Introduction

Headlines about Chinese innovation can induce a certain cognitive dissonance. On the one hand, until very recently true innovation in China was thought impossible due to censorship and control. The seemingly insurmountable conflict was clear: restriction versus innovation. How could that mesh of an economic, legal and political system, which we cannot label precisely with any existing reference points, be so successful economically and technologically?

Suddenly by 2017–2020, not a week went by without Western media reporting on the impressive and sometimes unnerving Chinese technology and artificial intelligence (AI) developments. Chinese facial and speech recognition companies are now world class, but we know little about their most impressive achievements because their commercial applications have mostly been piloted inside China's borders.

China's opaque cyber regime has also grabbed regular headlines. China's political system remains politically cloudy. Add world-class AI development to that setting and all our fears are confirmed. As a result, we have begun to question our own societies. Is technology no longer about consumer convenience and making our lives easier, but a tool for centralised control?

Cyber or Network Sovereignty became a key policy during Chinese President Xi Jinping's early tenure in 2014. This policy emphasises the authority of a nation-state to regulate cyberspace and assumes that every country should be able to control information and data flows within its jurisdiction as it does other goods and services.[1] China's Cyber Security

[1] Discussions of Network Sovereignty in official Chinese media focus on cross-border flows of information and international standard setting: see 'China Releases First Strategy on Cyberspace Cooperation' (*Xinhua*, 1 March 2017) <http://news.xinhuanet.com/english/2017-03/01/c_136094734.htm>.

Law (2017)[2] is the centrepiece of this policy. During 2017–2020, new technologies such as AI became more prominent in Chinese industry and innovation policymaking. Emerging technologies such as AI and the Internet of Things (IoT), rely heavily on using enormous datasets, some of which can be linked globally. These datasets have important implications for the development of new Chinese technologies, which may be impacted by China's Cyber Security Law and other legislation associated with Network Sovereignty. This is despite the fact that the Chinese government seeks to encourage these technologies under its innovation policies, such as Internet Plus.

There is a clear conflict between Chinese policies requiring localisation of data and economic imperatives demanding innovation by Chinese firms within the current globalised technology ecosystem.

The book is divided into an introduction, two main parts and a conclusion. Part I (Chapters 1–5) sets out the historical (2014–2017) and policy context, including introducing the analytical framework, the institutions established to regulate China's data laws, historical analysis of Chinese fuzzy logic regulatory practice, and contextual doctrinal analysis of key provisions in the Cyber Security Law. Part II (Chapters 6–9) documents the impact of Network Sovereignty, specifically data localisation provisions in the Cyber Security Law and associated regulations, on China's AI future. And how fuzzy logic regulatory practice helps to resolve contradictions between Network Sovereignty and innovation.

The first four chapters demonstrate that this internal tension is a longstanding feature of Chinese technology regulation and is evident in various laws and regulations introduced prior to the landmark Cyber Security Law. This book explores China's innovation policies (known as Internet Plus) and its regulatory restrictions on networks and data (under China's stated policy of Network Sovereignty) to identify the key areas of contradiction and tension (Chapter 3).

Competing interests within the Chinese government and the need to maintain flexibility in the face of rapid technological and social change are identified as potential explanations for this tension and the concept of 'fuzzy logic' legislating is adopted to conceptualise this regulatory approach.

China's Cyber Security Law is analysed in detail in Chapter 5, where a number of vague or undefined provisions are identified, especially

[2] «中华人民共和国网络安全法» [Cyber Security Law of the People's Republic of China] (People's Republic of China) National People's Congress, Order No 53, 7 November 2016 (Cyber Security Law).

focusing on the area of data localisation. Chapters 6 and 7 then demonstrate that this vagueness in the law has allowed for selective implementation by Chinese regulators when applying data localisation and privacy protection provisions of the Cyber Security Law.

