



FUTURE DEVELOPMENT 2050

Research Proposal by Institutes of Science and Development, CAS
Venue: EASA, Salzburg, April 27, 2018



BACKGROUND

FRAMEWORK

WORKING GROUPS 1-5

WORKING MECHANISM

OUTPUT AND FUNDING



BACKGROUND

- **PROFOUND CHANGES IN S&T:** a new round of scientific and technological revolution and industrial change has incubated disruptive breakthroughs.
- **THE SOCIO-ECONOMIC IMPACT:** disruptive achievements have changed the economic and social structure at an unprecedented speed, bringing about economic, social, ethical, security and privacy challenges.
- **THE NECESSITY FOR COOPERATION:** one single country's effort is not enough. It calls for extensive international cooperation with an open attitude.
- **AIM OF THE PROJECT:** to carry out a cooperation between EASA and CAS, to build a global innovation ecosystem and inter-state cooperation mechanism.



- On February 5, 2018, the European Academy of Sciences and Arts (EASA) welcomed a delegation from the Chinese Academy of Sciences (CAS). Weiping Liu (Vice President of CAS) and Felix Unger (President of EASA) presented the two Academies and discussed future cooperation.
- On February 19, 2018, President Felix Unger wrote a letter to President Chunli Bai and delineated research concerns in the vision of the future development up to 2050.
- On April 19, 2018, Professor Klaus Mainzer visited Institutes of Science and Development, CAS, and gave a talk on the seminar of “Strategic Challenges from Artificial Intelligence”. President Pan Jiaofeng of CASISD gave an opening speech.





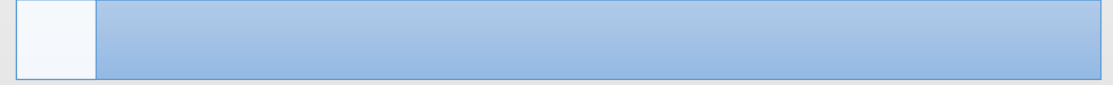
FRAMEWORK

S&T ITSELF



- ☐ The development trend of new technologies, focusing on digitalization, smart energy and AI.
- ☐ The characteristics and recognition methods of disruptive technologies, focusing on digitalization, smart energy and AI.

ITS IMPACT



- ☐ The influencing mechanism of new technologies on the whole human society and the way of life and production of human beings (education for example).
- ☐ The government intervention mechanism and governance structure to promote the development of new technology and its public policy tools.



WORKING GROUPS

**Work Group 1:
Digitalisation**

**Work Group 2:
Smart energy**

**Work Group 3:
Anthropocene: living
in our planetary
boundaries**

**Work Group 4:
Ethical
considerations in
new technologies**

**Work Group 5:
Artificial Intelligence**



WORKING GROUPS 1-DIGITALISATION

EASA

- A growing computer power. New super computers where China has already the most powerful computers of the world.
- The impact of quantum computers on the financial market and banks.
- The first who has the quantum computer is the winner.
- A software for artificial intelligence, a machine learning to handle a huge amount of data.
- Mega computers with new algorithms to detect new for science and technology.
- The new intelligence algorithms with application in exploring patterns of diseases and an advanced space technology.

CAS

- To study the global trends and features of digitalization, to investigate the global development pattern of key technologies, and to form a digitalization development strategy.
- The technologies concerned will not only limited to supercomputers, quantum computers, giant computers, artificial intelligence, deep learning and other digitalization technologies, but also emphasized on the integration of digital technology and intelligent technology, and to discuss the utilization of digitalization in medicine, space science, energy technology, smart cars and so on.

Size of Group: 8 people, 50 % of each Academy



WORKING GROUPS 2-SMART ENERGY

EASA

- Digitalization indicates an increasing consumption of energy, and calls for innovation in energy technology.
- The traffic and the mobilization will have a new impact, as the electric cars, generating environment and the issues of air pollution.
- Digitalization is changing the global economy and financial market with algorithm to enable predictive analytic profiles for the future products and costumers of the markets.
- Fast algorithm can decide in milliseconds on trade of stocks faster than the human brains.
- The block chain technology is to generate and to target liquidity to finance in our future.
- The intelligent infrastructures is challenging our mobility, the logistics, energy, industry and medicine. Influencing health, smart mobility, smart cities and smart grids.

CAS

- We fully agreed with the EASA recommendation that energy is a crucial issue in the development of digitalization and AI.
- Energy issue is not only an important arena for development and utilization of disruptive technologies, the development of disruptive technologies themselves will brought significant energy, environmental and sustainable issues.
- We believe that energy also needs to be “smart” to accommodate with the new technological revolution.

Size of Group: 8 people, 50 % of each Academy



WORKING GROUPS 3-ANTHROPOCENE: LIVING IN OUR PLANETARY BOUNDARIES

EASA

- We all on the globe are living in an Anthropocene, means that we are living with all our planetary boundaries.
- With increasing interconnection and challenge to integrate opposites. the future for China is in computer power and artificial intelligence.
- In parallel, the energy production must become smarter in order to realize China's ambitious scientific technology and economic targets.
- Education system has to be adopted to our new demands. new pedagogic features have to address the new situation and to make the students fit for our future.

