Mapping China's E-commerce related Research

An initial look at the opportunities for Sino-Danish collaboration

ICDK Innovation Project - December 2017

Foreword

The past few years has seen an unprecedented boom in China's e-commerce sector. During the 2017 Singles Day which was celebrated on 11 November (11/11) and has now become a global phenomenon, Chinese e-commerce giant Alibaba's total turnover reached more than $25 billion in 24 hours. This is more than the total yearly online sales in Brazil.

Given the size of the Chinese e-commerce market and the speed with which Chinese consumers are adopting these technologies, it may be interesting for Danish e-commerce-related research environments to explore new research opportunities focusing on China or involving Chinese partners. Hence, the purpose of this report is to present a preliminary glimpse of research undertaken in China within e-commerce related fields and, by doing so, inspire curiosity among Danish researchers who are not already working on China or with Chinese partners.

The report includes an overview of Chinese HEDU based research groups and the private (incl. state owned enterprises) R&D centers active in the field, i.e. including topics such as FinTech, logistics and communication in relation to e-commerce. Finally, a few expert interviews present examples of existing collaboration and indicate future directions.

We hope you will enjoy your reading and would be happy to arrange follow-up meetings in Denmark and study tours in China.

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Introduction

Overview and current market trends

China is the world's largest e-commerce market already. Over 40 percent of total global e-commerce spending comes from China. In 2015, China's online retail transactions reached $622.5 billion and this number is expected to reach $1.6 trillion before 2020. China's digital buyers accounted for more than 460 million already in 2015 and the number continues to increase, with 650 million projected in 2018. If the numbers hold true, China's e-commerce market will soon be larger than those of the US, the UK, Japan, Germany and France combined.[1]

The ICDK Shanghai perspective

China's expansion and development in e-commerce challenges and will potentially disrupt traditional value chains with consequences for how we understand the relationship between companies, suppliers, banks and consumers. This is happening already in China and is likely to eventually also influence markets in Europe and the US. Equally important, a growing number of Chinese companies, universities and government funded research institutions are working to develop new technologies and standards that may also eventually make their way onto the global market.

Given the size of the Chinese e-commerce market and the speed with which Chinese consumers are adopting these technologies, it may be interesting for Danish e-commerce-related research environments to explore new research opportunities focusing on China or involving Chinese partners. Hence, the purpose of this report is to present a preliminary glimpse of research undertaken in China within e-commerce related fields and, by doing so, inspire curiosity among Danish researchers who are not already working on China or with Chinese partners.

ICDK Shanghai would be pleased to engage in a dialogue with interested parties about how Danish-Chinese research and/or education collaboration might develop within e-commerce and related fields such as Fintech, logistics etc.

This report is part of an ICDK Shanghai project focused on mapping the commercial opportunities for cross-border e-commerce in China. The mapping can be found on www.chinaecommerce.dk.
For more information on the commercial aspects of e-commerce in China, please contact ICDK Shanghai's ICT Innovation Officer, Lu Yin: (+86 21) 8025 0628, luyinx@um.dk.

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[1] https://www.export.gov/article?id=China-ecommerce and http://www.dezshira.com/multimedia/view/overview-of-china-s-e-commerce-industry-5835.html

Actors and China's positions of strength

1.1 Government

The Chinese government has taken a very deliberate stance on promoting e-commerce in recent years. For instance by promoting investments in and establishment of special e-commerce zones, such as the China Hangzhou Cross-border E-commerce Comprehensive Pilot Area (Hangzhou is widely considered to be the e-commerce capital of China)[2]. Such initiatives are meant to stimulate the development of the industry and promote its internationalization.

At the same time, the government has also worked to streamline regulations to govern transactions in support of the consumer. Currently, however, many of these regulations are underdeveloped and the actual implementation vary from province to province; this may or may not change towards increased standardization in the coming years.

China International Electronic Commerce Center (CIECC) is the main organization under the Ministry of Commerce tasked to operate and serve as a platform for Chinese international e-commerce initiatives. As a state-level e-commerce organization, it promotes development and applications related to Chinese e-commerce, international cooperation and foreign exchanges of state-level electronic commerce. [3]

1.2 Research institutions

Many of China's leading research institutions have embarked on e-commerce related research. At the same time, new organisations are also being established. Below, three of the most prominent institutions are listed and briefly introduced. For a more comprehensive overview including universities active in the field, please see appendix.

