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Digital Entrepreneurship Policy in Korea, Japan, China, the United Kingdom, the United States, France and Germany, 2023

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Governments of the Republic of Korea, Japan, the People's Republic of China, the United Kingdom, the United States, France and Germany, with their legislatures, the Central Committee of the Communist Party of China, the NAIRR Task Force, the CFPB and the Federal Cartel Office

Summary: This report reviews the digital entrepreneurship policy that the governments of Korea, Japan, China, the United Kingdom, the United States, France and Germany set out from January to December 2023 in six domains — regulation and law, finance, culture, support, human capital and markets — and analyses it in its context, against theory and in practice. Generative AI organised the year's policy: binding rules in China, an executive order in the United States, guidance in Japan and the United Kingdom, and a bill in Korea. The best measures offered small firms and start-ups computing power and AI services by selection, widened the Blue Card to IT specialists without a degree, opened a public market to SMEs or brought a platform owner under special abuse control; the worst offered digital culture only plans, surveys and announcements. Much of the year's policy was a bill, plan or draft at its end, Korea cut public research, Germany proposed cuts to digital programmes and France to new broadband commitments, and governments reported outputs rather than effects.

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Digital Entrepreneurship Policy in Korea, Japan, China, the United Kingdom, the United States, France and Germany, 2023

Abstract

This report reviews and analyses the digital entrepreneurship policy of the governments of the Republic of Korea, Japan, the People's Republic of China, the United Kingdom, the United States, France and Germany in their own plans, laws, budgets and announcements. The policies are reviewed in six domains – regulation and law, finance, culture, support, human capital and markets – and analysed in their context, against theories of digital entrepreneurship, platforms, regulation, entrepreneurial finance and policy design, and in practice. Generative AI organised the year's policy. China's Interim Measures for generative AI services took effect on 15 August; the United States directed its agencies by Executive Order 14110; Japan relied on guardrails and the United Kingdom on principles for regulators; and Korea's AI bill was pending at the end of the year. Korea offered SMEs and ventures access to public computing, while the United Kingdom and Japan promised compute for start-ups without a route to it. Crypto-asset regimes took shape in Japan, Korea, the United Kingdom and France. Germany's Federal Cartel Office brought Apple under special abuse control, while platform rules were a bill in the United Kingdom, a recommendation in Japan and a plan in Korea. Germany opened the Blue Card to IT specialists without a degree and adopted a permit for founders from 2024; Japan let private bodies confirm founders' plans for its start-up visa; the United States proposed H-1B status for founder-owners; and the United Kingdom closed its Start-up route after widening its Innovator route. Korea cut public R&D, Germany proposed cuts to digital programmes and France to new broadband commitments, and governments reported outputs rather than effects. The period covered is January to December 2023.

Keywords

generative AI, AI governance, regulatory sandboxes, personal data, computing power, crypto-assets, stablecoins, platform competition, public procurement, skilled immigration, SME digitalisation

JEL Classification

L26, L86, O33, K24, L51, O38

1 INTRODUCTION

Key findings

- Generative AI organised digital entrepreneurship policy in 2023, but much of it was a bill, plan or draft at the end of the year.
- AI rules diverged: China's Interim Measures for generative AI services took effect on 15 August, the United States directed its agencies by Executive Order 14110, Japan relied on guardrails and the United Kingdom on principles for regulators, and Korea's AI bill was pending.
- Korea offered SMEs and ventures public computing, while the United Kingdom and Japan promised compute for start-ups without a route to it.
- Japan's stablecoin rules applied from 1 June, the United Kingdom and France legislated on crypto-assets, and Korea's Virtual Asset User Protection Act will take effect on 19 July 2024.
- Germany's Federal Cartel Office brought Apple under special abuse control; platform regimes were a bill in the United Kingdom, a recommendation in Japan and a plan in Korea.
- Germany opened the Blue Card to IT specialists without a degree and Japan let private bodies confirm start-up visa plans; the United States proposed H-1B status for founder-owners, and the United Kingdom closed its Start-up route after widening its Innovator route.
- Korea cut public R&D, Germany proposed cuts to digital programmes and France to new broadband commitments, the United Kingdom closed its voucher scheme for SMEs' software, and governments reported outputs, not effects.

Digital entrepreneurship depends on data, computing power, rules on algorithms and platforms, and markets reached through platforms that others own. Digital technologies, it has been argued, make entrepreneurial processes and outcomes less bounded (Nambisan, 2017), and the governance of digital infrastructure is itself a domain of policy (Sussan & Acs, 2017). This report applies the entrepreneurial ecosystem approach (Isenberg, 2011; Stam, 2015) to the digital entrepreneurship policy of Korea, Japan, China, the United Kingdom, the United States, France and Germany in 2023. It asks three questions:

1. What did each government set out in each domain of digital entrepreneurship in 2023?
2. How did the policies arise and how were they justified, how far were they valid in theory, and what had they achieved in practice by the end of the year?
3. What were their limitations, and what follows for policy?

The report draws on policy studies and entrepreneurship research where it bears on a policy – on problem representation (Bacchi, 2009; Rochefort & Cobb, 1993), digital ecosystems (Sussan & Acs, 2017), platforms (Cutolo & Kenney, 2021), data regulation and sandboxes (Cornelli, Doerr, Gambacorta, & Merrouche, 2024; Jia, Jin, & Wagman, 2021), AI investment (Babina, Fedyk, He, & Hodson, 2024), grants and tax relief (Dechezleprêtre, Einiö, Martin, Nguyen, & Van Reenen, 2023;

Howell, 2017), procurement (Edler & Georghiou, 2007) and immigrant talent (Hunt, 2011). Sections 2 to 5 review the policies by domain and country, analyse them, set out their limits and draw implications.

The report rests on the plans, laws, budgets, reports and announcements of these governments in 2023, including decisions of financial regulators and competition authorities (Table 1). Quotations from sources that are not in English are IFEED's translations.

Table 1: Government plans, laws, reports and announcements reviewed

Subject	Issuing bodies	Date and type	Period covered	Description
Korea				
Platform guideline and act plan	KFTC	12 January 2023 Press releases	January–December 2023	Review criteria; planned platform act.
Digital talent training	MSIT	19 January 2023 Press releases	January–June 2023	Budget and places for digital training; graduate programmes.
Security tokens	FSC	6 February 2023 Plan	February 2023	Tokenised securities under capital market law.
ICT regulatory sandbox	MSIT	28 March 2023 Press releases	March–December 2023	Exemptions granted since 2019; rule changes.
Hyperscale AI plan	MSIT	14 April 2023 Plan, press releases	April–December 2023	Computing for SMEs; AI support; AI bill status.
Digital Service Mall	PPS	17 April 2023 Press releases	April 2022–April 2023	Public purchases of cloud and software.
K-Cloud project	MSIT	26 June 2023 Press release	June 2023	Data centres on domestic AI chips; vouchers.
Virtual Asset User Protection Act	FSC	30 June 2023 Press releases	June–December 2023	User protection and unfair trading; draft decree.
Visa measures	MOJ	24 August 2023 Press releases	August–December 2023	Work for graduates; nomad visa without local work.
Budget for 2024	MOEF	29 August 2023 Budget	August–December 2023	AI lines proposed; research and development cut.
Fintech week and sandbox	FSC	13 September 2023 Press releases	August–December 2023	Visitors; sandbox designations; fintech support.
COMEUP 2023	MSS	8 November 2023 Press release	November 2023	Start-up festival with foreign founders.
Personal information law	PIPC	29 December 2023 Press release	March–December 2023	Revised act and decrees; later provisions.
Japan				
Web3.0 study group	Digital Agency	18 April 2023 Meeting material	January–April 2023	Consultation desks; trial DAO; tokens.
J-Find	ISA	21 April 2023 Programme outline	April 2023	Two-year stays to seek work or found a firm.
AI points of discussion	Cabinet Office	26 May 2023 Council paper	May 2023	Existing law first; computing and data needs.
Stablecoin regime	FSA	26 May 2023 Orders	May–December 2023	Electronic payment instruments from 1 June.

