

THE DATA REVOLUTION:

HOW CHINA CAN CAPTURE THE DIGITAL TRADE OPPORTUNITY AT HOME AND ABROAD

promoting sustainable global trade

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Important Notice on Contents

This research employs a broad definition of “digital trade” which covers the production, distribution, marketing, sale or delivery of goods and services – domestically and abroad – supported by cross-border data flows. As international trade increasingly spills into the digital sphere with potentially huge economic benefits for economies, developing a knowledge base around the topic of digital trade becomes ever critical. This report serves to inform:

- **Governments and policy makers** to take into account the importance of digital trade for both the external and domestic economies when formulating trade and economic policy;
- **Businesses** in harnessing the opportunities afforded by digital trade in the form of increased exposure to overseas markets and uplifting productivity at home;
- **Industry groups** in recognising the nature and magnitude of economic benefits that digital trade could bring about to different sectors, and champion these in their outreach efforts.

This report was prepared by the Hinrich Foundation with analytical support from AlphaBeta. All information in this report is derived from AlphaBeta analysis using both proprietary research and publicly available data. Where information has been obtained from third-party sources, this is clearly referenced in the footnotes.

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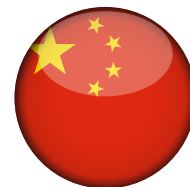
CONTENTS

EXECUTIVE SUMMARY	07
1. THE VALUE AT HOME FROM DIGITAL TRADE	12
Understanding how digital trade impacts day-to-day operations	14
The economic value of digital trade for domestic sectors	16
2. THE VALUE OF DIGITAL EXPORTS FOR CHINA	22
Overall value of digital exports	24
Digitally-enabled products	24
Digitally-enabled services	27
Indirect digital services	27
3. CAPTURING THE DIGITAL TRADE OPPORTUNITY	30
Perceived concerns related to digital trade	32
Priorities for action	37





THE DIGITAL TRADE OPPORTUNITY FOR CHINA



VALUE OF DIGITAL TRADE FOR CHINA'S DOMESTIC ECONOMY¹



Digital trade currently enables **UP TO RMB 3.2 TRILLION** of economic impact in China's domestic economy.



Potential benefits are spread across all sectors of Chinese economy, but particularly relevant in **CONSUMER & RETAIL, MANUFACTURING, INFRASTRUCTURE AND AGRICULTURE.**



By 2030, digital trade will enable an estimated **RMB 37 TRILLION** of economic impact in China's domestic economy.

VALUE OF DIGITAL TRADE FOR CHINA'S EXPORTS²



CHINA ACCOUNTS FOR MORE THAN 40% of the global value of e-commerce transactions.



If digital goods and services were a sector, it would be the **2ND LARGEST EXPORT SECTOR** for China.



By 2030, China's digital exports could **GROW BY 207%.**

THREE IMPERATIVES FOR CAPTURING THE OPPORTUNITY



1 ENSURING A ROBUST AND EFFICIENT DATA MANAGEMENT FRAMEWORK



2 RETHINKING CONTENT AND DATA RESTRICTIONS



3 MINIMISING BORDER FRICTIONS

1. This refers to economic value created by cross-border data flows for the domestic economy, and is estimated in terms of consumer surplus, productivity gains, and cost savings.

2. This refers to the value of exports of digital goods and services, which consists of: revenue from overseas digital downloads of local apps, sales of products to overseas markets through cross-border e-commerce platforms, services provided using digital technologies and imported digital services that get used in the export of other products and services.



EXECUTIVE SUMMARY

Although China has enjoyed historically high growth rates over the past decade, analysts anticipate that it will start to face a slowdown due to several broad socio-economic shifts. These include the shift from an industry-based to a services-driven economy and an ageing population. To sustain China's growth momentum into 2030 and beyond, China would need to hone competitive strategies beyond the low-cost advantage that has traditionally propelled its economic growth. Digital technologies are pertinent to this, by driving labour productivity and quality improvements. Understanding the role of digital trade (see Box 1 for the definition), both domestically and for exports, is therefore crucial for businesses and policymakers in China.

Though trade was once dominated by tangible goods, growth in global goods trade has flattened as global data flows have surged, with the amount of cross-border bandwidth having grown 45 times since 2005.¹ This is projected to increase by an additional nine times over the next five years as flows of information, searches, communication, video, transactions, and intra-company traffic continue to rise.² Digital trade is also supporting large productivity improvements in domestic sectors, which underpin the 4th industrial revolution. Yet, policymakers and business leaders are often in the dark on how to accurately measure the benefits digital trade can bring to an economy. Traditional economic measures fail to adequately measure the value of digital trade to exports and to the domestic economy. This creates the risk that the value of digital trade is not fully appreciated and taken into account when formulating

policy and business decision-making. This report aims to close the existing knowledge gap by quantifying the economic value of digital goods and services exports, as well as the value of digital trade in enabling productivity improvements in the domestic economy. It also summarises the perceived concerns governments may have in relation to digital trade and outlines recommendations for how the economic gains to digital trade may be realised while addressing these concerns.

Our key findings include (Exhibit 1):

- While digital trade already contributes significantly to China's domestic economy, this opportunity can increase by more than 11-fold by 2030 in the right settings.** Digital trade enables Chinese firms to take advantage of digital technologies by creating scale economies by pooling data across borders to generate richer insights, supporting collaboration (particularly where China may have skill gaps or labour shortages), enabling adoption of efficient business practices (such as allowing consumers real-time access to their bank accounts even when abroad) and supporting management of global supply chains (e.g., tracking of export containers using Internet of Things technology). Today, the economic value of digital trade-enabled productivity benefits to the Chinese economy is estimated to be worth RMB 3.2 trillion (US\$466 billion). By 2030, this could grow by more than 11-fold to reach RMB 37 trillion (US\$5.5 trillion).

1. McKinsey Global Institute (2016), *Digital globalisation: The new era of global flows*.

Available at: <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows>

2. McKinsey Global Institute (2016), *Digital globalisation: The new era of global flows*.

Available at: <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows>

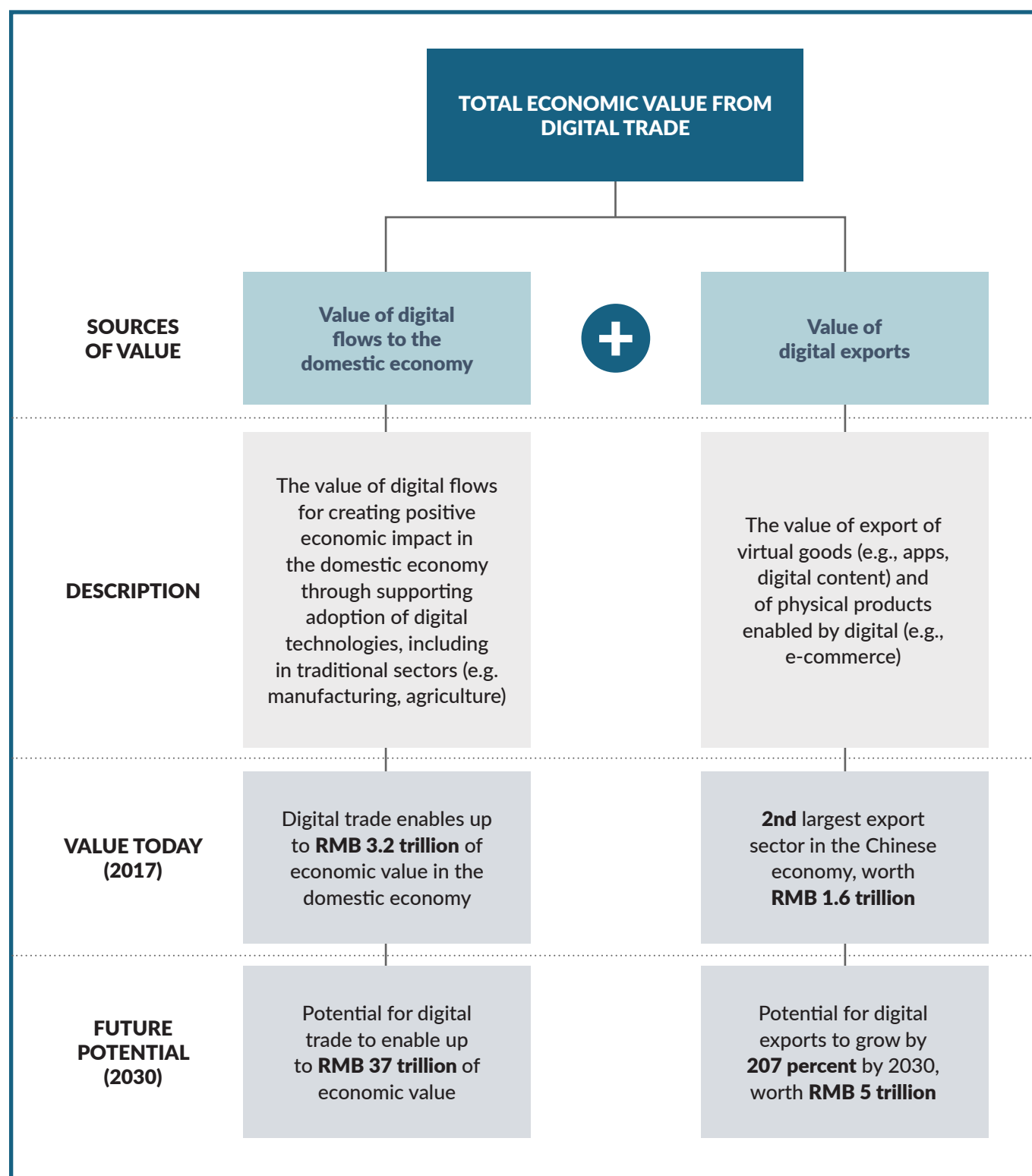
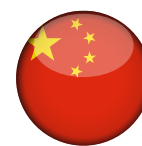


- Digital exports represent the 2nd largest export sector for China today and have the potential to grow even further.** The export value of virtual goods and services enabled by the digital economy, such as e-commerce, accounts for RMB 1.6 trillion (US\$236 billion), making it China's 2nd largest export sector. In fact, over 80 percent of this value is driven by digitally-enabled products, largely due to the impact of e-commerce. By 2030, this digitally-enabled export value could grow by 207 percent from today's levels, to become RMB 5 trillion (US\$726 billion).
- The digital trade dividend may yet prove elusive if digital trade is not fully facilitated at home and abroad.** Some of China's data management policies may no longer be fit for purpose as it seeks to help Chinese firms grow beyond its borders. It is imperative that China embraces cross-border data flows in order to achieve the productivity improvements required in the country's transition

into a service-based economy, to unlock further growth in some of the fastest-growing areas of China's economy such as its cross-border e-commerce exports and to sustain the growth of its traditional sectors such as manufacturing through facilitating "Industry 4.0" technologies. More broadly, given China's economic prominence in the region, there is an important opportunity for the country to lead in policy areas that pave the way for digital trade.

