JOURNAL OF
CROSS-DISCIPLINARY RESEARCH
IN COMPUTATIONAL LAW [CRCL]

Automated law enforcement: An assessment of China's Social Credit Systems (SCS) using interview evidence from Shanghai

Zhenbin Zuo*

Abstract

This paper provides one of the first fieldwork-based research accounts of China's Social Credit Systems (SCS). It focuses on the issue of automated law enforcement. Evidence is drawn from semi-structured interviews with Shanghai-based local government officials, judges and corporate employees, conducted in April 2021. These are actors who supervise, manage, and/or operate Shanghai's SCS at the level of daily practice. The paper examines the use of blacklists and joint sanctions within the wider framework of the SCS. The interview evidence, combined with online archival research, uncovers a more complete understanding than previously available of the detailed workings of these systems and of their perceived impacts, both positive and negative, in the field. Automation is observed to have achieved efficient scaling, but also to have negative consequences, including rigidity at the level of code, and perverse or counter-productive incentives at the level of human behaviour, leading to potential 'institutional overload'. Proposing an original institutional theory of computational law which identifies the role of governance in 'scaling and layering', the paper argues that automated enforcement can only achieve scale effects if human judgement is combined with automation. Human agency is needed to continuously realign and re-fit code-based systems to text-driven laws and social norms in specific spatio-temporal environments. In the final analysis, code operates in a path-dependent and complementary way to these other forms of governance. From social norms to laws, to data and to code, governance is layered via formalisation sustained by human work and societal feedback.

Keywords: automated enforcement, social credit systems, code-driven 'law', layering

Replier: Cynthia Liem • Delft University of Technology, c.c.s.liem@tudelft.nl.

Journal of Cross-disciplinary Research in Computational Law

DOI: pending

www.journalcrcl.org

* Assistant Professor, University of Essex, School of Law; Research Associate, University of Cambridge, Centre for Business Research. Zhenbin.zuo@essex.ac.uk.

Introduction

In *Surveillance Capitalism*,[1] Shoshana Zuboff challenged the vision of self-executing contracts presented by Google's Hal Varian. What if computer code can automatically enforce a car-hiring contract by locking the engine from afar, oblivious to whether there is a blizzard, a child in the car, or a mother waiting in a hospital? Zuboff calls attention to the 'uncontracts' which use code[2] to substitute for legal contracts, in the process removing human dialogue, problem-solving and empathy from law enforcement. Where Varian believed that code could scale up techno-legal governance, Zuboff warns of a world in which the 'the blankness of perpetual compliance' leads to the disappearance of both uncertainty and freedom, and 'the right to the future tense is endangered'[3].

China's Social Credit System (SCS), meanwhile, has already automatically enforced legal verdicts that refused millions of people's booking of flights or high-speed train journeys due to, among other things, unpaid commercial and consumer debts. The technology includes simple information infrastructures and facial recognition code embedded in cameras at boarding gates.[4] But what if there were a similar emergency situation to the one posed in Zuboff's question, where a single-parent mother needs to fly to see her child in a hospital across the country? Has the code embedded in the state-led SCS, similar to the corporate 'uncontracts' of the West's surveillance capitalism, led to similar dangers in removing human judgements? More broadly, can code, whether contained in the surveillance systems of platform companies or China's SCS, substitute or replace law, leading to what some proclaim as a 'legal singularity'?[5]

Recent studies have pointed to other aspects of the SCS: less an Orwellian dystopia, more a practical response to the complexity of governance in contexts where human behaviour increasingly interacts with techno-legal architectures and code-law coevolution.[6] This paper furthers their call for informed understanding of the SCS. It provides new fieldwork-based evidence to argue against the substitution hypothesis, namely that 'code will replace law'. It suggests, on the contrary, that law and code are complementary

[1] Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power, edn* (Profile Books 2018).

[2] Or in her words 'the positivist calculations of automatic machine processes'. ibid Chapter 7.VI Executing the Uncontract. p.333

[3] ibid pp.332-336. Also see similar general concerns by e.g. Frank Pasquale, 'A rule of persons, not machines: the limits of legal automation' (2019) 87 Geo. Wash. L. Rev. 1.

[4] See e.g. news report on China's railway facial recognition systems since 2016 'Beijing Station Pilots 'Face Scanning' for Entry Using Facial Recognition Technology [北京站试运行"刷脸"进站使用人脸识别技术-新华网]' (*Xinhua News Agency*, 2016) ⟨http://www.xinhuanet.com/politics/2016-11/30/c_1120017691.htm⟩; The system was formally used since 2017 'Four Major Changes in the 2017 Spring Festival Travel Rush: 'Face Scanning' Entry Available at Some Train Stations[年春运四大变化：部分火车站可"刷脸"进站-时政-人民网]' (*People's Daily Online*, 2017) ⟨http://politics.people.com.cn/n1/2016/1215/c1001-28951537.html⟩ infra section *Doctrines and interviews: make a flowchart of automated law enforcement in the SCS* with more details.

[5] See e.g. Benjamin Alarie, 'The path of the law: Towards legal singularity' (2016) 66(4) University of Toronto Law Journal 443; Benjamin Alarie, Anthony Niblett, and Albert H Yoon, 'Using machine learning to predict outcomes in tax law' (2016) 58 Can. Bus. LJ 231. Cf e.g. Simon Deakin and Christopher Markou, 'From Rule of Law to Legal Singularity' in Simon Deakin and Christopher Markou (eds), *Is Law Computable? : Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing November 2020); Lyria Bennett Moses, 'Not a Single Singularity' in Simon Deakin and Christopher Markou (eds), *Is Law Computable? : Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing November 2020); Harry Surden, 'Artificial intelligence and law: An overview' (2019) 35(4) Georgia State University Law Review 19; Harry Surden, 'Machine Learning and Law' (2014) 89(1) Washington Law Review 87.

[6] See e.g. Nicolas Kayser-Bril, 'China's social credit is not quite the dystopia you had in mind' (*Algorithm Watch*, 2022) ⟨https://r.algorithmwatch.org/nl3/sv94Xx-cTJFrPnlvkG76VA⟩; Jamie P Horsley, 'China's Orwellian social credit score isn't real' (2018) 16 Foreign Policy; Jeremy Daum, 'Untrustworthy: Social credit isn't what you think it is' [2019] Verfassungsblog: On Matters Constitutional; Daithí Mac Síthigh and Mathias Siems, 'The Chinese social credit system: A model for other countries?' (2019) 82(6) The Modern Law Review 1034; Theresa Krause and others, 'China's corporate credit reporting system: A comparison with the United States and Germany' (2023) 17(3) Regulation & Governance 755; Jamie P Horsley, 'China's Corporate Social Credit "System"' (2018) ⟨https://law.yale.edu/sites/default/files/area/center/china/document/horsley_china_corporate_social_credit_1-31-20.pdf⟩. Also Kiel Institute for the World Economy, 'Compliance in China under the Social Credit System and Growing Regulation: What are the Challenges Companies face?' (2022) ⟨https://www.ifw-kiel.de/institute/events/global-china-conversations/compliance-in-china-under-the-social-credit-system-and-growing-regulation-what-are-the-challenges-companies-face/⟩;Peng Chun, 'Joint Sanctions in China's Social Credit System' [2021] (in Chinese);Zhenbin Zuo, 'Governance by Algorithm: China's Social Credit System' (2020) ⟨https://www.finance.group.cam.ac.uk/system/files/documents/GovernancebyAlgorithm_CERF_Zhenbin6.16.2020.pdf⟩.

modes of governance, which require sustained human interventions and bottom-up societal feedback.

The paper aims to make two original contributions: (1) providing a more accurate description of China's SCS (specifically the blacklists and joint-sanctions branch) as low-tech, automated law enforcement observed in its daily operations with perceived gains and losses; and (2) exploring a more realistic theory of computational law in terms of 'complementarity' and 'layering', where code operates in a path-dependent and complementary way to law, requiring humans to overcome organisational or institutional limitations including the rigidity of code, perverse incentives, unanticipated behaviours, and institutional overload.

Existing literature has tried to provide grand narratives and theorisation of the SCS as a whole, such as 'data state'[7], 'reputation state'[8], 'new regulatory model'[9], 'infrastructure datafication'[10], 'state surveillance infrastructure'[11], 'cybernetic citizenship'[12], 'cybernetic control'[13], or 'rule of trust'[14], among others. Some are normatively critical and worried that China's SCS can lead to centralised authoritarian governance, undermine the rule-of-law, violate privacy, reinforce biases, exacerbate corruption, and so on. The paper recognises these harmful potentials and the complex governance reality in China where local experiments can have varied levels of rule-of-law protections. Also for this reason, the paper does not intend to provide a general normative analysis of China's SCS. It focuses instead on revealing the detailed workings of the automated enforcement systems within the SCS, which is rarely understood with empirical evidence from the field.[15] It is therefore an exercise in the use of empirical social science to study legal and technological practices. Nevertheless, it raises a normatively useful framework, which has 'ought-to' implications for the design of the SCS and computational law in general.

The argument will be structured as follows. In the next section, the paper reviews the 'code v law' debate and proposes an original theoretical framework of governance in terms of 'scaling and layering'. This framework raises the possibility that 'code complements law' – an alternative to the much-touted idea of substitution (section *Theoretical Framing: Automated law enforcement and 'layering' in the SCS*). The following section sets out the method, explaining the paper's mix of doctrinal and qualitative case study methods, and why they are suitable for testing the substitution and complementary hypotheses (section *Methodology*). Then the empirical evidence is presented. This takes the form of new fieldwork-based evidence of Shanghai's SCS. It starts by drawing a flowchart of how humans and machines work together in the SCS under simple code infrastructures and legal architectures, largely without using machine-learning, data-heavy statistics or block-chain technologies (section *Doctrines and interviews: make a flowchart of automated law enforcement in the SCS*). It then uses interview evidence to describe observed impacts, both positive and negative, of automated law enforcement (section *Interview evidence explored: Perceived*

[7] Anne SY Cheung and Yongxi Chen, 'From datafication to data state: Making sense of China's social credit system and its implications' (2022) 47(4) Law & Social Inquiry 1137.

[8] Xin [戴昕] Dai, 'Toward a reputation state: A comprehensive view of China's Social Credit System project' [2020] Social Credit Rating: Reputation und Vertrauen beurteilen 139.

[9] See. e.g. Larry Catá Backer, 'Next Generation Law: data-driven governance and accountability-based regulatory systems in the West, and social credit regimes in China' (2018) 28 S. Cal. Interdisc. LJ 123

[10] Ramon Salim Diab, 'Becoming-infrastructure: Datafication, deactivation and the social credit system' (2017) 1(1) Journal of Critical Library and Information Studies.

[11] Fan Liang and others, 'Constructing a data-driven society: China's social credit system as a state surveillance infrastructure' (2018) 10(4) Policy & Internet 415.

[12] Liav Orgad and Wessel Reijers, 'How to Make the Perfect Citizen? Lessons from China's Social Credit System' (2021) 54 Vand. J. Transnat'l L. 1087.

[13] Rogier Creemers, 'China's Social Credit System: an evolving practice of control' [2018] Available at SSRN 3175792.

[14] Yu-Jie Chen, Ching-Fu Lin, and Han-Wei Liu, 'Rule of trust: The power and perils of china's social credit megaproject' (2018) 32 Colum. J. Asian L. 1.

[15] See e.g. Dai (n 8) stated the lack of empirical evidence from the field. Also see Mac Síthigh and Siems (n 6); Cheung and Chen (n 7). Besides, most Chinese legal scholarship focuses more on theoretical and doctrinal discussion based on the analysis of legal texts or online news. See, e.g. Kui [沈岿] Shen, 'The Approach Consistent with the Rule of Law to Constructing the Social Credit System [社会信用体系建设的法治之道]' [2019] (5) China Legal Science [中国法学] 25; Xixin [王锡锌] Wang and Huang [黄智杰] Zhijie, 'On the Rule-of-Law Constraints on the Restrictions on Trust-Breaking [论失信约束制度的法治约束]' [2021] (1) China Law Review [中国法律评论] 96.

gains and loss of automated enforcement). An assessment section returns to the paper's theoretical framing in terms of 'governance scaling and layering' (section *Analysis: Governance layering and human agency in automated enforcement*), and is followed by the conclusion (section *Conclusions*).