Subject	Issuing bodies	Date and type	Period covered	Description
Digital society plan	Digital Agency	9 June 2023 Plan	June–December 2023	Business services, SME tools, start-up procurement.
Innovation strategy	Cabinet	9 June 2023 Cabinet decision	June–December 2023	Guardrails for generative AI.
New Capitalism action plan	Cabinet	16 June 2023 Cabinet decision	June–December 2023	Start-up visa reform; platform law to be considered.
Mobile ecosystem report	Digital Market Competition Council	16 June 2023 Report	June 2023	Ex-ante rules for large platforms proposed.
FSA policy priorities	FSA	29 August 2023 Policy statement	August–December 2023	Stablecoin registration; fintech week.
Economic package	Cabinet	2 November 2023 Cabinet decision	November 2023	AI computing and data; start-up procurement.
AI Strategy Council materials	Cabinet Office	7 November 2023 Council materials	October–November 2023	Hiroshima code of conduct; data desk; AI subsidy.
Regulatory sandbox	Cabinet Secretariat	12 December 2023 Briefing	June 2018–November 2023	Certified plans and resulting rule changes.
Tax reform outline	Cabinet	22 December 2023 Cabinet decision	December 2023	Innovation box including AI software.
Digital Garden City strategy	Cabinet	26 December 2023 Cabinet decision	December 2023	Target for training digital personnel.
Start-up support measures	Cabinet Secretariat	26 December 2023 Meeting material	October–December 2023	Compute for start-ups; start-up visa change.
China				
Data-security industry	MIIT et al.	3 January 2023 Opinions	January–December 2023	Engineer standards; overseas talent.
Personal data exports	CAC	22 February 2023 Rules	June–December 2023	Contract route for small exporters.
Digital China plan	CPC Central Committee; State Council	27 February 2023 Plan (summary)	February–December 2023	Summits, competitions, digital talent.
Government Work Report	State Council	5 March 2023 Work report	March–December 2023	Tasks, deficit, digital economy, platforms.
Institutional reform	CPC Central Committee; State Council	16 March 2023 Reform plan	March–December 2023	National Data Administration created.
Green data centre purchasing	MOF et al.	20 March 2023 Standard	June–December 2023	Energy rules; commitment letters at bidding.
SME digital pilot cities	MOF; MIIT	12 June 2023 Notice	June–December 2023	Central rewards per city; SME subsidies.
Generative AI measures	CAC et al.	10 July 2023 Rules	August–December 2023	Scope, training data, assessment, filing.
App filing	MIIT	21 July 2023 Notice	July–December 2023	Filing duty for apps and distributors.
Data resource accounting	MOF	1 August 2023 Provisions	August–December 2023	Data as assets from 1 January 2024.

Subject	Issuing bodies	Date and type	Period covered	Description
Government-service opinions	State Council General Office	18 August 2023 Opinions	August–December 2023	Enterprise services; electronic licences.
Metaverse action plan	MIIT et al.	29 August 2023 Action plan	August–December 2023	Firms, competitions, talent.
Computing infrastructure plan	MIIT et al.	8 October 2023 Action plan	October–December 2023	Inclusive computing for SMEs; contests.
Non-bank payment rules	State Council	9 December 2023 Regulations	December 2023	Licence, capital floor; in force from May 2024.
United Kingdom				
DPDI Bill	DSIT	8 March 2023 Press releases	March–November 2023	Bill introduced; carried over in November.
Spring Budget	HM Treasury	15 March 2023 Budget	March 2023	Compute promised; AI prize; new departments.
AI regulation white paper	DSIT	29 March 2023 Command paper	March–December 2023	Principles for regulators; sandbox for start-ups.
Digital Markets, Competition and Consumers Bill	DBT; DSIT	25 April 2023 Press release	April–December 2023	Strategic market status; turnover thresholds.
Unicorn Kingdom campaign	Cabinet Office	25 April 2023 Press release	April 2023	Promotion of the tech sector in the United States.
Help to Grow: Digital	DBT	9 May 2023 Statistics, answers	December 2021–March 2023	Uptake, spending and closure of the vouchers.
Financial Services and Markets Act	Parliament	29 June 2023 Act	June–December 2023	Powers over cryptoassets and sandboxes.
Online Safety Act	Parliament	26 October 2023 Act	October–December 2023	Duties scaled by size; fees above a threshold.
Cryptoasset regime	HM Treasury	30 October 2023 Response	February–October 2023	Phased regime, stablecoins first.
AI skills and compute	DSIT	31 October 2023 Press releases	October–November 2023	Skills, visa scheme, sandbox; AI Research Resource.
Autumn Statement	HM Treasury	22 November 2023 Fiscal statement	November 2023	More compute; AI timetable; SME taskforce.
Work visa statistics	Home Office	23 November 2023 Statistics	October 2022–September 2023	Global Talent, Innovator Founder, Start-up.
Digital Securities Sandbox	HM Treasury	14 December 2023 Regulations	November–December 2023	Sandbox for digital securities from January 2024.
United States				
Research resource plan	NAIRR Task Force	24 January 2023 Report	January 2023	Shared compute and data; users and budget.
AI risk management	NIST	January 2023 Framework, notice	January–November 2023	Voluntary framework; open consortium.
Mobile app ecosystem	NTIA	February 2023 Report	February 2023	Barriers for app developers; recommendations.

Subject	Issuing bodies	Date and type	Period covered	Description
SBIC final rule	SBA	18 July 2023 Final rule	August–December 2023	Accrual debenture; lower barriers for new funds.
Digital-asset bills	House	20 July 2023 Bills	July 2023	Market structure; payment stablecoins.
AI Cyber Challenge	White House	9 August 2023 Press release	August 2023	Prize competition; funds for small firms.
H-1B proposed rule	DHS	23 October 2023 Proposed rule	October–December 2023	H-1B status for founder-owners; cap-gap.
Executive Order 14110	President	30 October 2023 Executive order	October–December 2023	Reporting, competition, small firms, talent.
Open-banking proposal	CFPB	31 October 2023 Proposed rule	October–December 2023	Developer interfaces for consumer data.
Entrepreneurship proclamations	President	31 October 2023 Proclamations	April–November 2023	Entrepreneurship month; small business week.
Agency use of AI (draft)	OMB	1 November 2023 Draft memorandum	November–December 2023	Agency AI officers; competition in purchasing.
Cybersecurity certification	DoD	26 December 2023 Proposed rule	December 2023	Assessment levels; costs for small firms.
Software costs	IRS	2023 Notice	2023	Capitalisation and amortisation of software costs.
France				
France Num training and barometer	DGE	23 January 2023 Press releases	January–September 2023	Free training; small firms' views of digital.
Digital-asset providers	Parliament	9 March 2023 Act	March–December 2023	Stricter registration; crypto-asset ordinance.
AI calls of March	MEFIDS	29 March 2023 Press release	March–April 2023	Trusted, embedded and local AI demonstrators.
Trusted cloud	MEFIDS	4 April 2023 Press releases	April–June 2023	Cloud strand; office suites; SecNumCloud support.
Digital-space bill	Government (Senate)	10 May 2023 Bill, assessment	May 2023	Cloud credits, fees, interoperability.
AI effort of June	MEFIDS	16 June 2023 Press release	June–November 2023	AI clusters, digital commons, computing, challenge.
AI Booster	DGE; SGPI	16 June 2023 Press release	June 2023	Advice and training on AI for SMEs.
Digital-space bill (readings)	Parliament	5 July 2023 Bill texts	July–October 2023	Senate and Assembly texts; cloud rules.
E-invoicing postponement	DGFIP	28 July 2023 Press release	July 2023	Postponement; expected gains for SMEs.
Cyber SME scheme	MEFIDS	6 December 2023 Press release	December 2023	Cybersecurity advice for SMEs.
State use of AI	MEFIDS	12 December 2023 Press release	July–December 2023	AI experiment; Alliance incubator.
Finance Act for 2024	Parliament	29 December 2023 Act	December 2023	New dates for electronic invoicing.

Subject	Issuing bodies	Date and type	Period covered	Description
Budget request for 2024	MEFIDS	2023 Budget annex	2023	Digital, France Num, broadband.
Germany				
Platform cases	Federal Cartel Office	28 March 2023 Press releases	March–November 2023	Apple decision; Microsoft; OpenAI stake.
Skilled Immigration Act	Bundestag	16 August 2023 Act	August–December 2023	Blue Card for IT specialists; founder permit.
Draft budget for 2024	Federal Government	18 August 2023 Budget bill	August–December 2023	Digital titles; cuts to grants and AI research.
Online Access Act bill	Federal Government	23 August 2023 Bill	August–December 2023	Organisation account; digital-only services.
Start-up Strategy report	Federal Government	22 September 2023 Report	July 2022–September 2023	Procurement, real-world laboratories, data.
Growth Opportunities bill	Federal Government	2 October 2023 Bill	October–December 2023	Mandatory electronic invoices between firms.
IT security report	BSI	October 2023 Report	June 2022–June 2023	Threats to SMEs; cyber risk check.
Digital Summit	Federal Government	21 November 2023 Article	November 2023	Summit in Jena; AI as focus.
AI action plan	BMBF	November 2023 Action plan	November–December 2023	Access to computing; AI talent.
Future Financing Act	Bundestag	11 December 2023 Act	December 2023	Electronic and crypto-registered shares.
Digital services bill	Federal Government	22 December 2023 Bill	December 2023	Coordinator for digital services; platform fairness.