The report is structured into three chapters. Chapter 1 examines the current and potential impact of digital trade at home and quantifies the economic value of technological gains enabled by digital trade. Chapter 2 assesses the current and future potential value of digital exports for the Chinese economy. Chapter 3 highlights some of the concerns related to digital trade and how they can be addressed, and identifies the priorities for China to capture the digital trade opportunity.

EXHIBIT 1:

CHINA IS ALREADY REAPING SIGNIFICANT VALUE FROM DIGITAL TRADE,
BUT THE FUTURE VALUE COULD BE SIGNIFICANTLY HIGHER

SOURCE: AlphaBeta analysis

BOX 1.

DEFINING DIGITAL TRADE AND ITS COMPONENTS

At present, there is no consensus about the meaning of digital trade. Part of what makes defining digital trade difficult is the rapidly changing nature of the digital economy. Different definitions have been used by various international organisations. The World Trade Organisation (WTO) has generally employed the term “electronic commerce” rather than “digital trade”, defining it as “the production, distribution, marketing, sale or delivery of goods and services by electronic means”.³ The definition used by the United States International Trade Commission (USITC) is broader and includes the provision of e-commerce platforms and related services, but excludes the value of sales of physical goods ordered online, as well as physical goods that have a digital counterpart (such as books, movies, music, and software sold on CDs or DVDs).⁴ The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) recognises that while the narrowest definition of “digital trade” is “trade in digitised products” (i.e. trade in products with digital elements such as films and e-books, and in digital services such as IT and telecommunication services), a broader definition relates to “the use of digital technologies (ICTs) to conduct business”.⁵

This research employs a **broad definition of “digital trade”** which covers the production, distribution, marketing, sale or delivery of goods and services – domestically and abroad – supported by cross-border data flows. This consists of (a) trade in digitally-enabled products and services, and (b) cross-border data flows that create economic value in the domestic economy. Both components of digital trade are analysed in this report:⁶

- **Trade in digitally-enabled products and services.** There are three components to this: a) digitally-enabled products; b) digitally-enabled services; c) indirect digital services. For the purpose of this research, the value of exports in these components are estimated:

1. **Digitally-enabled products.** These refer to physical and digitised products that are traded electronically via the Internet, e.g., overseas digital downloads of local apps, or sales of physical products to overseas markets through cross-border e-commerce platforms.⁷
2. **Digitally-enabled services.** These refer to services that are provided using digital technologies. This is a large category because most industry sectors have adopted digital technologies and sell e-services to varying degrees. This includes online advertising (viewed from abroad), digital Information Technology-Business Purchasing Outsourcing (IT-BPO) services and the export of data processing and online software consultancy services. It also includes trade in other direct e-services such as online tourism-related booking and electronic banking; however, these categories are currently not able to be measured in a robust manner due to the lack of granularity in available data.
3. **Indirect digital services (embedded in other exports).** These refer to imported

3. UNESCAP (2016), *Internal trade in a digital age*. Available at: <http://www.unescap.org/sites/default/files/aptir-2016-ch7.pdf>

4. U.S. International Trade Commission (2017), *Global Digital Trade 1: Market Opportunities and Key Foreign Trade Restrictions*. Available at: <https://www.usitc.gov/publications/332/pub4716.pdf>.

5. UNESCAP (2016), *Internal trade in a digital age*. Available at: <http://www.unescap.org/sites/default/files/aptir-2016-ch7.pdf>

6. The detailed methodology is explained in an accompanying methodology document, which can be found on the Hinrich Foundation website (<http://hinrichfoundation.com/trade-research/>).

7. This research defines cross-border e-commerce platforms as Internet-enabled platforms that facilitate the selling and buying of products and services across national borders, where the seller and buyer are in different countries. This includes both B2B and B2C e-commerce. However, the analysis in this research focusses largely on B2C e-commerce due to the availability of existing data.



digital services that get used in the export of other products and services. Examples include telecommunication services such as email, video conferencing, digital file sharing, and Voice Over Internet Protocol (VOIP) services that are used by a mining firm exporting overseas.

- **Cross-border data flows.** This does not reflect “international trade” in its conventional sense, i.e. transactions involving the exchange of goods and services for money, that are conducted between two parties located in different countries. Rather, cross-border data flows refer to the exchange of data across national borders that create economic value, and may not necessarily be associated with monetary transactions nor interaction between two parties (in some cases, it involves exchanges within the same company). Cross-border data flows take place for a variety of

reasons including business processing (e.g., international supply chain data used to guide inventory stocking decisions at a company’s retail stores worldwide) and operational efficiency improvements (e.g., data flows enabling Internet banking functions overseas so that consumers wishing to access bank accounts from abroad can do so). This research estimates the economic impacts cross-border data flows create for the domestic economy. These are not represented in terms of Gross Domestic Product (GDP) or market size, but rather in terms of economic value, which relates to consumer surplus, productivity gains and cost savings. Six key channels (which are discussed further in Chapter 1) have been identified by which digital trade supported by cross-border data flows is important for boosting productivity, creating new revenue streams, or lowering costs in the domestic economy.



THE VALUE AT HOME FROM DIGITAL TRADE

Digital trade is supporting up to RMB 3.2 trillion (US\$466 billion) of economic benefits in China today through enabling digital technologies that increase worker productivity, lower costs and create new sources of revenue. While a large number already, the relatively low penetration rates of some digital technologies today suggests large potential for higher impact in the future. By 2030, this could grow by more than eleven-fold, reaching RMB 37 trillion (US\$5.5 trillion), in the absence of digital trade barriers at home and abroad.



UNDERSTANDING HOW DIGITAL TRADE IMPACTS DAY-TO-DAY OPERATIONS

This research adopts a broad definition of “digital trade” which relates to cross-border data flows, i.e. the exchange of data across national borders that create economic value (see Box 1 for detailed definition). In this chapter, the economic impacts which cross-border data flows create for China’s domestic economy have been estimated. To do this, six key channels have been identified through which digital trade is important for boosting productivity or lowering costs for Chinese sectors (Exhibit 2).

- Identifying and entering new markets.** New digital tools ranging from simple internet search engines to cloud computing, which is heavily reliant on cross-border data flows, can boost the export capabilities of firms, particularly micro, small and medium-sized enterprises (MSMEs). This allows these firms to operate with ease across geographies and tap into international supply chains, compete with larger exporters, and connect with consumers, suppliers, and investors across the globe. Analysis by the Asia Pacific MSME Trade Coalition (AMTC) estimates that digital tools could lower the export costs of an average MSME by as much as 82 percent and reduce the time involved in exporting for MSMEs by up to 29 percent.⁸
- Reducing cost and increasing speed of data storage, processing and access.** High data generation is more likely to lead to cross-border flows, in part due to storage requirements. For example, data processing is 5 to 7 percent of the total input costs in sectors such as financial services.⁹ Related to this, storing data in a number of geographic locations can enhance recovery management.
- Supporting collaboration.** Some activities may be particularly complex, and the sharing of data across borders enables collaboration between talents. This could include talent for the analysis of data or it could relate to the use of human-guided robotics. For example, remote robotic surgery allows complex operations to be completed even when those surgeons may not be in the same country. A further example is how cross-border data flows can enable researchers around the world to share insights, design experiments and analyse the results in a collaborative and real-time manner.¹⁰
- Enabling richer insights.** Used the right way, data can help companies improve products and make more informed business decisions. Analysis of the simplest datasets can lead to robust insights that inform important business decisions. For example, data on warehouse and point-of-sales inventory can allow retailers to optimise re-stocking through better forecasting of production and shipment needs, which could lead to increased sales.
- Introducing more efficient business practices.** Digital trade can be a critical enabler of greater operational efficiency for businesses. This could include providing greater accessibility of data for clients across geographies (for example, Chinese consumers wishing to access their bank accounts from overseas), enabling digital platforms to conduct routine operations such as collection and exchange of data, and outsourcing operations to locations with a comparative advantage in the provision of required services.