Chapters 8–9 examine the highly globalised nature of entrepreneurial ecosystems, particularly in open-source[3] development of AI innovations, over the past four years. The contradiction between control and stimulating innovation in Chinese data policymaking in this specific area is shown to be complex and evolving, yet entirely understandable in terms of the historical practice of fuzzy logic regulation. This gives rise to the broader question of whether the technological and financial ecosystem is too globalised to allow for data localisation in any particular country.[4]

Do China's data localisation laws, which were introduced as part of China's Network Sovereignty policy, adversely affect – or are they likely to adversely affect – open innovation in Chinese AI firms, which is a key goal of China's Internet Plus policy? To what extent does the tension between data localisation laws and policies, on the one hand, and innovation in AI, on the other, reflect a broader tension in Chinese policymaking between protecting domestic firms against competition from foreign firms while promoting open innovation in AI? Does innovation in AI depend upon cross-border open-source platforms? Do the requirements for data localisation more broadly affect open innovation by Chinese AI firms, as AI is a technology born of open innovation? Further, to what extent is it possible for China to promote domestic innovation in AI without Chinese AI firms engaging in partnerships with foreign firms?

Will complex and onerous data localisation laws eventually stifle Chinese AI development, and make Chinese tech products unsuited to markets outside China? There is evidence of this global tech decoupling every day, with a growing ban on Chinese AI products by the US government and others since 2019.

However, this book argues that China's 'fuzzy logic' policy framework is a pendulum that swings from global technology cosmopolitanism to restrictive domestic technology drives, depending on the geopolitical

[3] Briefly, 'open-source' computer code refers to any computer program whose source code is made available for use or modification for users or other developers. A more detailed explanation of open source appears in Chapter 9.

[4] Some literature detailing these contradictions within Chinese technology policymaking is beginning to emerge. For a detailed description of how technologies like AI assist the Communist Party's rule, see, for example, Yu Hong, *Networking China: The Digital Transformation of the Chinese Economy* (University of Illinois Press, 2017).

climate. Two policies (expanded further in Chapter 3) form each side of that pendulum.

0.1 Innovation versus Restriction

0.1.1 Internet Plus

Internet Plus is a policy introduced by the central government's State Council[5] requiring that China connect the latest internet technologies to industry.[6] Launched in 2015, it sets out initiatives supporting Smart Cities, big data, IoT and AI. China's first internet white paper, published in 2010, had already described the internet's 'irreplaceable role in accelerating the development of the national economy'.[7] Building on this, the Government Work Report[8] that Premier Li Keqiang delivered to the National People's Congress in March 2015 announced a new term for information technology policy: 'Internet Plus'. This was followed up with a detailed action plan drafted by the State Council in July 2015.[9] The intention for this action plan is to 'integrate mobile Internet, big data, cloud computing and the Internet of Things' to modernise traditional industries.[10] It is the latest iteration of a broader strategy to build China into a 网络强国 (*wangluo qiangguo* – a strong internet country). There has been considerable political analysis of this phrase by commentators, with many arguing that China wants to become an internet hegemon.[11]

[5] The State Council is the chief administrative authority of the People's Republic of China, chaired by Premier Li Keqiang.

[6] 'China Headlines: China Unveils "Internet Plus" Action Plan to Fuel Growth' (State Council of the People's Republic of China, 4 July 2015) <http://english.gov.cn/policies/latest_releases/2015/07/04/content_281475140165588.htm>.

[7] «中国互联网状况白皮书» [China Internet Status White Paper] (People's Republic of China) State Council, June 2010 (Internet White Paper).

[8] «2015 年政府工作报告» [2015 Government Work Report] (People's Republic of China) State Council, 5 March 2015.

[9] «国务院关于积极推进 '互联网+' 行动的指导意见» [Guiding Opinions on Actively Promoting the 'Internet Plus' Action Plan] (People's Republic of China) National People's Congress, 4 July 2015 (Guiding Opinions).

[10] «2015 年政府工作报告» [2015 Government Work Report] (n 8).

