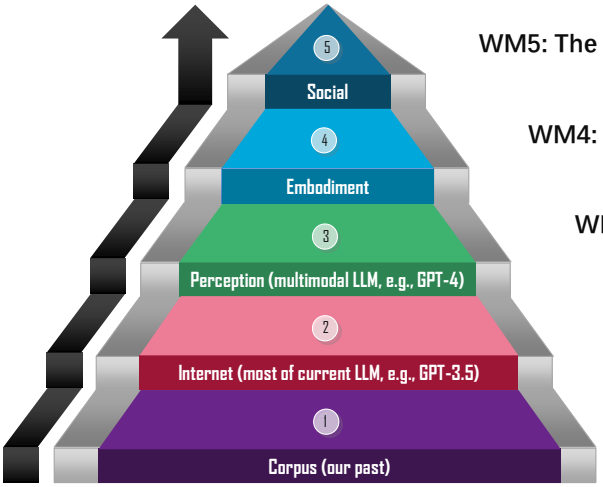
ChatGPT

DEEPMIND FLAMINGO

PaLI
ViT

DALL·E 2

Future Development: From GPT to World Models



WM5: The Social World

WM4: Embodiment and Action

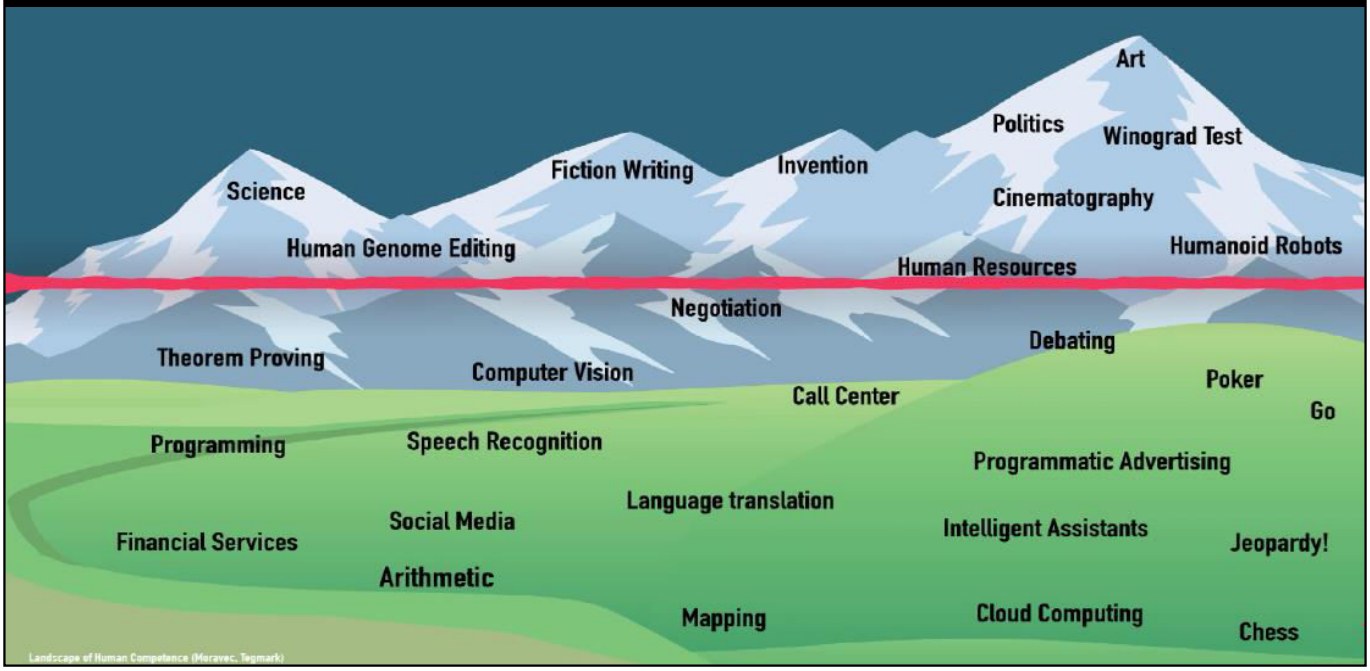
WM3: The Visual/Audio World

WM2: The Text World

WM1: Corpora & Representations

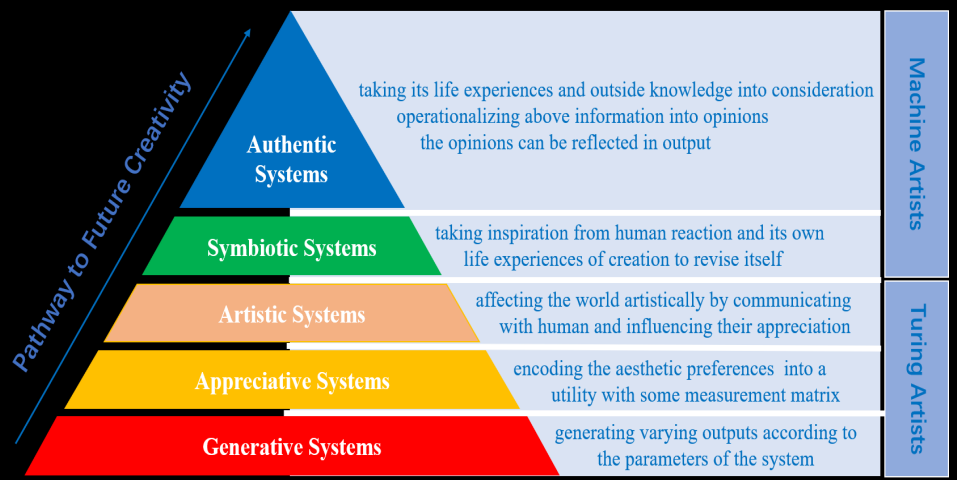
"Experience Grounds Language", EMNLP 2020

Art : Unique to Human, Challenging to Machine

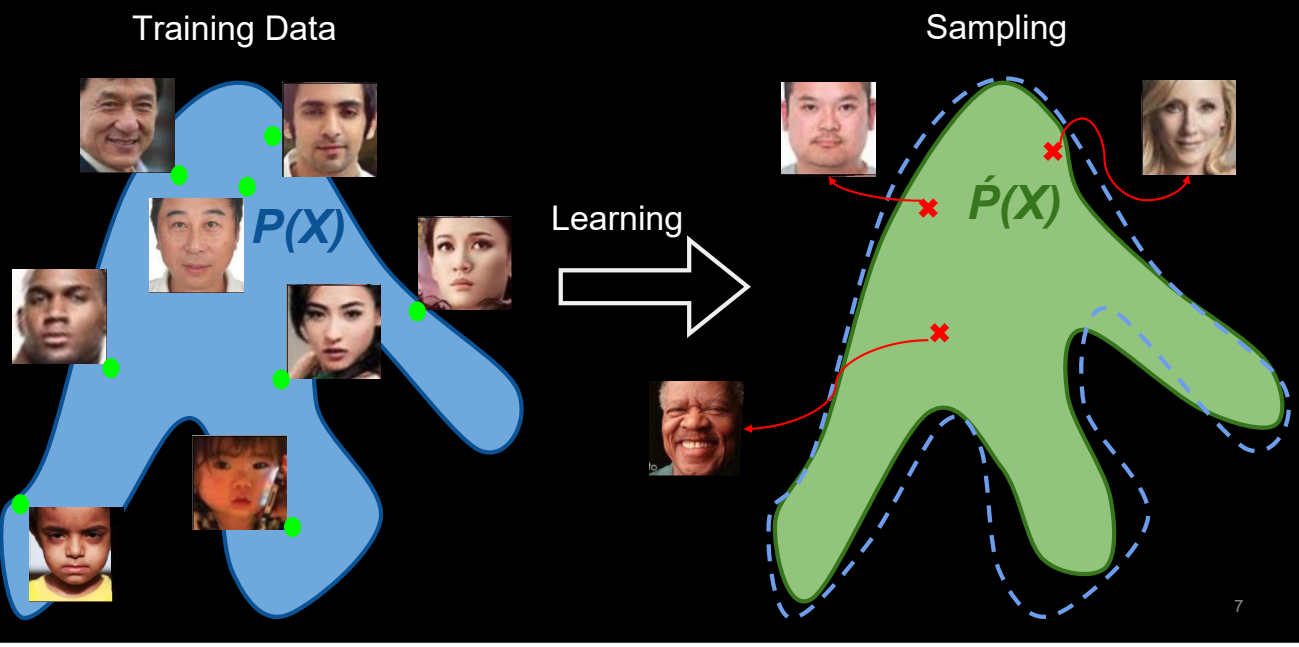


Two Types of AI Artist Systems

Hierarchy of AI Creative Systems in 5 Levels



Today's Turing Artists : Mimicking Human

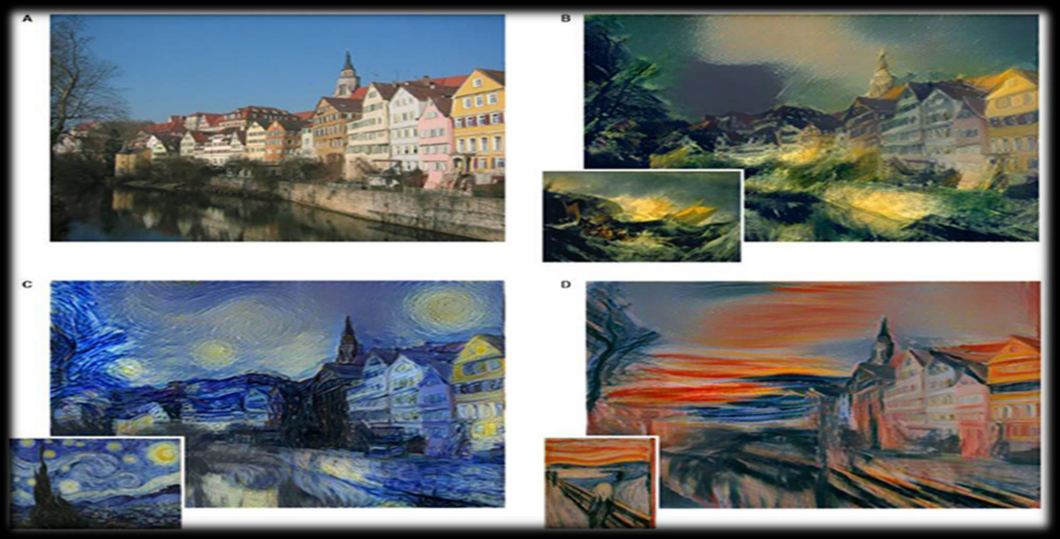


Mimicking Artefacts : Generative System

GAN PROGRESS ON FACE GENERATION

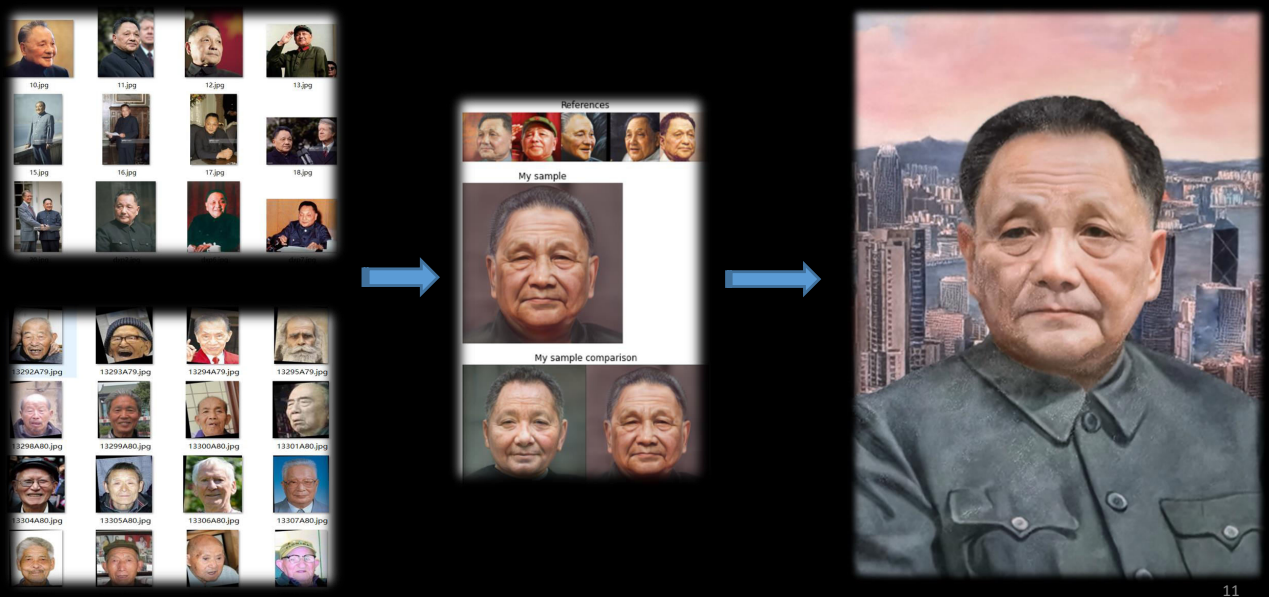
Source: Goodfellow et al., 2014; Radford et al., 2016; Liu & Tuzel, 2016; Karras et al., 2018; Karras et al., 2019; Goodfellow, 2019; Karras et al., 2020; AI Index, 2021; Hou et al., 2022