Source: The plans, laws, reports and announcements listed. Periods covered and descriptions: IFEED.

Note: Where a source has several parts, citations name the part (for example, plan or press release) before the page.

Abbreviations: AI, artificial intelligence; BMBF, Federal Ministry of Education and Research; BSI, Federal Office for Information Security; CAC, Cyberspace Administration of China; CFPB, Consumer Financial Protection Bureau; CMA, Competition and Markets Authority; CMMC, Cybersecurity Maturity Model Certification; CP, Command Paper; CPC, Communist Party of China; DAO, decentralised autonomous organisation; DARPA, Defense Advanced Research Projects Agency; DBT, Department for Business and Trade; DGE, Directorate-General for Enterprises; DGFIP, Directorate-General of Public Finances; DHS, Department of Homeland Security; DMCC, Digital Markets, Competition and Consumers; DoD, Department of Defense; DPDI, Data Protection and Digital Information; DSIT, Department for Science, Innovation and Technology; DX, digital transformation; EU, European Union; FSA, Financial Services Agency; FSC, Financial Services Commission; GDPR, General Data Protection Regulation; HC, House of Commons paper; HM, His Majesty/s; ICT, information and communications technology; ID, identification; IPO, initial public offering; IRS, Internal Revenue Service; ISA, Immigration Services Agency; IT, information technology; KFTC, Korea Fair Trade Commission; MEFIDS, Ministry of the Economy, Finance and Industrial and Digital Sovereignty; MIIT, Ministry of Industry and Information Technology; MIS, management information systems; MOEF, Ministry of Economy and Finance; MOF, Ministry of Finance; MOJ, Ministry of Justice; MSIT, Ministry of Science and ICT; MSS, Ministry of SMEs and Startups; NAIRR, National AI Research Resource; NDRC, National Development and Reform Commission; NIST, National Institute of Standards and Technology; NSF, National Science Foundation; NTIA, National Telecommunications and Information Administration; OMB, Office of Management and Budget; PIPC, Personal Information Protection Commission; PPS, Public Procurement Service; R&D, research and development; RD, regression discontinuity; RMF, risk management framework; SASAC, State-owned Assets Supervision and Administration Commission of the State Council; SBA, Small Business Administration; SBIC, Small Business Investment Company; SGPI, General Secretariat for Investment; SI, statutory instrument; SME, small and medium-sized enterprise; UK, United Kingdom; US and U.S., United States.

2 REVIEW OF DIGITAL ENTREPRENEURSHIP POLICIES

This section reviews the key policies of 2023 in six domains adapted from Isenberg's domains of the entrepreneurial ecosystem (Isenberg, 2011): regulation and law; finance; culture; institutional support; human capital; and markets, including initial public offerings and exit. In digital entrepreneurship they take the form of rules on AI, data and platforms; money for computing power and rules for crypto-assets and payments; digital public services and help with adoption; routes for digital talent; and public demand for digital products.

2.1 REGULATION AND LAW

Regulation turned on AI and data: binding rules in China, an executive order in the United States, guidance in Japan and the United Kingdom, and bills in Korea, France and Germany.

2.1.1 KOREA: PERSONAL DATA RULES, THE ICT SANDBOX AND THE AI BILL

The Personal Information Protection Act, fully revised and promulgated in March, applies the same rules online and offline, obliges every handler to report a breach within 72 hours and replaces criminal penalties for some violations with heavier economic sanctions; the right concerning automated decisions will take effect on 15 March 2024 (PIPC, 29 December 2023, items 3 and 5, and final paragraph). MSIT's ICT regulatory sandbox had granted 200 exemptions since January 2019, 39 of them in 2023; 125 services had reached the market and the rules behind 70 had been amended, and an amendment passed on 20 December will allow a designation to be cancelled where business has not begun within two years (MSIT, 28 March 2023, release of 21 December). An AI bill had passed a subcommittee of the National Assembly in February and was still being pursued in December (MSIT, 14 April 2023, release of 28 December).

This was a mixed policy. The sandbox was good: entry into the United Kingdom's fintech sandbox raised firms' funding and survival (Cornelli et al., 2024), and Korea's exemptions led to rule changes for 70 services. The privacy revision applied one rule online and offline. But the AI bill had not passed, so AI start-ups gained no legal certainty.

2.1.2 JAPAN: THE GUARDRAILS FOR GENERATIVE AI AND THE REGULATORY SANDBOX

Japan had no AI statute. The AI Strategy Council's interim points of 26 May rejected a choice between hard and soft law and asked developers and providers first to follow existing laws and guidelines (Cabinet Office of Japan, 26 May 2023, p. 8); the Integrated Innovation Strategy of 9 June called for "guardrails", with risks and responses arranged by developer, provider and user (Cabinet of Japan, 9 June 2023, p. 8). On 30 October the leaders of the Group of Seven welcomed guiding principles and a code of conduct for AI developers under the Hiroshima AI Process (Cabinet Office of Japan, 7 November 2023, Hiroshima AI Process slides, slide 1). The regulatory sandbox had certified 30 plans involving 149 businesses by the end of November, in fields including fintech, blockchain and AI, and 23 of the 29 completed plans had led to rule changes or clarified interpretations (Cabinet Secretariat of Japan, 12 December 2023, pp. 2, 6-7).

This was a mixed policy. Guidance without duties spared AI start-ups compliance costs, unlike the uniform rules under which investment in young, data-related ventures fell in Europe (Jia et al., 2021). The sandbox, of the kind whose entry raised fintech firms' funding (Cornelli et al., 2024), turned most completed tests into rule changes. But the guardrails bound no one, so founders gained little legal certainty.

2.1.3 CHINA: THE GENERATIVE AI MEASURES, DATA EXPORTS AND APP FILING

The Interim Measures for generative AI services, in force from 15 August, apply to services offered to the public in China, not to development or application without such a service; they promise inclusive, prudent and graded supervision, bar providers from using advantages in algorithms, data or platforms for monopoly or unfair competition, and require services with public-opinion attributes to pass a security assessment and file their algorithms (CAC et al., 10 July 2023, Arts. 2–4, 17). The CAC's standard-contract measures, in force from 1 June, let processors handling the data of fewer than 1 million people that have exported the data of fewer than 100,000 since 1 January of the previous year export personal information by contract (CAC, 22 February 2023, Arts. 4, 7). MIIT's notice of 21 July requires every app providing internet information services to be filed, existing apps by March 2024, and bars app stores and device makers from distributing unfilled apps (MIIT, 21 July 2023, Part II, items (1) and (9), and Part III, item (2)).

This was a mixed policy. The exemption of development and the contract route for small exporters lower fixed costs of the kind that, under uniform data rules, fell hardest on young, data-related ventures (Jia et al., 2021). But assessment and filing duties apply whatever a firm's size, and uniform duties of this kind have favoured the largest firms (Johnson, Shriver, & Goldberg, 2023).

2.1.4 UNITED KINGDOM: THE AI WHITE PAPER AND THE ONLINE SAFETY ACT

DSIT's white paper of 29 March chose not to legislate at first: five cross-sectoral principles were to be applied by existing regulators on a non-statutory basis, with a statutory duty on regulators only after an initial period, and burdens were not to fall disproportionately on smaller companies (DSIT, 29 March 2023, foreword, and paras 11–12, 28); on 22 November the response to the consultation was still promised for the end of the year (HM Treasury, 22 November 2023, para. 4.80). Under the Online Safety Act, which received Royal Assent on 26 October, proportionality is judged partly by the provider's size and capacity and fees are charged only above a revenue threshold set by regulations; most of it commences by regulations (Parliament of the United Kingdom, 26 October 2023, ss. 10(10), 83, 240). The Data Protection and Digital Information Bill, introduced on 8 March with claimed savings of more than GBP 4 billion over 10 years, was carried over into the new session (DSIT, 8 March 2023, press release, and news item of 8 November).

This was a mixed policy. The white paper's attention to small firms and the Act's size test limit the burden on young firms, on which uniform rules have fallen hardest (Jia et al., 2021). But the AI rules stayed principles, the data bill was not enacted and the Act's duties awaited regulations, so founders gained little legal certainty.