Institute of Information Sciences (IIS) at Shanghai Academy of Social Sciences, established in Shanghai in October 1978, is an information think-

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[2] http://i.aliresearch.com/file/20161017/20161017163807.pdf
[3] http://en.ec.com.cn

tank specializing in social science research and academic information service. [4]

Institute of Information Sciences primarily studies the major theoretical and practical issues occurring during social and economic digitalization. It focuses on information resources, electronic management, information security, smart city, industry information, foreign social science trends and so on, studies and analyses the domestic and foreign new theories and ideas, and provides multilayer and multiform cutting-edge information services for the governments, enterprises and public institutions.
Previous cross-border e-commerce research projects include "Cross-border E-commerce as a Game Changer for SMEs in BRICS Countries" and "UNIDO Initiates E-commerce Policy Framework and Industry Alliance for BRICS".

China E-commerce Research Center (CECRC) was founded in Hangzhou in 2006. It focuses on the e-commerce service industry. In recent years, it has published an award-winning e-commerce data report (including national statistics) in collaboration with the National Development and Reform Commission as well as with the Ministry of Commerce, and the Administration for Industry and Commerce.[5]

Alibaba Research Institute (ARI) is established by Alibaba, the world's largest e-commerce platform. Alibaba has announced that it will spend $15 billion over the next 3 years on research in quantum computing, artificial intelligence and other emerging technologies supporting their e-commerce business. ARI looks overseas for R&D collaboration opportunities. Its investments include the creation of DAMO [Discovery, Adventure, Momentum and Outlook] Academy to attract world-class talent, build partnerships and open research laboratories in seven cities around the world.
In China, ARI is already an active research institution focusing mainly on applied research, which also includes organising public events and publishing reports on e-commerce related topics. ARI's focus areas include:
- Information Economy and new commercial paradigms
- Business model innovation, C2B and future organization model
- Internet-enabled study of industries, such as e-commerce logistics or rural e-commerce
- Internet's influence on consumption, employment, investment, import and export
- Internet management, internet regulations, e-commerce legislation etc.

1.3 Universities
A list of relevant e-commerce university institutions can be found in the appendix, though nine universities stand out in China under the "C9

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[4] http://english.sass.org.cn:8001/index.jhtml
[5] http://www.100ec.cn

League" tag, which is a Chinese pendant to the American "Ivy League" universities. The universities include Tsinghua University, Peking University, Zhejiang University, Nanjing University, Fudan University, Shanghai Jiao Tong University, Xi'an University, University of Science and Technology of China and Harbin Institute of Technology. These universities enjoy special treatment by the government, in terms of additional funding and placement of national key laboratories.

In terms of e-commerce research, the amount of e-commerce research centres has been increasing in recent years. This trend seems to be supported by national policies for digitalization in all aspects of society, as well as a high focus on research into emerging technologies. Specifically, the "Made in China 2025"[6] and the "Internet Plus"[7] initiatives have put this on the agenda. The "One Belt One Road"[8] initiative is often utilized as an instrument for cross-border related e-commerce research. This year alone, centres have been opened at universities like Xi'an Eurasia University, Sichuan Technology and Business University and Fujian Normal University.

Wuhan University is leading in e-commerce publications, which partly can be attributed to their yearly e-commerce conference "Wuhan International Conference on E-business"[9].

Tsinghua is also at the top in terms of the amount of e-commerce publications, and in addition to that, they manage the National Engineering Laboratory for Electronic Commerce Technology, thus enjoying a high national status and political goodwill.

1.4 Research impact

The research output from Chinese universities in e-commerce related fields is growing. According to an all-time search of "e-commerce" on Web of Science, in aggregate Chinese researchers published 3035 articles compared to 28 in Denmark. However, the highly cited & hot ratio per publication is higher for the Danish publications compared to their Chinese counterparts. The ratio reached 3.5% for Danish papers, compared to 0.3% for Chinese papers. A Danish paper is thus 12 times more likely to be highly cited, than a Chinese publication. A similar situation is seen across other fields of science where China's vast research resources are producing an ever-growing number of publications, without being among the most cited articles. In some fields, however, this is slowly changing, which is mostly the case within the natural sciences.