Mimicking Styles : Appreciative System

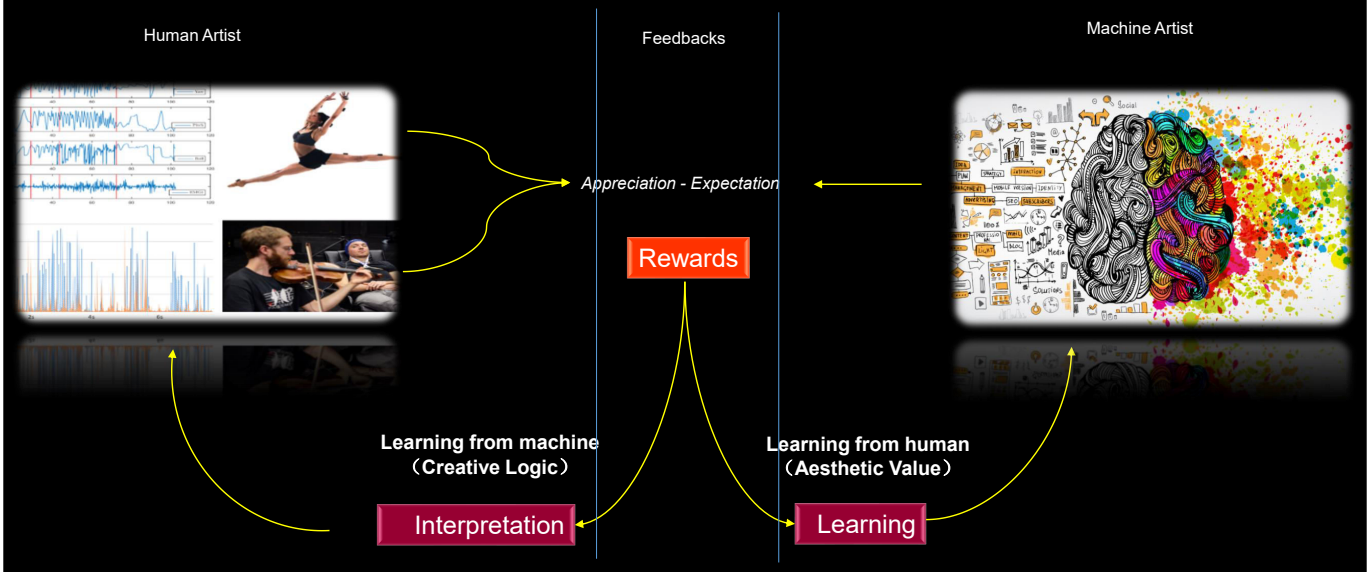


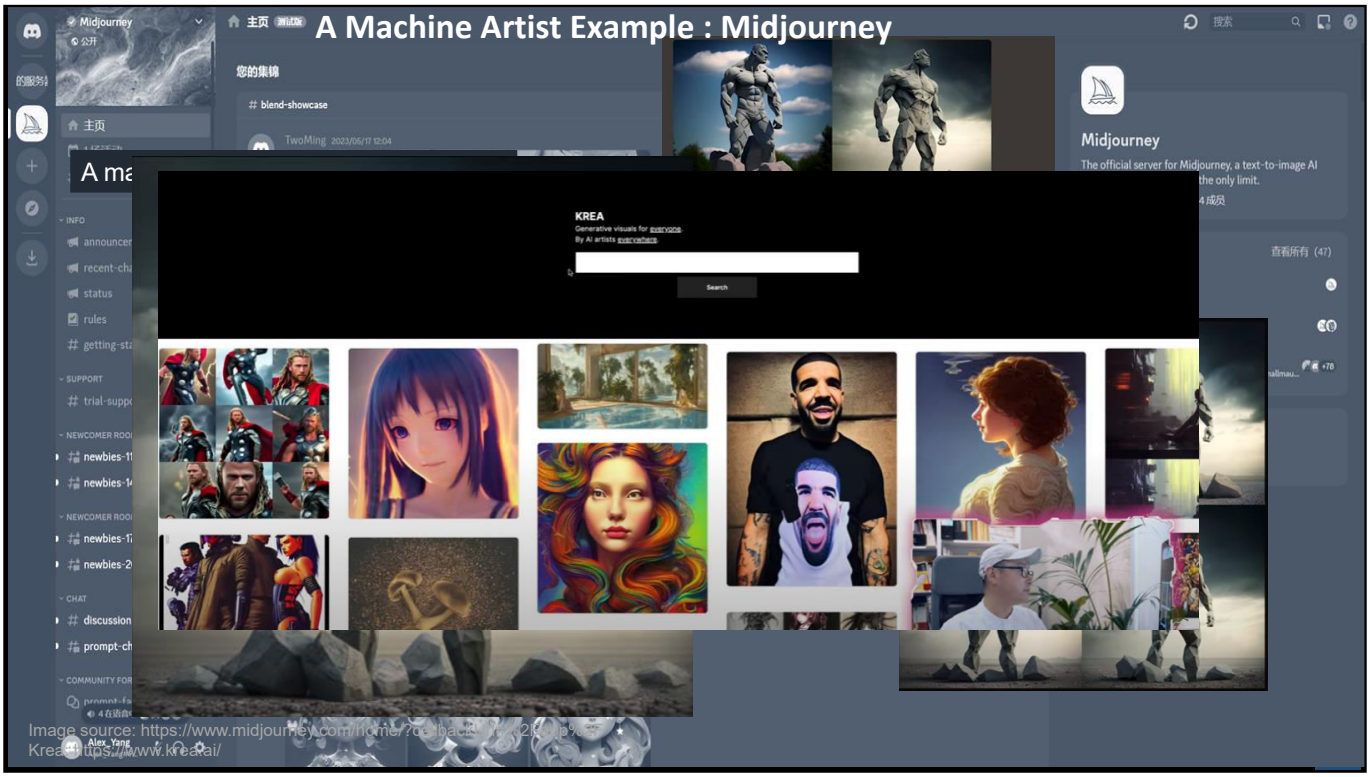
Mimicking Inspirations : Artistic System

Created by Our Turing Painter



Machine Artists : Building A Creative Machine



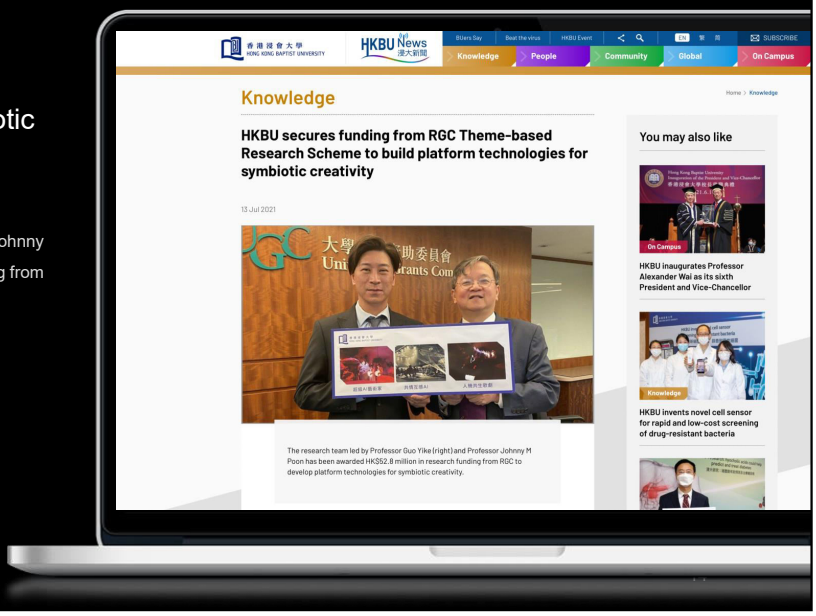


Our Journey Starts from Here

HKBU secures funding from RGC Theme-based Research Scheme to build platform technologies for symbiotic creativity

The research team led by Professor Guo Yike and Professor Johnny M Poon has been awarded HK$52.8 million in research funding from RGC to develop platform technologies for symbiotic creativity

HK $52.8 million



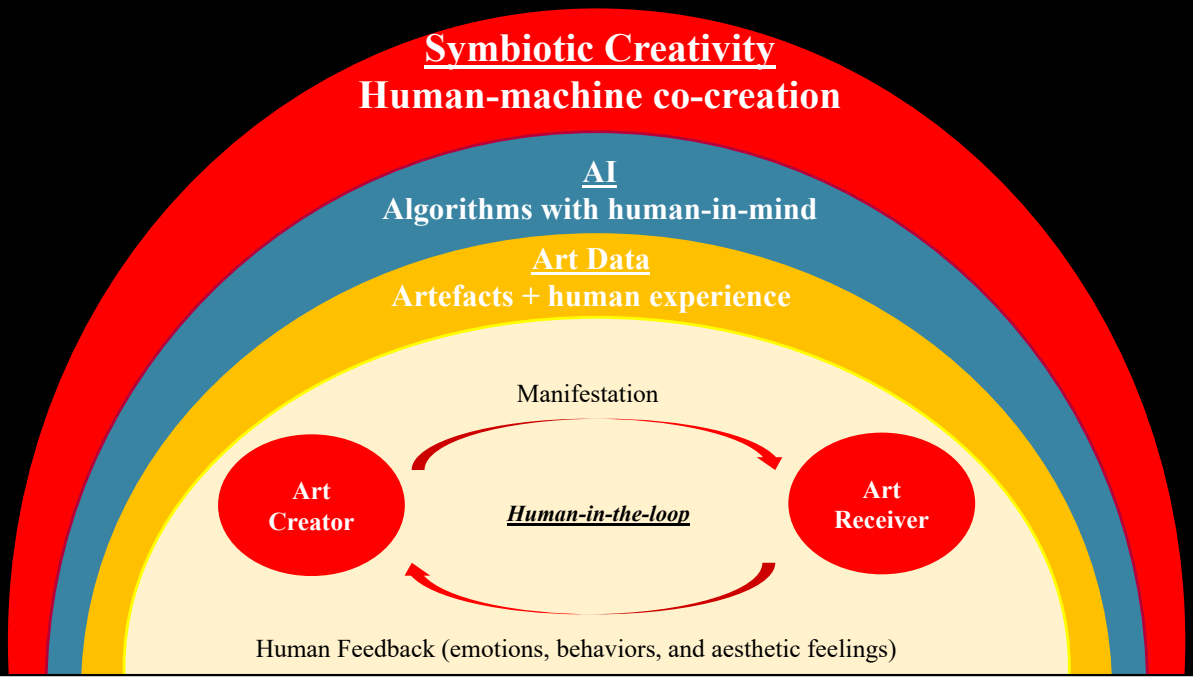
AI Meets Art : Our Ambition and Mission

"I want to paint humanity, humanity and again humanity."

— Vincent van Gogh

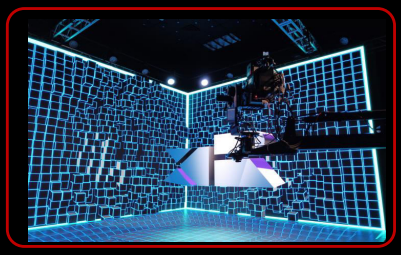
- ✓ AI enables new forms of art
- ✓ Art brings new innovation to AI

Ambitious AI-Art: Building Unique Art Data Sets



Building Platform Technologies for Symbiotic Creativity in Hong Kong (TRS T45-205/21-N)

AI Technology for Artefact Creation
– Building **ALGORITHMS**



Art Tech for Manifestation and Delivery
– Building **ENVIRONMENT**

Platform Deployment and Applications
– Building **APPLICATIONS**

香港故事|人机交互音乐会：唱响不一样的《东方之珠》

2022-07-17 18:05:40

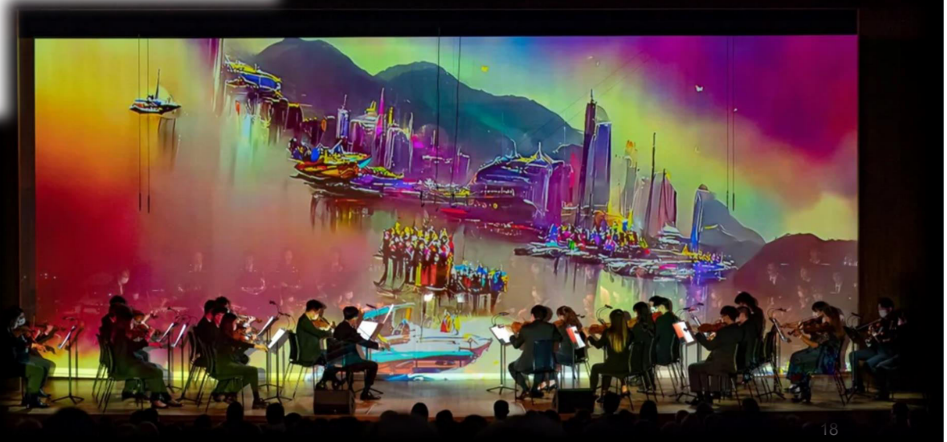
浏览量：150.5万

来源：新华社

新华港澳台

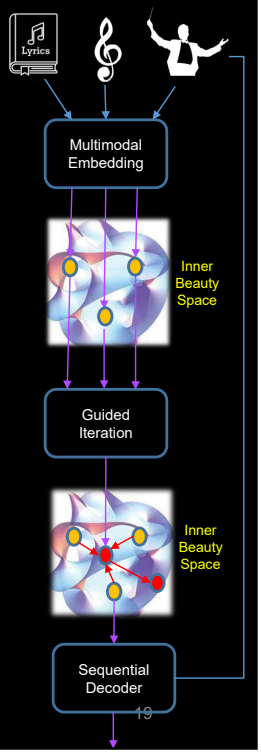
First Major Deliverable –

AI Choir

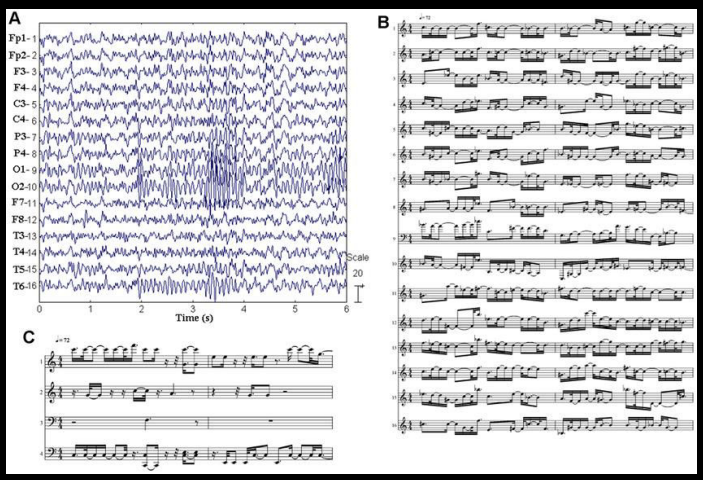


Visual Art Generation

Cloud ⟶ Flower



Singing Foundation Model



Humans create emotional and beautiful audios to by making sequential melody activate and satisfy our brain.

The emotions and characters we express in speaking and singing are controlled by our brains.

When we build the foundation model of audios, we are also modeling ourselves.

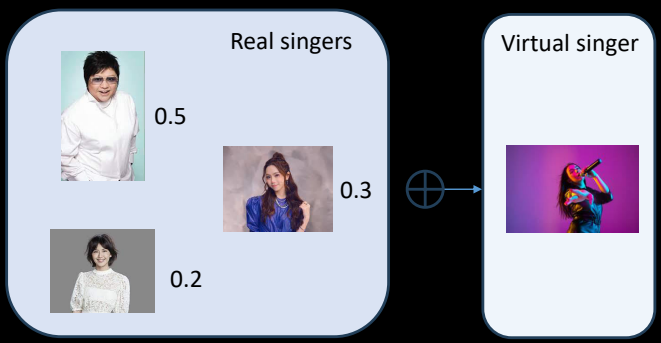
Targets

Create professional songs （歌） just by singing（唱）. (“唱”歌)

Singing Foundation Model

New Singer Creation (Singer Algebra)

- The model would learn an existing professional singer, and create new virtual singers which can be a combination of existing singers in terms of
  - a) **timbre**
  - b) **singing ranges**
  - c) **singing style**
- The virtual singers sing with the human singer, or replace the human singer, in the final production.

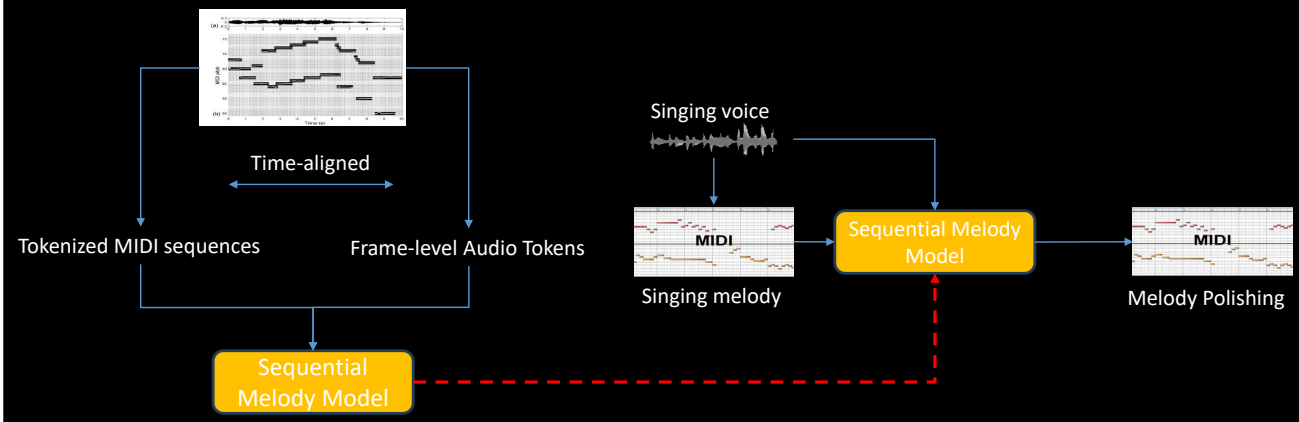


Producing an existing singer is a special case when one weight becomes 1.0

Targets

Melody Perfection

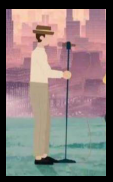
- The model can tune the input melody (in audio and MIDI) to a professional level while keeping the original structure. The singing voice is reproduced with original lyrics and finetuned melodies.