2.1.5 UNITED STATES: EXECUTIVE ORDER 14110 AND THE CMMC PROPOSAL

Executive Order 14110 of 30 October directed the Secretary of Commerce to require, within 90 days, reports from companies developing potential dual-use foundation models and from those acquiring or operating large computing clusters above interim thresholds, and committed the government to a fair, open and competitive AI marketplace so that small developers and entrepreneurs can continue to drive innovation (President of the United States, 30 October 2023, secs 2(b), 4.2). NIST's AI Risk Management Framework is voluntary and acknowledges that small and medium-sized organisations may face different challenges in using it (NIST, January 2023, framework, Part 1). DoD's proposed CMMC rule of 26 December would assess contractors' cybersecurity at three levels; 23,475 (75 %) of the 31,338 awardees of contracts with the cyber clause are small, and a small firm's Level 2 certification assessment would cost USD 104,670 over three years (DoD, 26 December 2023, pp. 89059–89060, 89086–89087).

This was a mixed policy. The order confined reporting to models and clusters above high computing thresholds, sparing small firms, and committed agencies to competition in AI. But it directed rules still to come, the framework bound no one, and the CMMC rule, a proposal, would put a six-figure cost on small defence suppliers.

2.1.6 FRANCE: THE DIGITAL-SPACE BILL AND ELECTRONIC INVOICING

The bill to secure and regulate the digital space, registered in the Senate on 10 May, would let cloud providers grant credits to businesses only for a limited period, up to a maximum set by decree, ban data-transfer fees other than migration fees and require interoperability and free interfaces; its impact assessment found that free credits, typically spread over a year, make start-ups captive of their first provider (Government of France, 10 May 2023, bill, Arts. 7–10, and impact assessment, p. 106). The Senate's text of 5 July would limit credits to one year; the Assembly's text of 17 October would leave the maximum to a decree within one year and cap switching fees at costs; each would replace an ordinance on games with monetisable digital objects with a three-year experiment (Parliament of France, 5 July 2023, Senate text, Art. 7, and Assembly text, Arts. 7, 7 bis, 15). The bill was pending at the end of the year. On 28 July the government postponed the general obligation of electronic invoicing, due from 1 July 2024, from which it expected SMEs to gain EUR 4.5 billion a year once generalised (DGFIP, 28 July 2023, p. 1); the Finance Act for 2024 put it back by more than two years, with micro-enterprises and SMEs last, subject to an EU authorisation (Parliament of France, 29 December 2023, Art. 91).

This was a mixed policy. The cloud articles target the lock-in through which large providers, it has been argued, hold power over the firms that depend on them (Cutolo & Kenney, 2021). But the bill was pending at the end of the year, and the postponement left small firms waiting longer for the gains the government itself expected from electronic invoicing.

2.1.7 GERMANY: THE ONLINE ACCESS AND DIGITAL SERVICES BILLS

The government's bill of 23 August amending the Online Access Act would make a single organisation account binding, set out a once-only principle and require federal business-law services that concern only businesses to be offered only online from the end of the fifth calendar

year after promulgation, saving business EUR 60.3 million a year (Federal Government of Germany, 23 August 2023, pp. 2–3, 7). The bill of 22 December implementing the EU’s digital services regulation would make a coordination point in the Federal Network Agency the supervisor of digital intermediaries and also implement the EU’s fairness rules for business users of online platforms (Federal Government of Germany, 22 December 2023, pp. 1–2). The Growth Opportunities bill of 2 October would make electronic invoices between domestic businesses mandatory (Federal Government of Germany, 2 October 2023, p. 2), and a statutory framework for real-world laboratories, or regulatory sandboxes, was at the stage of a Green Paper consultation held from July to September (Federal Government of Germany, 22 September 2023, p. 18).

This was a mixed policy. An organisation account, the once-only principle and digital-only services would lower the cost of dealing with the state, and national enforcement of platform fairness protects firms that sell through platforms. But every instrument was a bill or a consultation at the end of the year, and the digital-only rule would bind only years later.

2.2 FINANCE: GRANTS, FUNDING AND FINANCIAL INFRASTRUCTURE

Finance took three forms: public money for computing power and AI, regimes for crypto-assets and digital payments, and budget lines for digital programmes, several of them cut.

2.2.1 KOREA: THE VIRTUAL ASSET USER PROTECTION ACT AND THE BUDGET

The Virtual Asset User Protection Act, passed on 30 June and promulgated on 18 July, will take effect on 19 July 2024; it will require operators to keep users’ deposits and assets separate, hold a share of the assets in cold wallets, insure against hacking or build a reserve and keep records for 15 years, and will ban unfair trading; the draft decree of 11 December proposed a cold-wallet share of at least 80 % (FSC, 30 June 2023, pp. 1–3, and release of 11 December). The FSC’s framework of 6 February would bring security tokens under the Capital Markets Act, with amendments to be submitted in the first half of the year (FSC, 6 February 2023, future plan). The budget proposal for 2024 would raise AI spending from KRW 1,038.4 billion to KRW 1,202.8 billion, but the budget passed on 21 December cut research and development from KRW 31.1 trillion to KRW 26.5 trillion (MOEF, 29 August 2023, budget proposal, p. 27, and release of 21 December, p. 5).

This was a mixed policy. The Act will give crypto-asset businesses rules that protect their users, and the AI lines rose in the proposal. But the Act takes effect only in 2024, security tokens had a framework but no law, and the budget cut public research and development.

2.2.2 JAPAN: STABLECOINS, THE ECONOMIC PACKAGE AND THE TAX OUTLINE

The orders implementing the 2022 amendment of the Payment Services Act applied from 1 June, bringing stablecoins, as electronic payment instruments, and their handlers under registration (FSA, 26 May 2023, ss. 1–2), and FSA said it would speed up the registration of intermediaries (FSA, 29 August 2023, p. 13). The economic package of 2 November promised support for computing resources, training data, research on foundation models and a grant system for young AI researchers (Cabinet of Japan, 2 November 2023, p. 32), and the Cabinet Secretariat’s overview of

26 December listed JPY 116.6 billion under the supplementary budget for fiscal year 2023 for computing infrastructure used by start-ups and others (Cabinet Secretariat of Japan, 26 December 2023, p. 1). The tax reform outline of 22 December would create an innovation box allowing 30 % of the lesser of two measures of income from patents and AI-program copyrights to be deducted (Cabinet of Japan, 22 December 2023, p. 46); it needed legislation.

This was a mixed policy. The stablecoin regime gave issuers and intermediaries rules in force, and the innovation box would reward income from AI software. But no route was stated by which start-ups would reach that computing, and the box rewards income once earned, whereas R&D tax relief, it has been found, raises the R&D of smaller and constrained firms (Dechezleprêtre et al., 2023).

2.2.3 CHINA: SME PILOT CITIES, DATA ACCOUNTING AND PAYMENT RULES

Under the notice of 12 June by MOF and MIIT, the central budget gives each pilot city for SME digital transformation a reward of up to CNY 150 million for provincial capitals and certain other pilots and up to CNY 100 million for the rest over a two-year pilot, with about 30 cities to be chosen by competitive review in 2023; at least 80 % must subsidise SMEs' digital transformation, with the firm, the service provider and the government each bearing a part (MOF & MIIT, 12 June 2023, Part I, item (4), and Part IV, items (1)–(2)). MOF's interim provisions of 1 August will recognise data resources that meet the recognition conditions as intangible assets or inventory from 1 January 2024 (MOF, 1 August 2023, provisions, Part II, items 1 and 4, and Part IV). The State Council's regulations on non-bank payment institutions, signed on 9 December, will take effect on 1 May 2024 and will require a licence from the People's Bank of China and paid-in capital of at least CNY 100 million, and will oblige foreign institutions serving users in China to set up a local institution (State Council, 9 December 2023, Arts. 2, 6, 8, 60).

This was a mixed policy. The pilot funds put central money into small firms' digitalisation and make firms pay a share, and the accounting provisions will let firms book the data they build. But the funds go to adopters rather than new ventures, and a paid-in capital floor of CNY 100 million will raise the cost of entering payment services.

2.2.4 UNITED KINGDOM: PUBLIC COMPUTE AND THE CRYPTOASSET REGIME

The Spring Budget of 15 March promised, subject to the usual business case processes, about GBP 900 million for an exascale supercomputer and an AI Research Resource (HM Treasury, 15 March 2023, para. 3.92). On 1 November DSIT tripled the Research Resource's funding to GBP 300 million, including GBP 225 million for Isambard-AI in Bristol, for researchers to use from summer 2024, with priority access for the Frontier AI Taskforce (DSIT, 31 October 2023, release of 1 November). The Autumn Statement of 22 November added GBP 500 million over two financial years, bringing planned compute investment to more than GBP 1.5 billion, so that universities, scientists and start-ups have access (HM Treasury, 22 November 2023, paras 4.81, 5.174). The Financial Services and Markets Act 2023, enacted on 29 June, lets the Treasury extend the rules on financial promotion and regulated activities to cryptoassets, from a day to be set by regulations (Parliament of the United Kingdom, 29 June 2023, ss. 69, 86); on 30 October HM Treasury confirmed a phased regime, with fiat-backed stablecoins first and secondary legislation for the

wider regime aimed for 2024 (HM Treasury, 30 October 2023, paras 3.1, 3.18). The Digital Securities Sandbox regulations, made on 14 December, will come into force on 8 January 2024 (HM Treasury, 14 December 2023, reg. 1(2)).