Theoretical Framing: Automated law enforcement and 'layering' in the SCS

Blacklists and joint sanctions together constitute the two automated actions of law enforcement required by Chinese laws: (1) automated sharing of enforcement information and (2) automated penalisation or rejection of access/privileges. This paper calls them the 'automated enforcement' branch of China's SCS.[16] In the lens of legal technology or code-driven 'law', 'automated enforcement' is the technology that uses computational code to translate the operations of law enforcement into machine-readable forms. 'Code-driven legal tech' thus reduces human work and involvement in enforcement processes.[17]

Such legal tech can take the form of using computer language to directly represent legislation and regulation in machine-readable formats, which allows for fewer interpretative gaps associated with human judgement.[18] More relevant to this paper, this 'legal tech' uses computational code and hardwired architectures that automatically carry out the enforcement of text-driven laws in the physical world, again reducing human involvement. For example, 'smart contract' is a form of code-driven 'law', which uses block-chain and crypto-technologies to automatically enforce contracts.[19] There are also emerging practices of automating tax law[20] and antitrust enforcement in the world.[21]

Existing literature on automated law enforcement has discussed its negative consequences, such as de-skilling the police[22] the potential of restricting freedom afforded by law,[23] reducing contextualised, ethical judgements, removing useful indeterminacy[24], and having chilling ef-

[16] Due to limited space, the paper cannot provide a comprehensive online research of existing blacklists or joint sanctions for an overall description. Cf Severin Engelmann and others, 'Blacklists and Redlists in the Chinese Social Credit System: Diversity, Flexibility, and Comprehensiveness' (AIES '21, Association for Computing Machinery 2021). Neither does the paper have the space to address the diverse sets of socio-financial credit-scoring schemes, usually under the name of '*zheng xin*' (征信). See e.g. Cheung and Chen (n 7). With concerns on algorithmic black-box and scoring, see generally, F Pasquale, *The black box society: The secret algorithms that control money and information* (Harvard University Press 2015); Danielle Keats Citron and Frank Pasquale, 'The scored society: Due process for automated predictions' (2014) 89 Wash. L. Rev. 1. It is worth noting the two branches, risk-scoring and blacklisting, are separated in China's SCS. Many confusions about the SCS as an 'Orwellian' dystopia originates from a misconception that low credit-scores can lead to being blacklisted or sanctioned. In reality, however, except for some local experiments with weak procedural and rule-of-law safeguards (which the central state and legislature try to curb), poor credit-scores cannot trigger any of those. See e.g. Yang Zeyi, 'China just announced a new social credit law. Here's what it says' (*MIT Technology Review*, 2022) ⟨https://www.technologyreview.com/2022/11/22/1063605/china-announced-a-new-social-credit-law-what-does-it-mean/⟩.

[17] Matthew Waddington, 'Rules as code' (2020) 37(1) Law in Context 179; Mireille Hildebrandt, 'Code-driven Law: Scaling the Future and Freezing the Past' in Simon Deakin and Christopher Markou (eds), *Is Law Computable? Critical Reflections on Law and Artificial Intelligence* (Hart 2020); Laurence Diver, *Digisprudence: code as law rebooted* (Edinburgh University Press 2021). Also see Laurence Diver and others, 'Typology of Legal Technologies' (*COHUBICOL*, 2022) ⟨https://publications.cohubicol.com/typology⟩.

[18] See, e.g. Liane Huttner and Denis Merigoux, 'Catala: Moving Towards the Future of Legal Expert Systems' [2022] Artificial Intelligence and Law; Diver, *Digisprudence: code as law rebooted* (n 17).

[19] See Hildebrandt, 'Code-driven Law: Scaling the Future and Freezing the Past' (n 17). Also see Primavera De Filippi and Aaron Wright, *Blockchain and the Law: The Rule of Code* (Harvard University Press 2018).

[20] See Huttner and Merigoux (n 18) the *Catala* coding language.

[21] Thibault Schrepel and Teodora Groza, 'The adoption of computational antitrust by agencies: 2021 report' (2022) 2 Stanford Computational Antitrust 78.

[22] Elizabeth E Joh, 'The Consequences of Automating and Deskilling the Police' (*UCLA Law Review*, 2019) ⟨https://www.uclalawreview.org/the-consequences-of-automating-and-deskilling-the-police/⟩.

[23] Karen Yeung, 'Blockchain, transactional security and the promise of automated law enforcement: the withering of freedom under law?' [2017] TLI Think.

[24] Woodrow Hartzog and others, 'Inefficiently automated law enforcement' [2015] Mich. St. L. Rev. 1763; Lisa A Shay and others, 'Confronting automated law enforcement' in *Robot Law* (Edward Elgar Publishing 2016).

fects online (by copyright enforcement).[25] However, there are very few detailed empirical studies of these effects, and those with case studies often largely focus on the police settings in developed countries, such as criminal or traffic law enforcement (with one exception looking at traffic enforcement in developing cities where population is dense yet with poor infrastructures).[26] Moreover, despite the logics of automation being similar across these cases, in the sense that they rely on machines to replace human action, this line of literature has not so far discussed cases like China's SCS which mainly focuses on automating information-sharing and civil and administrative sanctions.

This paper locates China's SCS in the wider theoretical debate on computational law. It asks whether code and law substitute or complement each other as distinct forms of governance practices.[27] It draws on institutionalist theories[28] and computational law literatures[29] to propose a framework where data-driven and code-driven governance have distinct 'scaling' and 'layering' effects.

More specifically, 'scaling' means that in the process of moving from social norms to text-driven laws, and then from textual law to data, statistics and code, modes of governance can attain increased geo-spatial and temporal effects, expanding their reach over geographical territories, populations, and extending them in effects over time. In China, the move to greater formality in the legal system has helped break down kinship and region-based *guanxi* in China, facilitating a move to impersonal trade.[30] The rise of global financial and technological systems based on data and code have similarly facilitated trade and governance flows across geographically based national legal orders.[31]

The scaling effect occurs alongside a layering effect which is derived from the time-irreversible or 'non-ergodic' aspect of institutional evolution.[32] Layering means that progressively, more formalised modes of governance are path-dependent on the less formalised ones. In practice this means that just as text-driven law relies in part on social norms for its effectiveness, data and code will to some degree rest upon complementary legal mechanisms. This path-dependency risks making the scaling of governance both rigid and 'frozen' through time (in Mireille Hilde-

[25] J Nathan Matias and others, 'Do automated legal threats reduce freedom of expression online? Preliminary results from a natural experiment' (2020) ⟨https://osf.io/nc7e2/⟩; J Nathan Matias and others, 'Comments responding to US Copyright Office Notice of Inquiry Docket No. 2021-10' (2022) ⟨https://osf.io/498ja⟩.

[26] Shormee Saha, 'Automated traffic law enforcement system: A feasibility study for the congested cities of developing countries' (2020) 3(1) International Journal of Innovative Technology and Interdisciplinary Sciences 346.

[27] See Simon Deakin and Christopher Markou (eds), *Is Law Computable? : Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing November 2020).

[28] See e.g. Simon Deakin and others, 'Legal institutionalism: Capitalism and the constitutive role of law' (2017) 45(1) Journal of Comparative Economics 188; Masahiko Aoki, *Corporations in evolving diversity: Cognition, governance, and institutions* (Oxford University Press 2010); John R Commons, *Legal foundations of capitalism* (Routledge 2017).

[29] See Hildebrandt, 'Code-driven Law: Scaling the Future and Freezing the Past' (n 17); Laurence Diver, 'Computational legalism and the affordance of delay in law' (2021) 1(1) Journal of Cross-disciplinary Research in Computational Law; Deakin and Markou, *Is Law Computable? : Critical Perspectives on Law and Artificial Intelligence* (n 27). Also cf seminal works on 'law as code', e.g. Lawrence Lessig, *Code - Version 2.0* (Basic Books 2006).

[30] See e.g. Ding Chen and others, 'Law, trust and institutional change in China: Evidence from qualitative fieldwork' (2017) 17(2) Journal of Corporate Law Studies 257; Ding Chen and Simon Deakin, 'On heaven's lathe: State, rule of law, and economic development' (2015) 8(1) Law and Development Review 123.

[31] Drawing from Katharina Pistor, *The Code of Capital: How the Law Creates Wealth and Inequality* (Princeton University Press 2019); Alain Supiot, *Governance by Numbers: The Making of a Legal Model of Allegiance* (vol 20, Bloomsbury Publishing 2017); David Howarth, *Law as engineering: thinking about what lawyers do* (Edward Elgar Publishing 2013); Alain Supiot, *Homo juridicus: On the anthropological function of the law* (Translated by Saskia Brown from the French edition of 2005, Verso Books 2007).

[32] The non-ergodic concept is drawn from an emerging school of ergodicity economics. For a primer on non-ergodic, or simply put, time-irreversible social processes, see Ole Peters, 'The ergodicity problem in economics' (2019) 15(12) Nature Physics 1216; Ole Peters, 'Optimal leverage from non-ergodicity' (2011) 11(11) Quantitative Finance 1593. Also see Simon Deakin and Christopher Markou, 'Evolutionary law and economics: theory and method' (2021) 72 N. Ir. Legal Q. 682; Simon Deakin, 'Legal evolution: integrating economic and systemic approaches' (2011) 7(3) Review of Law & Economics 659.

[33] See e.g. the concept of scaling and freezing in Hildebrandt, 'Code-driven Law: Scaling the Future and Freezing the Past' (n 17). Also see Mireille Hildebrandt, 'The adaptive nature of text-driven law' (2021) 1(1) Journal of Cross-disciplinary Research in Computational Law; Mireille Hildebrandt, 'Law as Information in the Era of Data-Driven Agency' (2016) 79(1) The Modern Law Review 1.

brandt's words), with lock-in and imprinting effects that can lead to potential governance failures.[33] For example 'concept drifts' can happen when statistics and code no longer represent bottom-up changes in social reality; automatic tax-calculation algorithms relying on traditional data categories of employment status run the risk of producing outdated assessments following 'structural breaks' in the approach courts take to the legal classification of work relations.[34]

In the case of automated enforcement, reliance on code may diminish the 'hermeneutic gap' and 'affordance of delay' by law which Laurence Diver identifies as a positive and indeed essential aspect of law-based governance. The 'hermeneutic gap' refers to the human interpretational 'gap' or ambiguity when applying text-driven laws to individual cases. Text employing natural language leaves spaces for debate and future re-interpretation of its meaning. Far from being a flaw, 'delay' in law means that the real-life consequences of legal decisions can be more completely taken into account.[35]

Code-driven and data-driven governance, by introducing standardisation, may reduce costs but risk making systems of governance less flexible in dealing with social changes through time, and in the granular fitting of rules to local niches. Human judgements and interventions are thus irreplaceable in the realignment and refitting of these more formalised modes of governance to the less formalised modes, in order to achieve a long-term sustainable scaling, and complementarity between social norms, laws, data and code.[36]

Methodology

The paper combines doctrinal, archival and interview methods. The legal-doctrinal materials and archives used were publicly available online and mostly in Chinese. The interviews were semi-structured and conducted in Chinese mostly face-to-face in nine settings (only one online) with a total of 15 interviewees in Shanghai, April 2021. Most interviews were not recorded, but notes were taken almost verbatim and written up as transcripts right after the interviews, and later translated into English by the author. The interviewees were recruited using a snowballing method, in which personal and professional networks helped secure the initial few interviewees in order to start snowballing.

The 15 interviewees include two middle-rank judges/court administrators (M and N), one public data centre manager (K), one state-affiliated corporate manager (Y), one middle-rank local legislator (Z), and ten government officials, with one at supervisor rank (A), one at middle-rank (B), four at the front-line level (C to F), and four as state-owned corporate employees (G to J). Due to limited space and the aims of the paper, interview evidence are quoted unevenly among interviewees.

Interviews provide in-depth and thick descriptions of real practices and behavioural interactions between actors within socio-technical systems.[37] Although limited numbers of interviews conducted for this study are non-replicable data points, the transcripts provide rich information on perceptions and narratives which throw light on causality. Causal processes are hard to infer from quantitative statistical associations alone.[38] The interview evidence, triangulated with legal-doctrinal materials and on-

[34] See e.g. Simon Deakin and Christopher Markou, 'Evolutionary Interpretation: Law and Machine Learning' (2022) 1(2) Journal of Cross-disciplinary Research in Computational Law; Deakin and Markou, 'Evolutionary law and economics: theory and method' (n 32). Also Zuo, 'Governance by Algorithm: China's Social Credit System' (n 6).

[35] See Diver, 'Computational legalism and the affordance of delay in law' (n 29).

[36] Supra notes 32-34.

[37] See Amy R Poteete, Marco A Janssen, and Elinor Ostrom, *Working together: collective action, the commons, and multiple methods in practice* (Princeton University Press 2010) pp. 33-35; John Buchanan, *Hedge Fund Activism in Japan: The Limits of Shareholder Primacy* (Cambridge University Press 2012) p. 13.