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[6] https://www.csis.org/analysis/made-china-2025
[7] http://english.gov.cn/2016special/internetplus/
[8] http://english.gov.cn/beltAndRoad/
[9] http://www.whiceb.com/

Table 1 shows the percentage of Chinese published e-commerce research articles by organisation. With Wuhan University accounting for the strongest performance with only 2,70% of the total output, it is clear that many Chinese universities and research institutions are active in this field. While the top universities, e.g. Tsinghua and Zhejiang, clearly are potential partners, it may also be productive to look for compatible and complementary partners outside Chinese "top ranked" universities. Incidentally, it seems as if this could be a general trend. At least it has been noted by other commentators that the distribution of scholarly work in other emerging fields such as AI is widely spread across Chinese universities and research institutes and not only China's leading institutions, as it was the case only a few years ago.[10]

Table 1 - Ref.: Web of Science, topic=E-Commerce and country=China & Taiwan sorted by organization

Finally, table 2 highlights which areas are particularly prominent in Chinese e-commerce related publications. Not surprisingly, computer science and information systems rank highest. The noticeable position of business and management publications are not surprising, considering the growth of the e-commerce sector in recent years. It is, however, interesting to see that papers focusing on application as well as theory/method rank in the top. It indicates that both researchers with an applied and a theoretical focus are featuring prominently in the e-commerce field.

[10] https://www.theatlantic.com/technology/archive/2017/02/china-artificial-intelligence/516615/
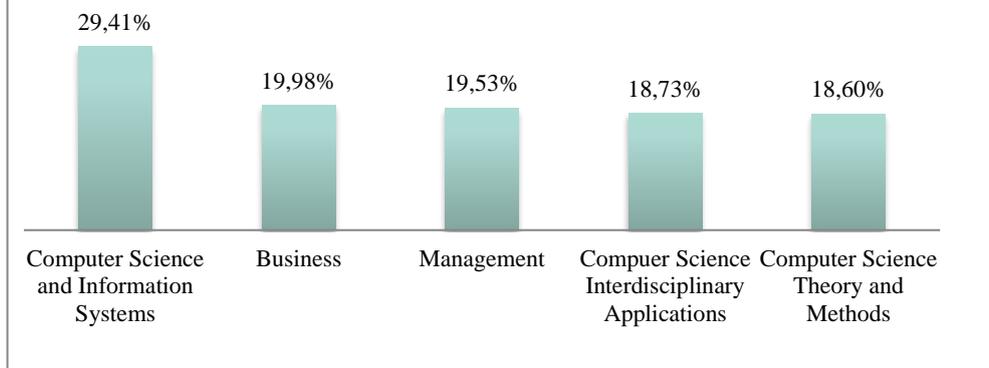
Table 2 - Ref.: Web of Science, topic=e-commerce and country=China & Taiwan sorted by field of research.

The numbers here are too crude to say something substantial about the nature of 'interdisciplinary applications', but its high ranking might indicate that Chinese e-commerce research groups increasingly involve researchers from different disciplines as a means to cover the complex nature of the field. To clarify such issues could be among the aims of a future study tour to visit some of the leading Chinese research groups.

Collaboration opportunities and experiences

This section features highlights from our interviews with three e-commerce experts working in Danish universities. The three experts either have specific experiences on working with Chinese cases, working with Chinese partners or they have informed opinions about possible directions of future collaboration between Chinese and Danish research environments.

Xiao Xiao, Associate Professor, Department of Digitalization at Copenhagen Business School

Xiao, who herself is Chinese, finished her bachelor at Wuhan University in China, then went to the US for her Ph.D. in Information Systems at Washington State University, and joined Copenhagen Business School in 2013.

"My research focuses on digital business models and digital platforms. I've worked extensively with China as a context, both in my research and in my teaching."

"There is a lot to learn from Chinese e-commerce, especially from China's many startup companies. They are so innovative, driven and pragmatic, and are also very open to participating in research projects, much more than established companies."

"Collaborating with local partners and institutions is key to gaining access to people, companies and data. The challenge for me is not so much language and culture, especially since many of these research environments are quite international. Rather, it can be difficult to find [Chinese] partners who practice qualitative research methods."

"I really see interesting potentials and possible cases developing from E-hub Nordic's links to Alibaba and Tmall Global. This is an important cross-border platform that gives Chinese consumers direct access to Nordic brands."