[11] This kind of analysis interprets Network Sovereignty to mean that China must strengthen its public and private networks, exert greater control over content and harden its broadband networks to close the technical loopholes used by other countries to undermine China's 主权安全 [sovereignty security], 政治安全 [political security] and 社会稳定 [social stability]. See, eg, Nigel Inkster, *China's Cyber Power* (Routledge, 2016) 35; Shazeda Ahmed and Steven Weber, 'China's Long Game in Techno-Nationalism' (2018) 23(5) *First Monday* <https://firstmonday.org/ojs/index.php/fm/article/view/8085/7209>.

While this may be true, a major objective of Internet Plus (literally 'internet + industry') is also to utilise network technologies to reform the inefficiencies in the public sector, such as in China's state-owned enterprises and government institutions.

0.1.2 Network Sovereignty

As noted, during President Xi Jinping's early tenure in 2014, Network Sovereignty became a key policy, emphasising the authority of a nation-state to regulate cyberspace and to control information and data flows as it does for other goods and services. Key statements by President Xi include that it is important for nation-states to have 'respect for cyber sovereignty' and to 'maintain cyber security and promote orderly development'.[12]

While the Chinese term 网络主权 (*wangluo zhuquan*) is commonly translated as internet or cyber sovereignty,[13] this is an imprecise translation.[14] This is because Network Sovereignty is not just about controlling online content; it also seeks to keep the very valuable data flows produced by China's technology ecosystems in China. Since 2006, dozens of restrictive rules and laws affecting tech companies have been legislated in China. However, observers have noticed a marked increase in the rigidity of these rules since 2014, culminating in the Cyber Security Law of 2017 and its associated regulations since.[15] This book examines how Network Sovereignty affects Chinese entrepreneurs: do they benefit from reduced foreign competition, or are they adversely impacted due to their own reliance on global networks? Commentators claim that these frequently vague regulations shut foreign information and communications technology (ICT) service providers out of the market and provide an

[12] Xi Jinping, 'Remarks by H E Xi Jinping President of the People's Republic of China at the Opening Ceremony of the Second World Internet Conference' (Speech, Wuzhen, 16 December 2015) <https://www.fmprc.gov.cn/mfa_eng/wjdt_665385/zyjh_665391/t1327570.shtml>.

[13] The official Chinese government English phrasing is 'Cyber Sovereignty': ibid.

[14] From a neutral language perspective, it is better translated as 'Network Sovereignty'.

[15] See, eg, Samm Sacks, Paul Triolo and Graham Webster, 'Beyond the Worst-Case Assumptions on China's Cybersecurity Law' (*New America*, 13 October 2017) <https://www.newamerica.org/cybersecurity-initiative/blog/beyond-worst-case-assumptions-chinas-cybersecurity-law>.

unfair advantage to Chinese firms,[16] but is this interpretation of the new policies too simplistic?

China's laws and regulations relating to data and ICT networks now regularly contain the phrases 'secure and controllable' (安全可控), 'secure and reliable' (安全可靠) or 'indigenous and controllable' (自主可控), and data localisation is frequently linked to security.[17] Yet in China's system of fuzzy logic regulatory practice, these terms and how they will be applied in practice are still not precisely understood.[18]

Further, as of 2016–2017, no other country had implemented a cyber security law as detailed and extensive as China's. Therefore, it is crucial to understand how this law – a key product of Chinese Network Sovereignty concerns – has been and will be implemented, and to evaluate its impact on data control/transfer within China and across international borders.

It is now becoming clear that how China interprets and applies this law will have implications beyond China's borders. Foreign governments and the ICT sector never expected that China would lead global technical standards bodies and technology development races, but it is now in the vanguard of innovation and international jurisprudence. Just as China once modelled its corporate laws on those of the United States and its constitution on that of the former Soviet Union,[19] some mainly non-democratic countries may now look to China's Cyber Security Law for a

[16] There is now a necessary technology Cold War undercurrent to the debate around Network Sovereignty. See, eg, Lora Saalman, 'New Domains of Crossover and Concern in Cyberspace' (*Sipri.org*, 26 July 2017) <https://www.sipri.org/commentary/topical-background/2017/new-domains-crossover-and-concern-cyberspace>.