CAS

- For this part of research, it will be more centred on the social and economic impact of disruptive technologies and its influence in the long term.
- we will study the prospects and challenges of the economic and social development of 2035 and 2050, China and the world, and focus on the penetration and support from digital intelligent technology in the different sectors of the society and economy, and reveal the wide influence and application of digital intelligent technology in economic and financial, energy environment, culture, education, information security, population health and etc.

Size of Group: 8 people, 50 % of each Academy



WORKING GROUPS 4-ETHICAL CONSIDERATIONS IN NEW TECHNOLOGIES

EASA

- Strategic planning of innovative development needs knowledge in the complex systems.
- Human dimension as on our ethics in sciences. All what we are doing in sciences are in respective to sustainability and lastly the effects to our human health.
- It's necessary in a global narrative to discuss the major basic elements of ethics by Confucius and the Christianity in an interreligious dialogue, important to understand the overall interconnectivity
- it's necessary to understand and to adapt our rapidly changing world and to invest sciences and coordination of natural sciences with social sciences and behavioral studies resulting out of the local traditions and attitudes.

CAS

- The dynamic changes of science, technology and social and economic systems have become rather complex, that the governance patterns need to be adjusted accordingly.
- We should pay more attention to the change and development of science and technology from the perspective of complex systems, and take into account a series of social governance, ethical laws, legal issues and institutional culture problems brought by the development of science and technology.
- It is necessary to push forward a coordinated development of the progress of natural science and technology, the development of social science and the evolution of human behaviour.

Size of Group: 8 people, 50 % of each Academy



WORKING GROUPS 5-ARTIFICIAL INTELLIGENCE

EASA

- Artificial Intelligence is demanded everywhere. The start has been with robotics. The applications are thousand fold, especially in medicine too.

CAS

- jointly driven by the mobile internet, big data, supercomputing, sensor networks, brain science, and under the driven force of new theories and technology and the strong demands for economic and social development, AI is developing rapidly with the characteristics of deep learning, cross-border fusion, human-machine collaboration, crowd intelligence, autonomic intelligence.
- Study the development trend of AI technology itself and its socioeconomic impact on economy, industry, labor market, education, health, security, etc.
- Concentrate on the legal, ethical, governance and policy issues engendered by the development of AI.

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CAN AI PERFORM WORKPLACE TASKS BETTER THAN HUMAN?

- Analysis of OECD's Survey for Adult Skills provided insights into the current AI capability with respect to human skills.
- Survey questions are responded by both computer and sampled adults in the measuring the skills of literacy, numeracy and digital problem solving skills.

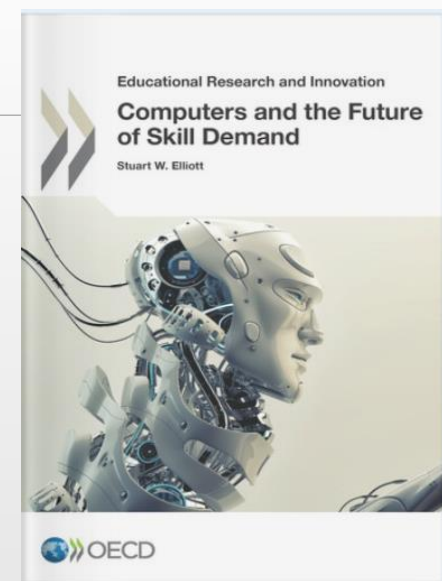
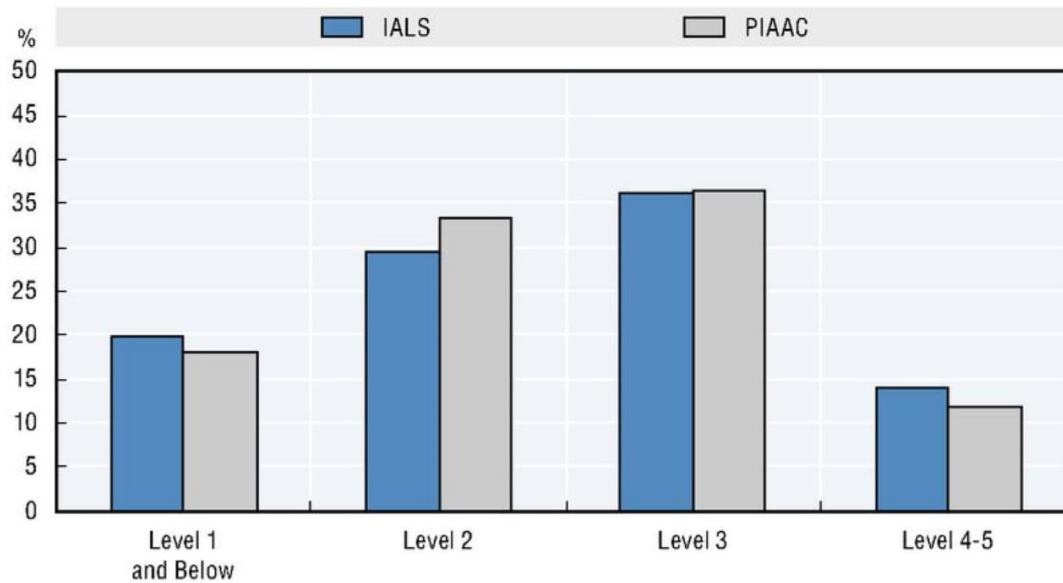