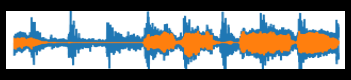
Targets

Accompaniment Generation

- The model can generate multi-instrument accompaniment based on the vocal audio.
  - Accompaniments are in harmony with melody of the input singing.

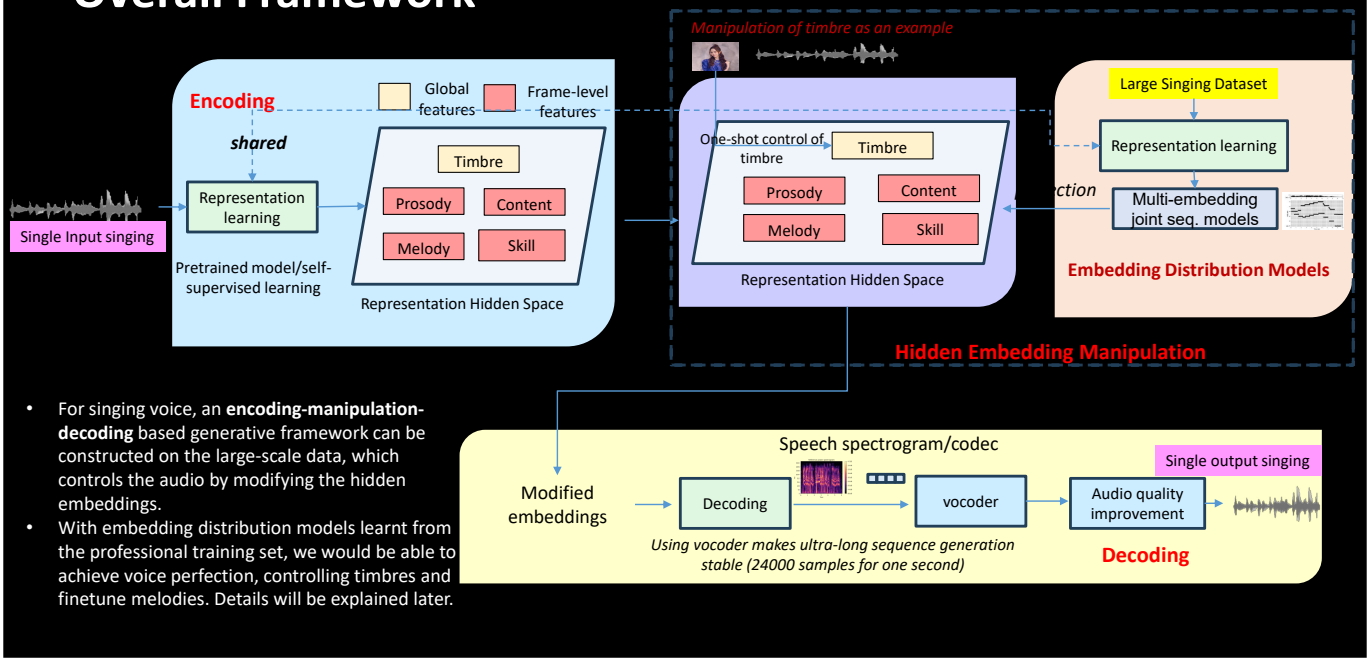


Singing Audio



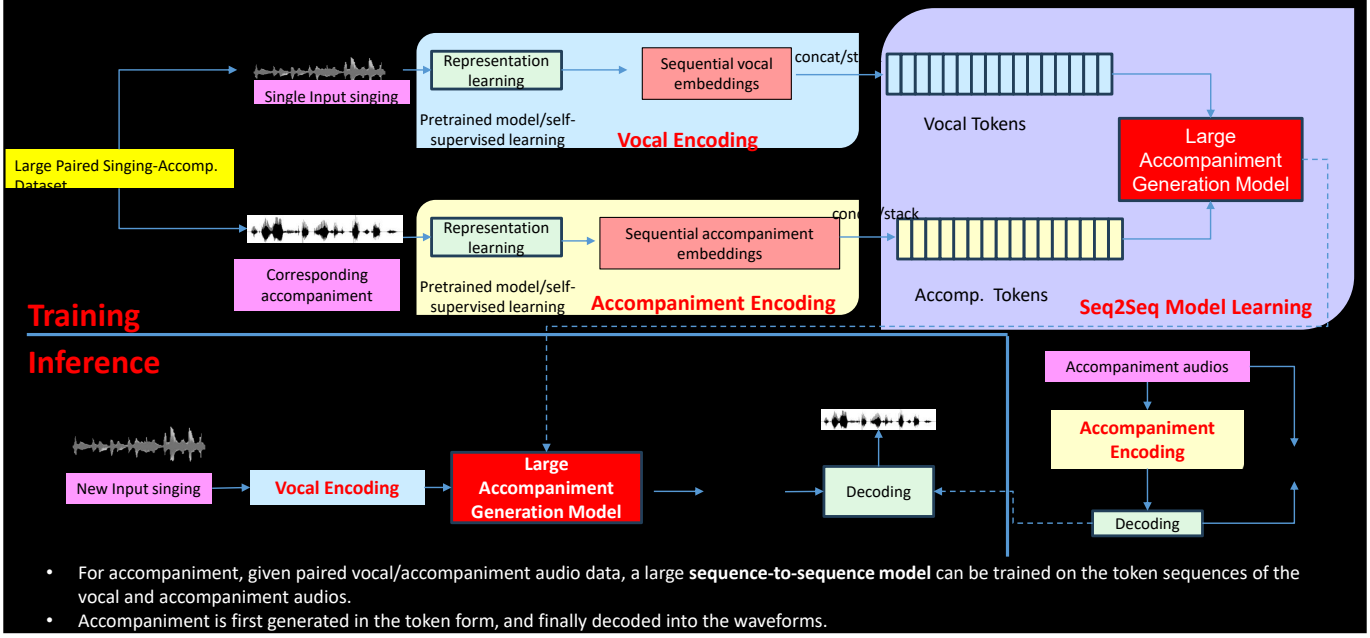
Time-Aligned
Accompaniment Audio

Overall Framework



- For singing voice, an **encoding-manipulation-decoding** based generative framework can be constructed on the large-scale data, which controls the audio by modifying the hidden embeddings.
- With embedding distribution models learnt from the professional training set, we would be able to achieve voice perfection, controlling timbres and finetune melodies. Details will be explained later.

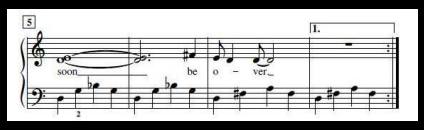
Overall Framework

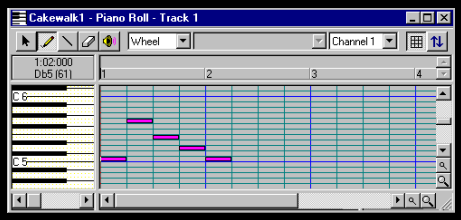


- For accompaniment, given paired vocal/accompaniment audio data, a large **sequence-to-sequence model** can be trained on the token sequences of the vocal and accompaniment audios.
- Accompaniment is first generated in the token form, and finally decoded into the waveforms.

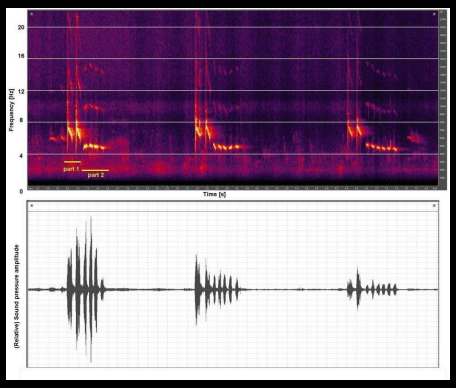
Audio Foundation Model (Singing Voice Model)

Audio is a sequence in “sound languages”.
Audio foundation model is a special case of large “language model”.





Symbolic music sequence



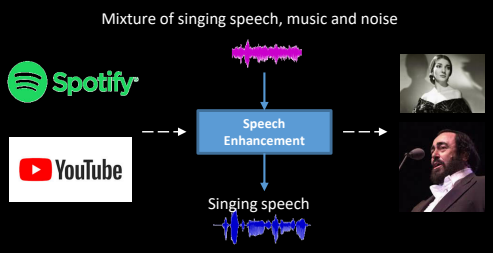
Audio music sequence

Audio Foundation Model: **Digitalize Human Voice**

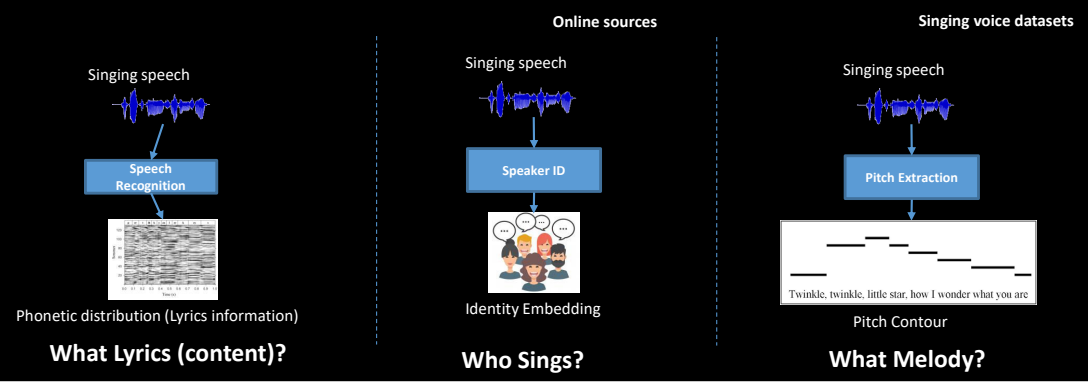
Auto-encoder Voice Foundation Model

Humans use existing skills for new tasks

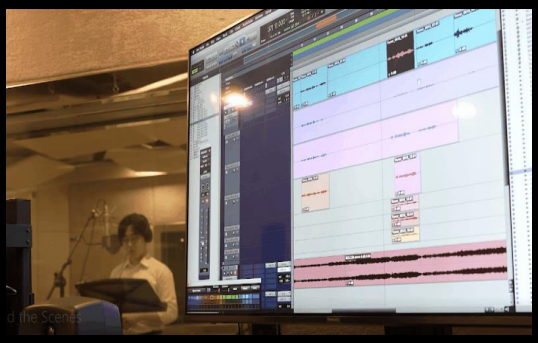
Four models were pretrained using public datasets for the specific tasks

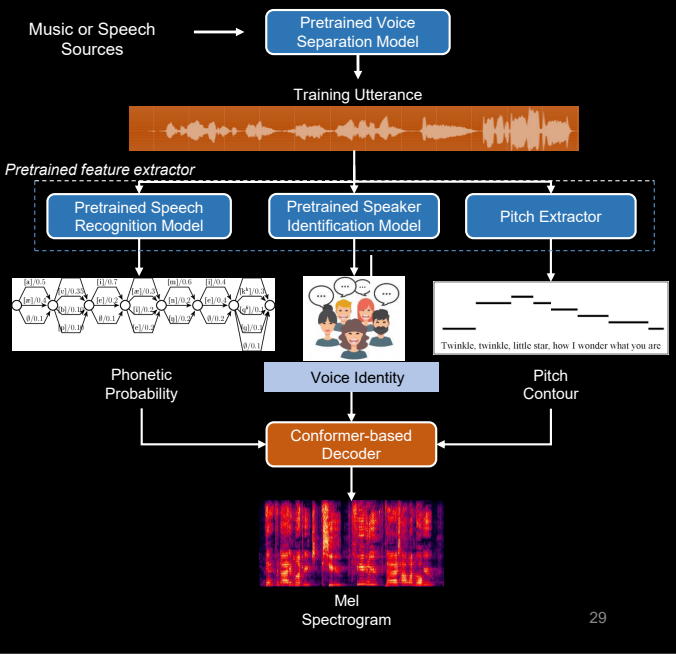


How to Get Data?

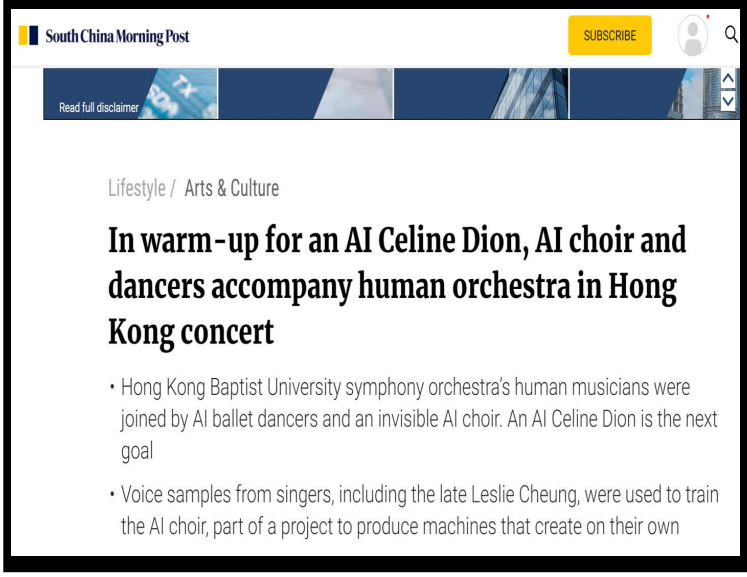


Vocal Illusion : Voice Modelling





Learning the Style of a Singer



South China Morning Post

SUBSCRIBE

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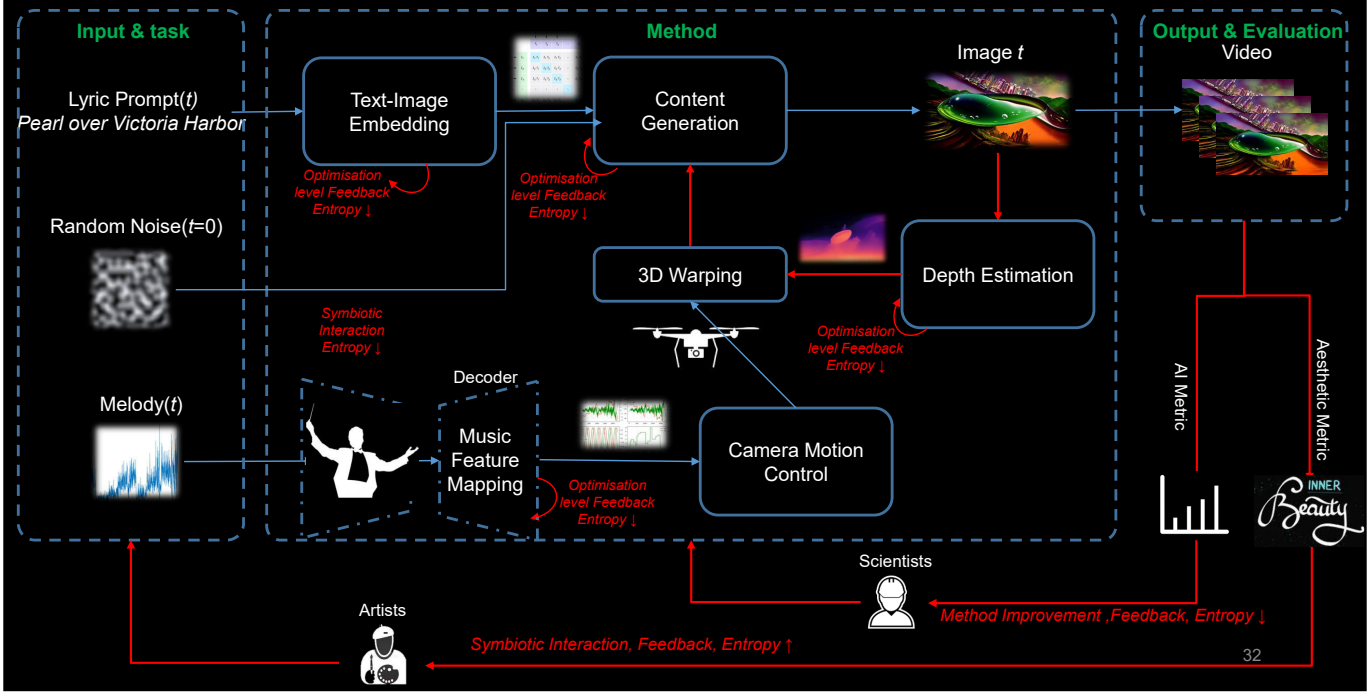
Lifestyle / Arts & Culture