[38] See advantages of Small-N case studies by qualitative fieldwork and interviews. e.g. Poteete, Janssen, and Ostrom (n 37) pp. 9, 11-12, 33-37.

[39] See discussion on advantages of mixed methods. ibid pp. 11-15

line archives, can help reveal how social norms, law, and code interact in reality.[39] It thus can help to answer the research question of whether code and law are substitutes or complements as governance practices.

However, the scope for triangulation between doctrine, online archives and interview evidence may be restricted by the limited amount of existing empirical evidence and research. Establishing the veracity of self-reports by interviewees is inherently difficult and requires the interviewer to exercise their own judgement on certain points. In this paper the interview evidence is presented with regard to the social, cultural and spatio-temporal contexts of each of the interviews. As suggested by Elinor Ostrom and her co-authors, interview-based fieldwork of this kind, by directly accessing the perceptions of actors including their understandings of causal processes and sequences in their local time-space, provides rich qualitative evidence which is not available from surveys or data analysis.[40] It is relevant to note in this context that publicly-available and reliable statistical evidence on the effects of SCS is currently lacking. Once it becomes available the findings of the present qualitative study could be tested using quantitative approaches.

Shanghai is suitable for a small-scale case study compared to other cities because of its more well developed civil and criminal justice systems in general (e.g. more independent courts and regulators), and a more developed SCS in particular. Shanghai was one of the earliest cities to trial the debtors list and also China's first SCS pilot city in general (since 1999)[41]. It was also the first city in China to pass a SCS local legislation (2017)[42]. Views from Shanghai can thus provide evidence in a longer time frame, in a more stable environment of economic development and rule-of-law safeguards, than is possible elsewhere. This distinct socio-economic and legal environment also make Shanghai's SCS a suitable comparative reference to the automated enforcement systems developed in Western countries/cities.[43] This paper neither has the space nor sufficient evidence to address the changes after Shanghai's Covid-19 lockdowns and state of emergency in 2022.

Doctrines and interviews: make a flowchart of automated law enforcement in the SCS

Civil procedures in two parts: human judges in adjudication and enforcement

According to China's Civil Procedure Law (2017), legal enforcement has separate procedures compared to that of adjudication. This also requires special staff, i.e. the enforcement judges who form a department separate from the adjudication bodies of courts in China. These enforcement judges oversee and operate the daily tasks of reviewing the written 'application to enforce' (*shenqing zhixing shu*, 申请执行书) sent by litigating parties to claim for, e.g. debt payments or compensations.[44]

These enforcement judges decide which and when cases can be moved from the adjudication procedure to the enforcement procedure. They are also responsible for tracing and examining, for example, a debtor's enforceable financial assets or property, and finally ensuring the legally required transfer of money and/or property is made from one party to another on time (sometimes involving freezing, seizing and auctioning these assets). At the end of the day, their jobs only finish when debts or compensations are paid in the physical world and confirmed by the litigating parties, and the enforcement cases can thus be labelled as 'closed' on the court's digital files system for the court

[40] Poteete, Janssen, and Ostrom (n 37) pp. 11-15, 33-37.

[41] See a brief history of the SCS, in Zuo, 'Governance by Algorithm: China's Social Credit System' (n 6).

[42] Credit-reporting industry regulations 2017.

[43] Cf e.g. Mac Síthigh and Siems (n 6).

[44] 'Application for Execution - Litigation Guide [申请执行- 诉讼指南]' (China Trial Process Information Public Network [中国审判流程信息公开网]) ⟨https://www.court.gov.cn/zixun-xiangqing-78732.html⟩. For a primer see the official online SPC litigation guidelines on applying to enforce.

[45] ibid. Also see China's 'Civil Procedure law' (2017) ⟨http://www.npc.gov.cn/zgrdw/npc/xinwen/2017-06/29/content_2024892.htm⟩ A225 mainly, and A227.

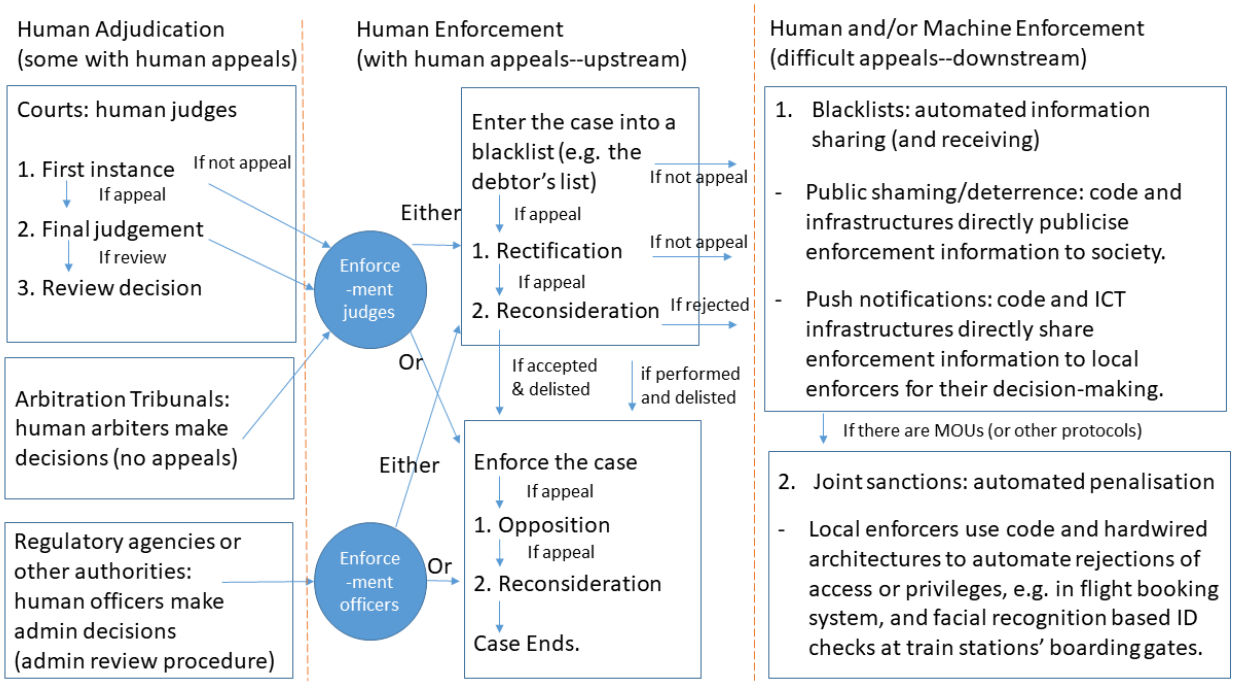

Figure 1: *A flowchart of automated enforcement in the SCS: Blacklists and Joint Sanctions*

administrators (i.e. the secretary, IT and human resource department) to archive and review.[45]

The enforcement judges can only start an enforcement procedure usually after a final verdict is made by an adjudication body, such as a court or an arbitration tribunal. In China the court system follows a single appeal procedure (plus review), which means the second instance judgment will be the final verdict (*ershen zhongshen*, 二审终审). The arbitration tribunals, however, follow a no appeal procedure (*yishen zhongshen*, 一审终审).[46]

For readers to have a closer look at the SCS, the author conducted an online search on Shanghai's Debtor's List on a date randomly chosen (June 26th 2022), and picked the first two names on the list[47].

1. The first one is a named individual 'W' (whose full name in Chinese is published online, but pseudonymised here for privacy reasons). In W's case (2020) the arbitration verdict is thus the final verdict upon which the enforcement procedure is initiated, or more accurately, 'recovered' (*huifu zhixing*, 恢复执行) after certain enforcement-suspending circumstances were removed in 2022.[48]

2. The second one is a manufacturing company Shanghai Fengyi, where in contrast, the first instance court's judgment (2021) is the final verdict as the parties decided not to appeal, which is the basis for the initiation of enforcement procedures by enforcement judges.[49]

[46] 'Civil Procedure law' (n 45).

[47] 'Shanghai Higher People's Court Website - List of Dishonest Judgement Debtors [上海市高级人民法院网--失信被执行人名单]' ⟨http://www.hshfy.sh.cn/shfy/gweb2017/channel_zx_list.jsp?pa=aemw9c3gPdcssz⟩.

[48] See 2022 W's case, Case No. 0677 of Shanghai Arbitration. Shanghai Higher People's Court Website [沪仲案字第0677号. 海市高级人民法院网] (http://www.hshfy.sh.cn/shfy/gweb2017, Shanghai 02 Execution Reinstatement 72, List of Dishonest Judgement Debtors [沪02执恢72号失信被执行人名单] 2022)

[49] See 2022 Shanghai Fengyi case, Shanghai 0120 Civil First Instance 11522. Shanghai Higher People's Court [沪0120民初11522号. 上海市高级人民法院网] (http://www.hshfy.sh.cn/shfy/gweb2017, Shanghai 0120 Execution 3708 List of Dishonest Judgement Debtors [沪0120执3708号失信被执行人名单] 2022).

These enforcement procedures also have a two-appeals safeguard under the Civil Procedural Law (2007, 2017) and its 2015 interpretation. According to these laws, courts (same and higher level) can review if there have been mistakes or unfair practices during enforcement. Enforcement applicants thus can use these procedures to explain their specific situations to and/or check the work of enforcement judges.[50]

Blacklists: invoke the dormant information-sharing procedures and automate them

The first type of machine involvement in the human enforcement loop is by automating laws related to blacklists. China's highest court, the Supreme People's Court (SPC), first issued a Judicial Interpretation 2013 that established the national Debtors List, which is a proto-typical text-driven blacklist law (amended in 2017).[51] The SPC essentially provided a national interpretation of China's Civil Procedure Law (2017) under the principle of honesty/good faith (A13). It required the full recording and publicising of non-enforced obligation information (*bu lvxing yiwu xinxi,* 不履行义务信息) of the listed subject to credit-reporting agencies and media, and limiting the subject from travelling abroad (*xianzhi chujing,* 限制出境) (A255).[52]

This national interpretation became a functional law to concretise *public information sharing,* which in essence are two *ad hoc* enforcement procedures required under A255 – this paper names them respectively as 'pushed notifications' and 'public shaming/deterrence'.

1. First, pushed-notification refers to the direct information-sharing between agencies in order to coordinate economic penalisations by agencies under laws or social norms, which save the agencies' information-searching and decision-making costs.

2. Second, public shaming or 'deterrence' means the socio-financial risk-labelling of the debtors under the name of both 'dishonesty' (social norm) and 'has the capacity but refuses to perform' legal verdicts (law).

These two *ad hoc* enforcement procedures under A255 used to be more dormant before the 2013 Judicial Interpretation. But once invoked and concretised, they became powerful. According to the interviews, these easily automated procedures are used by enforcement judges to reduce their workload in a normalised way.

[50] See China's Civil Procedure Law and the 'Regulations on Several Issues Concerning the Handling of Execution Objections and Review Cases by the People's Court [关于人民法院办理执行异议和复议案件若干问题的规定]' (SPC interpretation 2015) ⟨https://www.spp.gov.cn/spp/sfjs/201802/t20180201_363648.shtml⟩ on enforcement appeal procedures. Also see an official primer for litigants 'Application for Execution - Litigation Guide [申请执行- 诉讼指南]' (China Trial Process Information Public Network [中国审判流程信息公开网]) ⟨https://www.court.gov.cn/zixun-xiangqing-78732.html⟩. More details see later part on appeal. Recent Smart Court developments also allow for an online real-time update of (enabled by Wechat) and even the live-streaming of the enforcement judges' daily work. The enforcement applicants can thus watch, for example, enforcement judges go on trips to look for remaining assets of a judgement debtor and provide real-time feedback on the judges' work. Interview with judges M and N. Automation, or data-driven facilitation, of *adjudication* procedures falls into the Smart Court project rather than the SCS project. This includes, for example, the use of legal-predictive analytics, case recommendation systems and algorithmic case allocation systems. See e.g. in Zhenbin Zuo, 'China's Data Strategies: institutionalisation, activation and layering' in Moritz Hennemann (ed), *Global Data Strategies* (forthcoming, CH Beck Hart Nomos 2023). Also see Chinese literature on Smart Court in general, e.g. Weimin [左卫民] Zuo, 'How to Achieve Similar Cases and Similar Judgments through Artificial Intelligence [如何通过人工智能实现类案类判]' [2018] (2) China Law Review [中国法律评论].