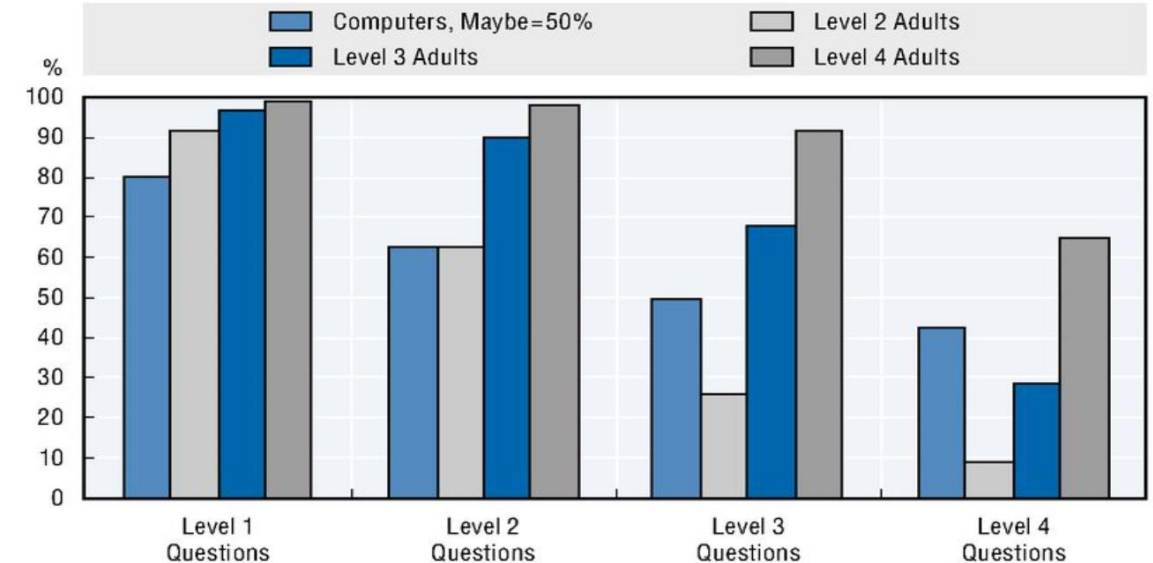
Figure 2.1. Distribution of adult population by level of literacy, IALS and PIAAC



Source: Annex A, Table A2.1 and International Adult Literacy Survey (1994-1998), and OECD (2016d), Survey of Adult Skills (PIAAC) (Database 2012, 2015), www.oecd.org/site/piaac/publicdataandanalysis.htm.

StatLink <http://dx.doi.org/10.1787/888933610632>

Figure 4.5. Comparison of computer literacy ratings with adults of different proficiency, using average rating with Maybe=50%, by level of PIAAC question difficulty



Source: Annex Table A4.5 and OECD (2016), Survey of Adult Skills (PIAAC) (Database 2012, 2015), www.oecd.org/site/piaac/publicdataandanalysis.htm.

StatLink <http://dx.doi.org/10.1787/888933610879>



WORKING MECHANISM



- **Responsibility:** CASISD as the platform to organize relevant research teams in China.
- **Measures:** Organizing the research team; define the research goal; organize the deliberation; consult and evaluate; participate in the research work.



- **Responsibility:** Establish a multi-level and regular mechanism for domestic discussion.
- **Measures:** Discussions on key time nodes and key research issues; exchange seminars at the research team level; intersections between research teams; consultative seminars on experts' opinions.



- **Responsibility:** Confirm the project leader, organize working groups and contacts, and build a research team respectively.
- **Measures:** Discuss the working mechanism; identify the research contents and division of labor.



- **Responsibility:** Establish a normalized international research and exchange mechanism.
- **Measures:** Participate in Danube Conference; President Unger's visit to CAS; Regular meetings of "Future World Development 2050" and a series of symposiums.



OUTPUT AND FUNDING

- Series of joint strategic reports on the topic of “Future development 2050”
- Joint declaration or initiative on the important issues of future technology and social development
- Research articles on development strategy and impact of new technology
- Regular meetings of “Future World Development 2050” under the brand of “Global Innovation Forum”
- It is suggested that CAS and EASA set up special research funds separately for their respective research work.



**Thank you for your attention
and look forward to
our cooperation!**

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