In warm-up for an AI Celine Dion, AI choir and dancers accompany human orchestra in Hong Kong concert

- Hong Kong Baptist University symphony orchestra's human musicians were joined by AI ballet dancers and an invisible AI choir. An AI Celine Dion is the next goal
- Voice samples from singers, including the late Leslie Cheung, were used to train the AI choir, part of a project to produce machines that create on their own

Conducting Machine

AI-based Cross-media Visual Storytelling System



Understanding : From Lyrics to Themes

The stream meanders to the south
小河彎彎向南流

The pearl of the east over night
東方之珠整夜未眠

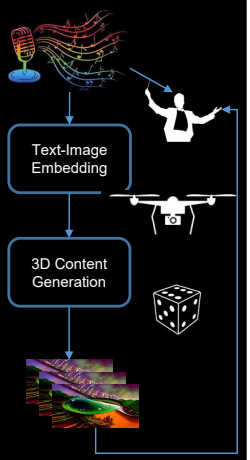
The see wind blows for 5000 years
讓海風吹拂了五千年

there in a garden of roses while moonbeams calmly shine

There the musk roses are sighing

On banks by the Ganges tide

We woo the power of bright dreams to shed their heavenly charms



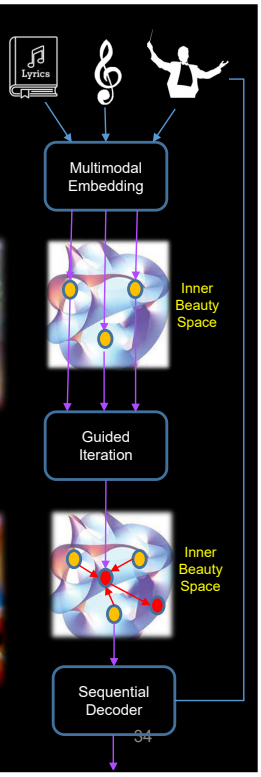
Machine Artist : Creation as Decoder

Cloud ⟶ Flower

Cloud ⟶ Butterfly ⟶ Many butterflies

Cloud ⟶ Cupid wings with love

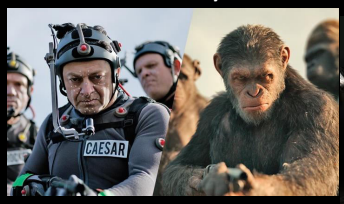
Treble clef ⟶ Flower petals

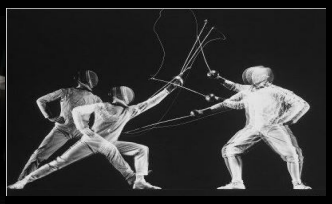


Motion Foundation Model

Motion Foundation Model aims at generating 3D trajectories that animate the human body in response to various physical world, human, or virtual context.

- Film production, CG (Computer Graphics) character animation
- Performing arts
- Motion science
- Mixed reality, Metaverse applications.



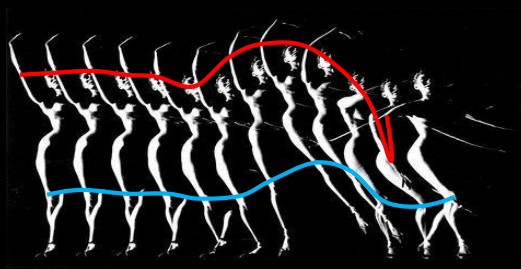
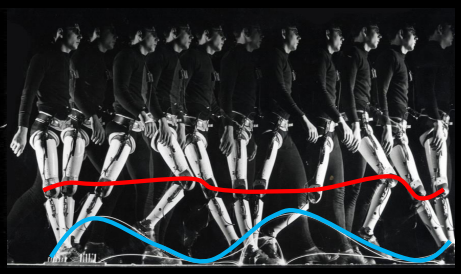



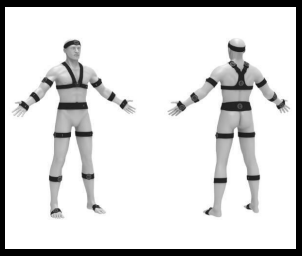

Generated Motion Qualities

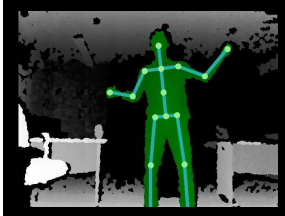
- Obey physical and kinematic laws
- Aesthetic style and messages consistent with artistic context

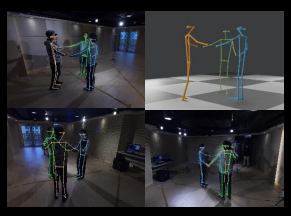
Motion Foundation Model

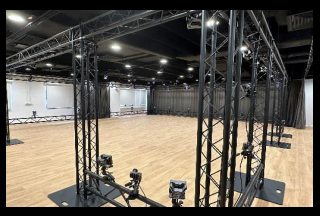
Human motion: spatial and temporal recordings of human skeletal joints captures human activity, aesthetic expression and emotion.


IMU Sensors


Depth Cameras

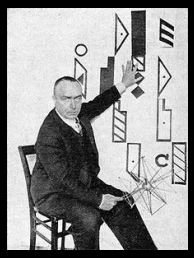

Multi-view stereo RGBs


Maker-based ToF

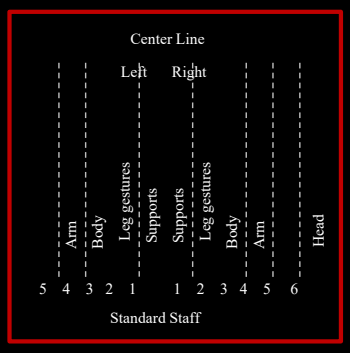
Labanotation – The Language of Motion

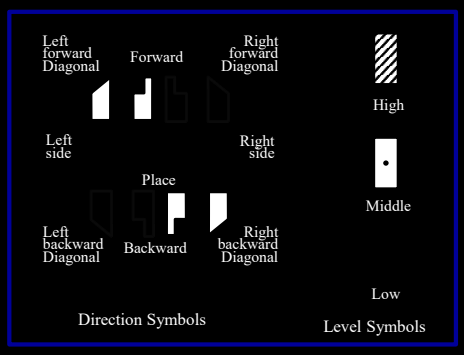
Labanotation: a structured system for analyzing and recording movement with symbols.

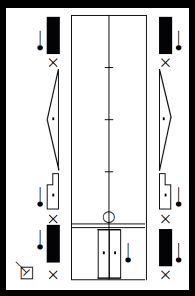
- Each symbol specifies: direction, level, timing, body part
- Genre- and Style- independent, able to record every kind of human motion [Guest13]



Rudolf Laban presenting his notation system, circa 1929





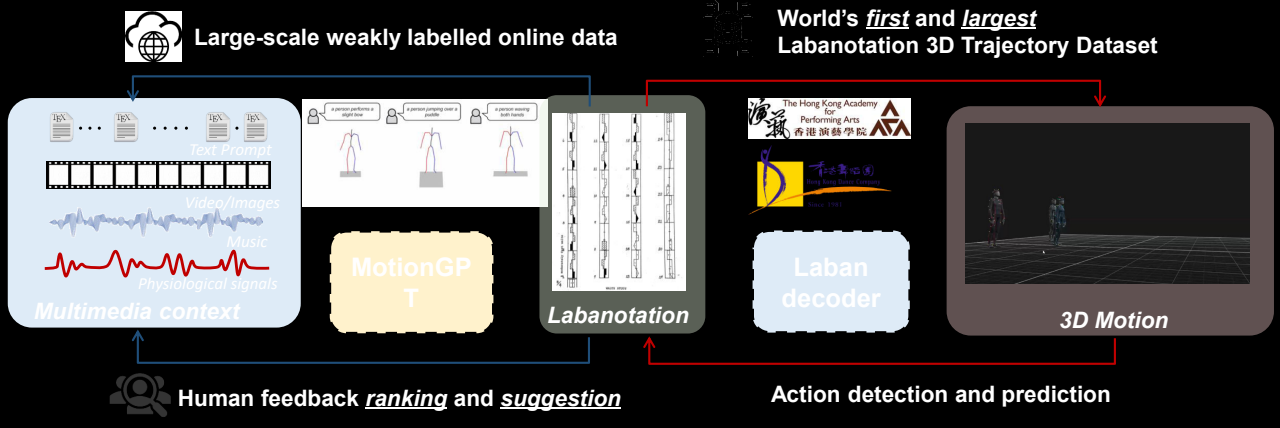


Labanotation example 1:
Ballet arm movement. Arms rest down, reach forward, outward, then back down.

37

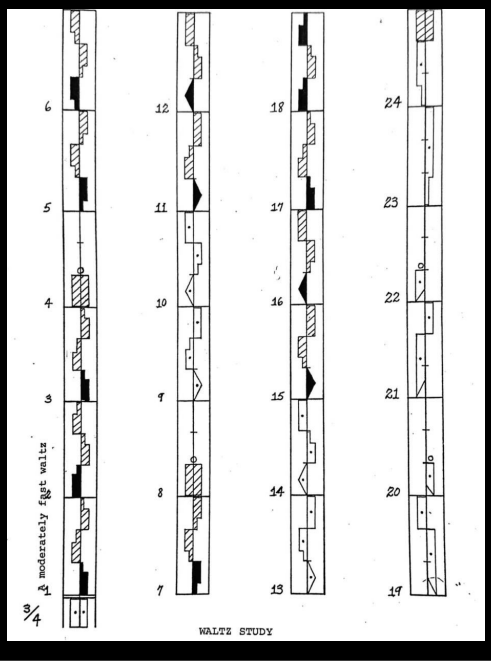
MotionGPT: A Language Model for Chorography

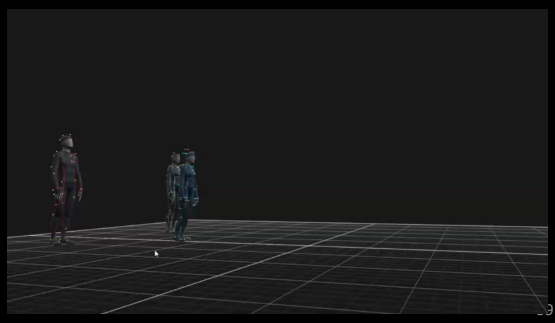
- Enabling Cross-Modality Motion Programming and Interpretation
  - MotionGPT - a large-scale pre-trained language model for *motion concept programming*
  - Laban Decoder*: trajectory sampling* framework based on the music condition, and the Labanotation scripts.



38

Labanotation Capture Sequence





Labanotation Helps to Build a DanceGPT

Compared to direct learning 3D joint directories and existing AI choreography frameworks, ***Labanotation*** is:

- Much more **compact** data representation as compared with 30 fps trajectory captures (a 1 min sequence contains 21x30x60= 37,800 data units), which will be too large to be fitted to a transformer model to calculate full self-attentions and study semantic meaning behind the variation
- Much more **descriptive** in describing body part actions, and automatically **generalizable** as one symbol could refer to many executions
- A much more **semantically meaningful** representation, that is dense, lower-dimensional, which can be easily projected to word embeddings and connect with the embedding space of other pretrained LLMs

Potentials to become a general artificial intelligence like ChatGPT

MotionGPT: A Language Model for Motion

- Enabling Cross-Modality Motion Programming and Interpretation
  - MotionGPT - a large-scale pre-trained language model for *motion concept programming*
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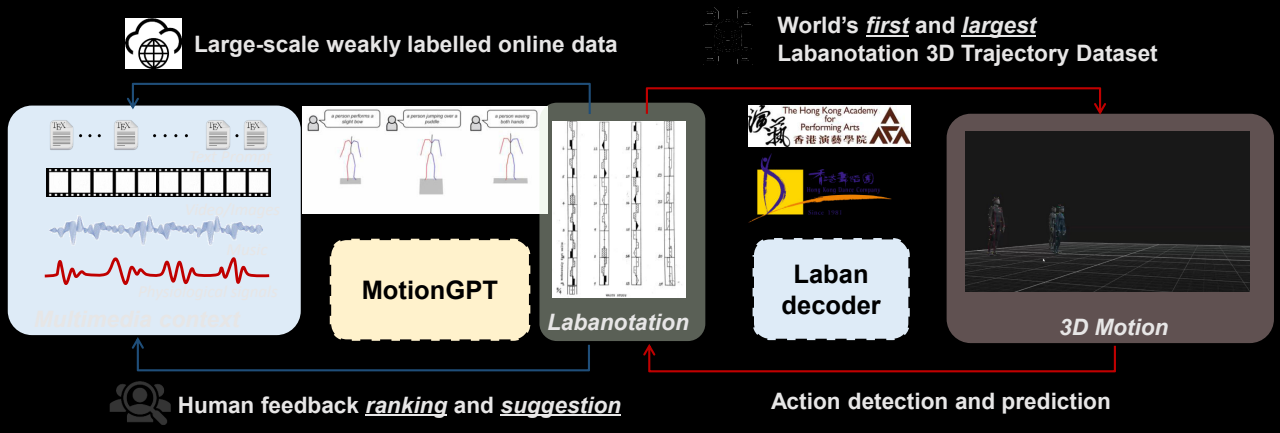
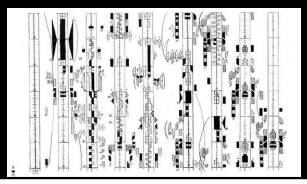


Motion Semantic Disentanglement and Style Transfer

Symbolic notation ***connects*** and ***disentangles*** kinematic concepts between dance

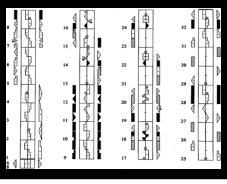
Semantic embedding for ***cross-style/cross-culture*** dance translation