This was a mixed policy. Public compute addresses a scarce input of AI firms, the Act gave crypto firms a statutory basis, and the securities sandbox will lower the cost of rules for new market infrastructure. But no route gave start-ups access to the machines, the taskforce came first, and the cryptoasset rules were still to be laid.

2.2.5 UNITED STATES: THE SBIC RULE AND IRS NOTICE 2023-63

SBA's final rule, effective from 17 August, created an Accrual Debenture for long-term equity funds and lowered licensing fees and other barriers for new fund managers, naming technologies critical to national security among its aims (SBA, 18 July 2023, pp. 45982–45983, 45990). IRS Notice 2023-63 gave interim guidance on the capitalisation that the Tax Cuts and Jobs Act of 2017 requires, under which software development costs count as research expenditure to be amortised over five years, or 15 years for foreign research (IRS, 2023, ss. 2.02, 5.03). H.R. 4763, introduced in the House on 20 July, would exempt sales of digital assets of up to USD 75 million in 12 months from Securities Act registration, and H.R. 4766 would allow only permitted issuers to issue payment stablecoins; each was referred to committee (United States House of Representatives, 20 July 2023, H.R. 4763, sec. 201, and H.R. 4766, sec. 3).

This was a mixed policy. The SBIC rule was good: it puts guaranteed leverage behind privately managed equity funds, the mix of public and private money favoured by evidence on government venture capital (Brander, Du, & Hellmann, 2015). But the guidance confirms that software firms must amortise development costs over years, whereas R&D tax relief, it has been found, raises smaller firms' R&D (Dechezleprêtre et al., 2023), and the bills were only introduced.

2.2.6 FRANCE: THE AI AND CLOUD CALLS AND LAW NO. 2023-171

On 29 March the government announced EUR 120 million of AI schemes under the State's investment plan, including calls for trusted-AI demonstrators and for AI demonstrators in the territories that companies may lead (MEFIDS, 29 March 2023, pp. 1–2), and on 16 June a Bpifrance call of EUR 40 million for digital commons for generative AI (MEFIDS, 16 June 2023, p. 2). The plan's cloud strand, EUR 667 million, targets emerging players, SMEs and start-ups; EUR 23 million was to go to three office-suite projects led by French software SMEs, and the SecNumCloud support scheme selected 21 projects and received a second EUR 3.5 million (MEFIDS, 4 April 2023, pp. 1–2). Law No. 2023-171 of 9 March empowered the government to adapt French law to the EU's crypto-asset regulation by ordinance and will make the registration of digital-asset service providers stricter from 1 January 2024 (Parliament of France, 9 March 2023, Arts. 8–9). The budget request for 2024 would cut new commitments for the very-high-speed broadband plan by 37.35 %, to EUR 46.4 million, while raising its payments by 6.11 %, to EUR 464.5 million (MEFIDS, 2023, p. 15).

This was a mixed policy. Competitive calls are the kind of support whose effect has been found largest for financially constrained firms (Howell, 2017), and the cloud strand targeted SMEs and

start-ups. But no awards from the AI calls were reported in the year, the registration rules will tighten crypto firms' duties before the EU regime, and the request would cut new broadband commitments, though payments would rise.

2.2.7 GERMANY: THE FUTURE FINANCING ACT AND THE DRAFT BUDGET FOR 2024

The Future Financing Act of 11 December, promulgated on 14 December and mostly in force from 15 December, lets companies issue electronic shares registered in a central register or, where the articles allow, in a crypto-securities register (German Bundestag, 11 December 2023, Arts. 13, 35). The government's draft budget for 2024 of 18 August put the digital agenda funding area at about EUR 623 million, but would cut the Digital Now grant for SMEs' digital investment from EUR 98.296 million in 2023 to EUR 82.049 million, citing a lower financial plan, and the BMBF's title for software systems and AI from EUR 165.51 million to EUR 128.0 million; EUR 10 million for a Data Institute was blocked pending the budget committee's consent (Federal Government of Germany, 18 August 2023, pp. 1071, 1094–1095, 3049). The budget remained a draft at the end of the year.

This was a mixed policy. Electronic and crypto-registered shares give firms a digital route to issue equity. But the draft budget would cut the grant for SMEs' digital investment and federal research on AI, and the Data Institute's money for 2024 was blocked.

2.3 CULTURE

Culture was the thinnest domain: festivals, a campaign, contests and surveys, but few programmes that change attitudes to founding digital firms.

2.3.1 KOREA: COMEUP 2023 AND KOREA FINTECH WEEK

At the opening of MSS's start-up festival COMEUP on 8 November, foreign start-ups were reported to make up about 60 % of those taking part, with a zone for about 100 of them (MSS, 8 November 2023, p. 1). The fifth Korea Fintech Week, held by the FSC from 30 August to 1 September, drew more than 11,000 visitors, against about 7,500 the year before (FSC, 13 September 2023, p. 1).

This was a mixed policy. Festivals with foreign founders and investors build the networks and role models through which, it has been argued, an entrepreneurial culture is reproduced (Spigel, 2017). But only participation was reported, and neither event addressed attitudes to founding firms.

2.3.2 JAPAN: THE WEB3.0 STUDY GROUP DAO AND JAPAN FINTECH WEEK

The Digital Agency set up a trial decentralised autonomous organisation for its Web3.0 study group, with its own rules and governance tokens, admitting 15 new members including venture capitalists, researchers and entrepreneurs (Digital Agency, 18 April 2023, pp. 2–3, 5). FSA announced a Japan Fintech Week to be created in March 2024 around its fintech symposium (FSA, 29 August 2023, p. 13). The Digital Agency's plan relied on existing recognition schemes, such as DX Selection for mid-sized and small firms, to spread good practice in digital transformation (Digital Agency, 9 June 2023, p. 79).

This was a mixed policy. A study group that admits entrepreneurs and investors, and a fintech week, build the relations through which, it has been argued, ecosystems reproduce an entrepreneurial culture (Spigel, 2017). But the recognition schemes predated the year and honour established firms, and the fintech week was a plan.

2.3.3 CHINA: THE SUMMITS AND COMPETITIONS OF THE DIGITAL CHINA PLAN

The Overall Layout Plan for Building Digital China, issued by the Central Committee of the Communist Party of China and the State Council in February, called for the Digital China summit and other major events to be run well and for high-level digital competitions, to make the idea of digitalisation take root (CPC Central Committee & State Council, 27 February 2023, part on overall planning, item 5). The computing infrastructure action plan of 8 October planned an application contest to select mature solutions for a catalogue (MIIT et al., 8 October 2023, plan, p. 9), and the metaverse action plan of 29 August planned competitions and industry summits (General Offices of MIIT, Ministry of Education, Ministry of Culture and Tourism, SASAC, & National Radio and Television Administration, 29 August 2023, plan, p. 4).

This was a poor policy. The plans promised summits and contests, but they aim at awareness of digitalisation and at mature solutions rather than founders, and none addresses attitudes to founding firms or the role models of an entrepreneurial culture (Spigel, 2017).

2.3.4 UNITED KINGDOM: THE UNICORN KINGDOM CAMPAIGN AND THE AI PRIZE

The Cabinet Office's "Unicorn Kingdom" campaign, launched in the United States on 25 April with billboards in San Francisco, promoted the United Kingdom to American entrepreneurs and investors as a place to breed tech unicorns, citing 162 founded in the United Kingdom (Cabinet Office, 25 April 2023, paras 1–2, 4). The Spring Budget announced a GBP 1 million prize every year for 10 years for researchers in AI (HM Treasury, 15 March 2023, para. 3.94), to be launched later as the Manchester Prize (HM Treasury, 22 November 2023, para. 4.80).

This was a mixed policy. A campaign that presents successful firms to founders abroad uses the role models through which, it has been argued, an entrepreneurial culture spreads (Spigel, 2017). But it aimed at foreign investors rather than at attitudes at home, and the prize rewards researchers rather than founders.

2.3.5 UNITED STATES: THE AI CYBER CHALLENGE AND THE PROCLAMATIONS

On 9 August the White House launched, with DARPA, the AI Cyber Challenge, a two-year competition to find and fix software vulnerabilities with AI, with almost USD 20 million in prizes and USD 7 million for small businesses that want to compete (The White House, 9 August 2023, paras 1–2 and section on participation). By Proclamation 10664 of 31 October the President declared November National Entrepreneurship Month, and Proclamation 10567 of 28 April, for National Small Business Week, noted that small businesses need high-speed internet to reach customers (President of the United States, 31 October 2023, pp. 27677, 75461).