[51] 'Supreme People's Court's Several Provisions on the Publicity of Information on Judgment Debtors, Legal Interpretation No. 17, July 16 [最高人民法院关于公布失信被执行人名单信息的若干规定法释17号]' (2013) ⟨https://www.chinacourt.org/law/detail/2013/07/id/146217.shtml⟩; Later amended in 2017, 'Supreme People's Court's Decision on Amending the 'Several Provisions of the Supreme People's Court on the Publicity of Information on Judgment Debtors,' Legal Interpretation No. 7. [最高人民法院关于修改《最高人民法院关于公布失信被执行人名单信息的若干规定》的决定,法释7号]' (2017) ⟨https://www.chinacourt.org/law/detail/2017/02/id/149233.shtml⟩.

[52] 'Notice of the Supreme People's Court on Conscientiously Implementing the Several Provisions on Announcement of the list of Dishonest Persons Subject to Enforcement' ⟨http://www.lawinfochina.com/display.aspx?id=16018%5C&lib=law⟩. 'Article 13 of the "Civil Procedure Law of the People's Republic of China" first established the principle of honesty and credibility in civil litigation, and Article 255 makes a principle provision on the publication of information on judgment debtors who do not fulfil their obligations and corresponding credit sanctions.' [《中华人民共和国民事诉讼法》第十三条首次确立了民事诉讼中的诚实信用原则，并在第二百五十五条对公布不履行义务的被执行人信息及相应的信用惩戒措施作了原则规定。].

1. First, the enforcement judges have large discretion in deciding whether a case should be labelled into the debtors list.[53] In fact, in most cases the reason for listing falls into the vague 'other situations' with limited evidence.[54] According to official A (supervisor rank), once a case is simply enlisted, the enforcement judges only need to wait for further evidence of a debtor's enforceable assets to emerge and decide whether to restart actively pursuing those assets. This makes the debtors list in essence a database for judges to 'buy time' in their work, and clear their backlogs of written enforcement applications yet to be reviewed.[55] These blacklist laws on enforcement are generally overseen by the National Development and Reform Committee (NDRC), and from national to local levels, have a unifying goal to enhance enforcement of laws and regulations at a time when human public enforcement resources are limited.[56]

2. Second, once a case is put into the debtors list/database, the push notification and public shaming/ deterrence procedures are automatically triggered. This does not require more efforts from the enforcement judges to follow up and clear the database. According to official A and manager Y, the responsibilities are then shifted to the courts and other agencies to negotiate on information-sharing, and to the IT department in courts to write the code and build the hardwire infrastructures. Once built, these machines ran enforcement procedures automatically at scale. They only require human enforcer's label inputs and periodical IT maintenance.[57] According to courts administrators M and N, and local legislator Z, these code infrastructures are deemed as cost-efficient investments by the SPC in saving human enforcers the time and effort. Meanwhile, the enforcement judges' job to enforce is also externalised to the private parties, particularly the debtors.[58]

[53] This is because of an ambiguity in the legal text that allowed the enforcement judges to enter a case into the debtors list with only preliminary evidence. A vague article in the Judicial interpretation (2013, 2017) on 'other situations (*qita,* 其他) where one has the capacity but refuses to perform'.

[54] See e.g. Case No. 0677 of Shanghai Arbitration. Shanghai Higher People's Court Website [沪仲案字第0677号. 海市高级人民法院网] (n 48); Shanghai 0120 Civil First Instance 11522. Shanghai Higher People's Court [沪0120民初11522号. 上海市高级人民法院网] (n 49). And any day's random search will return similar results on the reason for listing.

[55] See interview with official A (supervisor rank) 2021. It is worth noting that the SPC Debtors List (since 2013) oversees Shanghai's local debtor's list. They are the first widely used national blacklist and specifically aimed to resolve the 'difficult problem of judgment enforcement' (*zhixing nan,*执行难) in China's rule-of-law and judicial reform (*sifa gaige,*司法改革), at a time when high non-enforcement rates was a problem that endangers litigants' respect and confidence in the court system. See 'Notice of the Supreme People's Court on Conscientiously Implementing the Several Provisions on Announcement of the list of Dishonest Persons Subject to Enforcement' (n 52).

[56] National Development and Reform Commission and People's Bank of China, 'Establish a system of lists for joint incentives for trustworthiness and joint sanctions for untrustworthiness [建立守信联合激励对象和失信联合惩戒对象名单制度]' in *Guidance Opinion on Strengthening and Regulating the Management of Lists for Joint Incentives for Trustworthiness and Joint Sanctions for Untrustworthiness [*国家发展改革委人民银行关于加强和规范守信联合激励和失信联合惩戒对象名单管理工作的指导意见*]*.

[57] See interview with Y (manager) 2021.

[58] These code infrastructures are also welcomed by cooperating agencies whose enforcers also reduced daily work of searching for non-enforcement information and deciding whether to afford service or privileges, such as public funds, to certain applicants. See interviews with M, N and Shanghai legislator Z (all middle rank) 2021. This Supreme Court-made 2013 Judicial Interpretation later inspired multiple blacklist laws and regulations promulgated by regulatory agencies. These agencies invoked similarly 'dormant' clauses in other legislations, e.g. energy sector regulations, environmental protection regulations, and labour protections. 'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Serious Violations and Dishonest Market Entities and Related Persons in the Electric Power Industry [关于对电力行业严重违法失信市场主体及其有关人员实施联合惩戒的合作备忘录]' (2017) ⟨https://www.chinatax.gov.cn/n810341/n810755/c2665761/content.html⟩; 'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Serious Violations and Dishonest Entities in the Oil and Natural Gas Industry [关于对石油天然气行业严重违法失信主体实施联合惩戒的合作备忘录]' (2017) ⟨http://www.ndrc.gov.cn/zcfb/zcfbtz/201708/t20170828_858891.html⟩; 'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Dishonest Production and Operation Units and Their Related Personnel in the Field of Environmental Protection [关于对环境保护领域失信生产经营单位及其有关人员开展联合惩戒的合作备忘录]' (2016) ⟨https://www.ndrc.gov.cn/xxgk/zcfb/tz/201608/t20160819_963154_ext.html⟩; 'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Units and Their Related Personnel Who Severely Arrears Wages of Migrant Workersy [关于对严重拖欠农民工工资用人单位及其有关人员开展联合惩戒的合作备忘录]' ⟨http://www.csrc.gov.cn/csrc/c100205/c1003048/content.shtml⟩. For Chinese literatures, see e.g. Chun (n 6).

Joint sanctions: extended automatic penalisation and upstream appeal procedures

The second machine involvement in enforcement is the automation of joint-sanctions. The SPC, in practice, was not content with just invoking the dormant public information-sharing procedures. The SPC wanted to minimise the discretion of public and private local enforcers in their imposition of sanctions once they received the debtor's information. The SPC started by making two Memorandum of Understandings (MOUs) respectively in 2014 and 2015 with the China Railway, and the China Aviation Network. Both MOUs are facilitated by the National Development and Reform Committee (NDRC).

These two MOUs are the text-driven legal documents that concretised the required actions of China Railway and China Aviation Network. These agents then use code and ICT infrastructures to translate these laws into physical actions of, e.g. refusal of booking transactions and/or boarding of the debtors. Other MOUs established between the SPC and other public or private agents follow a similar implementation logic.

In the perspective of code-driven laws, the computational code directly enforces these MOUs, blacklists, and other laws, regulations and individual legal verdicts. These text-driven laws were eventually coded and built into the hard-wired infrastructures of the front-line enforcers. They are, for example, the online booking systems of high-speed trains and flights, and the boarding gates at train stations and airports with ID checkers and facial recognition scanners. The joint sanctions are thus the automatic executions of penalisations that merely extend the 'push notification' procedure required by blacklists. These joint sanctions reduce the involvement of human enforcers at local levels, or make it very costly for the local enforcers to deviate from their centrally instructed sanctions, such as rejection of booking or entry, usually required by blacklist laws.

In the narrow spaces of automated penalisation through joint sanctions, there is, nevertheless, an in-built appeal procedure of 'rectify and reconsider'. This appeal procedure, however, is a civil procedure placed at the start of the blacklist procedure, i.e. when the enforcement judges/regulators make the decision on whether one's enforcement case should enter a particular blacklist. In the flowchart of automated enforcement, this 'rectify and reconsider' procedure is situated upstream, which cannot be used at the downstream users' ends.

This 'upstream-blacklists, downstream-joint sanctions' structure entailed by the civil procedure laws on enforcement made the appeal procedure centralised at the upstream hands of the enforcement judges. According to the SPC's latest 2017 Amended Judicial Interpretation, which added Article 12 to the 2013 Judicial Interpretation, the debtor can first 'apply to rectify' (*shenqing jiuzheng*, 申请纠正) a decision of the enforcement judge which enters one's case into the debtors list database. 'This application should be reviewed within 15 days', and if successfully accepted, the rectification should be made 'within three working days'; otherwise the rectification application will be rejected (A12).[59]

If the applicant (debtor) is unsatisfied with the rejection by the enforcement judge, one can apply for a 'reconsideration' (*fuyi*,复议) at a higher level court within ten days of the rejection decision. The higher level will have to make a decision within 15 days. The enforcement will not be stopped during the period of reconsideration (A12).[60]

[59] A12 SPC 2017

[60] ibid. This is different from a litigation appeal under China's civil procedure law, but almost the same to the enforcement case appeal procedures, i.e. the 'opposition and reconsideration' procedure under A225 of 2017 Civil Procedure Law. 'Provisions of the Supreme People's Court on Several Issues concerning the Handling of Enforcement Opposition and Reconsideration Cases by People's Courts' ⟨http://lawinfochina.com/display.aspx?id=20108%5C&lib=law⟩ see the 15 days of review, and if rejected within ten days apply for reconsiderations at a higher court. This proximity indicates that the listing decisions by enforcement judges is also deemed as a standard enforcement action in civil procedure which can be appealed.

Interview evidence explored: Perceived gains and loss of automated enforcement

> 'Social Credit governance is a direction, because governance only by coercive force cannot work. There needs to be people's recognition from their heart, so that we don't need to give sanctions every day.'
>
> – Government Official A (supervisor rank)

Perceived gains: Efficient scaling, effectiveness and informed decision-making

The blacklists and joint sanctions have gained wide recognition in achieving enforcement efficiency and effectiveness, and better informed decision-making from the interviewees. The degrees and focuses of gains, however, are perceived with variety.

Government official A (supervisor rank) agreed that there had been positive scaling of the SCS where judgment compliance rates increased. However, official A also worried the potential 'over-effectiveness' of the system can reflexively undermine its own legitimacy, where courts and governments use the SCS too much and create 'new forms of path-dependencies' (as explained as 'institutional overload' in the negative impacts section). Local legislator Z (middle rank) also mentioned the different effectiveness of blacklists and sanctions depending on the different types of 'shaming', for example, between failing to comply in a commercial debtor's case, a corporate fraud, and a tort of sexual offence.

Official B (middle rank) claimed that the debtors list in particular is good for raising the corporation's expectations to abide by laws and contracts, which 'is good for Shanghai's general business environment and the examinations of such environment (by the IMF's Doing Business Report).' Official B also stated that other blacklists and joint sanctions are very useful for custom high-level accreditations, tax inspections, public finance projects approvals and so on. Official B also mentioned that in the state of emergency during Covid-19, the temporary blacklists of those who severely violated health regulations were also useful for public health governance. Public data centre manager K (middle-rank) claimed similar effectiveness and efficiency achieved by the blacklist systems, and emphasised the potential economic values of the enforcement data being processed, shared and maybe even transacted on the data market.

Officials C, D, E and F (front-line officers) commented that the SCS automatic enforcement is particularly effective in cities like Shanghai because people here are less afraid of direct sanctions, but care more about their business reputation. Compared to centralising the SCS blacklists and joint sanctions, Official C in particular believes that local governments and legislators should have more space to make their own automated enforcement systems.

State-affiliated corporate employee Y (front-line manager) of a credit-reporting agency in Shanghai also argued that the blacklist information they push to different agencies, i.e. their customers, were considered as useful by these end-users in their decisions-making or automated enforcements. Y claimed that Shanghai's SCS information-sharing project started with the collaboration with Shanghai's High Court, and the negotiations with different government departments on sharing information were later coordinated by the local NDRC and courts. Even though the negotiation, maintenance and standardisation of code and ICT infrastructures took time and effort in the past years, Corporate Employee Y believed those obstacles were worth overcoming for enforcement and informed decision-making. State-owned corporate employees G, H, I and J also share Y's opinion on the positive scaling effects. They manage the data governance of SCS and smart city projects for the Hefei government, which learnt largely from Shanghai.