Classic Western Ballet vs. **Traditional Chinese Dance**



Danse des petits cygnes
Swan Lake

Tchaikovsky

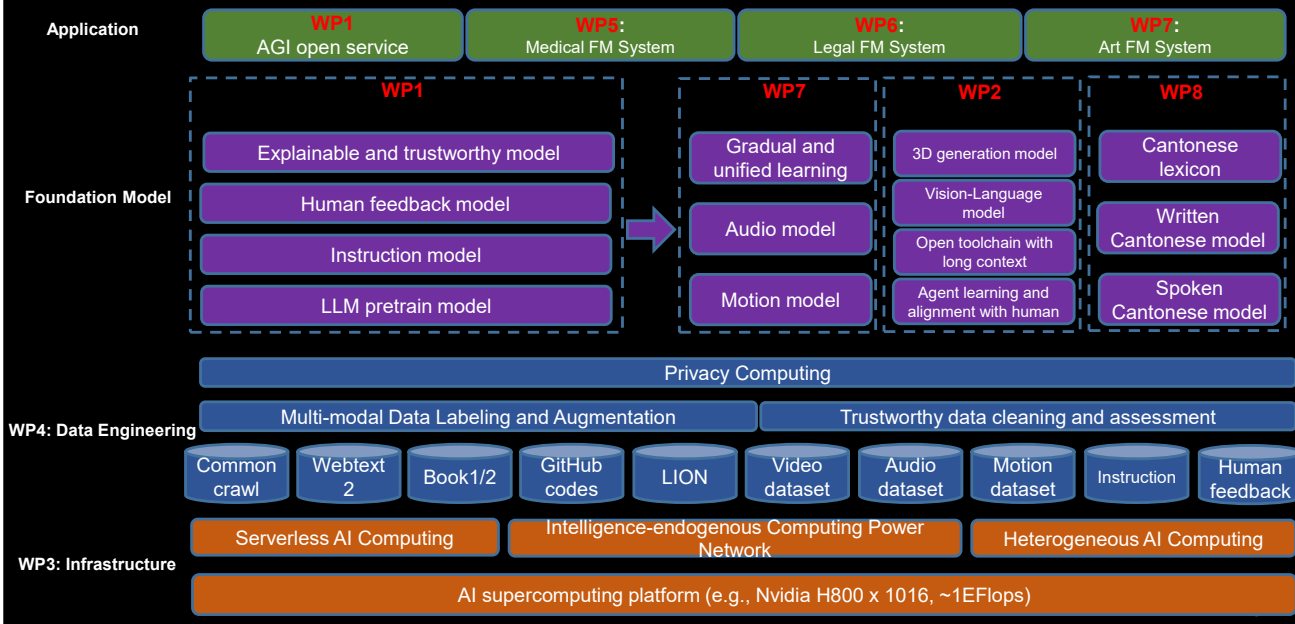


春江花月夜

张若虚（词）
鞠士林（曲）

Human and Machine Symbiotic Dancing

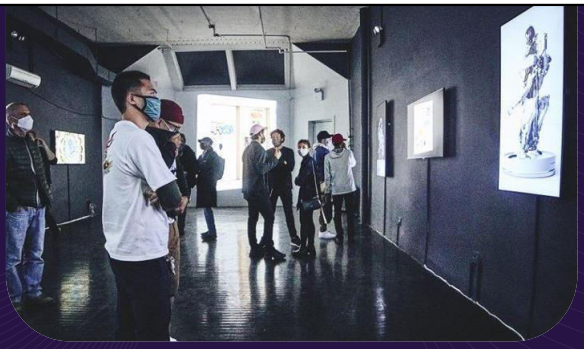
Hong Kong Generative AI R&D Centre

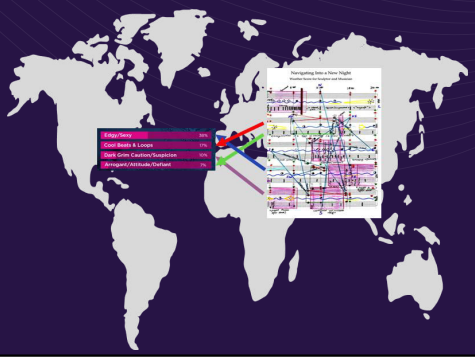


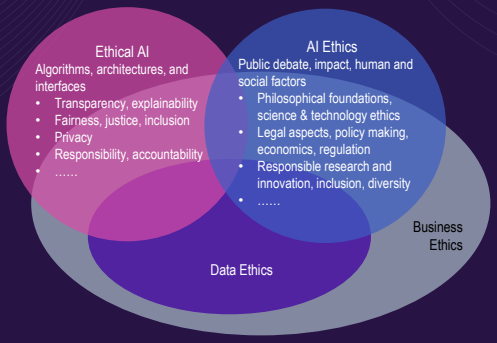
A Blockchain-Based Global Art Marketplace

A Curated Art Marketplace with a global artist network

Curated marketplace means that the platform determines which NFTs are allowed to be minted, posted and sold on directly its marketplace. Compared to an open marketplace, a curated marketplace is more limited and exclusive, requiring artists to apply and be accepted before being able to mint or sell NFTs in an attempt to keep fraud down and quality high.







A NFT for the Conference: On Wings of Song

O Holy Night

21 September 2023
(Day 4)

香港科技大學
THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Venture Capital Investments in AI

by Mr. K.O. Chia

Venture Capital Investments in AI

K O Chia
President, HKVCA Institute
kochia22@yahoo.com

HKUST WEF YGL
Sept 21, 2023

1

Agenda

- Discussion on AI from investment perspectives
- Venture Capital Investment Considerations
- Role of Venture Capital

2

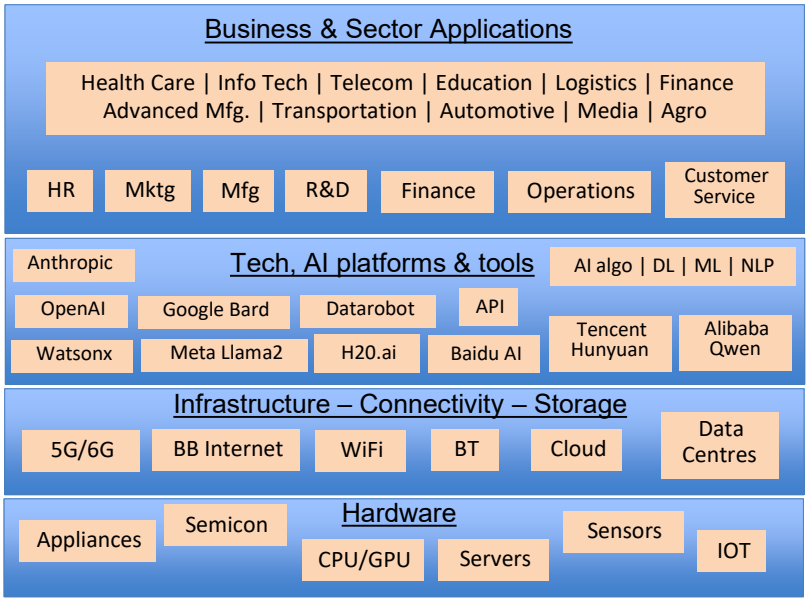
Implications on AI

- All industries, large or small, influenced by AI – adoption dependent on sectors & needs… contributing to $15.7 trillion* to the global economy by 2030
- Better decision making with more accurate data – but do not neglect human wisdom
- Work & play will change – demand for jobs with new skills (or needing upskilling)
- New talent: developers, data scientists, product managers, UX/UI designers

* PwC 2017 Sizing the Prize AI report

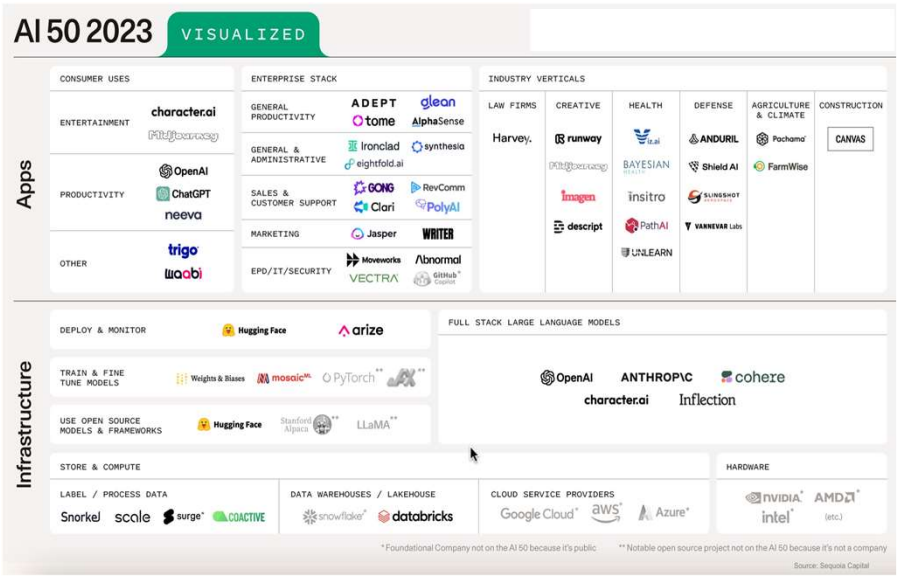
3

AI ecosystem market map



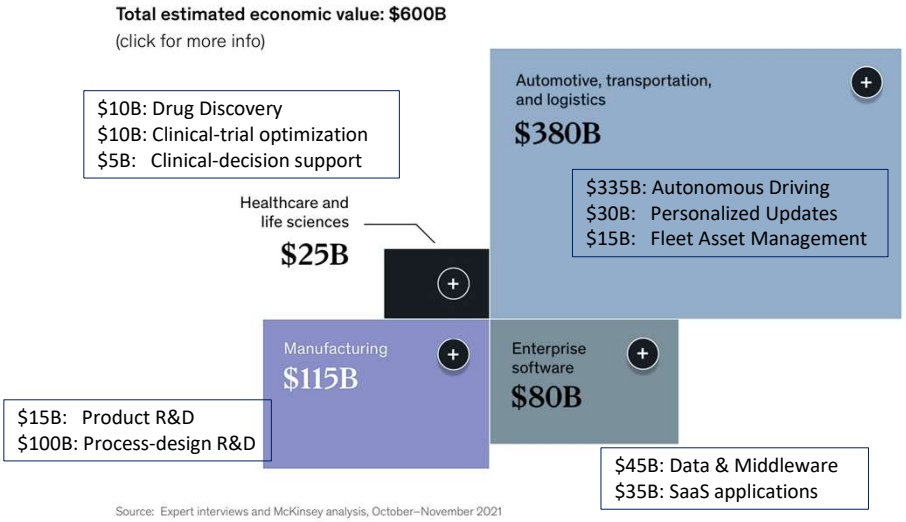
4

Sample of AI Landscape



5

Geographic map: China AI sector opportunities



6

Investors' Perspectives

Entrepreneur
Background
Vision carrier
Values & Character
Mindset
Leadership

Business Idea
Business Model
Sector Inefficiency
Local vs Global
Scalable
Social Impact
Responsible AI

Market Demand
Adoption rate
Market Creation
Disrupt market
Customer sectors

Team
Culture & DNA
Talent diversity
Existing Investors
Advisors
Chemistry

Readiness Level
Technical
Investor
HR
Management
Future

7

VC Post-Investment Value Add

Strategic
Virtual Management
Strategic context
CXO recruitment
Financial discipline
Do Well, Do Good

Resources
Global Network
Financing
Industry Knowledge
Growth
M&A

Fund Raising
Prep plans
Target Investors
Bankers
Investors' Relations
M&A

Access
Business services
Bank relationships
Board members
Portfolio synergy
Partners

Management Advice
Mentor-Advisor
Talent
VUCA & Crisis Mgmt
Trends

8

Role of Venture Capital

Economic Development	Nurturing Venture Capital	Ecosystem to Succeed
• Beyond financial asset class • Support Innovation & Entrepreneurship • Market creation of industries • Create new jobs & supporting industries	• Patient capital • Seasoned VC tend to be low profile & have seen many cycles • Talent diversity • Mentor-mentee	• Services ecosystem • Vibrant exchange • Consistent govt regulations & laws • Mobility of diverse int'l talent • Infrastructure

9

Summary: Food for thought on AI

- Highly dependent & trust on the data & AI models
- Management decision(s) based solely on such data outputs
- Still require human creativity, wisdom, social & ethics to balance AI technology
- Sustainable or just herd mentality or passing phase

10

DO It with a HEART

11

香港科技大學
THE HONG KONG
UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Panel Session:
Can Hong Kong reinvent itself as an Innovation-driven economy?

by Prof. Anthony B.L. Cheung &
Prof. Hong Lo &
Mr. Gary Liu

Moderated by Prof. Donald Low

1

Innovation

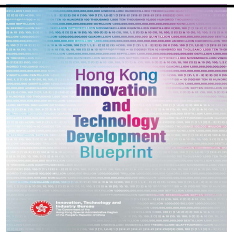
"Innovation policy: what, why, and how", by Jakob Edler & Jan Fagerberg, *Oxford Review of Economic Policy*, Vol. 33, No. 1, 2017

- Innovation is not primarily about generation of new ideas, the traditional focus of science and research policies, but trying **to exploit such ideas in practice** in order to enhance **competitiveness** and respond to problems or challenges that arise.
- To **transform** economies and cope with societal challenges through innovation, policymakers may need to **adjust their instrumentation.**
- An effective innovation policy needs to place **emphasis on supporting experimentation, implementation, and exploitation [i.e., start-ups]**, particularly at an early stage, while at the same time allowing different approaches to the solution of a problem **to co-evolve and compete**.
- Innovation is not only relevant in a narrow range of science-based (or high-tech) activities or in manufacturing industry but may be **a potent force of change in all parts of society** including, e.g., services industries, creative industries, and the public sector, or in the form of social innovation.

2

2022 I&T Development Blueprint

Mission: A diversified economy, quality jobs, quality of life, national needs



4 broad directions

- Enhance the **I&T ecosystem** and promote 'new industrialisation'
- Enlarge the **I&T talent pool**
- Promote **digital economy** development and develop Hong Kong into a **smart city**
- Proactively **integrate into overall development of nation [China]** and consolidate role as a bridge connecting Mainland and the world

8 Major Strategies

- ❑ To enhance the I&T ecosystem and promote interactive development of the upstream, midstream and downstream sector
- ❑ To promote technology industry development and achieve 'new industrialisation' in Hong Kong
- ❑ To diversify venture financing channels and support the development of start-ups and industries
- ❑ To promote I&T culture for all and enhance the overall I&T atmosphere in the community
- ❑ To enrich I&T talent resources and develop an international talent hub
- ❑ To accelerate the development of digital economy and smart city to enhance citizens' quality of life
- ❑ To deepen I&T co-operation with Mainland for better integration into the overall national development
- ❑ To leverage Hong Kong's advantages as an international city to foster global I&T collaboration

3

HK's hub advantage

- As a **global financial centre**, HK is not short of entrepreneurs and capital.
- As a **hub of world-class universities**, it is not short of top-notch researchers in science and technology.
- Yet, as of now, HK faces a **bottleneck** in the three principal factors of supply: Labour, Land, and Capital.
- HK businesses have excelled more in trading, real estate and finance in the past. There lacks a tradition of science & technology-based industries. Hence **need to re-industrialize**.
- HK presently faces the challenge of **adverse geopolitics**, including escalating US-China conflict resulting in sanctions / restrictions and constrained opportunities.
- A 'blessing in disguise', ironically, is the **relocation of Chinese scientists & researchers** from a less-welcoming US to HK.

4

New Policy Packages

- Policy packages have been rolled out by the current administration to lure external investment, attract foreign and mainland talent, and enlarge labour imports.
- Ambitious plans abound for new infrastructure, reclamation and a new Northern Metropolis, as well as expanding STEM education to support and nurture an innovation and technology hub.

Questions:

1. Are we **attracting the right talent** worldwide?
2. Are we doing enough to **retain talent** and halt the brain drain?
3. Are we grooming **the right productivity** through education and training?

5

Why is HK lagging behind other hub cities?