More information about Xiao Xiao can be found on her website:
https://www.cbs.dk/forskning/institutter-centre/department-of-digitalization/medarbejdere/xxitm

Roman Beck, Professor, Department of Business IT at IT University of Copenhagen

Roman leads the European Blockchain Center at ITU, where he and his colleagues work on the underlying technologies for e-commerce, including blockchain, machine learning and business analytics.

"In China, Alibaba is a very aggressive force of innovation, in terms of payments, new platforms and business models. It's a force to be reckoned with, and it has a global reach. See for example the collaboration between Mærsk and Alibaba [giving companies on the Alibaba platform direct access to online booking of space on Mærsk container ships]. It shows that traditional industries are adapting to the new realities imposed on them, in this case, by e-commerce."

"China's government is pushing hard to develop its own version of the blockchain technology. Mostly as a means to control the financial sector. They [the government] also tries to control bitcoin, which was otherwise very popular in China."

"It could be really interesting to explore joint education programs with Chinese partners. We run different types of programmes; some focus on executives and mid-level managers. Others are designed for university students. Both could be interesting in China."

More information about Roman Beck and the European Blockchain Center: https://pure.itu.dk/portal/en/persons/roman-beck%28d72cc0d6-fe4f-4392-bf88-243e5d7e36e5%29.html

Chee-Wee Tan, Professor, Department of Digitalization at Copenhagen Business School

Chee-Wee holds a Ph.D. in Business Administration from the University of British Columbia (Canada) as well as Master of Science and Bachelor of Science degrees from the National University of Singapore (Singapore).

"My research is about new services, technological trends and innovation and how these can benefit individuals, firms and society. China and Denmark share a high degree of acceptance of new technology, embracing ideas like a 'cashless society' and a general outlook that technology is a part of daily life."

"I'm involved in many CBS-based collaborations with partners in China. For instance, we have a joint research center with Jiaotong University in Shanghai which will have programmes in technology-enabled healthcare and possibly a double Ph.D. programme."

"China is an exciting place, but it is important to understand the different degrees of development internally in China. While the eastern provinces and largest cities like Beijing and shanghai can be compared to cities in Europe and the US, they also have remote areas that are yet to be developed in terms of supporting infrastructure. So in China, not only do you have questions of how e-commerce can be optimized for a very mature market, there are also questions concerning how e-commerce may penetrate into less developed areas and help these develop."

"One of the most attractive elements about collaborating with China is the data. The good universities in China have great data that we can gain access to, specifically good consumer data. It is better when you work with Chinese universities, as it allows you easier access to work with big technology companies, like Dianping and China Unicom, and conduct interesting experiments. They are very open to ideas and can pick out areas for collaboration. The more data oriented the companies are, the more interested they are in collaborating, as they see the use and value of research and partnership."

More information about Chee-Wee Tan and his research:
https://www.cbs.dk/en/research/departments-and-centres/department-of-digitalization/staff/ctadigi

Appendix 1

Mapping China's e-commerce related Research

The appendix contains the following elements:

- Universities/institutes
- Chinese research organizations
- Chinese top Fintech R&D organizations
- Chinese governmental organizations and policy initiatives
- Sino-Danish research platforms
- Upcoming international e-commerce conferences

Universities/institutes

Wuhan University – School of Information Management (SIM)	http://sim.whu.edu.cn/en/	The School of Information Management (SIM) in Wuhan University is the earliest, largest and strongest teaching and research institution in the field of library and information management in China. SIM is committed to develop interdisciplinary talents and professional leaders in information management. As a key school supported by the National "985 Project" and "211 Project", SIM has been consistently ranked the first in the field.
City university of Hong Kong	http://www.cityu.edu.hk/	Highly ranked university, with a high number of e-commerce related publications.
Beijing Jiaotong	http://en.bjtu.edu.cn/	The main research areas within the Department include various management information systems, assisting decision making systems, artificial intelligence expert systems and other economic issues as well as the research and development of computer technology. There are 4 curriculum groups in the Department, with more than 20 faculty members including 5 full professors, and 14 associate professors.
Tsinghua University - National Engineering Laboratory for Electronic commerce technology	http://www.ne-lect.org/index.php	Tsinghua is the top ranked science university in China, with a dedicated national research laboratory for E-commerce technologies.
Zhejiang University		Zhejiang University is one of the C9 League (Chinese equivalent of U.S. Ivy League) universities, and is located in Hangzhou, the same