Court Administrators/judges M and N (middle ranks) at an intermediary court in Shanghai did not directly comment on the blacklists' effectiveness. They however briefly discussed the huge amounts of enforcement work accumulated at the court due to the Person-to-Person (P2P) financial fraud cases in the past few years. They explained that the enforcement judges in the court were focusing on these big caseloads using new technologies like blockchain and 'enforcement live stream' on WeChat, but did not discuss if the debtors list was useful. Instead, the court ad-

ministrators suggested some alternatives to the automated enforcement measures of blacklists and joint sanctions in e.g. the Hangzhou's internet court (briefly discussed below).

Perceived loss: Rigidity, human perverse behaviours, and institutional overload

Rigidity of enforcement Court Administrator/judges M and N (middle ranks) did not directly criticise the Shanghai debtor's list, but raised some different 'buffering' attempts other courts were making in order to let the debtors have certain flexibility in terms of automated sanctions. They claimed that:

> 'The automatic enforcement by the SPC is very rigid (*gangxing*, 刚性). Once listed the limitations on high-expenditure activities are automatically controlled by the SPC (in Beijing). Due to technological coerciveness (*jishu qiangpo xing*, 技术强迫性), an enforcement case once listed cannot be closed unless it go through the SPC. We wished to have the local enforcement judges operate the details, but it proves to be infeasible.'
>
> 'This might not be the best for a company's development. It is like giving water for fish to grow–we need to let them slowly pay back their loans. In some Hangzhou courts there are new buffering attempts of "instituting credits" (*shuxin jizhi*, 树信机制), where the courts underwrite for the debtors so that they can operate normally to repay their debts. As in if you suddenly restricted someone's business it is for sure they won't be able to repay their debts. Some buffering measures can be more effective.'

Their views indicate that there are certain counter-productive aspects embedded in the rigidity of the automatic law enforcement systems. The SPC debtors list and joint sanctions, which have a very centralised code and ICT architecture, are perceived as sometimes inefficient when individual cases require more buffers and deviations from clear-cut penalisations in local environments.

Human perverse behaviours and dis-incentivisation Government Official A (supervisor rank) pointed out that the redundancy of human talents and dis-incentivisation are key problems.

> 'Currently our enforcers are not publicly well-rated. When a case cannot be enforced, the enforcement judges just throw it (into the debtors list). The state feeds these batch of enforcement judges in the team of judges to do things. You should fulfil your obligations. Go nudge people to repay their debts when you should nudge them, so that they can be delisted from blacklists. Otherwise this database grows larger and larger.'
>
> 'If the enforcement judges just throw cases into the blacklists, and leave them there, this social credit institution will lose its functions. This cannot become an excuse for lazy government (*lanzheng*, 懒政).'

Official A went on to discuss the problem of wasting human expertise as public resources, and the over-simplification of enforcement tasks at a place where problems should be dealt with more granularity.

> 'In fact, the personnel department has very important responsibilities. We cannot just simplify the question (with automation). There are so many people every year taking civil service exams which consume large amounts of public resources. These people want to work properly, but you do not train them anymore [...]
>
> The court is the same. When you have this blacklist at the back end to resolve all things, enforcement becomes over-simplified. But this is exactly a situation that requires the granularization of institutions (*zhidu jingxihua*, 制度精细化).'

Official A also critically pointed out that the normalisation of the *ad hoc* enforcement procedures is not sustainable, and the need for an accountability mechanism to re-incentivise human enforcers to delist people from the blacklists.

> 'You have to make sure that every measure has been exhausted at this step of the task (of enforcement), then consider going there (the blacklists) [...] Even though every measure has been exhausted, you (the enforcer) still need to provide me with a promise on when I will be delisted [...]
>
> We need to clearly allocate the responsibilities in the step of social credit repair. The governments, courts or credit-reporting agencies who enter people into lists need to also be responsible for delist-

> ing. It has to become a legal obligation too. In this case the next time you enter someone into the list there will be expectations (to delist) [...] This (blacklist) in essence is administration-backed hard regulations, which thus should have the same redress mechanisms with other kinds of administrative powers [...] This should be common sense.'

The problem of human redundancy and disincentivisation is considered by Official A as leading to the overstretched institutional capacity (*zhidu rongliang*, 制度容量) of the SCS, an apprehension this paper calls 'institutional overload' (*zhidu chaozai*, 制度超载).

Institutional overload Official A (supervisor ranks) explained the problem of over-stretched institutional capacity as follows:

> 'For example, there cannot be more than 10% of the population being blacklisted, even 3-5% of the population is too much. The proportion should have certain limits. Imagine among the 1.4 billion Chinese people, there are more than 3% people under social credit related sanctions, then this will exceed the institutional capacity (of the SCS). This is related to the quantity of the total population.'
>
> 'This is a problem of institutional capacity [...] the database may be unable to run with such large numbers. This is not a problem of limited technological conditions, but an institutional problem. If too many people are put into the (blacklist) database, they will get used to it and stop being deterred by this (blacklist).'

This concern echoes some news reports since 2019 on the worrying number of accumulated entries in the debtors list, excluding other national and local blacklists.[61] Although the official number of existing debtors is 7,503,034 as of June 28th 2022, which is only about 0.05% of the Chinese population (1.4 billion), the accumulated entries between 2013-2019 exceeded 1% of the national population (more than 15 million entries, but may have large numbers of repetitions and without deducing those delisted).[62]

Moreover, the accumulated number of people in the debtors list from 2013-2021 has exceeded over 1% of the population in some provinces.[63] For example, the accumulated number of debtors in Zhejiang in 2021 amounts to 1.2% of the province's population (784,100 people), while Shanghai reached 0.92% (220, 000 people), and Jiangsu hit 0.83% (704,500 people), according to a news report that scraped online data from QiChaCha (a widely used private database on corporate enforcement information in China).[64] These three regions of the Yangzi Delta are historically highly active in commercial and financial activities while consistently constituting large proportions of China's GDP.[65] In addition, though the existing number of debtors should be much lower than these accumulated numbers, there are other blacklists adding to the total numbers of people who are currently under the automated enforcement effects of the SCS in these provinces.[66]

In this sense, the worries of Government Official A about the number of people in blacklists reaching 3% of a local population is likely to have happened in densely populated and economically active cities/localities. Even the apprehension about the total number of blacklisted people hitting a 3% national population (as in the accumulated number of people who were ever listed on any kind of blacklist) is not completely unwarranted. Official A further claimed the essence of the SCS institutions in Shanghai

[61] 'In 2021, China added 1.34 million 'old scoundrels', Jiangsu accumulated 704,500 people [2021年我国新增"老赖"134万人次,江苏累70.45万人次]' (*Yangtse*, 2021) ⟨https://www.yangtse.com/zncontent/2052424.html⟩; 'What to make of the fact that there have been nearly 13 million instances of being blacklisted for breach of trust across the country? [如何看待全国已经近1300万例被列入失信黑名单?]' (*Zhihu*, 2019) ⟨https://www.zhihu.com/question/318670954⟩.

[62] 'What to make of the fact that there have been nearly 13 million instances of being blacklisted for breach of trust across the country? [如何看待全国已经近1300万例被列入失信黑名单?]' (n 61).

[63] 'In 2021, China added 1.34 million 'old scoundrels', Jiangsu accumulated 704,500 people [2021年我国新增"老赖"134万人次,江苏累70.45万人次]' (n 61).

[64] ibid.

[65] See e.g. Bozhong Li and Jan Luiten Van Zanden, 'Before the great divergence? Comparing the Yangzi Delta and the Netherlands at the beginning of the nineteenth century' (2012) 72(4) The Journal of Economic History 956.

[66] See e.g. interviews with Government Official B (managerial rank). The eight blacklists in Shanghai that generate eight types of data in addition to the SPC debtors list.

should be to promote social integrity, and only penalise a very limited number of people in the society.

> 'Governance does not rely on coercive force, even though at first it might borrow some of the state's coercive power as administrative commands. But this is premised on costing the state's credit (people's confidence in the state). The state pays for all the resisting moods of the regulated parties [...]
>
> We must look at why we built this institution. At first there is an institutional arrangement to adjust people's ideals, such as having integrity (*jiang yiqi*, 讲义气). Being an honest (*shouxin*, 守信) person is an honour (*guang rong*, 光荣). The institution wants to avoid disintegrity (*shixin*, 失信), and adjust people's behavioural habits, in order to make people abide by laws and social norms [...]
>
> Shanghai's social credit law has a promotional task. It should only set penalising arrangements for very few people in the society, and enforce these arrangements. It is absolutely not about regulating everyone's behaviours using this law.'

To solve the problem of institutional overload, Government Official A (supervisor ranks) stated several points on (1) assigning balanced accountability mechanisms for those in charge of the automated enforcement SCS, e.g. the enforcement judges, (2) making these enforcers responsible for raising the public awareness of the SCS laws; (3) providing buffering zones for debtors to perform their legal obligations before imposing automatic sanctions, and (4) long-term quantified evaluations of institutional capacities of the blacklists and joint sanctions to make sure people still acknowledge the overall legitimacy and effectiveness of these automated systems. The buffering zone argument also echoes the above comments of the two court administrators/judges M and N.

Analysis: Governance layering and human agency in automated enforcement

The debtors list and its joint sanctions were developed by the SPC to increase the scale of law enforcement under the pressures of limited resources available for human enforcement; the number of judges is too small in proportion to the large numbers of non-enforcement cases. The SPC supplied a concrete interpretation of the *ad hoc* rules (A255) that were almost 'dormant' in existing civil procedural texts before 2013.

Once the legal interpretation is made clear by the SPC, the 'hermeneutic gap' in Diver's words, is diminished. 'Law's affordance of delay' is also removed once this interpretative ambiguity is limited.[67] This paved the way for the SPC and NDRC to complete the negotiation of MOUs with different public and private agencies, and then the building of code and ICT infrastructures at scale. These code and hardwired infrastructures automated both (1) the public information-sharing legal procedure (blacklist), and (2) the extended penalisation imposed by local enforcers (joint sanctions laws). This further reduced the human interpretative spaces at local enforcers' level, and thus allowed for more fidelity and immediacy in the local enforcement of these extended sanctions at large scales. The perceived gains of code-driven legal enforcement in the SCS also corroborate this scaling effect. The more formalised mode of code-driven governance, some of it embedded in ICT infrastructures, saved on human labour and enabled large-scale enforcement in Shanghai, with its high density of commercial and financial activities. This code-driven enforcement also allowed for better informed decision-making across different public and private agencies and their enforcers, which contributed to an overall improved efficiency and effectiveness of governance at scale.

However, as explained earlier, the appeal procedures of the joint sanctions are situated at the upstream blacklists end. A debtor cannot explain their situation, such as the rejection of flight booking or boarding on high-speed trains, to

[67] See Diver, 'Computational legalism and the affordance of delay in law' (n 29).

a local enforcement officer, but has to file a rectification application to the enforcement judge if the listing decision is a mistake. Moreover, as described by Shanghai's court administrators/judges, the rigidity of the code and ICT infrastructure have led to high costs for localisation of code and laws. The local enforcement judges have to go through the central SPC system to delist a debtor, without much discretion at each individual case. This rigidity of the automated enforcement system provides very little space for accommodations of specific needs at the level of granularity needed. As Official A argued, the result can be counterproductive oversimplifications of many enforcement tasks.

This mismatch between the code-driven enforcement on the one hand and the granular social reality on the other is evidence of the 'layering effect' at the spatial dimension. The mismatch requires human agency to realign and re-fit the code with laws and social norms. When the use of code-driven automatic enforcement becomes so rigid and imprinted that it can no longer represent or satisfy the real need of a niche space, bottom-up human interventions are required. Hangzhou court's innovative attempts to underwrite protection for debtors is a good example of human-created buffer zones, as explained by court administrators/judges M and N. This echoes Government Official A's argument to create local buffering institutions before imposing immediate and standardised sanctions. The conscious human choice at local levels to deviate from the code's path-dependence can restore law's 'affordance of delay' and the 'hermeneutic gap'. Relatedly, the human effort to realign code to its local socio-legal order can potentially prevent the negative effects of layering and maintain the positive effects of scaling. The 'layering effect' can also help us see how the SCS code is path-dependent on the highly standardised legal rules it translates, and thus guide the human efforts to change both the law and code to allow for a buffer zone before penalisations.[68]

Moreover, the 'institutional overload' problem in the SCS reveals deeper costs of the layering effects in the long-run, that is, by reference to its temporal dimension. As described by Official A, with human enforcement judges and officers disincentivized over time, the code-driven enforcement systems of blacklists will keep accumulating more people in their databases, reflecting code's path-dependency. These code-driven blacklists and joint sanctions can freeze people's futures by not allowing people to change through time, for example, by not giving them loans to restart a business to pay back past debts. It is particularly so when the code follows a path-dependence to incentivise human enforcers to input data into the blacklists, while not giving them obligations to clear people out of the database.