(HKUST-led SPPR findings, 2022)

- HK's universities have not been delivering comparable results to research universities active in R&D and KT in hubs elsewhere, despite ranking among the world's top 50 and excelling in basic research.
- **Should Public Research Universities in HK take up a pioneer/driving role** in accelerating the development of a global I&T hub in the GBA?
- **If so, how?** (a) University-specific support & rewards, (b) government policy directions, (c) reshaping and restructuring the eco-system
- **Building a vibrant innovation ecosystem** - universities are vital but need a strong **G-I-U (官產學) collaborative regime**. **Re-envision and Reconnect!**
- **Government** to invest in R&D and education **+ Major private sector initiatives**. Pooling of risks?

6

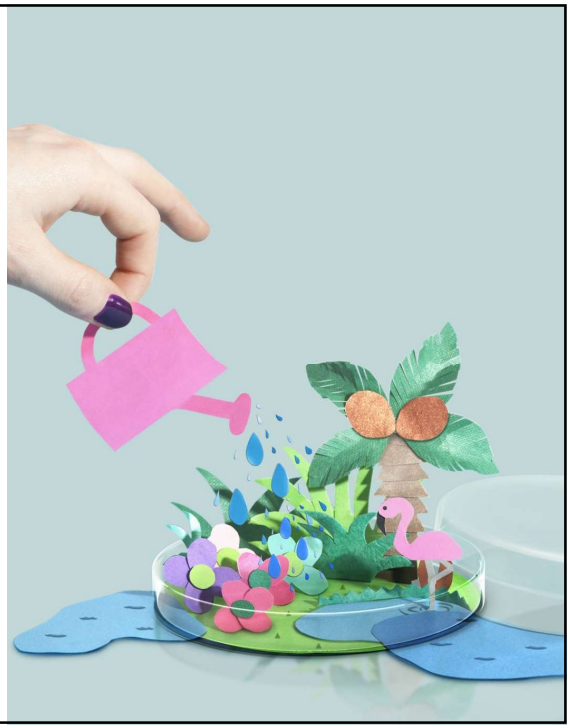
3rd Economic transformation towards industrial revolution 4.0

- Leveraging **existing strengths:** 'Innovation' to be integrated with HK's best – financial, business, professional and social services, grounding productivity in higher-end and high value-added activities
- **People, Market & Location**
- **'Can do' entrepreneurial spirit** as an outlier and adventurer (敢為天下先)
- **Between China and the World:** New basis of 're-industrialization' and 're-intermediation'?
- What **critical value** can HK add to a rising China in Innovation & Technology? Regional collaboration within GBA
- Does HK still enjoy strong **linkage to the West**?
- **Is international business and investment community** still confident in HK's future prospect and in 'one country, two systems'

7

To reinvent HK as an innovation-driven economy, we need more than money and talent

- What has been lacking is a vibrant **innovation ecosystem** that provides conducive space for creativity and the right incentives.
- The **market force** is still primary. The question is whether **private firms** see promising prospect in innovation investments.
- The 'collective' (and risk pooling) nature of innovation requires **government** to play a more proactive role in R&D and education



8

Innovation is not just about promoting science & technology

- A ‘smart city’ is not just a digital city. Innovation also entails social renewal and transformation.
- We need a new generation of talent with critical thinking and strong adaptability in a fast-changing world.
- The creative capacity to groom innovation calls for breaking boundaries and challenging paradigms and orthodoxies.
- An eco-system that is intellectually uptight and does not tolerate failures is not conducive to innovation.

9

Can Hong Kong reinvent itself as an innovation-driven economy?

Hong K. Lo
Dean of Engineering
Director of GREAT Smart Cities Institute
Hong Kong University of Science and Technology

An innovation-driven economy

An innovation-driven economy is characterized by a strong emphasis on research, development, and the application of new ideas, technologies, and processes to drive economic growth and competitiveness. It is an economy that fosters and encourages innovation as a key driver of productivity, prosperity, and sustainable development.

Key Ingredients

1. **Knowledge Creation and Research**: An innovation-driven economy places a high value on knowledge creation and invests in research and development (R&D) activities.
2. **Entrepreneurship and Start-up Culture**: The presence of a vibrant entrepreneurial ecosystem and a culture that supports risk-taking and experimentation is crucial for an innovation-driven economy.

Key Ingredients

3. **Intellectual Property Protection**: A robust legal framework for protecting intellectual property rights is essential to incentivize innovation.
4. **Access to Capital**: Access to diverse sources of capital, such as venture capital, angel investors, and public funding, is vital for innovation-driven economies.

Key Ingredients

5. **Skilled Workforce and talent development**: An innovation-driven economy requires a skilled and adaptable workforce capable of driving technological advancement
6. **Collaboration and Networking**: Collaboration and networking among various stakeholders, including businesses, academia, research institutions, and government agencies, are essential for fostering innovation.

Key Ingredients

7. **Supportive Regulatory Environment**: A flexible and supportive regulatory environment encourages innovation by minimizing bureaucratic hurdles, facilitating experimentation, and adapting regulations to accommodate emerging technologies.

Key Ingredients

8. **Infrastructure and Digital Connectivity**: Adequate physical and digital infrastructure, including transportation networks, communication systems, broadband connectivity, and data infrastructure, are fundamental for supporting innovation and enabling the efficient flow of information, ideas, and technologies.

Key Ingredients

9. **Government Support and Policies**: Government support through policies, incentives, and funding plays a crucial role in promoting an innovation-driven economy. continuous improvement.
10. **Market Demand and Customer Orientation**: Innovation-driven economies prioritize market demand and customer orientation.

Example: developing a novel traffic control system

Ingredient	Rating
• Knowledge Creation and Research	
• Entrepreneurship and Start-up Culture	
• Intellectual Property Protection	
• Access to Capital	
• Skilled Workforce and talent development	
• Collaboration and Networking	
• Supportive Regulatory Environment	
• Infrastructure and Digital Connectivity	
• Government Support and Policies	
• Market Demand and Customer Orientation	

Will Fintech make the world a better place?

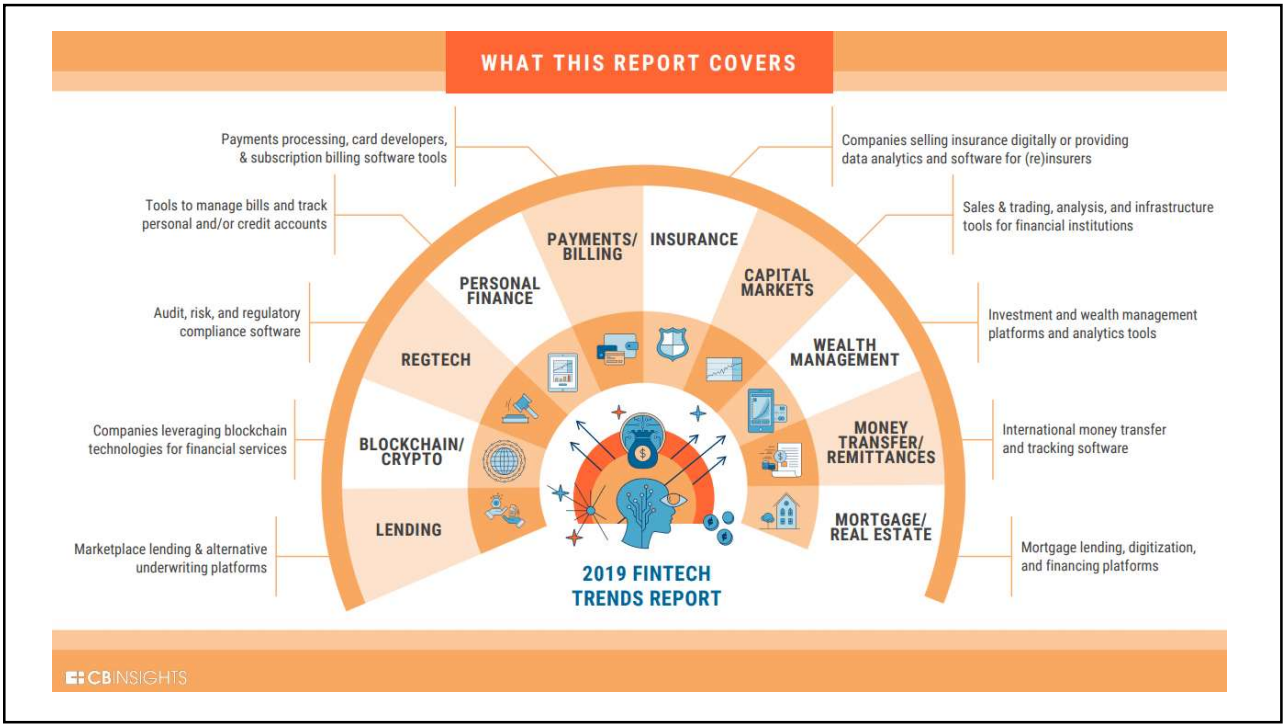
Donald Low
Professor of Practice in Public Policy
Director, Leadership and Public Policy Executive Education
Hong Kong University of Science & Technology

1

The Key Issues

- What benefits does fintech bring? Do the benefits outweigh the costs?
- Which parts of finance are most vulnerable to disruption? Are these disruptions beneficial to society?
- Why does Big Tech want to go into finance?
- How should governments and public policies respond?

2



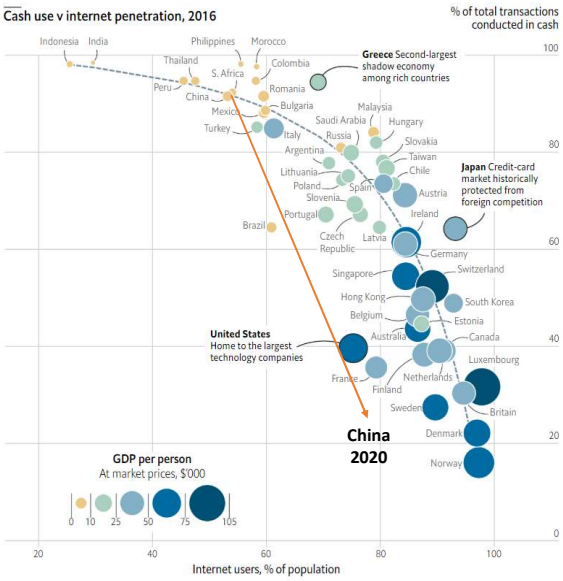
3

A brief overview of Fintech and why it matters

- **New financial technologies**, and the companies built around these technologies, are **improving the execution of many basic functions of a financial system – payments, savings and credit, investment, and insurance**.
- The developments have the potential to increase the efficiency, inclusion, and stability of financial markets, but they could also create new risks and/or amplify prevailing ones.
- The **structure of financial markets and institutions will also be affected**. For instance, traditional commercial banks could face challenges to their business models as fintech shifts the balance of power between them and new forms of intermediation by non-banks and even non-financial institutions.
- These changes to finance are important because commercial banks play a crucial role in money creation and all economic activity. Banks themselves could adopt new financial technologies and become more efficient, but there is also **the prospect that some of these technologies would undermine their traditional roles and their sources of revenue**. Fintech thus affects the relative importance (and even the viability) of traditional banks; it therefore has implications not only for financial markets, but also for economic activity and monetary policy.
- **A common theme that links the new entrants to finance is their use of digital technologies and their largely online existence; another theme is their extensive use of big data, machine learning, and AI tools to automate the application, screening and approval processes involved in the provision of credit, insurance, and other financial products.**

4

Fintech started in developing countries with mobile money and digital payments



5

China's Retail Payment Transformation

- In 2004, Alipay was created initially as an online payment system for Taobao, an online retail platform by Alibaba.
- At a time when online commerce was in its infancy in China, the lack of trust between online buyers and sellers was a major impediment. Alipay was designed as a (trusted) third party that would hold the money paid by a buyer and release it to a seller only after the buyer confirmed receipt of the product.

- Alipay's success in resolving the lack of trust between transacting parties resulted in its rapid growth, which led to its adoption on other platforms outside the Alibaba ecosystem.
- Alipay's success also inspired competition, most notably WeChat Pay – the payment function of WeChat, a social network system set up in 2011 by Tencent. In 2014, at the time of the Chinese New Year, WeChat introduced a feature for giving virtual red envelopes. In 2017, 47 billion red envelopes were sent over the CNY period.

- A key feature of Chinese digital payments, in addition to their ease of use and high reliability, is their low cost. This makes such payments viable even for micro-scale transactions.
- The fee paid by merchants Alipay and WeChat Pay is nominally 0.6 percent of the transaction amount, and discounts on large volumes imply that the actual fees average out to about 0.4 percent of transaction amounts. This is in stark contrast to the high costs of retail payments in the US, where credit cards (which dominate payments) usually charge 2.5–3 percent of the transaction amount plus a monthly fee.

6

Benefits of mobile money

- In low and middle-income countries, mobile money has given a large share of the population access to the formal financial system by enabling individuals to conduct basic banking transactions (e.g., payments, savings, obtaining credit) and access to simple financial products using personal handheld devices. This promotes **financial inclusion**.
- Second, payment has become a form of **identity**. The phone number connected to a specific M-PESA account, for instance, uniquely identifies an individual for the purpose of conducting a broad range of financial transactions. This creates a secure channel for the easy transfer of social payments to households as well as household payments for governmental services and taxes with less risk of corruption.
- Allows governments to **reduce money fraud and tax evasion**.
- Mobile money can also provide a **low-cost conduit for cross-border remittances and payments**. This is typically a costly operation as it involves not just exchanging one currency for another, but also moving money across borders.

Some Concerns

- Mobile money could provide a channel for the transfer of funds related to illicit activities. This risk is mitigated to some extent by the traceability of any transaction that is electronic, which acts as a deterrent.
- Cash is anonymous; mobile money isn't and could allow governments and tech companies to snoop on people's shopping habits and exploit their personal data.
- Digital access may not be universal.
- Mobile money should be more secure and less vulnerable to theft, but electronic payments systems may be vulnerably to technical failures and cyber-attacks.

7

Fintech Intermediation

- Fintech has helped to create alternatives to banks as sources of loans. Models of peer-to-peer lending that link businesses directly to households and investors, thereby circumventing traditional financial intermediaries, show promise, but banks still dominate credit markets in most countries.
- **Digital banks (or challenger banks)** are typically (mostly if not entirely) online operations that offer fee-free accounts, with no minimum balances and issue debit and credit cards to their members. They have their own banking licenses.
- Their limited physical presence give digital banks a cost advantage compared to traditional banks. They also eschew many of the fees that traditional banks charge – such as fees for monthly account maintenance, overdrafts, transfers, non-sufficient funds, and ATM transactions – all of which disproportionately affect accounts with low balances.
- **Peer-to-Peer Lending (P2P lending)** allows individuals and investors to invest in specific, usually unsecured, loans. In November 2019, the Chinese government gave all P2P lending platforms a two-year deadline to become small-loan providers under more direct oversight.
- **Insuretech** companies seek to use technologies such as AI to make insurance products simpler and more accessible, e.g., sharing economy platfroms such as Airbnb, Uber and Grab provide homeowners/drivers with short-term, micro-insurance policies.