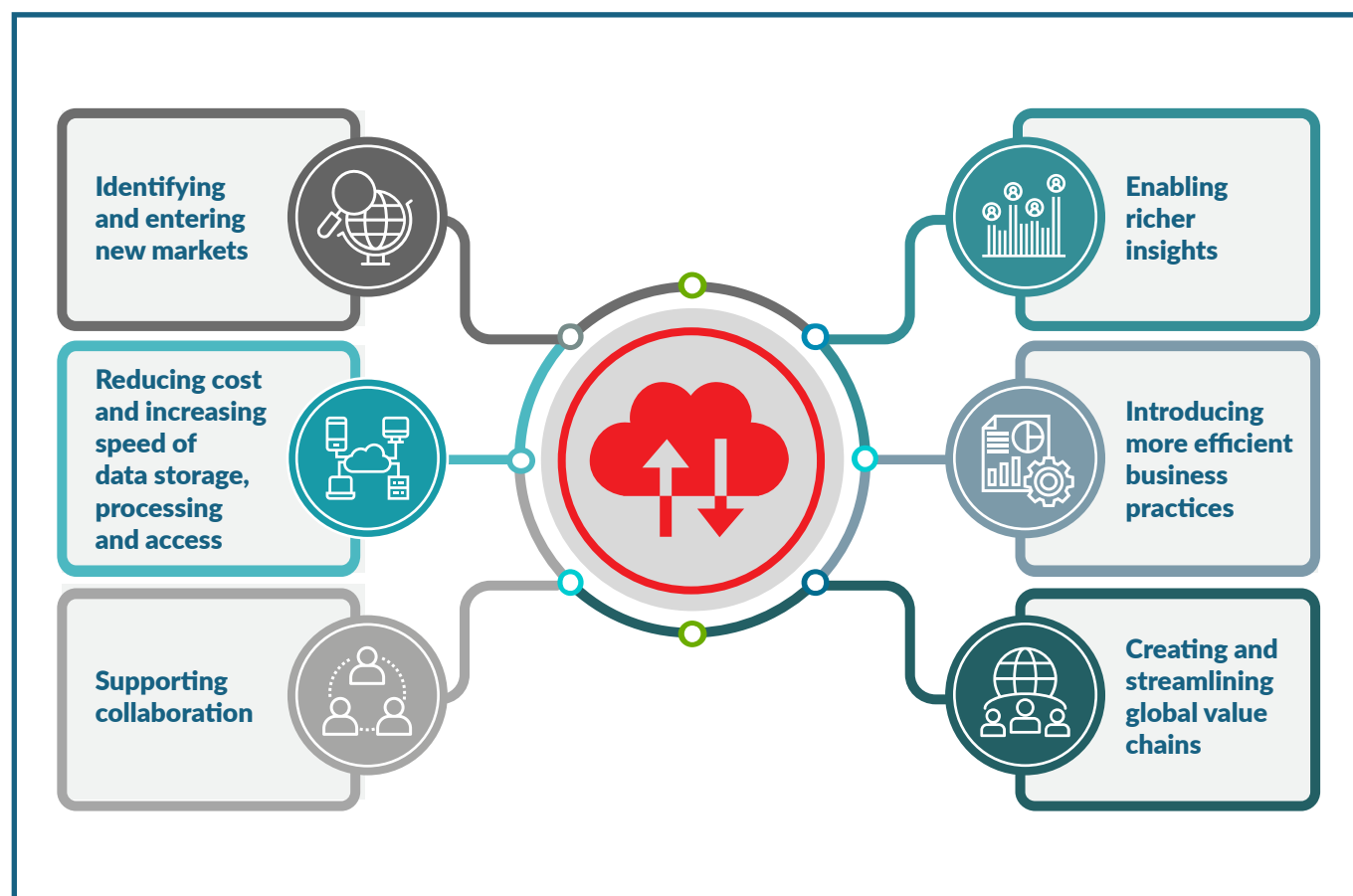
8. Asia Pacific MSME Trade Coalition (2018), *Micro-Revolution: The new stakeholders of trade in APAC*.

9. Matthias Bauer et al. (2014), *The costs of data localization: Friendly fire on economic recovery*, European Centre for International Political Economy (ECIPE). Available at: http://www.ecipe.org/app/uploads/2014/12/OCC32014_1.pdf

10. Joshua Paul Meltzer (2014), “The Internet, Cross-Border Data Flows and International Trade”, *Asia & the Pacific Policy Studies*, vol. 2, no. 1. Available at: <https://onlinelibrary.wiley.com/doi/epdf/10.1002/app5.60>

EXHIBIT 2:

DIGITAL TRADE SUPPORTS PRODUCTIVITY, GROWTH AND COST EFFICIENCY THROUGH SIX MAIN CHANNELS



- **Creating and streamlining global value chains.**

Digital data flows can help create efficiencies in real-time monitoring and decision-making to support global value chains. For example, businesses are able to receive customer orders in real time and adjust production processes accordingly. Likewise, monitoring the transit of goods across countries through the Internet-of-Things enables better control over supply chains, creating significant logistical benefits.

“ This research adopts a broad definition of 'digital trade' which relates to cross-border data flows, i.e. the exchange of data across national borders that create economic value. ”

THE ECONOMIC VALUE OF DIGITAL TRADE FOR DOMESTIC SECTORS

To understand the economic value of digital trade for China's domestic sectors, a set of relevant technological applications for different sectors of the Chinese economy were identified based on an extensive review of the academic literature (Exhibit 3).¹¹ The importance of digital trade was then assessed for each technological application, based on factors related to the six channels highlighted above, including (a) the volume of data generated (requiring more efficient storage requirements); (b) the scale requirements to draw insights (which cross-border data flows can facilitate by enabling pooling of data); (c) the complexity of the activity (and hence the potential need for cross-border collaboration); and (d) whether the activity to which the technology is being applied is itself cross-border in nature.

The value of these applications was sized both for 2017 and 2030. Economic value supported by digital trade across the major sectors in the Chinese economy is estimated to have been up to RMB 3.2 trillion (US\$466 billion) in 2017. This number could increase by more than 11-fold to as much as RMB 37 trillion (US\$5.5 trillion) by 2030 (Exhibit 4), in the absence of barriers to digital trade internationally.

Some of the main opportunities and examples by sector include:¹²

- **Consumer & Retail.** With China's shift towards a consumption-based economy, a growing middle

class and base of IT-savvy millennials, e-commerce will drive this sector to become the largest beneficiary of digital technologies. Accounting for 42 percent of global e-commerce transactions, China's e-commerce market is estimated to be larger than that of France, Germany, Japan and the UK combined.¹³ It also hosts a third of the world's e-commerce unicorns (defined as a start-up company valued at more than US\$1 billion).¹⁴ These have tremendously impacted China's domestic economy: in 2014, 250 million buyers in China used the e-commerce site Alibaba, and orders from here accounted for more than 60 percent of all package deliveries in China and more than a-tenth of China's total retail sales.^{15, 16} By leveraging big data, such unicorns have blurred the lines between e-commerce, social media, search and payments. Digital trade is crucial for this sector given the size of China's domestic market, and the need for Electronic Retailers (e-tailers) to utilise cross-border data flows to connect to overseas suppliers.¹⁷ As Director of Alibaba's research arm (AliResearch), Mr Ouyang Cheng, states, "As e-commerce activities are carried out on a digital platform involving large amounts of data, cross-border data flows and the policies that govern them are critical to our company. The most important application of such data flows is their impact on streamlining global value chains. By allowing MSMEs and individual merchants to sell their goods and services directly

11. The detailed methodology is explained in an accompanying methodology document, which can be found on the Hinrich Foundation website (<http://hinrichfoundation.com/trade-research/>).

12. The descriptions below only include a subset of the total technologies analysed in this research. See the methodology document for a more extensive discussion of the analysis, which can be found on the Hinrich Foundation website (<http://hinrichfoundation.com/trade-research/>).

13. McKinsey Global Institute (2017), Digital China: Powering the economy to global competitiveness. Available at: <https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness>

14. McKinsey Global Institute (2017), Digital China: Powering the economy to global competitiveness. Available at: <https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness>

15. World Economic Forum (2017), Seven things to know about Alibaba, China's online giant.

Available at: <https://www.weforum.org/agenda/2017/01/factbox-alibaba/>

16. Fortune (2017), The accelerating disruption of China's economy.

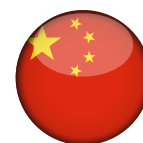
Available at: <http://fortune.com/2017/06/26/china-alibaba-jack-ma-retail-ecommerce-e-commerce-new/>

17. McKinsey Global Institute (2016), Digital globalization: The new era of global flows.

Available at: <https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Digital%20globalization%20The%20new%20era%20of%20global%20flows/MGI-Digital-globalization-Executive-summary.ashx>

EXHIBIT 3:

EXAMPLES OF RELEVANT TECHNOLOGIES BY SECTOR IN CHINA











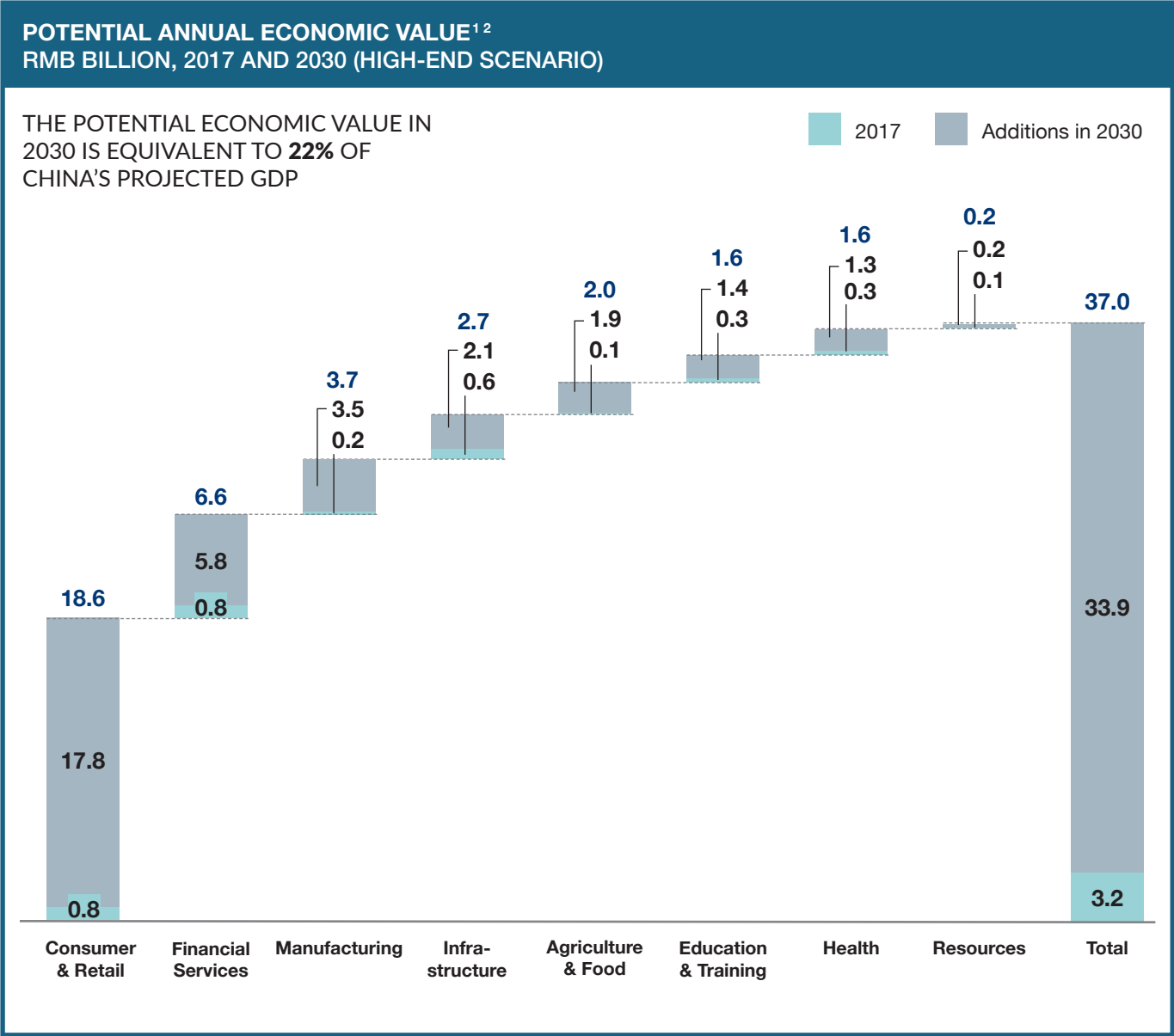
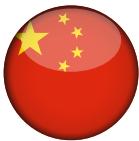
 Resources	<ul style="list-style-type: none"> • Smart exploration • Predictive safety • Performance monitoring • Autonomous mining equipment
 Financial Services	<ul style="list-style-type: none"> • Big data analytics • Digitising marketing, distribution, and service • Reg tech • Financial inclusion through mobile payments
 Agriculture & Food	<ul style="list-style-type: none"> • Precision farming • Supply chain management • Food safety • Real-time market information
 Manufacturing	<ul style="list-style-type: none"> • Big data analytics • Additive manufacturing • IoT-enabled supply chain management
 Health	<ul style="list-style-type: none"> • Remote patient monitoring • Telehealth • Data-based public health interventions • Detection of counterfeit drugs • Smart medical devices • AI-enabled diagnostics
 Infrastructure	<ul style="list-style-type: none"> • Smart grids • 5D BIM & project management technologies • Predictive maintenance • Smart buildings • Smart roads • Smart ports
 Consumer & Retail	<ul style="list-style-type: none"> • Digitising channels • Inventory management • Analytics-driven products and services
 Education & Training	<ul style="list-style-type: none"> • E-career centres and digital jobs platforms • Personalised learning • Online retraining programmes

EXHIBIT 4:

DIGITAL-TRADE IS SUPPORTING UP TO RMB 3.2 TRILLION OF PRODUCTIVITY BENEFITS IN CHINA TODAY, WHICH COULD GROW TO RMB 37 TRILLION BY 2030



1. These estimates do not represent GDP or market size (revenue), but rather economic value, including consumer surplus. The sizing includes the economic value that is both "somewhat enabled" and "highly enabled" by digital trade.

2. Due to rounding to the nearest billion, the numbers in this table may not add up precisely to the totals indicated.

SOURCE: AlphaBeta analysis

to consumers in the rest of the world, cross-border e-commerce platforms alter and shorten global manufacturing, supply and consumption value chains.”¹⁸

- **Financial services.** Two key technology drivers are the digitisation of banking services and mobile money services enabling greater financial inclusion. With over 220 million customers in forty countries operating 600 million accounts, the Industrial and Commercial Bank of China (ICBC) conducts analytics on large cross-border data sets to improve risk management, inform decisions on locating new branches to best serve its markets, and forge stronger customer relationships.¹⁹ Its ability to leverage digital trade and utilise information to and from its disparate locations across the globe greatly optimise the bank’s analytics capabilities and customer service quality.²⁰ China has experienced one of the highest increases in financial inclusion rates over the past 4 years, thanks to the proliferation of mobile money services for which users do not require to have a formal bank account to register. Indeed, such services have become the main cashless payment method for daily small transactions in China; as of March 2017, Weixin and WeChat combined have a monthly active user base of 938 million users, with a year-on-year increase of 23 percent.²¹ Given the cross-border nature of payments and remittances, the need to store high volumes of data safely and the potential for international collaboration with overseas payment services and merchants, digital trade and cross-border data flows play a critical
- **Manufacturing.** With slowing population growth and economic restructuring towards a services-driven economy, China must leverage technologies to enhance labour productivity. The government’s “Made in China 2025” plan aims to boost robot density to 3 times its current level by 2020,²² and indeed China is already the world’s largest buyer of industrial robots.²³ Such automation systems are accompanied by real-time reporting on equipment performance analysis, fuel consumption, maintenance and other operational needs, which rely heavily on data exchanges with the original manufacturer. As China is a key global manufacturer, cross-border transactions between suppliers and customers can be made more efficient by leveraging real-time data on inventory levels and product quality. Given the strong need for cross-border collaboration and data exchange in enhancing advanced manufacturing technologies, digital trade is crucial to support the required productivity gains.
- **Infrastructure.** Digital technologies can enhance the efficiency of constructing and maintaining infrastructure, while minimising resource use. Faced with the need to support 21 percent of the world’s population in an environment of climate change and rising resource costs²⁴, technologies such as smart grids have gained traction. The current penetration rate of smart meters in China is already more than 80 percent²⁵, and China’s National

18. Based on interview with Director of the Cross-Border E-Commerce Research Centre under AliResearch, Mr Ouyang Cheng.

19. Information Technology & Innovation Foundation (2015), Cross-border data flows enable growth in all industries.

Available at: <http://www2.itif.org/2015-cross-border-data-flows.pdf>

20. Information Technology & Innovation Foundation (2015), Cross-border data flows enable growth in all industries.

Available at: <http://www2.itif.org/2015-cross-border-data-flows.pdf>

21. Tencent and Ipsos (2017), 2017 mobile payment usage in China report.

Available at: https://www.ipsos.com/sites/default/files/ct/publication/documents/2017-08/Mobile_payments_in_China-2017.pdf

22. McKinsey Global Institute (2017), Digital China: Powering the economy to global competitiveness.

Available at: <https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness>

23. McKinsey Global Institute (2017), Digital China: Powering the economy to global competitiveness.

Available at: <https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness>

24. Climate Change, Agriculture and Food Security (2014), Cutting our losses? Learning from food waste in China.

Available at: <https://ccafs.cgiar.org/blog/cutting-our-losses-learning-food-waste-china#.WOTZfdly2y>

25. McKinsey Global Institute (2017), Digital China: Powering the economy to global competitiveness.

Available at: <https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness>



Energy Administration has recently invested US\$580 billion in this technology.²⁶ Digital trade is crucial due to the need for cost-efficient, secure storage arrangements for the large volumes of data generated and to enable cross-border collaboration (e.g., benchmarking of energy efficiency levels).

- **Agriculture & Food.** Digital technologies such as Internet-enabled real-time market information, precision farming and food safety technologies can help improve China's agriculture and food sector. In 2016, Tsinghua University collaborated with IBM and Walmart to launch a Food Safety Collaboration Centre in Beijing to improve the tracking of food using blockchain technology.²⁷ This technology was demonstrated to be able to trace the origins of a batch of fruit in 2.2 seconds, as opposed to the traditional industry timeline of 6 days.²⁸ The initiative leverages Walmart's international network

of food suppliers and distributors to trace the global flows of food items that end up in China, as well as those that originate from China.²⁹ Digital trade is crucial in this sector due to the need to share data across borders (for example, monitoring exports using IoT) and the need to pool data to enhance insights to be used in precision farming.

- **Education & Training.** Two key productivity opportunities lie in digital job platforms and personalised learning programmes. Digital job platforms can potentially boost China's GDP by 1.5 percentage points and create over 13 million jobs by 2030, by reducing search costs and enhancing the efficiency of job matches.³⁰ China currently has the third highest number of users on the professional networking portal, LinkedIn, after the US and India.³¹ Digital trade is important for many of these opportunities given the scale benefits from

26. McKinsey Global Institute (2017), *Digital China: Powering the economy to global competitiveness*.

Available at: <https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness>

27. Technode (2018), *Perfecting food safety: How China does it with IoT and blockchain*. Available at: <https://technode.com/2018/02/28/food-safety-blockchain-iot/>

28. Technode (2018), *Perfecting food safety: How China does it with IoT and blockchain*. Available at: <https://technode.com/2018/02/28/food-safety-blockchain-iot/>

29. IBM (2017), Walmart, JD.com, IBM and Tsinghua University launch a blockchain food safety alliance in China.

Available at: <https://www-03.ibm.com/press/us/en/pressrelease/53487.wss>

30. McKinsey Global Institute (2015), *A labor market that works: Connecting talent with opportunity in the digital age*.