[17] These phrases began appearing from 2014, first in the banking industry. In late 2014, the China Banking Regulatory Commission and the National Development and Reform Commission, the Ministry of Industry and Information Technology (MIIT) and the Ministry of Science and Technology (MOST) jointly issued «关于应用安全可控信息技术加强银行业网络安全和信息化建设的指导意见» (称 317 号文) [Guiding Opinions on Applying Secure and Controllable Information Technology to Strengthen the Network Security and Informatisation of the Banking Industry (Circular 317)] (People's Republic of China) China Banking Regulatory Commission (CBRC), 26 December 2014 (Circular 317). Since that time these phrases, particularly 'secure and controllable', have become synonymous with Network Sovereignty.

[18] For example, a retreat from formal law in controlling online social movements means that tech companies must often patrol and self-regulate social media content: see Benjamin L Liebman, 'China's Law and Stability Paradox' in Jacques DeLisle and Avery Goldstein (eds), *China's Challenges* (University of Pennsylvania Press, 2015) 157.

[19] After 1979, when China began emphasising the rule of law rather than the previous rule of man system of the Cultural Revolution, it experimented with pilot projects and created a legal system that many other countries could recognise, not least because many of China's commercial laws were 'borrowed from abroad': see Samuli Seppänen, *Ideological*

template. How Chinese regulators interpret and apply this law will have both domestic and international ramifications.

0.2 Fuzzy Logic: The Chinese Approach to Innovation Regulation

Regulatory practice in China is best analysed through two concepts: one is fuzzy logic legislating;[20] the other is public–private petri dishes (see next section). In short, the Chinese government drafts vague laws that can be implemented and effectively adapted with a high degree of discretion (similar to fuzzy logic machines that learn and adapt through doing); and the government also implements pilot schemes, often at a local level, to test new technologies and related policies in a controlled environment (similar to a chemical petri dish experiment).

There is a long history of these systems and approaches to legal development in China. Case studies of innovation in China focusing on high-profile Chinese firms[21] have tended to ignore the impact of Network Sovereignty issues and, by extension, the complexity of regulatory practice and government involvement – both positive and negative – in the innovation ecosystem. By contrast, studies of China's cyber-control regime have generally neglected to note how that regime frequently stimulates Chinese firms' innovation and have overemphasised the perceived dystopian risks. Many have covered one side of the picture: either innovation[22] or restrictions.[23] Yet no scholars or commentators have extensively

Conflict and the Rule of Law in Contemporary China (Cambridge University Press, 2016) 72.

[20] Oren Perez and others have developed a concept of 'fuzzy law' since the 1990s. See Oren Perez, 'Fuzzy Law: A Theory of Quasi-Legal Systems' (2015) 28 *Canadian Journal of Law and Jurisprudence* 343. Perez refers to fuzzy law as 'quasi-legality' or soft law. I refer to the Chinese government as deliberately employing unclear laws: 'fuzzy logic'.

[21] See, eg, Edward Tse, *China's Disruptors: How Alibaba, Xiaomi, Tencent, and Other Companies Are Changing the Rules of Business* (Penguin, 2015).

[22] See, eg, G S Yip and B McKern, *China's Next Strategic Advantage: From Imitation to Innovation* (MIT Press, 2016); Tse, *China's Disruptors* (n 21); Yu Zhou, *The Inside Story of China's High-Tech Industry: Making 'Silicon Valley' in Beijing* (Rowman & Littlefield, 2008).

[23] See Guobin Yang, 'Social Dynamics in the Evolution of China's Internet Content Control Regime' in Monroe E Price, Stefaan Verhulst and Libby Morgan (eds), *Handbook of Media Law* (Routledge, 2012) 293. See also Rogier Creemers, 'Cyber China: Updating Propaganda, Public Opinion Work and Social Management for the 21st Century' (2017) 26(103) *Journal of Contemporary China* 85.

covered the symbiotic crossover between them. Again, the reality is that headlines about Chinese innovation policies induce a certain cognitive dissonance. On the one hand, commentators have claimed that true innovation is impossible due to China's censorship and control.[24] Conversely, a comprehensive survey of Chinese private entrepreneurs concluded: 'Party building in the private sector has been more successful at promoting the firms' interests than exerting Party leadership.'[25]