This was a mixed policy. A competition with money reserved for small businesses gives young AI and security firms a stage beside leading AI companies, building the networks through which, it has been argued, entrepreneurial ecosystems work (Spigel, 2017). But the proclamations celebrated entrepreneurs without a programme, and the challenge rewards solutions to a government problem rather than founding.

2.3.6 FRANCE: THE AI CHALLENGE AND THE FRANCE NUM BAROMETER

On 16 June the President announced an international challenge on general-purpose AI to compare the best teams in the world, with rules to follow within weeks (MEFIDS, 16 June 2023, p. 3). The France Num barometer of 25 September found that 76 % of very small firms and SMEs saw a real benefit in digital technology, five percentage points fewer than the year before, and that 48 % feared losing data or being hacked (DGE, 23 January 2023, release of 25 September, p. 1).

This was a poor policy. A survey of small firms' attitudes is a basis for policy, but the year offered no programme aimed at attitudes to founding firms or at the networks of an entrepreneurial culture (Spigel, 2017); the AI challenge, aimed at research teams, was an announcement.

2.3.7 GERMANY: THE DIGITAL SUMMIT AND THE DIGITAL HUB INITIATIVE

For its Digital Summit in Jena on 21 November, with AI as its focus, the government announced about 1,000 participants from politics, business, science and civil society (Federal Government of Germany, 21 November 2023, first and final paragraphs). The Digital Hub Initiative's 12 hubs connect start-ups with established firms, talent, investors and science, with EUR 5.508 million in the draft budget for 2024 (Federal Government of Germany, 18 August 2023, pp. 1092–1093).

This was a mixed policy. Hubs that connect founders with firms and investors, and a summit on AI, build the networks of an entrepreneurial culture (Spigel, 2017). But the summit addressed policy makers and established business more than founders, and the hubs' money for 2024 was in a draft.

2.4 SUPPORT: INSTITUTIONAL SUPPORT

Support turned on computing power, small firms' digital adoption and new institutions for data.

2.4.1 KOREA: COMPUTING ACCESS, AI SERVICES AND THE K-CLOUD PROJECT

MSIT's plan of 14 April offered SMEs and ventures access to 1 petaflop for up to three months from April, and on 3 July its hyperscale AI utilisation programme selected 125 users, 81 of them SMEs and start-ups, for AI platforms, consulting and training from July (MSIT, 14 April 2023, plan, part VI.1, and release of 3 July). Phase 1 of the K-Cloud project, launched on 26 June, began two data centres on domestic AI chips with 39.9 petaflops and funded high-performance computing for 90 projects (KRW 2.5 billion) and AI vouchers for 31 projects (KRW 10 billion) that buy solutions on domestic chips (MSIT, 26 June 2023, table of phase-1 projects). The FSC's Fintech Support Centre gave in-depth consulting to 79 firms, and its D-Testbed for early fintech start-ups ran two rounds with 39 teams (FSC, 13 September 2023, release of 26 December, p. 3).

This was a good policy. Computing and AI services were offered to SMEs and start-ups by selection, which matters because the gains from AI investment, it has been found, go mostly to larger firms (Babina et al., 2024), and the fintech support reached young firms directly. But the K-Cloud help was tied to domestic chips, and take-up and effects were not reported.

2.4.2 JAPAN: G-BIZ ID, J-GRANTS AND THE DESK FOR AI TRAINING DATA

The Digital Agency's priority plan of 9 June set improvements to G-Biz ID, the common business authentication ID, during fiscal year 2023, including screening with the individual number card, and a rebuild of the J-Grants subsidy application system by about fiscal year 2024, and it promoted an SME digitalisation portal and the IT introduction subsidy (Digital Agency, 9 June 2023, pp. 12, 77, 79), which also covers AI products (Cabinet Office of Japan, 7 November 2023, economic package slide, item 2(1)). The AI Strategy Council's action plan of 7 November opened a desk in the Cabinet Office at which AI developers can consult on training data (Cabinet Office of Japan, 7 November 2023, action plan, s. 3(2)), and the Cabinet Secretariat was the single window for the regulatory sandbox (Cabinet Secretariat of Japan, 12 December 2023, p. 2).

This was a mixed policy. Single sign-on, online subsidy applications and a desk for training data lower the cost of dealing with the state and of building AI. But most of these continued existing services, the rebuild of J-Grants was scheduled for 2024, and none was aimed at founders.

2.4.3 CHINA: THE NATIONAL DATA ADMINISTRATION AND COMPUTING PLAN

The plan of 16 March for reforming Party and State institutions created a National Data Administration under the NDRC to coordinate data institutions and the planning of Digital China and the digital economy; provincial governments are to set up their own data bodies (CPC Central Committee & State Council, 16 March 2023, item (14)). The opinions of 18 August of the General Office of the State Council asked the national government-service platform to explore big data, AI and blockchain so that benefits can be delivered without application, and called for mutual recognition of electronic licences across regions (General Office of the State Council, 18 August 2023, Part II, item (5), and Part III, item (9)). The computing infrastructure action plan of 8 October encouraged localities to give SMEs and research bodies inclusive computing resources at lower cost (MIIT et al., 8 October 2023, plan, p. 7).

This was a mixed policy. A data administration, services delivered without application and cheaper computing address the costs of data and of dealing with the state that keep small firms from digital tools. But the computing support was an encouragement without money, the local reforms run into 2024, and none was aimed at new ventures.

2.4.4 UNITED KINGDOM: THE END OF HELP TO GROW: DIGITAL AND AIRLOCK

Help to Grow: Digital, the voucher scheme for SMEs' software, closed on 31 March after 1,527 applications, 1,394 of them accepted, and about GBP 31.4 million of spending, against allocations of GBP 107 million for 2023-24 and GBP 97 million for the following year; the government said the closure let it refocus on other support for small businesses (DBT, 9 May 2023, written answers of July). The AI white paper promised a multi-regulator sandbox targeted at start-ups and SMEs

(DSIT, 29 March 2023, paras 97, 100), whose pilot the Autumn Statement put in the spring, and the Autumn Statement announced a taskforce with industry on SMEs' adoption of digital technology (HM Treasury, 22 November 2023, paras 4.80, 5.148). The government announced the launch of "Airlock", a regulatory sandbox in which AI innovators can test their technologies in health care earlier (DSIT, 31 October 2023, skills package release).

This was a mixed policy. The Airlock sandbox is of the kind whose entry raised fintech firms' funding and survival (Cornelli et al., 2024). But the year's main act closed the SME digital adoption scheme, with no replacement beyond a taskforce, and the start-up sandbox was a promise.

2.4.5 UNITED STATES: THE DIRECTIONS TO SBA AND THE NAIRR REPORT

Executive Order 14110 directed SBA to prioritise Regional Innovation Cluster funding for clusters planning Small Business AI Innovation and Commercialization Institutes and up to USD 2 million of Growth Accelerator Fund Competition bonus prizes for accelerators that add AI, and to assess whether its programmes cover small firms' spending on adopting AI; it ordered NSF to launch a pilot of the National AI Research Resource within 90 days (President of the United States, 30 October 2023, secs 5.2(a), 5.3(c)). The NAIRR Task Force's final report of January had recommended a resource of USD 2.6 billion over an initial six years, open to academic institutions, non-profit organisations and start-ups or small businesses with federal small-business research awards (NAIRR Task Force, 24 January 2023, pp. v, vii, 8). NIST opened its AI Safety Institute Consortium on 2 November to organisations that can contribute expertise, products, data or models (NIST, January 2023, notice of 2 November).

This was a mixed policy. The directions named small firms' access to AI support, and the Task Force named start-ups among the users of public computing, which matters because AI's gains go mostly to larger firms (Babina et al., 2024). But the directions were still to be carried out, the pilot was ordered for the research community, and the Task Force's budget was a recommendation.

2.4.6 FRANCE: AI BOOSTER, THE CYBER SME SCHEME AND FRANCE NUM

AI Booster, launched on 16 June and operated by Bpifrance, offers SMEs and mid-sized firms training and advice on integrating AI, aims to reach several thousand firms and pays up to 80 % of the cost from EUR 25 million, with priority for firms of 10 to 2,000 employees and turnover above EUR 250,000 (DGE & SGPI, 16 June 2023, pp. 1-2). The Cyber SME scheme, launched on 6 December with EUR 12.5 million, gives SMEs and mid-sized firms advice from diagnosis to an action plan (MEFIDS, 6 December 2023, p. 1). The budget request for 2024 gave France Num, the scheme for small firms' digital transformation, EUR 0.3 million to run the initiative (MEFIDS, 2023, p. 70).