Available at: <https://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Digital%20globalization%20The%20new%20era%20of%20global%20flows/MGI-Digital-globalization-Full-report.aspx>

31. Statista (2018), *Leading countries based on number of LinkedIn users as of July 2018*.

Available at: <https://www.statista.com/statistics/272783/linkedin-membership-worldwide-by-country/>



pooling a large number of insights (both in terms of learning results and in cross-border job matching).

- **Health.** In a country with low per-capita health spending, a shortage of medical professionals, and urban-rural disparities in medical care, there has been an increased awareness of the role technologies can play in enabling better healthcare outcomes. In April 2018, China's first smart hospital was opened in Guangzhou, where an Artificial Intelligence (AI) system helps doctors diagnose conditions and prescribe medications, reducing the time for patient inquiries by as much as 50 percent, and diagnosing as much as 90 percent of common illnesses.³² The Ministry of Industry and Information Technology has set an explicit target that by 2020, AI systems should be developed enough to diagnose more than 95 percent of all common diseases.³³ This target may be better
- achieved by leveraging international health services that pool international datasets to facilitate the faster development of new treatments and more reliable diagnoses.³⁴
- **Resources.** As the world's largest producer of coal, gold and most rare earth minerals³⁵, China has much to gain from technologies that leverage data and analytics to help develop a better understanding of its resource base and improve scheduling and processing decisions to maximise equipment utilisation and yields.³⁶ Digital trade is thus crucial for technologies in the resources sector due not only to the need for cost-efficient data storage solutions but also for global Chinese companies to pool data across their different international operations to understand opportunities for improved performance.

32. Open Gov Asia (2018). China's first smart hospital featuring AI opened in Guangzhou.

Available at: <https://www.opengovasia.com/chinas-first-smart-hospital-featuring-ai-opened-in-guangzhou/>

33. Open Gov Asia (2018). China's first smart hospital featuring AI opened in Guangzhou.

Available at: <https://www.opengovasia.com/chinas-first-smart-hospital-featuring-ai-opened-in-guangzhou/>

34. Information Technology & Innovation Foundation (2015), Cross-border data flows enable growth in all industries.

Available at: <http://www2.itif.org/2015-cross-border-data-flows.pdf>

35. Pricewaterhouse Coopers (2012), China's mining sector. Available at: https://www.pwc.com/id/en/asia-school-of-mines/assets/chinas-mining-sector_benson-wong.pdf

36. McKinsey Global Institute (2017), Digital China: Powering the economy to global competitiveness.

Available at: <https://www.mckinsey.com/featured-insights/china/digital-china-powering-the-economy-to-global-competitiveness>



THE VALUE OF DIGITAL EXPORTS FOR CHINA

China's digital exports in 2017 are estimated to be worth roughly RMB 1.6 trillion (US\$236 billion), making it China's second largest export sector. To maintain and even enhance this strong performance, China's strategy in its export markets must be supported by cross-border data exchanges and processing. It is estimated that if digital trade were fully leveraged, China's digital exports could more than triple in value to become RMB 5 trillion (US\$726 billion) by 2030.



OVERALL VALUE OF DIGITAL EXPORTS

China is already performing strongly on capturing the digital export opportunity and has the potential to go much further. China's digital exports are estimated to be currently worth RMB 1.6 trillion (US\$236 billion), making it China's 2nd largest export sector. This is equivalent to almost 12 percent of all China's exports. By 2030, it could grow by 207 percent (Exhibit 5).

It should be noted that this report's estimate of the value of digital exports is conservative due to data constraints. For digitally-enabled products, the value of products

exported via cross-border e-commerce platforms only focusses on Fast Moving Consumer Goods (FMCG) and not other categories of goods where e-commerce could be important, due to the availability of data. Since a large proportion of FMCG goods are business-to-consumer (B2C) in nature, the estimate of e-commerce exports would likely approximate the value of B2C e-commerce. Similarly, the value of digitally-enabled services only focusses on a subset of services where robust data is available.

DIGITALLY-ENABLED PRODUCTS

The value of these exports is currently RMB 1.3 trillion (US\$192 billion) and could grow by over three times the current value by 2030, reaching RMB 4.5 trillion (US\$666 billion). This growth is being driven by rapidly expanding e-commerce exports and exports of digital apps.

- **E-commerce.** E-commerce platforms can be crucial gateways to connect firms to export markets and provide a new source of future growth for traditional sectors such as manufacturing. Approximately 12 percent of the global goods trade is now conducted via international e-commerce, with much of it driven by platforms such as Alibaba, Amazon, eBay, Flipkart, and Rakuten.³⁷

According to the United Nations Industrial Development Organisation (UNIDO), over 32 percent of Chinese businesses are engaged in online business. Data from eBay shows that

Chinese businesses on the eBay platform are much more likely to be involved in exporting than those not using the platform. Indeed, many Chinese businesses have already tapped the e-commerce export opportunity, with over 21 percent of businesses currently engaged in exporting (versus 9 percent in India).³⁸

Based on average export revenue data and eBay data on the proportion of sellers on their platform that are exporting, it is estimated that e-commerce generated over RMB 1.3 trillion (US\$196 billion) of export revenues for China in 2017, which could grow to over RMB 4.3 trillion (US\$643 billion) by 2030 based on forecasted growth of e-commerce markets in nearby countries.³⁹

However, many businesses, particularly Small and Medium Enterprises (SMEs) still face substantial challenges to bridge the gap to global markets. They

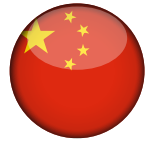
37. McKinsey Global Institute (2016), *Digital globalisation: The new era of global flows*. Available at: <https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Digital%20globalization%20The%20new%20era%20of%20global%20flows/MGI-Digital-globalization-Full-report.ashx>

38. World Bank Enterprise Surveys (2018?). Available at: <http://www.enterprisesurveys.org/Custom-Query>

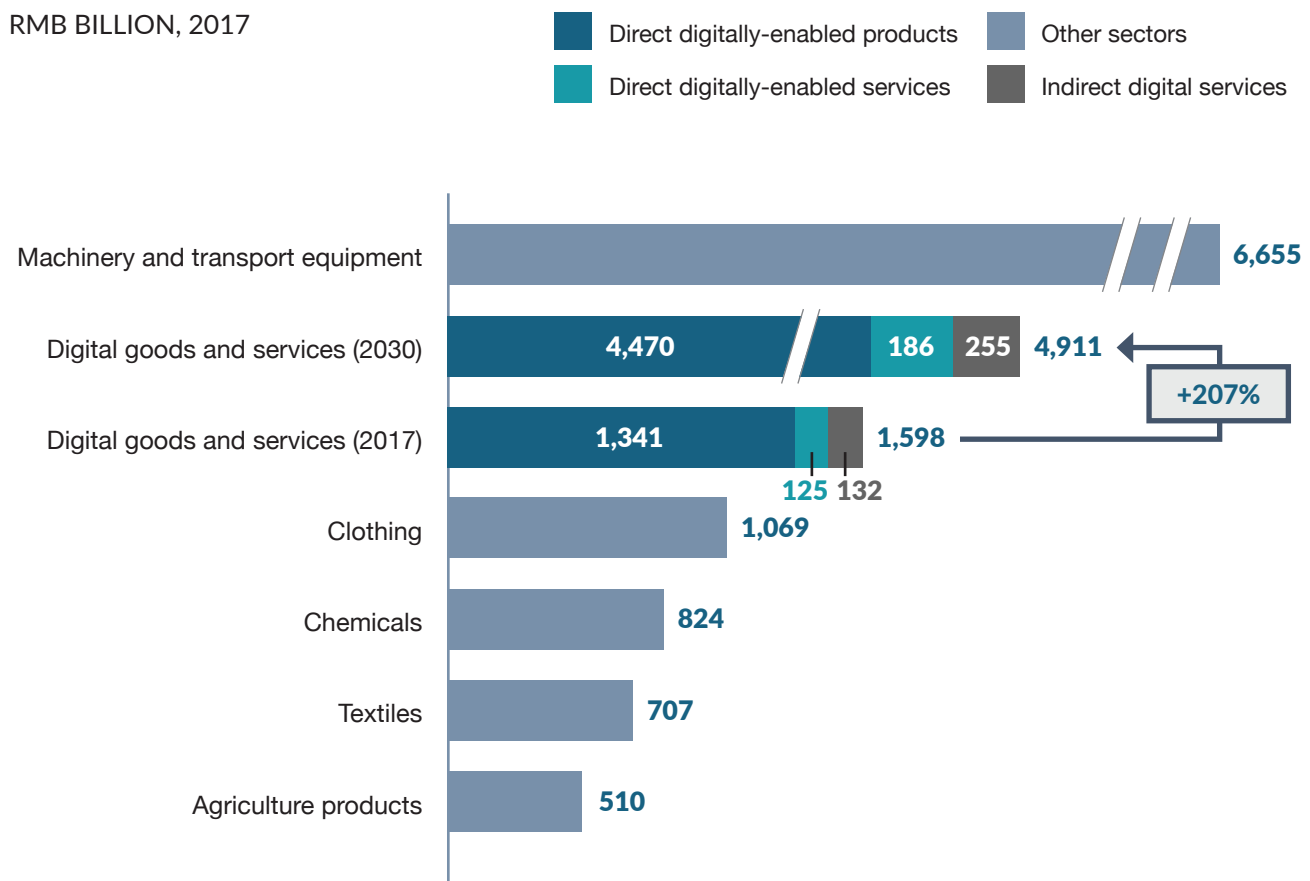
39. Based on AlphaBeta analysis. The estimate of the value of China's e-commerce exports in 2017 at RMB 1.33 trillion is close to AliResearch's estimate of China's cross-border e-commerce B2C exports, which is evaluated to be about RMB 1.29 trillion. AliResearch's figure of RMB 1.29 billion yuan was derived based on their estimate of "503.2 billion yuan in 2015, with a year-on-year increase of about 60%". See: AliResearch (2016), *2016 China cross-border e-commerce report*. Available at: <http://www.aliresearch.com/en/news/detail/id/21050.html>