But both Network Sovereignty and innovation policies must be taken into account when evaluating the current and future evolution of the Chinese technology ecosystem. There is a symbiotic relationship between the government and private firms, which emerges from the way that the Chinese government's pilot petri dishes provide unprecedented opportunities for Chinese tech firms to build new technologies. It is therefore in the interests of both sides to minimise the negative impact of censorship and restriction on innovation by those firms. It is, moreover, no accident that a current Chinese innovation policy is promoted as 'Mass Entrepreneurship': setting a policy environment that encourages the masses (老百姓 – *laobaixing*) to start their own businesses.[26]

Further, describing China's cyber security restrictions without understanding their impact on Chinese innovation from the perspective of private Chinese companies would create an incomplete and misleading idea about these policies. This book aims to capture the innovation and the entrepreneurial story, not just the Chinese government's restrictive policies, and in the process to provide a more complete picture of how Chinese technology regulation works in practice.

This can be done by reconceptualising the unique Chinese approach to regulation of innovation as a dynamic interaction between fuzzy logic legislating and testing via public–private petri dishes. Importantly, this analysis also recognises the difficulty in separating targeted government assistance from private bottom-up experimentation at the firm level.

[24] In March 2014, the *Harvard Business Review* famously published an article entitled 'Why China Can't Innovate': see Regina M Abrami, William C Kirby and F Warren McFarlan, 'Why China Can't Innovate' (March 2014) *Harvard Business Review* <https://hbr.org/2014/03/why-china-cant-innovate>.

[25] Bruce J Dickson, *Wealth into Power: The Communist Party's Embrace of China's Private Sector* (Cambridge University Press, 2008).

[26] See Xu Wei, 'China to Further Promote Innovation and Entrepreneurship' (State Council of the People's Republic of China, 12 July 2017) <http://english.gov.cn/premier/news/2017/07/12/content_281475723086902.htm>.

0.2.1 Policy Petri Dishes in Chinese Innovation

Policy petri dishes have a long history in Chinese policymaking. China's economic and legal reforms began with pilot agricultural and economic zones in 1979.[27] The relationship between legal and economic development was seen as 'bidirectional – a co-evolutionary process'.[28] In other words, law played an important role in Chinese economic growth, as economic policy also heavily influenced the legal system.[29] Many new laws, regulations, rules and constitutional amendments were adopted to promote and assist China's economic boom, and it is well documented that pilot economic zones were used as legal and economic testing grounds.[30]

Likewise, although constitutionally and legally China is a unitary state, in fact local governments (provincial and below) have enjoyed a high degree of autonomy and freedom in policy enforcement, especially with regard to economic issues, such as the role of state-owned enterprises (SOEs) within their provinces. This has been documented as being the case since the beginning of the reform and opening policies in the late

[27] See Pitman B Potter, *The Chinese Legal System: Globalization and Local Legal Culture* (Routledge, 2001) 2.

[28] Donald Clarke, Peter Murrell and Susan Whiting, 'The Role of Law in China's Economic Development' in Thomas Rawski and Loren Brandt (eds), *China's Great Economic Transformation* (Cambridge University Press, 2008) 375, 391. The success of these zones has been appraised at length: see Zhicun Gao and Clem Tisdell, 'China's Reformed Science and Technology System: An Overview and Assessment' (2004) 22(3) *Prometheus: Critical Studies in Innovation* 311; Hooshang Amirahmadi and Grant Saff, 'Science Parks: A Critical Assessment' (1993) 8(2) *Journal of Planning Literature* 107; Loren Brandt and Thomas G Rawski, 'China's Great Economic Transformation' in Brandt and Rawski (eds), *China's Great Economic Transformation* (Cambridge University Press, 2008) 1; Cong Cao, 'Zhongguancun and China's High-Tech Parks in Transition: "Growing Pains" or "Premature Senility?"' (2004) 44(5) *Asian Survey* 647; Cong Cao, 'Zhongguancun: China's Silicon Valley' (2001) 28(3) *China Business Review* 38.