More severely, the foundation of the automated enforcement element of SCS can be eroded as such code-driven governance reaches its capacity limits. As explained in the apprehension of 'institutional overload', the entire governance system of automated enforcement would fail if people's foundational cognitions of laws of contract, or social norms of 'honesty' and 'justice', start to drift. When too many people are trapped by the blacklists without much hope of leaving them soon, they will perceive a 'new normal' that defies the current law and code. This can mean that all previous modes of governance, from social norms to text-driven laws, to the code that enforces these laws and norms, by losing their legitimacy, cease to be 'normative'. Without continuous human judgements, it is likely some code-driven institutions would have already reached their capacity and collapsed.

For example, after the 2017 Amended Judicial Interpretation added the 'rectify and reconsider' procedures (A12), enforcement judges in Shanghai could handle appeals and address grievances of those being mistakenly listed. They could also consciously limit the data size of the debtors list by setting redlines of, for example, not reaching 0.5% of the local population. It was important, according to interviewees, that local enforcers keep adjusting the fit between code and its foundational social norms and laws to maintain their positive complementarity. In the debtors list case, judges should make sure only 'very few people are listed'. As Official A argued, after all the SCS is designed to promote honesty and legal compliance, rather than making people stop believing in the courts and these values and laws.

[68] Diver, 'Computational legalism and the affordance of delay in law' (n 29).

Conclusions

This paper provides one of the first fieldwork-based studies on China's SCS in Shanghai, and analyses this new evidence with an original framework of governance scaling and layering in automated enforcement. It uses new empirical evidence to uncover the workings of blacklists and joint sanctions systems from the viewpoints of those who supervise, manage and/or operate them. Methodologically, the paper combines new interview evidence with doctrinal and online archival research to tell a more detailed story about the SCS in a particular context (Shanghai). It provides a more complete understanding and empirical grounding which complement existing grand narratives or theorisations of the SCS as a whole.[69]

Although the case study is small-scale and focuses only on the enforcement branch of the SCS, it nevertheless provides a thick description of the workings of these systems, and their perceived positive and negative impacts. It thereby makes a number of contributions. First, with the benefit of this in-depth description, the paper avoids overgeneralisations of the workings of the SCS and provides a more accurate picture, grounded in delineated time and space, than has been previously available. It shows that the 2013 SPC debtors list as a prototype of blacklists, was at first a concretised judicial interpretation of an existing dormant *ad hoc* rule in civil procedure (A255). This new SPC interpretation was then enforced with code and ICT infrastructures for public information sharing, which in detail was constituted of both (1) 'push notification' to agencies, and (2) public shaming/deterrence. Evidence shows that the ambiguity of the judicial interpretation allowed enforcement judges to mass-label cases into the debtors list. In this way human judges used the new debtors list to save time and work, in the face of mounting case backlogs. The code-driven blacklists also reduced the information-searching efforts of human enforcers in other agencies, who need this court information for their own decision-making processes.

In addition, the 'push notification' part of SCS requires extensive negotiations and coordination in unifying the code and hardwired infrastructures to scale up automation. This led to the NDRC's involvement in establishing MOUs between agencies, which extended the 'push notification' to the joint sanctions mechanisms. The MOUs required immediate and full enforcement from local enforcers, which incentivised building of new code and infrastructures at local levels for joint enforcement. This extended automation while reducing the workloads of front-line enforcers, further squeezing their decision-making spaces. These code-driven joint sanctions, nevertheless, also increased the fidelity of local enforcement required by central interpretations of laws and regulations. The joint sanctions, as a result, became the direct code-translation of the MOUs and related substantive laws that entail penalisation. To this point, the blacklists and joint sanctions have become legal technologies that use code to directly represent laws. They are embodied in computational code that, for example, automatically reject a debtor's flight bookings or public funds applications.

This first description of how automated enforcement works paved way for the second descriptive part of the paper, which categorises the positive and negative impacts of these systems. As demonstrated in the interview evidence and archival research, major perceived gains include effective enforcement at scales and better informed decision-making. The extent of positive effects, nevertheless, vary according to the interviewees, who work at different stages of the automated enforcement process.

Meanwhile, problems of rigidity, human redundancy and institutional overload were raised. First, human appeals from the enforcement of these code-driven 'laws' are difficult to make at local levels. Local enforcers have to refer the case back to the enforcement judges/officers who are 'upstream' in the chain of automation. These front-line officers, including some of the judges involved, do not necessarily have the authority and/or system permission to alter the code's decisions. The hardwired code structure of this long stream of enforcement procedures, as seen in the flowchart, can become rigid and costly in niche environ-

[69] See supra Cheung and Chen (n 7); Dai (n 8); Backer (n 9); Diab (n 10); Liang and others (n 11); Orgad and Reijers (n 12); Creemers (n 13); Chen, Lin, and Liu (n 14).

ments. This has led to the Hangzhou court's reported innovative attempts (as revealed in the interviews) to provide public underwriting for debtors and help them operate through difficult periods of times.

Moreover, the automation of enforcement has disincentivised enforcement judges/officers. They in turn mass labelled cases into blacklists, leading to an overgrowth of data entries. As noted by an interviewee at the supervisor level, this ever-growing number of people being blacklisted can lead to a general change of perceptions over the system's overall legitimacy and purpose. If the blacklisted individuals start to realise that so many others around them are also blacklisted, they would perceive it as 'normalised' and thus stop believing the system as 'just' or 'promoting honesty and law-abiding values'. This potential problem of 'institutional overload' requires re-incentivising human judges/officers by accountability systems, as suggested by the interviewee. Human agency and judgement are required to continuously limit blacklist data entries and monitor the self-execution of code infrastructures at local levels. Laws should change and require human enforcers to be accountable for new jobs, such as clearing people out of the blacklists. Local enforcers should be required to diligently root out enforcement errors, and ensure the self-execution of code do not overburden individuals and the system as a whole.

Finally, these thick descriptions of automated enforcement systems in the SCS were analysed using a frame of governance in 'scaling and layering'. The paper argued that such automated 'legal techs' represent a highly formalised mode of governance/normativity. This high formalisation of code provides scale effects in governance, as compared to other less formalised modes of governance such as social norms and text-driven laws. The language of code provides high levels of standardisation and fewer ambiguities in interpretations. It can be further entrenched as physical infrastructure. This increased level of formalisation guarantees fidelity of the human and machine enforcers' actions according to the laws. This highly formalised mode of governance by code, however, does not allow for the 'hermeneutic gap' or 'delay by law' embedded in human interpretations of texts.

The paper then moves on to argue that the scaling effect of code-driven 'laws' or architectures cannot be achieved without humans consciously managing the problems of 'layering'. The perceived evidence of rigidity shows that layering happens in niche spaces, where local contingencies require deviations from the code's central control of enforcement.

Fears of human redundancy and institutional overload demonstrate governance layering in the time dimension. Code-driven enforcement proves to be path-dependent and complementary to the less formalised modes of governance, i.e. the social norms and text-driven laws. If individual perceptions of, for example, good faith or laws of contract, change due to the overgrowth of automated enforcement, code would be deprived of its own meaning within human beings' lived time-space. Like legal devices, code also 'wears out'.

Human agency is therefore required to continuously realign and re-fit these 'layered' modes of governance, from social norms to laws, to data and code. Only in this way, code can maintain sustainable scaling, and achieve positive complementarities between modes of governance in specific spatio-temporal environments.

In considering future directions for research, the paper opens the way to the pursuit of a series of long-term empirical and collaborative endeavours to better understand the 'law v code' debate in varying jurisdictions. It invites researchers across the globe to apply this study's hypotheses and frameworks, including the 'complementarity hypothesis' (that code complements law) and the proposed framework of governance 'scaling and layering', to their own case studies and qualitative fieldwork. The paper's conceptual framework points towards future theoretical developments in the field of computational law, drawing on institutionalist theories in law and the social sciences. This paper has illustrated the challenges but also the potential benefits of tackling the complex subject of China's SCS using fieldwork-based methods and interview evidence in a single city setting. Its approach could be used in future to study (1) not just cities, but also rural regions; (2) not only the SPC's Debtor's Lists, but also the numerous ministerial blacklists and joint enforcement mechanisms, such as the regulations on the energy sector and on environmental and labour protections; and (3) not only the enforcement branch, but also the risk-scoring systems of the SCS. Such studies could seek to establish how far phenomena such

as 'institutional overload' are occurring more generally, and how far they may have been successfully averted by human feedback in various temporal and spatial settings. Future studies may throw light on the role of legal training in the implementation of the SCS and on the question of how far agents' incentives are affected by organisational structures. They may also provide more detail on how agents reinvent and operationalise reflexive laws and local practices in mitigating the risks associated with the negative path-dependencies of 'code', within the SCS's layered governance structures. Moreover, they may provide evidence on new and developing initiatives including the 2017 SPC Amendment, the incoming national legislation on social credit, and the 'instituting credit' programme of the Hangzhou judges. Finally, the paper poses some questions that transcend jurisdictional boundaries, for example, on the relevance and applicability of computational law theories originating from common law and/or continental law jurisdictions in other regions, and the influence of Chinese legal and technological systems on the development of common law and/or continental legal theories in computational law. The paper does not claim to have all the answers to these questions, but has hopefully provided a springboard for further exploration and discussion in this growing field.

References

Alarie B, 'The path of the law: Towards legal singularity' (2016) 66(4) University of Toronto Law Journal 443.

Alarie B, Niblett A, and Yoon AH, 'Using machine learning to predict outcomes in tax law' (2016) 58 Can. Bus. LJ 231.

Aoki M, *Corporations in evolving diversity: Cognition, governance, and institutions* (Oxford University Press 2010).

'Application for Execution - Litigation Guide [申请执行-诉讼指南]' (China Trial Process Information Public Network [中国审判流程信息公开网]) ⟨https://www.court.gov.cn/zixun-xiangqing-78732.html⟩.

'Application for Execution - Litigation Guide [申请执行-诉讼指南]' (China Trial Process Information Public Network [中国审判流程信息公开网]) ⟨https://www.court.gov.cn/zixun-xiangqing-78732.html⟩.

Backer LC, 'Next Generation Law: data-driven governance and accountability-based regulatory systems in the West, and social credit regimes in China' (2018) 28 S. Cal. Interdisc. LJ 123.

'Beijing Station Pilots 'Face Scanning' for Entry Using Facial Recognition Technology [北京站试运行"刷脸"进站使用人脸识别技术-新华网]' (*Xinhua News Agency*, 2016) ⟨http://www.xinhuanet.com/politics/2016-11/30/c_1120017691.htm⟩.

Bennett Moses L, 'Not a Single Singularity' in S Deakin and C Markou (eds), *Is Law Computable? : Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing November 2020).

Buchanan J, *Hedge Fund Activism in Japan: The Limits of Shareholder Primacy* (Cambridge University Press 2012).

Case No. 0677 of Shanghai Arbitration. Shanghai Higher People's Court Website [沪仲案字第0677号. 海市高级人民法院网] (http://www.hshfy.sh.cn/shfy/gweb2017, Shanghai 02 Execution Reinstatement 72, List of Dishonest Judgement Debtors [沪02执恢72号失信被执行人名单] 2022).

Chen D and Deakin S, 'On heaven's lathe: State, rule of law, and economic development' (2015) 8(1) Law and Development Review 123.

Chen D and others, 'Law, trust and institutional change in China: Evidence from qualitative fieldwork' (2017) 17(2) Journal of Corporate Law Studies 257.

Chen Y.-J, Lin C.-F, and Liu H.-W, 'Rule of trust: The power and perils of china's social credit megaproject' (2018) 32 Colum. J. Asian L. 1.

Cheung AS and Chen Y, 'From datafication to data state: Making sense of China's social credit system and its implications' (2022) 47(4) Law & Social Inquiry 1137.

Chun P, 'Joint Sanctions in China's Social Credit System' [2021].

Citron DK and Pasquale F, 'The scored society: Due process for automated predictions' (2014) 89 Wash. L. Rev. 1.

'Civil Procedure law' (2017) ⟨http://www.npc.gov.cn/zgrdw/npc/xinwen/2017-06/29/content_2024892.htm⟩.