EXHIBIT 5:

**IF DIGITAL WERE A SECTOR, IT WOULD REPRESENT CHINA'S
2ND LARGEST EXPORT SECTOR, AND COULD INCREASE BY
207 PERCENT BY 2030**

VALUE OF EXPORTS FOR CHINA¹

RMB BILLION, 2017



1. Due to rounding to the nearest billion, the numbers in this table may not add up precisely to the totals indicated.

SOURCE: WTO (data on 19 other sectors); AlphaBeta analysis



often lack the resources to research international sales opportunities, build global business networks and promote their products overseas. Box 2 illustrates the opportunities available to Chinese SMEs in accessing e-commerce platforms to export their goods and services. To strengthen China's cross-border e-commerce market including simplifying the processes for SMEs to take part in it, China passed its first e-commerce law in August 2018, which seeks to "protect [the] legal rights and interests of all parties" by requiring e-commerce operators to fulfil obligations to protect their merchants and consumers' rights and interests including personal information, intellectual property rights and safeguarding the quality, health and safety of products.^{40, 41} It also seeks to promote greater competition in China's e-commerce sector by banning anti-competitive practices from e-commerce operators.⁴²

- **Digital apps.** China has over one billion mobile devices and accounts for US\$1 out of every US\$4

generated globally across the app stores, in-app ads and mobile commerce. The country's 2017 domestic consumer spend exceeded RMB 202 billion (US\$30 billion). In Q4 2017 alone, app users in China spent well over 200 billion hours in apps.⁴³

There is also a growing number of export markets for China-produced apps. Coupled with the Belt and Road Initiative (BRI), Chinese publishers have seen their apps gain significant traction in countries where there is BRI investment, with these countries accounting for up to 55 percent of all app downloads.⁴⁴ For example, Chinese messaging app WeChat is now the third most commonly used app in the world by monthly active users. WeChat also boasts a built-in mobile wallet as well as social media functionality. Combined, Chinese app exports in 2017 accounted for over RMB 11 billion (US\$1.6 billion) and this number is estimated to grow to potentially over RMB 120 billion (US\$18 billion) by 2030.⁴⁵

40. Trevor Little (2018), "A detailed look at the positives and negatives of China's new e-commerce law". *World Trademark Review*.

Available at: <https://www.worldtrademarkreview.com/anti-counterfeiting/detailed-look-positives-and-negatives-chinas-new-e-commerce-law>

41. Xinhua Net (2018), "China focus: China adopts e-commerce law to improve market regulation".

Available at: http://www.xinhuanet.com/english/2018-08/31/c_137434452.htm

42. Xinhua Net (2018), "China focus: China adopts e-commerce law to improve market regulation".

Available at: http://www.xinhuanet.com/english/2018-08/31/c_137434452.htm

43. AppAnnie (2018), "China Was the Largest App Market in the World for Time Spent in Apps in 2017."

Available at: <https://www.appannie.com/en/insights/market-data/china-app-economy-2017/>

44. AppAnnie (2018), 2017 Retrospective Report. Available at: <https://www.appannie.com/en/insights/market-data/app-annie-2017-retrospective/#download>

45. Based on AlphaBeta analysis.



DIGITALLY-ENABLED SERVICES

The value of these exports is currently RMB 125 billion (US\$18.5 billion) and could grow by almost 50 percent the current value by 2030, reaching RMB 186 billion (US\$27.5 billion).⁴⁶ This includes telecommunication

services such as the export of email, video conferencing, digital file sharing, and Voice Over Internet Protocol (VOIP) services as well as data processing.

INDIRECT DIGITAL SERVICES

Imported digital services are crucial for enabling the growth of the exports of non-digital sectors. In traditional sectors such as manufacturing, imported digital services, such as email, video conferencing, Voice Over Internet Protocol (VOIP), digital file sharing and data processing have helped Chinese firms reach new markets.

For example, JW Marriot Hotel Chongqing utilised WeChat as one of their key communication channels to

consumers. Leveraging the social media and payment aspects of WeChat, the hotel has been able to increase consumer engagement through gamification, improve the quality of customer data, and eliminate the need for the middlemen in reservations (such as online travel agencies).⁴⁷ These digital tools have enabled the hotel to substantially increase their bookings, particularly by overseas visitors.⁴⁸ In 2017, the impact of imported digital services on exports in all other sectors in China is estimated at over RMB 132 billion (US\$19.5 billion).⁴⁹

46. Based on AlphaBeta analysis.

47. Trinity Business School (2016), "WeChat Marketing in Chinese Hotel Industry".

Accessible at: <http://digitalmarketingstrategy.ie/wechat-marketing-chinese-hotel-industry/>

48. PWC (2015), Case Study: Casa Di Natura.

Available at: <http://www.digitalinnovation.pwc.com.au/small-business-digital-growth/case-studies/casa-di-natura-case-study.html>

49. Based on AlphaBeta analysis.

BOX 2: TAPPING THE CROSS-BORDER E-COMMERCE OPPORTUNITY FOR CHINESE SMES

With the growth of China's cross-border e-commerce sector, the benefits to the country's many SMEs looking to export are numerous. As Director of AliResearch, Mr Ouyang Cheng, states, "SMEs neither own the required channel, nor have the required branding and scale that allow them to easily access overseas markets. However, digital e-commerce platforms may allow them to reach consumers directly, allowing them to provide services to the consumers at a level that, traditionally, only large enterprises could provide."⁵⁰ This box highlights two examples of Chinese companies that have stood to gain from the rise of cross-border e-commerce.

TOMTOP ENTERPRISE: CONNECTING CHINESE SMES AND THEIR PRODUCTS TO EXPORT MARKETS

Shenzhen-based Tomtop enterprise is an example of a Chinese enterprise which has successfully ridden the cross-border e-commerce wave to achieve high growth within a relatively short amount of time. An online trading enterprise which utilises a variety of online e-commerce channels such as eBay, Amazon, AliExpress as well as its own, Tomtop purchases, develops and sells products across a wide range of categories. Since its establishment in 2004, Tomtop



50. Based on interview with Director of the Cross-Border E-Commerce Research Centre under AliResearch, Mr Ouyang Cheng.



has rapidly grown from exporting to two countries to more than 200 countries and regions around the world, with the company's sales growing to its current US\$3.5 billion today.

In recognition of the barriers that many Chinese SMEs face in exporting overseas, the company has also organised a "Ferry Boat Plan for SMEs", which seeks to identify promising Chinese SMEs that might be facing headwinds in their export experiences, and help bring their products to overseas markets through Tomtop's online channels.⁵¹ A representative from the company who was interviewed expressed his belief that SMEs are in fact integral to the growth of cross-border e-commerce, stating, "In recent years, the immense growth of cross-border e-commerce, especially in B2C exports, both relies on and feeds into the growth of SMEs. SMEs are able to react nimbly and adapt quickly to the demands of B2C markets, due to the typically higher flexibility and smaller scale of SMEs' production processes, which can satisfy the needs of many different consumers across different markets. For example, Tomtop works

with thousands of suppliers from SMEs, which are able to meet the dynamic needs of our customers."⁵²

DÀ-JIĀNG INNOVATIONS SCIENCE AND TECHNOLOGY (DJI): EXPORTING HIGH-QUALITY DRONES THROUGH ONLINE PLATFORMS

Also headquartered in Shenzhen, DJI is a Chinese technology company which manufactures unmanned aerial drones for aerial photography and videography. The company also designs and manufactures drone-related accessories such as camera gimbals, flight platforms, drone cameras, propulsion systems, camera stabilizers, and flight control systems. Recognising there was demand in overseas markets for drones that could shoot high-quality aerial videos by both mass-market consumers and industry specialists, DJI tapped into global e-commerce platforms such as Amazon and other high-traffic networks to quickly expand out of China and seize market share.⁵³ Today, DJI is estimated to have a global market share of around 70 percent.⁵⁴

51. Tomtop (2019), "Tomtop ferry boat plan for SMEs". Available at: <http://www.tomtop.cn/about/viewCategoryPage?categoryId=1392>

52. Based on interview with a representative from Tomtop Enterprise.

53. TradeGecko (2017), "How DJI created and took over the drone world."

Available at: <https://www.tradagecko.com/blog/how-dji-created-and-took-over-the-drone-world>

54. TechNode (2018), "World's top drone seller DJI made \$2.7 billion in 2017".

Available at: <https://technode.com/2018/01/03/worlds-top-drone-seller-dji-made-2-7-billion-2017/>



CAPTURING THE DIGITAL TRADE OPPORTUNITY

It is imperative that China embraces cross-border data flows for three key reasons: to achieve the productivity improvements required in the country's transition into a services-driven economy, to unlock further growth in some of the fastest-growing areas of China's economy such as its cross-border e-commerce exports and to sustain the growth of its traditional sectors such as manufacturing through facilitating "Industry 4.0" technologies. More broadly, given China's economic prominence in the region, there is an important opportunity for the country to lead in policy areas that pave the way for digital trade.

PERCEIVED CONCERNS RELATED TO DIGITAL TRADE

Governments have increased their constraints on digital trade in recent years, ranging from data localisation requirements through to local registration mandates. Four reasons are often made to justify such interventions:



1. PRIVACY

Protecting the privacy of citizens



2. SECURITY

Enabling rapid access to data for law enforcement and safeguarding national and cyber security



3. ECONOMIC

Supporting the growth of domestic digital firms and local jobs



4. FISCAL

Protecting the local tax base

Many of these justifications require critical examination. Some are either false or overlook the fact that the same end objective could be achieved more efficiently through technological measures or other regulations without jeopardising the benefits of digital trade.