		city where Alibaba has their headquarter.
Peking University -- Guanghua School of Management	http://eng-lish.gsm.pku.edu.cn/index/en/in-dex.html	Our mission extends beyond business or management. We are an institution comprised of scholars, pioneers, and innovators. We are determined to advance management knowledge and cultivate leaders. We are dedicated to the betterment of China and the global society. With a team of over 120 faculty, comprised of a diverse group of prominent business leaders and experts, students of all programs have unparalleled academic support. Faculty serve as mentors and their research goes beyond the publication - actively shaping China's national policies.
Shanghai Jiaotong University – Department of Management Information Systems	http://www.acem.sjtu.edu.cn/en/acem/management_infosys.html	Research covers mainly group decision-making, E-government, Internet-based innovation services, E-business, evaluation of IT project investment.
Fudan University School of Management – Department of IM & IS	http://www.fdsm.fudan.edu.cn/En/IM_IS.aspx	Faculty members in the department conduct a variety of research on the application and management of modern information technology (IT)/information systems (IS) (including e-commerce), the objective of which is to provide enterprises with guidance on utilizing IT/IS to improve their competitiveness and managerial skills. Specifically, the faculties conduct teaching and research in such fields as fundamental theories, business models, IT/IS strategy, IT/IS management, IS development, and IT applications.
University of Science and Technology Beijing – Electronic Commerce Institute	http://sem.ustb.edu.cn/jgen/a/Elec-tronic_Com-merce_Institute/	The Electronic Commerce Institute mainly engaged in domains such as Supply Chain Management, Enterprise Resource Planning and Customer Relationship Management, and aims to the study of production planning and scheduling, sales management, purchasing management, network engineering and other core technology research and software implementation.
Xi'an Eurasia University E-Commerce Research Center	http://form.snedu.gov.cn/jyn-ews/gdxx/201705/12/67546.html & http://www.eura-sia.edu	Xi'an has established an e-commerce research center, and could thus be an indication of a high interest in international e-commerce collaboration.
Fujian Normal University - Cross Border E-Commerce Research Center	http://i.fjsen.com/2017-06/14/con-tent_19663953_all.htm	A new cross border electronic commerce research center was established in 2017, with only Chinese language sources available.
Sichuan Technology and Business University -	http://www.stbu.edu.cn/html/news/xueyuan/2017/0706/8748.html	A new electronic commerce research center has been established in Sichuan 2017, with only Chinese language sources available.
University of International Business and Economics (UIBE) – Cross-Border E-Commerce Research Center	http://i.ali-research.com/file/20161017/2016101716 3807.pdf & http://site.uibe.edu.cn/newseng-lish/html/ViewNews	While little information is public in English, an e-commerce research center at this university in Beijing is given by a collaboration report with AliResearch.

	Info.aspx?sys-Name=TradeSchool-Teacher&NewsId=21 0	

Chinese research organizations

Institution	Link	Description
Shanghai Academy of Social Sciences - Institute of Information Sciences (ISS)	http://english.sass.org.cn:8001/informationSciences/index.jhtml	With "Information society research" as the research direction of the key discipline, and "information resource management" as the distinctive discipline, Institute of Information Sciences mainly studies the major theoretical and practical issues occurring during social and economic informationization, focuses on information resources, electronic management, information security, smart city, industry information, foreign social science trends and so on, studies and analyzes the domestic and foreign new theories and ideas, and provides multilayer and multiform cutting-edge information services for the governments, enterprises and public institutions.
China E-commerce Research Center (CECRC)	http://www.100ec.cn	CECRC was founded in Hangzhou in 2006, and is dedicated to research national e-commerce related fields. The center publishes national statistics, and contribute to national policy development.
Alibaba Research Institute	http://www.ali-research.com/en/index.html	The Alibaba Research Institute (ARI) hosts conferences and develop research reports. The research scope includes the following: • Future Studies: Information Economy and new commercial DT paradigm studies • Microlevel: Business model innovation, such as C2B and future organization model • Midlevel: Internet-enabled study of industries, such as e-commerce logistics or rural e-commerce • Macrolevel: Internet's influence on consumption, employment, investment, import and export • Management studies: Internet management, internet regulations, e-commerce legislation etc.