This was a mixed policy. State-funded advice on AI and cybersecurity brings digital tools to SMEs. But AI Booster favours firms with at least 10 employees and established turnover, so it reaches adopters rather than founders, and France Num's running budget was EUR 0.3 million.

2.4.7 GERMANY: DIGITAL CENTRES, THE DATA INSTITUTE AND THE AI PLAN

The draft budget for 2024 would fund the SME Digital centres and IT security in business with EUR 60.422 million, against EUR 62.468 million in 2023 (Federal Government of Germany, 18 August 2023, p. 1091). The Bundestag's budget committee released funds for a Data Institute in May, whose tasks were to be developed from concrete use cases (Federal Government of Germany, 22 September 2023, p. 17). The BMBF's action plan on AI of November set the goal of creating access to computers and data for business, especially SMEs and start-ups (BMBF, November 2023, p. 11), and the BSI offered SMEs a cyber risk check in which an IT service provider reviews 27 requirements in one to two hours (BSI, October 2023, p. 65).

This was a mixed policy. Advisory centres, a cyber risk check and a data institute address small firms' costs of adopting digital tools and of finding data. But the centres' funds would fall in the draft, the Data Institute was still being set up, and access to computing for start-ups was a goal.

2.5 HUMAN CAPITAL: EDUCATION AND TRAINING, AND LABOUR

Human capital policy turned on digital skills and on routes for foreign talent and founders.

2.5.1 KOREA: DIGITAL TALENT TRAINING AND THE DIGITAL NOMAD VISA PILOT

MSIT planned KRW 453.7 billion in 2023 to train 52,000 people in digital skills and on 20 June selected 20 universities for master's and doctoral training in digital fields (MSIT, 19 January 2023, releases of 19 January and 20 June). On 24 August the Ministry of Justice announced that international students would be allowed to work in fields open to foreigners for three years after graduation (MOJ, 24 August 2023, p. 2). Its digital nomad visa, piloted from 1 January 2024, will admit remote workers employed by foreign companies who earn at least twice the per-capita gross national income, KRW 84.96 million on 2022 figures, but will strictly restrict their employment in Korea (MOJ, 24 August 2023, release of 29 December, pp. 1-2).

This was a mixed policy. Training on this scale and the promised work rights for graduates would widen digital firms' hiring pool. But no route was opened for foreign founders, and the nomad visa will restrict its holders from working in Korea, so it will bring no first employees to Korean start-ups.

2.5.2 JAPAN: J-FIND AND THE START-UP VISA

From April the Future Creation Talent system, J-Find, lets graduates of universities ranked in the top 100 of at least two of three world rankings, within five years of graduating, stay up to two years to look for work or prepare a start-up (Immigration Services Agency of Japan, 21 April 2023, p. 1). The New Capitalism action plan of 16 June noted that the start-up visa allowed a stay of up to one year and promised, within the year, a framework under which certified venture capital firms and other private bodies, not only local governments, can confirm foreign founders' start-up plans; it also noted that foreign-born people were 1 % of Japan's highly skilled workers, against 23 % in the United Kingdom (Cabinet of Japan, 16 June 2023, pp. 19, 41). The expanded start-up visa scheme began operating in October (Cabinet Secretariat of Japan, 26 December 2023, p. 1), and the

economic package of 2 November considered extending the stay under the start-up visa to two years (Cabinet of Japan, 2 November 2023, p. 37). The Digital Garden City Nation strategy aims to train 2.3 million digital personnel, with capacity for 450,000 a year by the end of fiscal year 2024 (Cabinet of Japan, 26 December 2023, p. 36).

This was a mixed policy. J-Find opened a route for foreign graduates to prepare start-ups, and from October private bodies could confirm founders' plans for the start-up visa; immigrants, it has been found, start companies more often than natives with similar education (Hunt, 2011). But J-Find admits only graduates of top-ranked universities, the start-up visa still allowed a stay of one year while a longer stay was being considered, and the training target was a plan.

2.5.3 CHINA: DATA-SECURITY TALENT AND THE METAVERSE ACTION PLAN

The data-security industry opinions of 3 January, issued by MIIT with other departments, called for a national occupational standard for data-security engineers, a digital technology engineer training project and the use of existing talent-introduction policies to bring in overseas talent and teams (MIIT et al., 3 January 2023, Part VII, item (15)). The metaverse action plan asked universities to expand metaverse disciplines and to draw in overseas talent in AI, blockchain and virtual reality (General Offices of MIIT et al., 29 August 2023, plan, p. 10), and the Digital China plan called for new academic programmes in digital fields and digital literacy training for the whole population (CPC Central Committee & State Council, 27 February 2023, part on overall planning, item 4). Up to 20 % of the SME pilot funds may buy services from digital service providers, including training (MOF & MIIT, 12 June 2023, Part IV, item (2)).

This was a mixed policy. The plans join training to the needs of digital industries, and a standard for data-security engineers defines a scarce skill. But they relied on existing talent policies, opened no route for foreign founders and carried no budget of their own.

2.5.4 UNITED KINGDOM: THE AI SKILLS PACKAGE AND THE VISA ROUTES

DSIT's skills package of 31 October, worth GBP 118 million, named 12 Centres for Doctoral Training in AI backed by GBP 117 million announced earlier, a GBP 1 million grant scheme to help AI talent relocate to the United Kingdom, and a new visa scheme, without details, to help innovative businesses bring early-career AI researchers (DSIT, 31 October 2023, skills package release). In the year to September, Global Talent visa grants, which cover digital technology, rose by 58 % to 4,046 and Innovator Founder grants more than doubled to 520, while the Start-up route closed in July after the Innovator route was widened in April (Home Office, 23 November 2023, s. 1.3).

This was a mixed policy. The skills package, the widened Innovator route and the growth of Global Talent and Innovator Founder grants bring in researchers and founders, and immigrants who entered on student or work visas, it has been found, patent and start companies at higher rates than natives (Hunt, 2011). But the new visa scheme had no details, and the Start-up route closed once the Innovator route had been widened.

2.5.5 UNITED STATES: THE PROPOSED H-1B RULE FOR FOUNDER-OWNERS

DHS's proposed rule of 23 October would let beneficiary-owners, founders with a controlling interest in the petitioning company, hold H-1B status, because there are "limited pathways for entrepreneurs" under existing regulations; their first two validity periods would be limited to 18 months each, and they could spend time on tasks such as finding investors provided most of their time goes to specialty-occupation duties. It would also keep F-1 students in status until 1 April while an H-1B petition is pending, and comments closed on 22 December (DHS, 23 October 2023, pp. 72870, 72872, 72905-72906). Executive Order 14110 directed DHS to review pathways for experts in AI, naming start-up founders using the International Entrepreneur Rule (President of the United States, 30 October 2023, sec. 5.1).

This was a mixed policy. Letting founders hold H-1B status in their own firms would open a route for immigrant founders, the group that, it has been found, starts companies more often than natives with similar education (Hunt, 2011). But the rule was a proposal at the end of the year, and its 18-month terms would limit controlling owners.

2.5.6 FRANCE: THE AI CLUSTER CALL AND FRANCE NUM TRAINING

The AI cluster call, announced on 16 June, puts EUR 500 million of the investment plan into five to 10 universities and schools to become leaders in AI teaching and research, chosen by an international jury, with the aim of doubling the number of high-level AI specialists (MEFIDS, 16 June 2023, pp. 1-2). France Num's fourth call for training operators, launched on 23 January, aims to train 100,000 firms; on 21 June 15 new groups of operators were selected, nearly 38,000 managers and staff of small firms had been trained since 2021, and 61 % of participants said they had acted within six months (DGE, 23 January 2023, releases of 23 January and 21 June).

This was a mixed policy. Research clusters build the skills base of AI firms, and free training reached small firms with reported results. But the cluster money goes to research and higher education institutions, and no route was offered to foreign founders or digital talent.

2.5.7 GERMANY: THE SKILLED IMMIGRATION ACT

The Act on the further development of skilled immigration, promulgated on 18 August, sets the general EU Blue Card salary threshold at 50 % of the pension contribution ceiling and opens the Blue Card to IT specialists without a degree who earn at least 45.3 % of the ceiling and have three years of experience; these provisions took effect on 18 November (German Bundestag, 16 August 2023, Art. 1, s. 18g, and Art. 12). From 1 March 2024 a skilled foreigner holding a stipend from a German business organisation or public body to prepare a company will be able to receive a residence permit for up to 18 months, and from 1 June 2024 an opportunity card will allow a job search (German Bundestag, 16 August 2023, Art. 2, s. 21(2b), and Arts. 3, 12).