CONCERN 1:

PROTECTING THE PRIVACY OF CITIZENS AND SAFEGUARDING THEM FROM INAPPROPRIATE CONTENT

Digitised information requires appropriate privacy safeguards in order to protect citizens and safeguard against nefarious use or interference. There are different ways of addressing data privacy concerns and many can achieve the same objective of safeguarding privacy, without unduly impeding data flows.

For example, the Asia Pacific Economic Cooperation (APEC) forum has established the Cross-Border Privacy Rules (CBPR) and Privacy Recognition for Processors (PRP) systems which requires participating businesses

to implement data privacy policies consistent with the APEC Privacy Framework.⁵⁵ These forms of privacy protections are solutions that allow cross-border data flows while safeguarding privacy through interoperable enforcement mechanisms, providing an ideal international framework that Asia Pacific policymakers should seek. On the other hand, data localisation requirements could actually increase privacy risks by requiring data to be stored in single centralised locations that become more vulnerable to intrusion.⁵⁶

CONCERN 2:

ENABLING RAPID ACCESS TO DATA FOR LAW ENFORCEMENT AND SAFEGUARDING NATIONAL AND CYBER SECURITY

Cybersecurity concerns may be exacerbated by constraints on cross-border digital trade that limit the scale of cloud providers (thus potentially impacting their ability to ensure appropriate investment in data safeguards) and by concentrating data in few locations (as opposed to maintaining redundant datasets at multiple data centres spread across countries).

Modern data storage systems take advantage of “sharding”, a type of database partitioning that separates very large databases into smaller, faster and more easily managed parts called data shards. Sharding assists the intelligent transmission and storage of data, enabling the movement and replication of data between data centres and across borders in the interests of integrity, efficiency and security.

Cloud providers balance factors ranging from internet bandwidth and the likelihood of power outages over available networks to network throughput in order to optimise systems.⁵⁷ As one set of researchers found, “Requirements to localise data do nothing on their own to make data safer; in fact, they will only make it impossible for cloud service providers to take advantage of the Internet’s distributed infrastructure and use sharding.”⁵⁸

Moreover, research has shown that local storage providers apply less rigour to data security than global providers as a result of fewer financial resources, less technological expertise, lower competitive need to draw customers and technological restrictions (e.g., on sharding and the distributed storage of backup copies).⁵⁹

55. For further information, see: <http://www.cbprs.org/>

56. Tom Uren (2018), “Data localization threatens economic growth without improving security”. Available at: <https://www.aspistrategist.org.au/data-localisation-threatens-economic-growth-without-improving-security/>

57. Urs Holzle (2018), “Freedom of data movement in the cloud era” (Google Blogs). Available at: <https://www.blog.google/products/google-cloud/freedom-data-movement-cloud-era/>

58. Patrick Ryan, Sarah Falvey, and Ronak Merchant (2013), “When the cloud goes local: The global problem with data localization”. IEEE Computer Society, Issue 12, Vol. 46. Available at: <https://www.computer.org/csdl/mags/co/2013/12/mco2013120054-abs.html>

59. James Arlen and Brendan O’Connor (2015), “Xenophobia is hard on data: Forced localization, data storage, and business realities”, Sector. Available at: <http://www.sector.ca/Program/Sessions/Session-Details/xenophobia-is-hard-on-data-forced-localization-data-storage-and-business-realities/>

There are also numerous examples of data localisation creating issues for the resilience and security of data by making it susceptible to a single point of failure. For example, in 2012, a small explosion in a data centre in Calgary, Canada, led 30,000 people to lose landline phone services (including to emergency services) and interruptions to the functioning of radio stations, fire authorities, taxi services, and even some local government functions for several days.⁶⁰ National-level events such as flooding, earthquakes, tornadoes, and wildfires could create resiliency issues even for data stored at multiple points within a country.

International agreements can also help broaden global collaboration in enforcing cybersecurity. In 2015, China and the US forged a “cyber-agreement” to “provide timely responses to requests for information and assistance concerning malicious cyber activities” and “refrain from conducting or knowingly support cyber-enabled theft of intellectual property”.⁶¹

There are valid issues when it comes to law enforcement officials requiring timely access to data in other countries; however, these issues are best addressed by tackling the specific requirements of law enforcement agencies through inter-governmental data sharing agreements, rather than constricting data flows.⁶²

CONCERN 3: SUPPORTING THE GROWTH OF DOMESTIC DIGITAL FIRMS AND LOCAL JOBS

There are two main economic concerns that governments typically have regarding digital trade: firstly, that the economic benefits of trade are largely channeled to large multinationals at the expense of local companies, and secondly, that domestic digital products and services will lose competitiveness in the absence of protectionist policies. The first concern has typically led to digital trade barriers in the form of stringent local registration and data localisation requirements, while the second concern to protectionist policies for the trade of digital goods and services. While it is prudent to apply such policies to certain segments of goods and services or sectors that are deemed nationally strategic, it is worth relooking at some of these arguments to avoid unduly impeding the economic benefits of digital trade.

It has been argued that free digital trade will result in a select number of large multinationals (with the necessary scale) capturing the economic benefits, while local firms

receive limited benefits and local economies miss out on employment opportunities. The economic literature has debunked the notion that trade protectionism spurs the creation of highly-productive domestic champions⁶³, and the same is even more true for the digital sector for several reasons.

Digital multinationals make important contributions to the local digital ecosystem. In China, examples of the importance of digital multinationals to the local digital industry are plentiful:

- **Investment in research.** Google will be opening an artificial intelligence (AI) research facility in Beijing, which will support China’s AI research community by funding and sponsoring AI conferences and workshops, and by building up the local AI talent base.⁶⁴

60. Leviathan Security Group (Year?), “Comparison of Availability Between Local and Cloud Storage”. Available at: <https://static1.squarespace.com/static/556340ece4b0869396f21099/t/559dad9ae4b069728afca34a/1436396954508/Value+of+Cloud+Security+-+Availability.pdf>

61. John W. Rollins et al (2015), US-China cyber agreement, CRS Insight. Available at: <https://fas.org/srg/crs/row/IN10376.pdf>

62. Joshua P. Meltzer and Peter Lovelock (2018), Regulating for a digital economy: Understanding the importance of cross-border data flows in Asia. Available at: https://www.brookings.edu/wp-content/uploads/2018/03/digital-economy_meltzer_lovelock_working-paper.pdf

63. For a literature review, see Arvind Panagariya (2011), “A Re-examination of the Infant Industry Argument for Protection”, Journal of Applied Research. Available at: <http://journals.sagepub.com/doi/abs/10.1177/097380101000500102>

64. The Verge (2017), “Google opens Chinese AI lab, says ‘science has no borders’”.

Available at: <https://www.theverge.com/2017/12/13/16771134/google-ai-lab-china-research-center>



- **Support for innovation.** IBM's "Smarter Cities Challenge" is a competitive grant programme in which IBM partners cities who have put forth the most compelling proposals by leveraging IBM's technical expertise in cloud computing, analytics and artificial intelligence to achieve their visions – fully funded by IBM.⁶⁵ Six Chinese cities including Chengdu and Nanjing have received such support, particularly in the areas of administrative and transport services, and fostering economic development through technology.⁶⁶
- **Support for small business.** Microsoft's cloud computing system has enabled over 70,000 Chinese businesses to buy, sell, lease and distribute online software and other digital resources as an on-demand service. This has allowed many small Chinese businesses to avoid the hefty expense and complexity of buying and managing software licenses, and benefit from the convenience of a plug-and-play online resource.⁶⁷
- **Support for the education system.** Alibaba's

"Alibaba Cloud Academy" is an online programme offering cloud computing courses by Alibaba's cloud experts, as well as professional certifications upon the completion of the courses.⁶⁸

Second, digital trade constraints bring about significant additional operational costs which, in fact, often fall hardest on SMEs. While a major company may have sufficient revenues and scale to justify building data centres in multiple locations, smaller firms can be shut out of the domestic and international internet economy if they are not able to access affordable computing and data services. Past research has found that local companies would be required to pay 30 to 60 percent more for their computing needs from strictly enforced data localisation policies.⁶⁹ It has also been observed that not only does the fragmentation of global online networks by data localisation laws result in delays, inefficiencies and higher costs from building or renting physical infrastructure in each jurisdiction, it also imposes the need to operate in a "complex array of different jurisdictions imposing conflicting mandates and conferring conflicting rights".⁷⁰

65. IBM (2017), "Smarter Cities Challenge aims to make lasting urban improvements".

Available at: <https://www.ibm.com/blogs/cloud-computing/2017/02/17/smarter-cities-challenge-improvements/>

66. IBM Smarter Cities Challenge (2018). Available at: <https://www.smartercitieschallenge.org/cities>

67. South China Morning Post (2016), "Microsoft's cloud computing services growing sky high in China".

Available at: <https://www.scmp.com/tech/leaders-founders/article/2049168/microsofts-cloud-computing-services-growing-sky-high-china>

68. Alibaba Cloud (2018). Available at: <https://edu.alibabacloud.com/>

69. Leviathan Security Group (2014), Quantifying the costs of forced localization. Available at: <https://static1.squarespace.com/static/556340ece4b0869396f21099/t/559dad76e4b0899d97726a8b/1436396918881/Quantifying+the+Cost+of+Forced+Localization.pdf>

70. Sascha Meinrath (2013), "We can't let the Internet become balkanized", Slate.

Available at: http://www.slate.com/articles/technology/future_tense/2013/10/internet_balkanization_may_be_a_side_effect_of_the_snowden_surveillance.html

Third, digital constraints not only negatively affect the digital sector itself, but the broader economy. In fact, the larger impact is on non-digital sectors. The macroeconomic costs of forced data localisation range between 0.7 percent and 1.1 percent of GDP.⁷¹ In addition, data localisation has been associated with investment decreases of up to 4 percent.⁷² In China's context, a study has shown that the country's restrictive data regulations including forced data localisation have led to an overall negative economic value of increased prices, reduced productivity and lost consumer welfare – equivalent to 1.1 percent of China's GDP.⁷³ In addition, the perceived benefit of data localisation requirements

for domestic employment is typically much smaller than expected. Data centres, for example, are “capital-heavy” but “job-light” investments that are likely to create few local jobs.⁷⁴

Fourth, protectionist trade policies could encourage retaliatory behaviour in other jurisdictions with the potential to shut out local firms from these foreign markets. In China's context where many of its firms have gone global, such international trade rules could have an adverse impact on their growth and there is a risk of retaliatory action.