Chinese top Fintech R&D organizations

Institution	Number of patent applications	City
Tencent Technology (Shenzhen) Co., Ltd.	51	Shenzhen
China Construction Bank Corporation	31	Beijing
China UnionPay Co., Ltd	24	Shanghai
Tendyron Technology Co., Ltd.	14	Beijing
KPS Shenzhen Innovation Technology Co., Ltd.	14	Shenzhen
Aerospace Information Co., Ltd.	14	Beijing

Beijing Qihoo Technology Co., Ltd.	12	Beijing
Fujian Landi Commercial Equipment Co., Ltd.	12	Fuzhou
Qi Zhi Software (Beijing) Co., Ltd.	12	Beijing
Inspur Software Group Co., Ltd.	10	Ji'nan

Reference: Mapping of Chinese R&D Networks, ICDK Analysis No, 4, February 2016, Danish Agency for Science, Technology and Innovation

Chinese governmental organizations and policy initiatives

Organization	Information	
China International Electronic Commerce Centre (CIECC)	http://ciecc.mofcom.gov.cn/	CIECC is a support body of the Chinese Ministry of Commerce responsible for developing, maintaining and regulating nation-wide electronic commerce infrastructure. It promotes international cooperation to build and strengthen cross-border electronic commerce relations.
Policy		
Made in China 2025	https://www.csis.org/analysis/made-china-2025	"Made in China 2025" is an initiative to comprehensively upgrade Chinese industry. The initiative draws direct inspiration from Germany's "Industry 4.0" plan, which was first discussed in 2011 and later adopted in 2013. The heart of the "Industry 4.0" idea is intelligent manufacturing, i.e., applying the tools of information technology to production. In the German context, this primarily means using the Internet of Things to connect small and medium-sized companies more efficiently in global production and innovation networks so that they could not only more efficiently engage in mass production but just as easily and efficiently customize products.
Internet Plus	http://english.gov.cn/2016special/internetplus/	"Internet Plus" refers to the application of the internet and other information technology in conventional industries. It is an incomplete equation where various internets (mobile Internet, cloud computing, big data or Internet of Things) can be added to other fields, fostering new industries and business development in China. This initiative shares similarities to the "Industrial internet" coined by the U.S. government, and the European idea of "Industry 4.0".
The Belt and Road Initiative	http://english.gov.cn/beltAndRoad/	The initiative aims to promote orderly and free flow of economic factors, highly efficient allocation of resources and deep integration of markets by enhancing connectivity of Asian, European and African continents and their adjacent seas. The plan called for policy coordination, facilities connectivity, unimpeded trade, financial integration and people-to-people bonds to make complementary use of participating countries' unique resource advantages through multilateral mechanisms and multilevel platforms.

Sino-Danish research platforms

Organization	Information	
Sino-Danish Center	http://sdc.university/	SDC is a partnership between all eight Danish universities, the Chinese Academy of Sciences (CAS) and the University of Chinese Academy of Sciences (UCAS). The overall objective is to promote and strengthen collaboration between Danish and Chinese learning environments and increase mobility of students and researchers between Denmark and China.
Nordic Centre Fudan	http://www.nordiccentre.net/	The Nordic Centre serves as: • A platform for initiating and developing research and educational programmes, conferences, and workshops of mutual interest to Nordic and Chinese scholars. • A teaching institution for Chinese students and scholars who study the Nordic countries, and for Nordic students and scholars pursuing study of China. • An organiser of programmes and courses for the Nordic business community in Shanghai.
Innovation Centre Denmark – Shanghai	http://icdk.um.dk/en/innovationcentres/shanghai/	Innovation Centre Denmark Shanghai is your entry point to growth in China, being one of the fastest developing markets in the world. We help you connect with companies, research institutions, and local authorities to address research and business opportunities.

Upcoming international e-commerce conferences

The Seventeenth Wuhan International Conference on E-business	http://www.whiceb.com/	The annual Wuhan International Conference on E-Business (WHICEB) is an AIS affiliated conference which cover e-business related topics. Wuhan International Conference on E-Business holds annually in May, and is widely recognized in the region and beyond as an excellent and fascinating academic conference
The 20th International Conference on Electronic Commerce	https://icec.net	ICEC 2018 will be held in Tianjin, China, July 6th & 7th at Nankai University. The theme is: Challenges and Opportunities for e-Commerce in Sharing Economy. Submission deadline for papers is March 1st