Commons JR, *Legal foundations of capitalism* (Routledge 2017).

Creemers R, 'China's Social Credit System: an evolving practice of control' [2018] Available at SSRN 3175792.

Dai X, 'Toward a reputation state: A comprehensive view of China's Social Credit System project' [2020] Social Credit Rating: Reputation und Vertrauen beurteilen 139.

Daum J, 'Untrustworthy: Social credit isn't what you think it is' [2019] Verfassungsblog: On Matters Constitutional.

De Filippi P and Wright A, *Blockchain and the Law: The Rule of Code* (Harvard University Press 2018).

Deakin S, 'Legal evolution: integrating economic and systemic approaches' (2011) 7(3) Review of Law & Economics 659.

Deakin S and Markou C, 'From Rule of Law to Legal Singularity' in S Deakin and C Markou (eds), *Is Law Computable? : Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing November 2020).

S Deakin and C Markou (eds), *Is Law Computable? : Critical Perspectives on Law and Artificial Intelligence* (Hart Publishing November 2020).

— 'Evolutionary law and economics: theory and method' (2021) 72 N. Ir. Legal Q. 682.

— 'Evolutionary Interpretation: Law and Machine Learning' (2022) 1(2) Journal of Cross-disciplinary Research in Computational Law.

Deakin S and others, 'Legal institutionalism: Capitalism and the constitutive role of law' (2017) 45(1) Journal of Comparative Economics 188.

Diab RS, 'Becoming-infrastructure: Datafication, deactivation and the social credit system' (2017) 1(1) Journal of Critical Library and Information Studies.

Diver L, 'Computational legalism and the affordance of delay in law' (2021) 1(1) Journal of Cross-disciplinary Research in Computational Law.

— *Digisprudence: code as law rebooted* (Edinburgh University Press 2021).

Diver L and others, 'Typology of Legal Technologies' (*COHUBICOL*, 2022) ⟨https://publications.cohubicol.com/typology⟩.

Engelmann S and others, 'Blacklists and Redlists in the Chinese Social Credit System: Diversity, Flexibility, and Comprehensiveness' (AIES '21, Association for Computing Machinery 2021).

'Four Major Changes in the 2017 Spring Festival Travel Rush: 'Face Scanning' Entry Available at Some Train Stations[年春运四大变化：部分火车站可"刷脸"进站-时政-人民网]' (*People's Daily Online*, 2017) ⟨http://politics.people.com.cn/n1/2016/1215/c1001-28951537.html⟩.

Hartzog W and others, 'Inefficiently automated law enforcement' [2015] Mich. St. L. Rev. 1763.

Hildebrandt M, 'Law as Information in the Era of Data-Driven Agency' (2016) 79(1) The Modern Law Review 1.

— 'Code-driven Law: Scaling the Future and Freezing the Past', in S Deakin and C Markou (eds), *Is Law Computable? Critical Reflections on Law and Artificial Intelligence* (Hart 2020).

— 'The adaptive nature of text-driven law' (2021) 1(1) Journal of Cross-disciplinary Research in Computational Law.

Horsley JP, 'China's Corporate Social Credit "System"' (2018) ⟨https://law.yale.edu/sites/default/files/area/center/china/document/horsley_china_corporate_social_credit_1-31-20.pdf⟩.

— 'China's Orwellian social credit score isn't real' (2018) 16 Foreign Policy.

Howarth D, *Law as engineering: thinking about what lawyers do* (Edward Elgar Publishing 2013).

Huttner L and Merigoux D, 'Catala: Moving Towards the Future of Legal Expert Systems' [2022] Artificial Intelligence and Law.

'In 2021, China added 1.34 million 'old scoundrels', Jiangsu accumulated 704,500 people [2021年我国新增"老赖"134万人次,江苏累70.45万人次]' (*Yangtse*, 2021) ⟨https://www.yangtse.com/zncontent/2052424.html⟩.

Joh EE, 'The Consequences of Automating and Deskilling the Police' (*UCLA Law Review*, 2019) ⟨https://www.uclalawreview.org/the-consequences-of-automating-and-deskilling-the-police/⟩.

Kayser-Bril N, 'China's social credit is not quite the dystopia you had in mind' (*Algorithm Watch*, 2022) ⟨https://r.algorithmwatch.org/nl3/sv94Xx-cTJFrPnlvkG76VA⟩.

Kiel Institute for the World Economy, 'Compliance in China under the Social Credit System and Growing Regulation: What are the Challenges Companies face?' (2022) ⟨https://www.ifw-kiel.de/institute/events/global-china-conversations/compliance-in-china-under-the-social-credit-system-and-growing-regulation-what-are-the-challenges-companies-face/⟩.

Krause T and others, 'China's corporate credit reporting system: A comparison with the United States and Germany' (2023) 17(3) Regulation & Governance 755.

Lessig L, *Code - Version 2.0* (Basic Books 2006).

Li B and Van Zanden JL, 'Before the great divergence? Comparing the Yangzi Delta and the Netherlands at the beginning of the nineteenth century' (2012) 72(4) The Journal of Economic History 956.

Liang F and others, 'Constructing a data-driven society: China's social credit system as a state surveillance infrastructure' (2018) 10(4) Policy & Internet 415.

Mac Síthigh D and Siems M, 'The Chinese social credit system: A model for other countries?' (2019) 82(6) The Modern Law Review 1034.

Matias JN and others, 'Do automated legal threats reduce freedom of expression online? Preliminary results from a natural experiment' (2020) ⟨https://osf.io/nc7e2/⟩.

Matias JN and others, 'Comments responding to US Copyright Office Notice of Inquiry Docket No. 2021-10' (2022) ⟨https://osf.io/498ja⟩.

National Development and Reform Commission and People's Bank of China, 'Establish a system of lists for joint incentives for trustworthiness and joint sanctions for untrustworthiness [建立守信联合激励对象和失信联合惩戒对象名单制度]' in *Guidance Opinion on Strengthening and Regulating the Management of Lists for Joint Incentives for Trustworthiness and Joint Sanctions for Untrustworthiness [*国家发展改革委人民银行关于加强和规范守信联合激励和失信联合惩戒对象名单管理工作的指导意见*]*.

'Notice of the Supreme People's Court on Conscientiously Implementing the Several Provisions on Announcement of the list of Dishonest Persons Subject to Enforcement' ⟨http://www.lawinfochina.com/display.aspx?id=16018%5C&lib=law⟩.

'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Dishonest Production and Operation Units and Their Related Personnel in the Field of Environmental Protection [关于对环境保护领域失信生产经营单位及其有关人员开展联合惩戒的合作备忘录]' (2016) ⟨https://www.ndrc.gov.cn/xxgk/zcfb/tz/201608/t20160819_963154_ext.html⟩.

'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Serious Violations and Dishonest Entities in the Oil and Natural Gas Industry [关于对石油天然气行业严重违法失信主体实施联合惩戒的合作备忘录]' (2017) ⟨http://www.ndrc.gov.cn/zcfb/zcfbtz/201708/t20170828_858891.html⟩.

'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Serious Violations and Dishonest Market Entities and Related Persons in the Electric Power Industry [关于对电力行业严重违法失信市场主体及其有关人员实施联合惩戒的合作备忘录]' (2017) ⟨https://www.chinatax.gov.cn/n810341/n810755/c2665761/content.html⟩.

'Notice on Issuing the Memorandum of Understanding on Joint Punishment of Units and Their Related Personnel Who Severely Arrears Wages of Migrant Workersy [关于对严重拖欠农民工工资用人单位及其有关人员开展联合惩戒的合作备忘录]' ⟨http://www.csrc.gov.cn/csrc/c100205/c1003048/content.shtml⟩.

Orgad L and Reijers W, 'How to Make the Perfect Citizen? Lessons from China's Social Credit System' (2021) 54 Vand. J. Transnat'l L. 1087.

Pasquale F, *The black box society: The secret algorithms that control money and information* (Harvard University Press 2015).

Pasquale F, 'A rule of persons, not machines: the limits of legal automation' (2019) 87 Geo. Wash. L. Rev. 1.

Peters O, 'Optimal leverage from non-ergodicity' (2011) 11(11) Quantitative Finance 1593.

— 'The ergodicity problem in economics' (2019) 15(12) Nature Physics 1216.

Pistor K, *The Code of Capital: How the Law Creates Wealth and Inequality* (Princeton University Press 2019).

Poteete AR, Janssen MA, and Ostrom E, *Working together: collective action, the commons, and multiple methods in practice* (Princeton University Press 2010).

'Provisions of the Supreme People's Court on Several Issues concerning the Handling of Enforcement Opposition and Reconsideration Cases by People's Courts' ⟨http://lawinfochina.com/display.aspx?id=20108%5C&lib=law⟩.

'Regulations on Several Issues Concerning the Handling of Execution Objections and Review Cases by the People's Court [关于人民法院办理执行异议和复议案件若干问题的规定]' (SPC interpretation 2015) ⟨https://www.spp.gov.cn/spp/sfjs/201802/t20180201_363648.shtml⟩.

Saha S, 'Automated traffic law enforcement system: A feasibility study for the congested cities of developing coun-

tries' (2020) 3(1) International Journal of Innovative Technology and Interdisciplinary Sciences 346.

Schrepel T and Groza T, 'The adoption of computational antitrust by agencies: 2021 report' (2022) 2 Stanford Computational Antitrust 78.

Shanghai 0120 Civil First Instance 11522. Shanghai Higher People's Court [沪0120民初11522号. 上海市高级人民法院网] (http://www.hshfy.sh.cn/shfy/gweb2017, Shanghai 0120 Execution 3708 List of Dishonest Judgement Debtors [沪0120执3708号失信被执行人名单] 2022).

'Shanghai Higher People's Court Website - List of Dishonest Judgement Debtors [上海市高级人民法院网--失信被执行人名单]' ⟨http://www.hshfy.sh.cn/shfy/gweb2017/channel_zx_list.jsp?pa=aemw9c3gPdcssz⟩.

Shay LA and others, 'Confronting automated law enforcement' in *Robot Law* (Edward Elgar Publishing 2016).

Shen K, 'The Approach Consistent with the Rule of Law to Constructing the Social Credit System [社会信用体系建设的法治之道]' [2019] (5) China Legal Science [中国法学] 25.

Supiot A, *Homo juridicus: On the anthropological function of the law* (Translated by Saskia Brown from the French edition of 2005, Verso Books 2007).

— *Governance by Numbers: The Making of a Legal Model of Allegiance* (vol 20, Bloomsbury Publishing 2017).

'Supreme People's Court's Decision on Amending the 'Several Provisions of the Supreme People's Court on the Publicity of Information on Judgment Debtors,' Legal Interpretation No. 7. [最高人民法院关于修改《最高人民法院关于公布失信被执行人名单信息的若干规定》的决定,法释7号]' (2017) ⟨https://www.chinacourt.org/law/detail/2017/02/id/149233.shtml⟩.

'Supreme People's Court's Several Provisions on the Publicity of Information on Judgment Debtors, Legal Interpretation No. 17, July 16 [最高人民法院关于公布失信被执行人名单信息的若干规定法释17号]' (2013) ⟨https://www.chinacourt.org/law/detail/2013/07/id/146217.shtml⟩.

Surden H, 'Machine Learning and Law' (2014) 89(1) Washington Law Review 87.

— 'Artificial intelligence and law: An overview' (2019) 35(4) Georgia State University Law Review 19.

Waddington M, 'Rules as code' (2020) 37(1) Law in Context 179.

Wang X and Zhijie H, 'On the Rule-of-Law Constraints on the Restrictions on Trust-Breaking [论失信约束制度的法治约束]' [2021] (1) China Law Review [中国法律评论] 96.

'What to make of the fact that there have been nearly 13 million instances of being blacklisted for breach of trust across the country? [如何看待全国已经近1300万例被列入失信黑名单?]' (*Zhihu*, 2019) ⟨https://www.zhihu.com/question/318670954⟩.

Yeung K, 'Blockchain, transactional security and the promise of automated law enforcement: the withering of freedom under law?' [2017] TLI Think.

Zeyi Y, 'China just announced a new social credit law. Here's what it says' (*MIT Technology Review*, 2022) ⟨https://www.technologyreview.com/2022/11/22/1063605/china-announced-a-new-social-credit-law-what-does-it-mean/⟩.

Zuboff S, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power, edn* (Profile Books 2018).

Zuo W, 'How to Achieve Similar Cases and Similar Judgments through Artificial Intelligence [如何通过人工智能实现类案类判]' [2018] (2) China Law Review [中国法律评论].