CONCERN 4: PROTECTING THE LOCAL TAX BASE

A fear of many policymakers is that digital trade makes it easier for companies to shift profits to low-tax jurisdictions and hence avoid paying taxes. This perception, however, is not necessarily backed by the data. Research by the European Centre for International Political Economy (ECIPE) shows that the taxes paid by the world's largest Internet firms are on average commensurate with leading businesses across the Asia-Pacific region.⁷⁵ As government officials have increasingly acknowledged, the international approach to tackling Base Erosion and Profit Shifting (BEPS) and US tax reform have together been largely successful at addressing the issue of double-non-taxation and indefinitely deferred taxation respectively.

The conversation has now moved on to how that tax should be allocated among countries, particularly countries with large consumer markets. At present,

digital multinationals (like non-digital multinationals) pay the majority of their tax where their product development takes place. Some countries have expressed their desire for the presence of large consumer markets to play a stronger role in how profit (and therefore taxing rights) is allocated, but it is no longer accurate to suggest that there is a broad problem of digital multinationals not paying enough tax at a global level.

Surveys of digital multinational enterprises conducted by AlphaBeta in past research found that investors are more concerned about the unpredictability of the tax environment, as opposed to the rate itself.⁷⁶ The early lessons from BEPS reforms in the region highlight the importance of a strong consultation process with industry and of enforceable mechanisms that do not discriminate against the digital sector.⁷⁷

71. Matthias Bauer et al. (2014), *The costs of data localization: Friendly fire on economic recovery*, European Centre for International Political Economy (ECIPE). Available at: http://www.ecipe.org/app/uploads/2014/12/OCC32014_1.pdf

72. Matthias Bauer et al (2014), “The costs of data localisation: friendly fire on economic recovery”, European Centre for International Political Economy. Available at: http://www.ecipe.org/app/uploads/2014/12/OCC32014_1.pdf.

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76. AlphaBeta (2017), *Digital Nation: Policy levers for investment and growth*. Available at: <http://www.alphabeta.com/digital-nation-policy-levers-investment-growth/>

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PRIORITIES FOR ACTION

China has already taken a positive step to advance a critical component of digital trade – cross-border e-commerce – through the passing of its first e-commerce law in August 2018 which seeks to balance the interests and rights of all parties and improve the competitiveness of the sector.

Further actions can be taken to create a similarly conducive environment with regard to the enablement of cross-border data flows, which, as illustrated in the earlier chapters, are critical to China for three reasons.

Firstly, cross-border data flows underpin the required productivity improvements as the country transitions into a services-driven economy. Secondly, enabling such

flows is critical to some of the fastest-growing areas of China's economy, such as its cross-border e-commerce exports, and will strengthen the country's existing regulations to help promote this sector. Thirdly, as China seeks to sustain the growth of its traditional sectors such as manufacturing while confronting an ageing population coupled with declining cost advantages, cross-border data flows become increasingly crucial in the nation's bid to adopt "Industry 4.0" technologies in these sectors. More broadly, given China's economic prominence in the region, there is an important opportunity for China to lead in policy areas that pave the way for digital trade. With regard to China's priorities to capture the digital trade opportunity, this section outlines possible actions in two broad categories: at home and abroad.

CATEGORY 1: ACTION AT HOME

China has a number of opportunities to enhance its current domestic regulatory approach to digital trade:

- **Ensuring a robust and efficient data management framework.** China currently applies several data localisation policies, together with restrictions on the storage and processing of information outside of China in a range of sectors including health and financial services.⁷⁸ A key regulation enacted in 2016 was the country's cybersecurity law, which prevented foreign technology firms from having a presence in China and mandating all business to be conducted through local partners, with local data storage requirements applied.⁷⁹ Some restrictions

have also grown stricter with time; in 2017, a draft circular extended the remit of data localisation restrictions from "critical information infrastructure" to all "network operators".⁸⁰

While there are legitimate public policy concerns for restricting the movement of some forms of data (e.g., to address privacy issues), establishing guidelines for this could be useful. A positive step would be for China to adopt the APEC Privacy Framework and join the APEC Cross Border Data Privacy Rules System, as well as adopt ISO Standards such as ISO27018, which specifies controls to protect personal data.

78. Nigel Cory (2017), "The critical role of data in the global economy", Information Technology and Innovation Foundation.

Available at: <http://www2.itif.org/2017-usitc-global-digital-trade.pdf>

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80. Hunton and Williams (2017), "China publishes draft measures for security assessments of data transfers".

Available at: <https://www.huntonprivacyblog.com/2017/04/11/china-publishes-draft-measures-security-assessmentsdata-transfers/>



A related opportunity is to contribute to the development of international standards for digital infrastructure and technologies, thereby encouraging interoperability between digital frameworks to avoid the costs of companies having to customise their approaches to every single market.

- **Rethinking content restrictions.** Restrictions to access certain online content can impose onerous costs on China's digital enterprises by increasing the cost of offering services online, and in some cases, make it impossible.

In particular, well-balanced internet Intermediary Liability (ILL) regulations can help to ensure the effective removal of illegal or undesirable content without constraining the free flow of information. China's intermediary laws and content takedown procedure have been considered strict, and intermediaries are not entitled to the "safe harbour" defense.⁸¹ It is imperative that regulations define clear and cost-efficient requirements for intermediaries to comply with legislation and provide clarity on any potential liability.

- **Minimising border frictions.** Cross-border trade would be greatly enhanced through appropriate rules governing Intellectual Property Rights (IPRs), and by engaging in trade facilitation practices such as improving the efficiency of the clearance and delivery of low-value and small parcels (for e-commerce) and minimising unnecessary procedures and duties (for digital products).

It should be ensured that rules governing IPRs (such as IP disclosure requirements) and copyright are not too restrictive nor too lax, in order to create a conducive environment for businesses to innovate in digital sectors.

In addition, China should look to raise its de minimis thresholds, plus remove customs duties on digital products.⁸² Low thresholds when applied to goods can impose significant administrative costs. A de minimis threshold of US\$200 could generate over US\$30 billion in economic benefits for all 21 APEC members.⁸³ China's current de minimis threshold of US\$8 is relatively low by international standards (the Australian threshold is US\$756, and the US threshold is US\$800).⁸⁴

81. European Center for International Political Economy (2018), Digital trade restrictiveness index. Available at: <http://ecipe.org/dte/dte-report/>

82. This does not preclude governments from applying local consumption or sales taxes, but these cannot discriminate against international designers or developers.

83. Stephen Holloway and Jeffrey Rae (2012), "De minimis thresholds in APEC", World Customs Journal, Vol.6 # 1. Link?

84. Olim Latapov et al. (2017), "The de minimis threshold in international trade: The costs of being too low", World Economy. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1111/twec.12577>



CATEGORY 2: ACTION ABROAD

The Chinese Government is currently engaged in a number of bilateral and multilateral trade deals. These include the Regional Comprehensive Economic Partnership (RCEP), a proposed free trade agreement (FTA) between the ten-member states of the Association of Southeast Asian Nations (ASEAN) and the six states with which ASEAN has existing free trade agreements (Australia, China, India, Japan, South Korea and New Zealand).

There is also a strong opportunity for China to join the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP) in order to be in line with international standards for digital trade rules. Coming into effect on 30 December 2018, the CPTPP currently consists of 11 countries which together account for over 13 percent of global GDP and 15 percent of global trade.⁸⁵ The CPTPP's "E-Commerce Chapter"

provides extensive protection for data created through digital trading which is consistent with China's growing e-commerce and IT industries.⁸⁶ By joining the CPTPP, China will potentially benefit from provisions within the Agreement that could facilitate the global competitiveness of homegrown Chinese e-commerce enterprises such as Alibaba, Tencent and Huawei.

Moreover, China's active participation in the United Nations Centre for Trade Facilitation and e-Business (UN/CEFACT), which assists relevant stakeholders to define the best approach and standards for trade facilitation, has been a positive step. Going forward, there is an opportunity for China to take leadership in formulating global standards for digital trade and advocating on the abovementioned three issues which can help enhance the digital trade opportunities for Chinese firms.

85. Asia Customs and Trade (2019), "Landmark CPTPP enters into force. Available at: <http://customstrade.asia/2019/01/03/landmark-cptpp-enters-into-force/>

86. Key principles to promote fair cross-border e-commerce transactions under the CPTPP include: commitments not to impose custom duties on digital products, commitments to adopt or maintain a legal framework that provides for the protection of the personal information of e-commerce users, the non-discriminatory treatment of digital products and commitments to provide reasonable network access for telecommunications suppliers. Source: Full text of the Comprehensive and Progress Agreement for Trans-Pacific Partnership. Available at: <https://www.mfat.govt.nz/assets/CPTPP/Comprehensive-and-Progressive-Agreement-for-Trans-Pacific-Partnership-CPTPP-English.pdf>

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