[29] By 2009, early commentary had begun suggesting the policies had worked: see Denis F Simon and Cong Cao, *China's Emerging Technological Edge* (Cambridge University Press, 2009).

[30] Stephen C Hsu, *Understanding China's Legal System* (New York University Press, 2003) 274–6. See also Susan M Walcott, *Chinese Science and Technology Industrial Parks* (Ashgate, 2003); Barry Naughton, *The Chinese Economy: Transitions and Growth* (MIT Press, 2007); Barry Naughton, *Growing out of the Plan: Chinese Economic Reform, 1978–1993* (Cambridge University Press, 1996); Cassandra C Wang, George C S Lin and Guicai Li, 'Industrial Clustering and Technological Innovation in China: New Evidence from the ICT Industry in Shenzhen' (2010) 42(8) *Environment and Planning* 1987.

1970s.[31] Laws and regulations that supported innovation but did not limit the power of the central government were viewed as a technocratic 'means to an end', and when they proved successful at local levels, they were expanded to the rest of China.[32]

Within this context of localised petri dish experimentation, China's government has also provided a flexible policy environment to attract foreign investment, especially in the field of technology, and to encourage the interaction between tech companies, universities and research institutions.[33]

By 2014, Tse, Wertime, Chow and others had begun to argue that after a long period of sustained technocratic success in building China into a manufacturing powerhouse, it was no longer simply a copycat or imitation economy, but had developed a true innovative spirit.[34] In this, they disputed the argument advanced by North and others that institutional development leads to a path-dependent pattern of development[35] or that top-down policymaking suppresses grass-roots innovations.[36] This is

[31] See Potter, *The Chinese Legal System* (n 27) 10. 'State capitalism' is a concept that has emerged in the literature. However, how private tech companies operate in this milieu requires further study: see Benjamin Liebman and Curtis Milhaupt (eds), *Regulating the Visible Hand? The Institutional Implications of Chinese State Capitalism* (Oxford University Press, 2015).

[32] See Seppänen, *Ideological Conflict and the Rule of Law* (n 19) 72.

[33] Javade Chaudhri, 'Chinese Industrial Policies: Indigenous Innovation, Intellectual Property Rights, and the Trade Issues of the Next Decade' (2011) 34(1) *Thomas Jefferson Law Review* 1, 15.

[34] Edward Tse, 'Don't Belittle China's Innovation Potential' (*Europe's World*, 14 February 2014) <https://www.friendsofeurope.org/insights/dont-belittle-chinas-innovation-potential>; David Wertime, 'It's Official: China Is Becoming a New Innovation Powerhouse: The World's Factory Is Turning into an R&D Machine – And Fast Catching Up with America' (*Foreign Policy*, 7 February 2014) <https://foreignpolicy.com/2014/02/07/its-official-china-is-becoming-a-new-innovation-powerhouse>; Stacey Chow, 'How Will China's Innovation Change the World?' (*World Economic Forum*, 16 July 2015) <https://www.weforum.org/agenda/2015/07/how-will-chinas-innovation-change-the-world>.

[35] Douglass C North, *Institutions, Institutional Change and Economic Performance* (Cambridge University Press, 1990) 17.

[36] Phelps suggests innovation is impossible without grass-roots activism, and governments cannot 'die-cast' entrepreneurs: see Edmund S Phelps, *Mass Flourishing: How Grassroots Innovation Created Jobs, Challenge, and Change* (Princeton University Press, 2013). Phelps revisits these issues in Edmund S Phelps, 'The Dynamism of Nations: Toward a Theory of Indigenous Innovation' (2017) (12)1 *Capitalism and Society* 1. He suggests that a mass flourishing is necessary and top-down innovation will not work. See also Eric Reinert, *How Rich Countries Got Rich and Why Poor Countries Stay Poor* (Constable & Robinson, 2007); Peter B Evans, *Embedded Autonomy: States and Industrial*