Zuo Z, 'Governance by Algorithm: China's Social Credit System' (2020) ⟨https://www.finance.group.cam.ac.uk/system/files/documents/GovernancebyAlgorithm_CERF_Zhenbin6.16.2020.pdf⟩.

— 'China's Data Strategies: institutionalisation, activation and layering', in M Hennemann (ed), *Global Data Strategies* (forthcoming, CH Beck Hart Nomos 2023).

A reply: On the Risk of Risk-modeling

Cynthia Liem • Delft University of Technology, c.c.s.liem@tudelft.nl

In 'Automated law enforcement: An assessment of China's Social Credit Systems (SCS) using interview evidence from Shanghai', Zuo provides valuable insights into the way Shanghai's SCS is implemented and experienced. While I have so far been aware of general discussions about the SCS, the qualitative study presented greatly concretizes real-life experiences with this system by various enforcers.

Looking at the discussion, I found it particularly striking to see how SCS really are socio-technical systems. By making explicit the perceptions and experiences of the human stakeholders working with such systems, Zuo's article strongly underlines this. As such, I would argue the article especially invites discussion on the impact of digitalization and (partial) automation of processes, and governance questions surrounding this.

In other words, this story is not as much about 'algorithms', 'data', or state-of-the-art AI technology – concepts and terms that lately, at least in my personal experience, have been forefronted and prioritized in discussions on regulation and responsible adoption of computational approaches in societally impactful applications.

For example, one recital of the EU AI Act states that the Act 'should not cover systems that are based on the rules defined solely by natural persons to automatically execute operation'.[70] Considering the Flowchart of Automated Enforcement as illustrated in Zuo's article, the SCS discussed may however be very close to this concept.

Social scoring always has been a theme of concern in the AI Act, but here, it also is interesting how the European interpretation seems to differ from the examples as given by Zuo. Zuo's examples about debtors are rooted in human judgement of debt, which looks far away from automated evaluation or classification of 'natural persons or groups thereof based on multiple data points related to their social behaviour in multiple contexts or known, inferred or predicted personal or personality characteristics over certain periods of time'.[71] Furthermore, the foreseen European prohibition of social scoring systems 'should not affect lawful evaluation practices of natural persons done for a specific purpose in compliance with national and Union law'.[72] In other words, a system like the one described by Zuo may likely not be in scope of a future AI Act.

I am not necessarily surprised by these discrepancies. In my own public engagement work as a computer scientist commenting on applications of risk-modeling of citizens, I have frequently have seen hard-coded human business rules being automated. However, in the examples as given by Zuo, it really strikes me how discussions on possibly harmful impact are not at all about digital or automated classification, but rather about the way in which human judgment is digitalized and propagated, in contexts where scaling and layering will happen.

To comment on this article through the eyes of a computer scientist, it seems more fitting to take a human factors and software engineering perspective to this story than a machine learning or AI perspective, and in this have explicit attention to multiple stakeholders. The system as described mostly seems to serve those on the enforcing side, reducing their workload and providing standardized and scalable follow-up to actions. It seems particularly efficient at propagation: as soon as a debtor is blacklisted, the consequences for the debtor will automatically be rolled out. However, one can then wonder to what extent the

[70] European Commission, 'E.U. AI Act' COM (2021) 206 final, Recital 12.
[71] European Commission, 'E.U. AI Act' COM (2021) 206 final, Recital 17.
[72] ibid.

interests and rights of the (possible) debtor are sufficiently taken into account.

The safeguard to appeal happens early on and upstream, at the moment a citizen may be entered into the debtors list database. This process appears to have relatively short response times ('apply to rectify' should be reviewed within 15 days, and in case of a rejection of the appeal, the reconsideration at a higher-level court should be made within 10 days of the rejection decision). I do not have sufficient contextual knowledge to be able to judge whether these time intervals are reasonable and realistic. There seems very little a debtor can do, as soon as they are entered into the database. Especially as local SCS implementations and interpretations appear to be scattered, this is something citizens should be clearly informed about.

Furthermore, I am wondering to what extent the system includes safeguards reflecting that debt may not always be attributable to bad behavior of a person. For example, in 2022, energy prices rose so fast in The Netherlands that citizens could not pay their energy bills and fell into debt, forcing the government to compensate.[73] Would the SCS be sufficiently flexible to deal with such cases?

What I find concerning is that it seems convenient for judges to put citizens on the debtor list. This can be done for vague 'other situations' reasons and relieves them from the need to enforce, while there seems no incentive to take people off the blacklist. I would argue such incentives should be designed, especially as the blacklist has concrete consequences.

It does seem that the ultimate purpose of the blacklist and its consequences remain at a somewhat vague level. On the one hand, it seems a way to emphasize the importance of reputation, implement public shaming and negative consequences for bad actors, and as such deter good actors from becoming bad actors. At the same time, it also seems to be used as a target: more than 3% of the population being blacklisted may both normalize bad behavior, and cause technical scaling issues with the database.

As for this, it would be important to clarify what the goal of the blacklist and the SCS is, as this will impact more concrete requirements for a software solution. Should it be a comprehensive database of cases? If so, there seem no assumptions on how many people would be in such a database, and being able to scale to large numbers would be a requirement to explicitly include. At the same time, if it is more about public reputation and deterrence, a smaller curated set of recognizable and relatable examples may suffice already. In the latter case, the purpose may be more communicative; in this, I can imagine that next to punishing bad examples, incentivizing good examples may be useful, and design of a proper narrative would become more important.

In terms of architectural setup, I would like to reflect on centralized vs. decentralized approaches. Informal and decentralized modes of enforcement were more common in the past. In now choosing more centralized blacklisting and joint sanction setups, this informality is reduced, but at the cost of potentially excessive rigidity. Some interviewees indicate more space for local interpretation may be better. However, if local informality is a concern, and some degree of standardization is desired, a compromise needs to be found between the two approaches. For example, this could be found in a setup in which local exceptions can be made, provided they are well-justified in a centrally accountable way.

Finally, it is unclear to what extent the SCS digital systems are to be built and released as one-shot full systems, or to what extent they will actively be maintained and may involve iterative architectural updates. As for this, in the Dutch government, ICT maintenance had for a long time not been sufficiently acknowledged and budgeted, leading to current problems with inflexible legacy systems[74]. I hope the SCS context will have taken this into account, rather than realizing a monolithic system that may turn out too inflexible in practice, yet hard to iteratively maintain and improve.

[73] See ANP, 'Netherlands to pay down energy bills for residents who fall into debt: Report' (*NL Times*, 2022) ⟨https://nltimes.nl/2022/09/12/netherlands-pay-energy-bills-residents-fall-debt-report⟩.

[74] See Kim Loohuis, 'Dutch government must sort IT mess as priority' (*Computer Weekly*, 2019) ⟨https://www.computerweekly.com/news/252475028/Dutch-government-must-sort-IT-mess-as-priority⟩.

Author's reponse

Zhenbin Zuo

I am grateful for Prof. Liem's insightful comments and suggestions. Firstly, as she rightly observes, my paper does not discuss what the EU AI Act proposes to regulate as social scoring decision-making. Rather, the paper focuses on how the automation of enforcement after human decision-making (see flowchart Figure 1 page 8) adversely influences upstream human decisions and a wider set of stakeholders in real-life, rationally-bounded institutions and organisations.

The paper tries to reveal how downstream automations systematically change the spatio-temporal structure of law enforcement (standardised at wider geographies, with speed) and the upstream human enforcer's incentives and behaviours (over-reliance on, e.g., databases, software, and AI-embedded boarding gates with facial recognition). Over time, such socio-technical hybridization of human judgment and machine calculation influences affected individuals' perception of the legal system. Indeed, debtors might start questioning the very concept of debt, honesty, and the legitimacy of law.

In this sense, I would argue that the paper is about governance by algorithms, data and AI; and that is also why here, Hildebrandt's theory of 'freezing' and Diver's theory of law's affordance of delay apply.[75] Perhaps the current discussions in AI and machine-learning laws/ethics (including the EU Act) should not only focus on automated decision-making (including social scoring and big-data profiling), but also on the wider automated institutional environments of decision-making (including enforcement) that manifest complex scaling and layering processes.

This is exactly the purpose of my paper: to call for a better understanding of the modern legal system itself as a socio-technical system functioning with enforcement agents and infrastructures, previously based on text and increasingly on code, embodied and deployed in various spatio-temporal environments layered with complex needs of populations and geographies at scale.

If I may be provocative, the point is that our fields of AI governance and computational law (in both law and CS) should supplement the current focus on individualised automated decision-making with a more socio-institutional and organisational understanding of modern rule-of-law systems. I believe this would require more CS experts with 'human factors and software engineering perspectives' (in Liem's words) to talk to AI experts about onboarding more stakeholders. Maybe more importantly, lawyers and social scientists should facilitate such dialogues by providing comprehensive visions of the goals of institutions and laws, and how we can maintain focus on such goals while avoiding systematic problems such as 'institutional overload'. Methodologically we need more cross-disciplinary empirical studies that uncover causal processes within courts, enforcement agents and the wider civil society in order to push forward AI governance and computational law research. I hope this paper provides new frameworks, methods, and initial evidence for such an approach.

Secondly, Liem's comments on specific design issues are timely. Among them, the architectural setup and iterative updates are most important in the context of SCS, especially during and after the pandemic when more people and businesses failed to pay their debts on time. Local courts and governments had to make more flexible adjustments like forgiveness and mediation to help medium,

[75] Mireille Hildebrandt, 'Code-driven Law: Scaling the Future and Freezing the Past' in Simon Deakin and Christopher Markou (eds), *Is Law Computable? Critical Reflections on Law and Artificial Intelligence* (Hart 2020); Laurence Diver, *Digisprudence: code as law rebooted* (Edinburgh University Press 2021).

small and micro-sized businesses.[76] The SCS seemed to be functioning in a more decentralised way in order to prevent too many persons and/or businesses from being restrained by the Debtor's List in their daily and/or commercial activities[77] The latest draft of the national Social Credit Law should attempt to rebalance these centralised v decentralised approaches, and learn from the Dutch government's experience on budgeting/enacting ICT system updates.[78] This new legislation needs to embed incentives and organisational support for Chinese courts, civil service officers and private enforcers to iteratively improve and sustain both technological and legal designs in light of public values.

References

Diver L, *Digisprudence: code as law rebooted* (Edinburgh University Press 2021).

Hildebrandt M, 'Code-driven Law: Scaling the Future and Freezing the Past' in S Deakin and C Markou (eds), *Is Law Computable? Critical Reflections on Law and Artificial Intelligence* (Hart 2020).

National Development and Reform Commission, Draft Law of the PRC on the Establishment of the Social Credit System (Released for Solicitation of Public Comments) [中华人民共和国社会信用体系建设法(向社会公开征求意见稿)] (2022).

'Supreme People's Court, Press conference on leading cases and innovative mechanisms which support medium, small and micro-sized businesses for development [最高法举行人民法院助力中小微企业发展典型案例和创新机制发布会]' (2022) ⟨http://www.scio.gov.cn/xwfb/gfgjxwfb/gfgjfbh/zgf/202307/t20230705_726564.html⟩.

Xuan L, 'Exercise judicial functions to rescue companies in difficulty and help the high-quality development of the real economy [发挥司法功能挽救困境企业,助力实体经济高质量发展]' (2023) ⟨https://c.m.163.com/news/a/HVB9J3LH051486CM.html⟩.

[76] See e.g. China Central Television General Channel news reporton Guizhou High Court helping debtors restart their businesses by initiating and facilitating debt forgiveness, Li Xuan, 'Exercise judicial functions to rescue companies in difficulty and help the high-quality development of the real economy [发挥司法功能挽救困境企业,助力实体经济高质量发展]' (2023) ⟨https://c.m.163.com/news/a/HVB9J3LH051486CM.html⟩ (with full video of interviews with Supreme Court judges, local judges and local business owners).

[77] See the Supreme Peoples Court's press conference on 2022-4-19, presenting a list of innovative and multi-layered solutions to help alleviate debt problems for local businesses: 'Supreme People's Court, Press conference on leading cases and innovative mechanisms which support medium, small and micro-sized businesses for development [最高法举行人民法院助力中小微企业发展典型案例和创新机制发布会]' (2022) ⟨http://www.scio.gov.cn/xwfb/gfgjxwfb/gfgjfbh/zgf/202307/t20230705_726564.html⟩

[78] National Development and Reform Commission, Draft Law of the PRC on the Establishment of the Social Credit System (Released for Solicitation of Public Comments) [中华人民共和国社会信用体系建设法(向社会公开征求意见稿)] (2022).