8

Hong Kong's virtual bank licenses

	Banking	Financial Services	Digital Finance	Insurance	Technology	Retail
Livi VB	中国银行 BANK OF CHINA				JD 京东数科	Jardines
SC Digital Solutions	Standard Chartered				PCCW HKT	Ctrip 携程
ZhongAn Virtual Finance				眾安國際 ZA International		
Welab Digital			WeLab			
Ant SME Services (Hong Kong)			蚂蚁金服 ANT FINANCIAL			
Infinium	ICBC	HKEX			Tencent	新世界發展有限公司
Insight Fintech HK		AMTD			mi	
Ping An OneConnect				中国平安 PING AN		

9

SINGAPORE DIGITAL BANK LICENSES: WHAT SINGAPOREANS NEED TO KNOW

FULL BANK LICENSE	FULL BANK LICENSE	WHOLESALE BANK LICENSE	WHOLESALE BANK LICENSE
Grab Singtel	sea	蚂蚁集团 ANT GROUP	绿地集团 GREENLAND GROUP Linklogis Beijing Co-operative Equity Investment Fund Management

Here's all you need to know about the digital bank licenses...

SeedlyReads

10

Big Techs

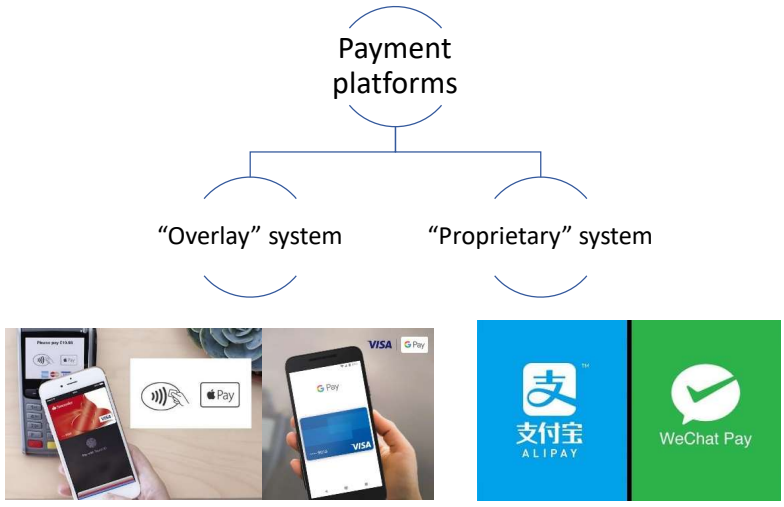
- Large companies with established technology platforms.
- Key features of their business model are data analytics, network externalities and interwoven activities.
- Enable direct interactions among many users through online multi-sided platforms (social network, e-commerce and search engine) and produce a large stock of user data that can be used to offer a range of services
- Increasingly moving into financial services: (1) payments, (2) money management & insurance and (3) lending.

11

Financial services by big tech

1. Payments

- Payments were the first financial service big techs offered.
- Big techs' payment platforms are of two types: overlay and proprietary
- Big Techs' payment platforms both compete with and rely on commercial banks.
- Potential entry to remittance services and cross-border retail payments.



12

Financial services by big tech

2. Money Market Funds and Insurance

- Big techs offer money market funds (MMFs) as short-term investments on their platforms since most of their customers maintain a balance in their accounts.
- These funds are managed by:
  - Companies affiliated with big tech firm;
  - Third parties
- By analyzing their customers' investment and withdrawal pattern, big techs can closely manage the MMFs' liquidity, which allows them to offer users the possibility to invest (and withdraw) their funds instantaneously.
- MMFs offered trough big tech platforms have grown substantially, e.g., within five years (by 2019), the Yu'ebao money market fund had assets over CNY 1 trillion (157 billion) and around 350 million customers.
- Some big techs (Uber, Airbnb, Grab, Lyft) have started to offer insurance products. They use their platforms as a distribution channel for third-party products, including auto and health insurance. They collect customer data, which they can combine with other data to help insurers improve their product marketing and pricing strategies.

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Financial services by big tech

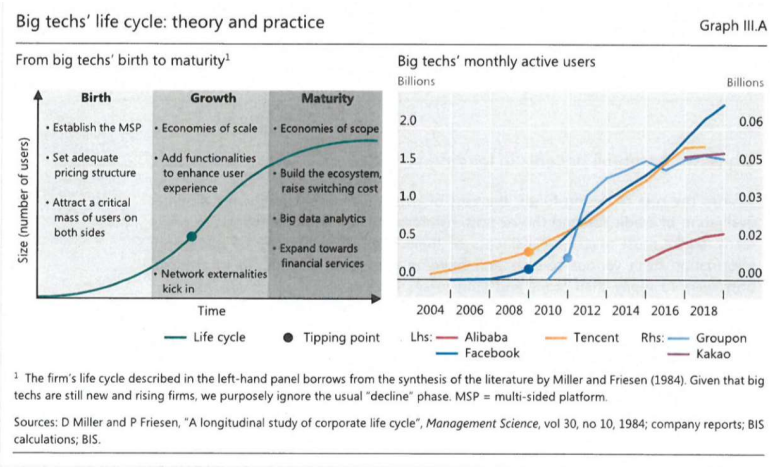
3. Credit Provision

- Due to big tech's e-commerce platforms, some of them have entered the lending market, mainly to serve SMEs and households. Typically, loans are small with short maturity (up to one year).
- Big techs have expanded strongly in jurisdictions with lighter financial regulation and higher banking sector concentration.
- Despite substantial recent growth, total fintech credit still constitutes a very small proportion of overall credit. Even China, which has the highest amount of fintech credit per capita, the total flow of fintech credit amounted to less than 3% of total credit outstanding to the non-bank sector in 2017.
- Big techs' relatively small lending footprint reflects their limited ability to fund themselves through retail deposits. What options do they have if they wished to increase lending:
  - Establish an online bank (e.g., MYbank and WeBank)
  - Partner with an established bank: Big techs provide the customer interface and undertake loan approval using data analytics, while the bank provides the funds and manages the loan.
  - Obtain funds through loan syndication or securitisation, already a common strategy among fintech firms, e.g., Ant Financial's gross issuance of exchange-traded. asset-backed securities accounted for almost one-third of securitization in China in 2017.

14

How do big techs grow?

- Big techs create value as multi-sided platforms (MSPs) that enable interactions between two or more groups of users, e.g., social networks, e-commerce, and search engines.
- An essential feature of MSPs is the presence of **network externalities**: the fact that users on one side of the platform attract users and increase benefits on the other side. To attract users, platforms typically charge a low fee. This solves the chicken-and-egg problem and gives rise to a self-reinforcing dynamic.
- What makes these platforms unique is the convergence of three factors: **network effects**, collection of personal **data** on a large scale, and many adjacent **activities**.



→ **Increasing returns to scale; economies of scope**

15

Why would big techs expand into banking?

Advantages (+) and Disadvantages (-)

	Large banks	Big techs
Data	(+) Verifiable/reliable customer data with a long history; high importance of data privacy ensures customer trust (-) Relatively small number of customers	(-) Mix of verifiable and potentially less reliable data; shorter history of customer data; lower priority on data protection and privacy. (+) Data on a large number of customers
Network	(+) Various financial activities and services already provided (-) Strict regulatory limits on activities and data usage	(-) Network externalities require a large customer base (+) Significant network externalities due to wide range of non-financial activities and captive ecosystem with potentially high exit costs
Activities	(+) Experience in high-margin and complex products and risk management; wider range of financial services; access to cheap funding sources. (-) Activities limited to financial services	(-) Limited role in key financial services (+) (Near-) zero marginal costs in providing low-cost financial services; existing activities yield data that can be used to support new services (i.e. high economies of scope)

16

Why would big techs expand into financial services?

Big techs' potential benefits in lending activities

- Besides the cost of raising funds, the cost of lending is closely tied to the *ex ante* evaluation of credit risk and the *ex post* enforcement of loan repayments.
- To price loans, banks assess the riskiness of their borrowers, usually by gathering information from various sources and building relationships. The central problem here is one of information asymmetry, so to prevent the risks of default, banks monitor borrowers and require collateral.
- If the information cost is prohibitive, banks refrain from serving borrowers (e.g., those with no collateral, the unbanked, MSMEs those with no credit history or audited financial records) or do so only at very high spreads. But high spreads create another problem: adverse selection.
- Big techs have a competitive advantage over banks and serve firms and households that would otherwise have limited access to credit. Big techs do so by tapping different but relevant information though their digital platforms.
- In monitoring borrowers, big techs use the big data available of their platforms, e.g., transactions, reputation, industry-specific characteristics, social media and other channels. They can also use deduct the monthly payments on a credit line from the borrower's revenues that go through its payment account. And given their network effects and high switching costs, big techs can enforce loan repayments by the threat of exclusion.

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Why would big techs expand into financial services?

Big techs' potential costs: market power and misuse of data

- Big techs' role in financial services brings efficiency gains and financial inclusion, but the very features that bring benefits also have the potential to generate new risks and costs associated with market power.
- Once a captive ecosystem is established, competitors have little scope to build rival platforms. Dominant platforms can raise entry barriers, exploit their market power and network externalities to increase users' switching costs or exclude potential competitors.
- Big techs could **favor their own products or try to obtain higher margins** by making financial institutions' access to prospective clients via their platforms more costly. Other anti-competitive practices could include "product bundling", cross-subsidizing activities, or raising switching costs.
- Another, new type of regulatory risk is the **anti-competitive use of data**, i.e., the rise of data or digital monopolies. Once their dominant position in data in established, big techs can engage in price discrimination and extract rents. They may use their data not only to assess a potential borrowers's creditworthiness but also to identify the highest rate/premium the borrower would be willing to pay for a loan/insurance.
- The scope for influencing and manipulating consumers' preferences is greatly expanded because of big techs have much richer consumer information and their deeper integration into consumers' everyday lives.

18

Is the Fintech revolution beneficial for society?

- The fintech revolution touches every aspect of financial markets and institutions. It carries the prospect of **democratizing finance** by providing the economically less privileged with cheap access to the financial system. Fintech promises to deliver, and has begun to deliver, lower costs and more efficient financial intermediation.
- The rise of new types of nonbank financial institutions has helped to create **new products** for savers and borrowers. But whether these institutions will displace commercial banks is not conclusive at this stage.
- New technologies will improve financial inclusion, giving lower-income households access to financial services and products at lower cost, and provide **easier access to credit**. The need for collateral could become less important if banks and other lenders were to have better ways to access credit risk, lowering an important barrier to small-scale entrepreneurial activity.

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Is the Fintech revolution beneficial for society?

- Developing countries, especially middle-income countries with rapidly growing middle classes (like China and India), have taken the lead on many fintech innovations. Why?
  - First, by adopting new technologies rather than build on prevailing ones, they can **leapfrog** advanced economies.
  - Second, the sheer **size** of their markets makes it possible to scale up services that can yield significant profits even if the margins per transaction are minimal.
  - Third, in some cases, there are **no powerful incumbents** to thwart progress, unlike in advanced economies where the political clout and market dominance of incumbents make it harder for new entrants.
  - Fourth, government officials and regulators in developing economies seem to have accepted that the **benefits of innovations** that provide easy access to financial services to vast swaths of previously under-served populations are worthwhile enough to accept certain risks.

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Is the Fintech revolution beneficial for society?

How should public policy respond?

- But as new institutions intrude on the business areas of traditional banks, they will also take on some of the **financial risks** associated with those activities. Some new business models are untested and could add stresses to the financial system, especially in difficult times.
- New firms with non-traditional products could fall through **cracks in the regulatory system**, leaving customers who do business with them exposed without the protection of government-mandated safety nets.
- The suitable role(s) the government ought to play in relation to fintech is a complex matter. In advance economies, including the US, regulation has tended to protect incumbents and limit competition. Network effects and outdated antitrust regulation enabled the ascendancy of Big Tech firms – Amazon, Apple, Facebook, Google – that dominate their respective spaces and gobble up any competitors they cannot squash.
- The US financial system does not suffer from such extreme concentration, but stringent regulatory requirements have created barriers to entry in financial markets and kept competition in check.

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Is the Fintech revolution beneficial for society?

How should public policy respond?

- By contrast, lax regulation in some countries has created room for the unfettered entry of firms with innovative financial products and services. But, as we saw in the case of China, network effects can create new titans that not only undercut existing incumbents (probably a good outcome), but also hinder newer entrants (a clearly bad outcome).
- Financial supervisory and regulatory frameworks will need to adapt and evolve quickly to manage the risks that shift to new and under-regulated parts of the financial system.
- Another policy concern is **privacy and data protection**. The digital nature of transactions makes it easy to trace and keep track of a wide array of transactions. There are often few controls over or restrictions on how companies maintain or use the data they gather from their customers.
- In China for instance, while the state has imposed privacy protections that limit how fintech platforms can use data gleaned from their users, these run up against other state priorities. In 2014, the State Council proposed a social credit system to build a composite measure of creditworthiness that would underpin a “harmonious socialist society”. Given the pervasiveness of platforms such as Alibaba and Tencent in the lives of Chinese citizens, and the likelihood that these companies will not resist complying with any information demands from the government, it is conceivable that these platforms could one day become part of a broader surveillance mechanism.

22


TRT WORLD
China's
'Black Mirror'
nightmare?

23

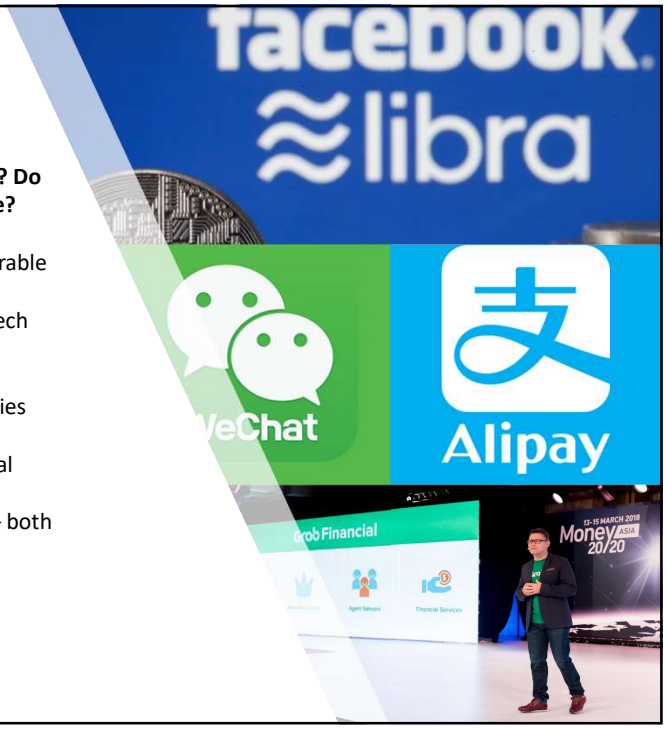

WHAT IS CHINA'S
SOCIAL CREDIT SYSTEM?

24

How should governments/central banks respond to the opportunities and challenges of fintech?

- **What should (financial) regulators be concerned about? Do new financial technologies make things better or worse?**
  - Financial stability; systemic risks
  - Financial inclusion; exploitation of financially vulnerable groups
  - Competition and monopoly power; conduct of fintech firms
  - Data protection and privacy
  - Money laundering and the financing of illicit activities

- These concerns do not just fall within traditional financial regulation; they also cut across regulatory domains *and* geographical borders. Coordination among authorities – both national and international – is crucial.



25

Why do central banks want to introduce a central bank digital currency (CBDC) for consumers?

1. A CBDC providers greater transactional efficiency than cash, making payments cheaper and quicker.
2. It can serve as a backstop to private sector-managed payment systems, avoiding a breakdown of the payment infrastructure during a crisis of confidence.
3. It helps to increase financial inclusion, providing low-income households and those in sparsely populated areas easy access to digital payments.
4. It may reduce counterfeit and illicit transactions (since physical cash is anonymous).
5. It can ease the zero lower bound constraint on monetary policy (i.e., it allows the central banks to set negative interest rates to "force" people to spend instead of save); it also makes it easier to engineer the central bank's "helicopter drops" of money.
6. It brings informal economic activity out of the shadow, broadening the tax base and reducing tax evasion.
7. Its traceability makes it hard to use CBDC for illicit purposes such as money laundering and financing terrorism.

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What are the regulatory challenges of big techs going in finance?

Big techs have the potential to become dominant in the financial market due to their advantages in the data-network-activities loop, but this may also create regulatory disparities between big techs and highly regulated financial institutions.

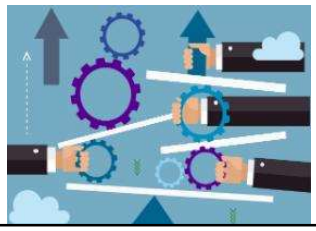
↓

Financial regulation

Big techs can raise entry barriers for potential competitors; they can make the price of using their platforms more costly to other financial institutions. They can also use 'product bundling' or cross-subsidize activities to attract/retain customers or raise switching costs.

↓

Competition policy



Big techs can use their data to engage in price discrimination and assess borrowers' credit-worthiness. Use of personal data can lead to the exclusion of high-risk groups from socially useful insurance markets or may create biases towards minorities and other excluded groups.

↓

Data protection and privacy

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The competition-financial stability nexus

1. New entrants are good because they challenge incumbents, increase inclusion and lower costs.

2. New entrants may undermine financial stability because they don't have the experience of capital buffers that incumbents do. Incumbents are more likely to be profitable and thus more able to accumulate a strong equity base.

"…the relationship between entry and effective competition is far from obvious when the DNA feedback loop is taken into account. New entry may **not** increase market contestability—and competition—when big techs are envisaged as the new entrants. This is because big techs can establish and entrench their market power through their control of key digital platforms, e.g., e-commerce, search or social networking**.** On the one hand, such control may generate outright conflicts of interest and reduce competition when both big techs and their competitors (e.g. banks) rely on these platforms for their financial services. On the other hand, a big tech could be small in financial services and yet rapidly establish a dominant position by leveraging its vast network of users and associated network effects. In this way, the rule of thumb that encouraging new entry is conducive to greater competition can be turned on its head."

"…the traditional focus of competition authorities on a single market, firm size, pricing and concentration as indicators of contestability is not well suited to the case of big techs in finance"

Bank of International Settlement Annual Report 2019 Chapter 3

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Public policy towards Big Techs in finance

"Same activity, same regulation"

Same regulation should be applied if big techs' activity falls within the scope of traditional financial regulation (e.g. banks)

Thinking across regulatory silos

Big techs' activities in finance warrant a more comprehensive approach that encompasses not just financial regulation but also competition and data protection/privacy objectives.

Competing policy objectives

The policy tools that serve financial regulation objectives may impinge on competition and data privacy objectives, and vice versa. The interactions produce potentially complex trade-offs that do not figure in traditional financial regulation.

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MAS regulatory sandbox

- Space for experimentation for innovative technology
- Failure(s) can be contained
- Overall safety and stability of the financial system is maintained

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What about blockchain technology and cryptocurrencies?

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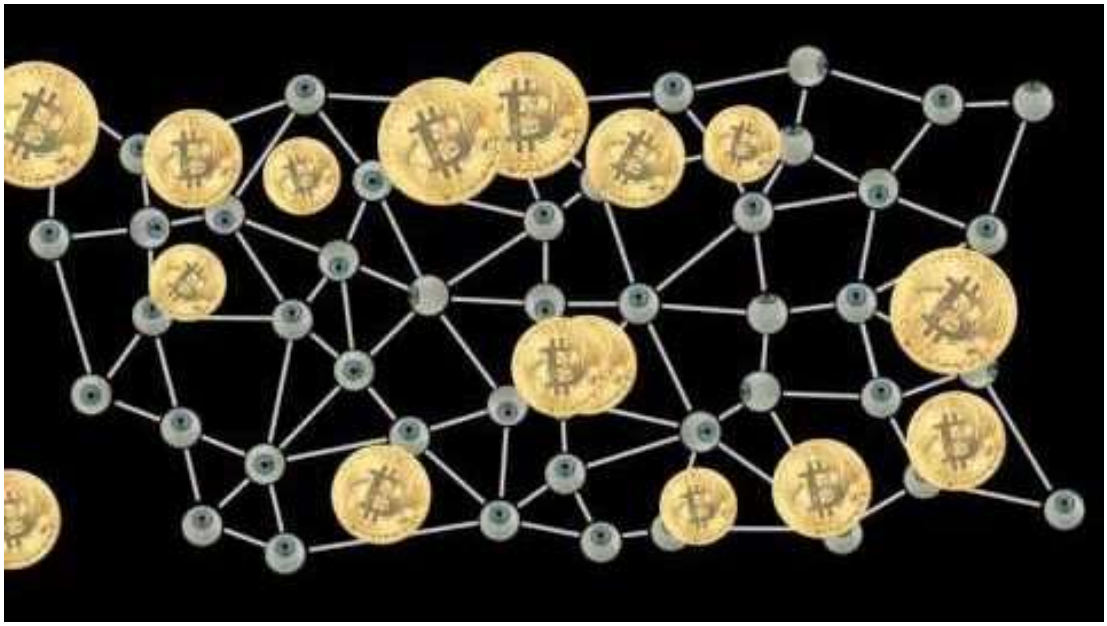

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What is money? What must an efficient payment system do?

- **Money serves three basic functions:**
  - As a unit of account
  - A medium of exchange
  - A store of value

- A unit of account is used to denominate the prices of goods and services , creating a concrete way to express value. A medium of exchange is something that can be used in financial transactions, including to buy goods and services. A store of value is a way to maintain the purchasing power of one's earnings or wealth over time.

- What is fiat money? What gives fiat money the value it claims to have?

- **What do we want from a payments system?**
  - It must provide a way of **identifying and connecting the parties** to a transaction;
  - It must **validate the actual transaction**;
  - It must make sure **the transaction is easily verifiable and immutable** (cannot be undone or changed later); and
  - It must **preclude double-spending of the same unit of money**.

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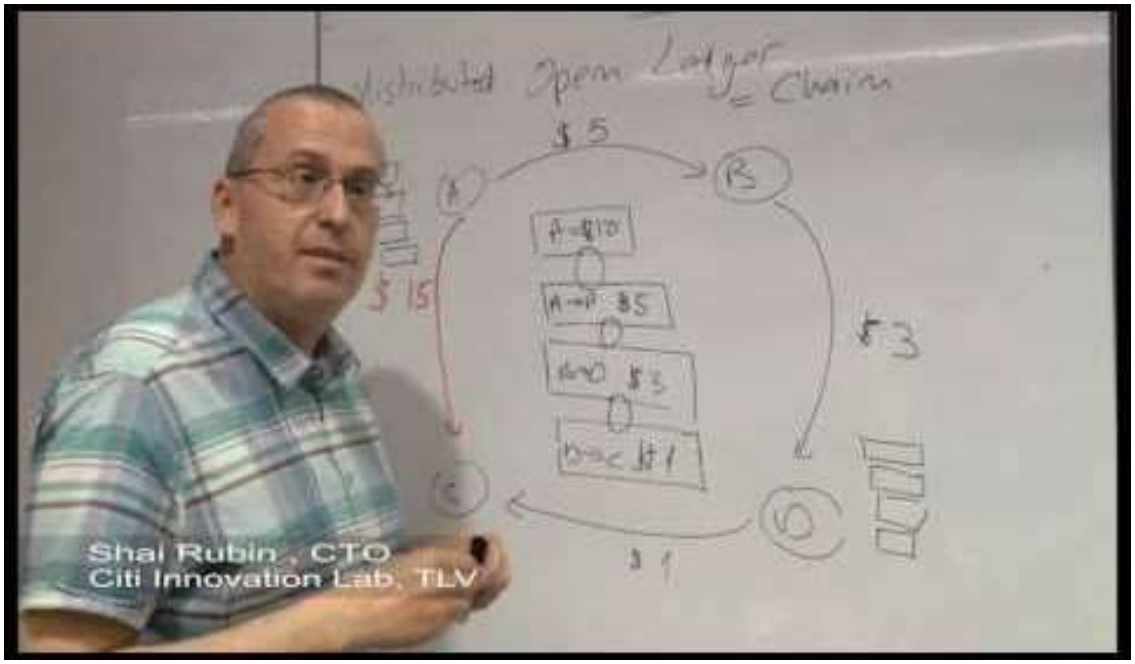

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Building blocks of Bitcoin

- The Bitcoin white paper (2008) notes that resolving the need for trust, which is inherent to a physical currency issued by a trusted third party (such as the central bank), is critical to any payment mechanism: "These costs and payment uncertainties can be avoided in person by using physical currency, but no mechanism exists to make payments over a communication channel without a trusted party. What is needed is an **electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party."**
- In other words, Bitcoin (and many other cryptocurrencies) was intended as a *medium of exchange* that would facilitate the execution of financial transactions outside the ambit of traditional institutions and government control, relying only on the digital identities of the transacting parties. The logic behind Bitcoin is that a form of **public consensus** – achieving agreement among participants in a distributed network – can replace trust in a central entity (such as a government or a commercial bank).
- Bitcoin seeks to remove trust in formal institutions – whether government or private (e.g., commercial banks) – and replace that with a **highly transparent public trust mechanism**. It building blocks are based on **cryptography**, which we normally associate with secrecy (rather than transparency).

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Building blocks of Bitcoin

- **Public and private keys** are the basic elements of the Bitcoin digital payment system. A digital coin is stamped with the public key of its owner; it would also be associated with the owner's private key to ensure that it has only one owner. To transfer the coin, the owner digitally signs the coin using his private key together with the public key of the next owner: the payment to whom he is making a payment. Anyone can electronically check the public keys of both transacting parties to verify the chain of ownership.
- In a typical cryptocurrency, each transaction is identified with a unique hash function, which allows for transaction information to be abridged into a standardized format that enables easy **verification**. A second element – a Merkle tree – allows the transaction information to be synthesized in a way that simplifies the verification process for even a large volume of transactions.
- Merkle trees have three benefits:
  - They enable easy verification of the integrity and validity of an entire block of data.
  - They require little memory or disk space since they compress a large amount of information.
  - Their proofs and management require only small amounts of information to be transmitted across networks.

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Building blocks of Bitcoin

Distributed Ledger Technology (DLT)

- DLT does not involve cryptography; it takes the form of electronic databases that are maintained simultaneously and synchronized across a number of nodes (computers) on a network. The network, which is composed of many nodes, has no central point of authority.
- Information on each transaction is sent to every node on the network to be **validated** and grouped into time-stamped blocks of transactions. **Each node maintains a copy of all transactions on the network**.
- DLTs are relevant not just for payments but also for other types of transactions. Electronic settlement systems are accounting ledgers where the ownership of assets is recording, and settlement is the process of updating the records of ownership of the assets that are being transferred. Payment is "settled" by decreasing the payer's balances and increasing the receiver's balances and updating the ledger accordingly.
- The transparency and decentralized nature of DLTs are essential elements of the technology's **security**. These is no central point of failure, making the network less vulnerable to cyberattacks; the loss of one or even a few nodes does not pose a threat to the integrity of the network at large. It is also difficult for a malicious agent to meddle with the distributed ledger as any changes to one copy of the ledger would be visible to the entire network.

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Building blocks of Bitcoin

- In theory, a DLT by itself could prevent double-spending by appointing one or a set of trusted parties to validate transactions and ensure that they could no be reversed. But Bitcoin accomplishes the twin objectives of validation and immutability without relying on a trusted third party. How?
- Owners of Bitcoin wallets transact directly with one another on the network. Each Bitcoin wallet is associate with a pair of keys – a public digital identifier of that wallet and a private key (a secret key known only to the owner of the wallet).
- What happens when Jack send a payment of one bitcoin to Jill? Bitcoin uses a **Proof of Work protocol** to accomplish its validation and immutability objectives. For the network to accomplish this without a third party, every block of transactions has to be validated by someone, and whole network then has to accept that as a valid block of transactions. This is what a public consensus means.
- The Proof of Work protocol requires miners (certain nodes in the network) to use their computational power to solve a randomly generated cryptographic problem in exchange for a financial reward (in Bitcoin). These problems are generated automatically by the Bitcoin algorithm, with no human intervention. Once a node solves the assigned problem, that solution is broadcast and confirmed by other nodes. The validated block of transactions is then appended to the existing public (or open) ledger and is available for anyone to view.

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Building blocks of Bitcoin

- The public ledger is called the blockchain as once the transactions coming onto the network are grouped into blocks of data and are validated, the blocks are then chained together. The process is simple – each block includes a hash of the preceding block, and each new block is linked to all the preceding blocks on the chain.
- What is the point of the Proof of Work protocol? It is to reduce fraud, increase security and enable trust in the payment system. Proof of Work is used to sequence the history of transactions securely while increasing the difficulty of tampering/altering data over time.
- An attacker who wants to double-spend any bitcoin would have to create alternative block of chain of blocks with a different transaction history. This would require enormous computing power, enough to overwhelm everyone else's on the network.
- Proof of work is what keeps the blockchain secure. Proof of work cannot be faked because it requires the deployment of actual computing power – clever programs or algorithms are of little use in solving cryptographic puzzles. While there have hacks into Bitcoin exchanges that have caused people to lose bitcoins from their digital wallets, the Bitcoin blockchain *itself* has not been successfully hacked.
- The rewards for validating a block are hardwired to fall over time as more bitcoins are mined. In this process, the number of generated rewards per block is halved (i.e. divided by two) to keep the total supply of bitcoins, which will never exceed 21 million from growing too fast. The cap on Bitcoin supply is seen as essential to preserving Bitcoin's value.

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Why has Bitcoin not lived up to its potential?

- If the blockchain technology is such a marvel, why hasn't Bitcoin replaced any currency in a significant way? And why hasn't it become a widely accepted medium of exchange, which was the original purpose?
  - **Unstable value**

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Why has Bitcoin not lived up to its potential?

- If the blockchain technology is such a marvel, why hasn't Bitcoin replaced any currency in a significant way? And why hasn't it become a widely accepted medium of exchange, which was the original purpose?
  - **Unstable value**
  - **Poor medium of exchange**: As interest in Bitcoin surged to new heights, the number of transactions grew faster than the network's ability to validate them all within a short period. This caused the speed of using Bitcoin to decline even as transaction costs rose. The built-in decline in the reward for mining discourages miners from performing the costly calculations needed to validate new blocks on the blockchain unless they receive a transaction fee.
  - Second, the rise in Blockchain transaction volume might prevent some transactions from ever being validated and posted. Proof of Work is thus a structural constraint on Bitcoin's effectiveness as a medium of exchange. By design, the level of difficulty of the computational puzzle adjusts automatically such the network can handle only about seven transactions per second,

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Why has Bitcoin not lived up to its potential?

- If the blockchain technology is such a marvel, why hasn't Bitcoin replaced any currency in a significant way? And why hasn't it become a widely accepted medium of exchange, which was the original purpose?
  - **Unstable value**
  - **Poor medium of exchange**
  - **Vulnerability to hacking and double-spending**: While the Bitcoin blockchain hasn't been hacked, some of the exchanges on which they are traded have been. Also the Proof of Work protocol is vulnerable to another type of attack, known as the majority or 51 percent attacks.
  - **Mirage of digital anonymity:** Bitcoin users have to reveal their identities and physical addresses to receive goods or services; their addresses cannot remain fully anonymous.
  - **Proof of Work damages the environment**: Mining requires ongoing purchases of hardware and an immense amount of energy consumption, both of which are environmentally harmful.
  - **Rising value of bitcoin is also based entirely on a fragile foundation of faith**: Unlike gold or oil, bitcoin has no intrinsic usefulness.
  - **No room for error**

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