This was a good policy. Opening the Blue Card to IT specialists without a degree widens the supply of hires for digital firms, and the founder permit will open a route for immigrant founders (Hunt, 2011). Its limit is that the founder permit depends on a German stipend and lasts 18 months.

2.6 MARKET: MARKET AND INDUSTRY SUPPORT, IPO AND EXIT

Market policy combined public purchasing of digital services, rules on platform power and rules to open financial data and app stores to entrants; none addressed the listing of digital firms.

2.6.1 KOREA: THE DIGITAL SERVICE MALL AND THE PLATFORM ACT PLAN

PPS's Digital Service Mall for cloud, AI and commercial software passed KRW 1.17 trillion of purchases in its first year to April; SMEs accounted for 80 % of purchases and 70 % of the digital services listed, and in April PPS began to assess the public benefit and the innovativeness of innovative products separately (PPS, 17 April 2023, paras 1, 3-4, and release of 18 April). The KFTC's guideline on abuse of dominance by online platforms took effect on 12 January without creating new rules (KFTC, 12 January 2023, bullets 1-2). On 19 December the KFTC told the Cabinet that it would pursue a Platform Competition Promotion Act to designate a few dominant platforms and ban self-preferencing and restrictions on multi-homing; the release gave no date for a bill (KFTC, 12 January 2023, release of 19 December, pp. 2-3).

The Digital Service Mall was a good policy: a public market in which SMEs win most purchases gives digital firms early public buyers, as it has been argued procurement can (Edler & Georghiou, 2007). The platform measures were a mixed policy: bans on self-preferencing would protect firms that, it has been argued, depend on platforms in an asymmetry of power (Cutolo & Kenney, 2021), but the guideline added no rules and the act was a plan.

2.6.2 JAPAN: THE MOBILE ECOSYSTEM REPORT AND IT PROCUREMENT REFORM

The Digital Market Competition Council's final report of 16 June concluded that rules set in advance fit the mobile ecosystem better than case-by-case enforcement and proposed them for large providers of operating systems, app stores, browsers and search engines: freedom to use other payment systems, fair, reasonable and non-discriminatory terms for app stores, and effective use of alternative app distribution (Digital Market Competition Council, 16 June 2023, pp. 29-30, 82-83, 103); the government would consider the legal system needed (Cabinet of Japan, 16 June 2023, p. 30). The economic package of 2 November promised, within fiscal year 2023, negotiated contracts with J-Startup firms holding advanced technology and higher bidding classes for them, and procurement reform across ministries drawing on the Digital Agency's planned scheme to give priority to technically strong start-ups (Cabinet of Japan, 2 November 2023, pp. 38, 46).

This was a mixed policy. Rules set in advance would support the app developers who, it has been argued, create much of a platform's value (Parker, Van Alstyne, & Jiang, 2017), and the procurement measures would give start-ups first public buyers, as it has been argued procurement can (Edler & Georghiou, 2007). But the platform rules were a recommendation and the procurement measures announcements at the end of the year.

2.6.3 CHINA: GREEN DATA CENTRE PURCHASING AND THE PLATFORM ECONOMY

The standard for the government procurement of data-centre equipment and services, issued by MOF with other ministries and in force from 1 June, requires a power usage effectiveness of no

more than 1.4 and lets bidders submit a commitment letter instead of test or certification reports, with checks by sampling at acceptance (MOF, Ministry of Ecology and Environment, & MIIT, 20 March 2023, notice, items 3 and 6, and standard, items 5.1–5.2). The Government Work Report of 5 March set the line for the year: develop the digital economy, raise the level of regular supervision and support the development of the platform economy (State Council, 5 March 2023, part on this year's work, item 2). The metaverse action plan aimed at a few globally influential ecosystem firms and a batch of specialised SMEs (General Offices of MIIT et al., 29 August 2023, plan, p. 2).

This was a mixed policy. Accepting a commitment letter lowers bidding paperwork for smaller suppliers in a public market that, it has been argued, can be an early market for innovation (Edler & Georghiou, 2007). But the standard is green purchasing, not a start-up route, the platform-economy line was a statement, and the metaverse targets favour firms the state selects, though high-growth firms, it has been argued, cannot be picked reliably (Mason & Brown, 2013).

2.6.4 UNITED KINGDOM: THE DIGITAL MARKETS, COMPETITION AND CONSUMERS BILL

The Digital Markets, Competition and Consumers Bill, introduced on 25 April, would let the CMA's Digital Markets Unit designate firms with strategic market status, set conduct requirements and impose fines of up to 10 % of global turnover; the government said the dominance of a few firms had held back start-ups and smaller firms (DBT & DSIT, 25 April 2023, press release). Only firms with UK revenue above GBP 1 billion or global revenue above GBP 25 billion could be designated, and small and micro businesses are out of scope (DBT & DSIT, 25 April 2023, impact assessment, pp. 43, 75). It was carried over to the next session (DSIT, 8 March 2023, news item of 8 November).

This was a mixed policy. Conduct requirements for the largest platforms address the power that, it has been argued, platform owners hold over dependent firms (Cutolo & Kenney, 2021), and its thresholds spare small firms. But the bill was not enacted, so no firm was designated.

2.6.5 UNITED STATES: THE NTIA APP REPORT AND THE OPEN-BANKING RULE

NTIA's report of February found that Apple and Google control the leading mobile operating systems and app stores and that their policies "have created unnecessary barriers and costs for app developers", and recommended that Congress enact laws to open app distribution and that platform owners be barred from requiring their own payment systems (NTIA, February 2023, pp. 1–2, 45–46). The CFPB's proposed rule of 31 October would oblige banks and other providers to give authorised third parties consumer data through developer interfaces that it expects to replace screen scraping, with tiered compliance dates for smaller institutions and the stated aim of not entrenching incumbents (CFPB, 31 October 2023, pp. 74800–74801, 74803). OMB's draft memorandum asked agencies to keep the purchase of AI open to competition and to avoid entrenching incumbents (OMB, 1 November 2023, memorandum, s. 5(d)(iii)).

This was a mixed policy. The report named the platform power on which, it has been argued, app developers depend (Cutolo & Kenney, 2021), the data rule would open bank data to fintech entrants, and the memorandum would keep federal purchases of AI contestable, the early market that, it has

been argued, procurement can create (Edler & Georghiou, 2007). But the report's measures were recommendations, and the rule and the memorandum were proposals at the end of the year.

2.6.6 FRANCE: THE SOVEREIGN CLOUD RULE AND THE ALLIANCE INCUBATOR

In the bill to secure and regulate the digital space, the Senate's text would require public authorities buying commercial cloud for sensitive data to use EU-established providers in which non-EU entities hold no more than 24 % of the capital individually or 39 % collectively; the National Assembly deleted that rule and would instead oblige State administrations to protect sensitive data against access by non-EU public authorities, with details by decree (Parliament of France, 5 July 2023, Senate text and Assembly text, Art. 10 bis A). The interministerial digital directorate's incubator Alliance, running since July, brought administrations, start-ups, firms and researchers together to develop sovereign and free AI products and supported six initiatives by 12 December (MEFIDS, 12 December 2023, pp. 1-2). The second wave of AI demonstrators in the territories lets companies, notably emerging innovators, lead consortia (MEFIDS, 29 March 2023, p. 2).

This was a mixed policy. An incubator that brings start-ups into public AI projects, and demonstrators that young firms may lead, give them early public users, as it has been argued procurement can (Edler & Georghiou, 2007). But the sovereign cloud rule was in a pending bill, the Assembly deleted its ownership caps, and the incubator served the State's own tools.

2.6.7 GERMANY: THE APPLE DECISION AND THE MICROSOFT-OPENAI REVIEW

On 5 April the Federal Cartel Office announced its decision that Apple is of paramount significance for competition across markets, which subjects it for five years to the extended abuse control of section 19a of the Competition Act; the Office found that Apple controls app developers' access to its customers and was examining whether its tracking rules favour its own offers (Federal Cartel Office, 28 March 2023, release of 5 April). It had opened a proceeding on Microsoft on 28 March (Federal Cartel Office, 28 March 2023, para. 1). On 15 November it found that Microsoft's stake in OpenAI and their cooperation were not subject to German merger control, because Microsoft's influence predated OpenAI's substantial activity in Germany, which began only in 2023, while saying that it must watch closely the involvement of large firms in young AI companies; Apple's appeal against its decision was pending in court (Federal Cartel Office, 28 March 2023, release of 15 November). The progress report on the government's Start-up Strategy found that public contracts go to start-ups only to a very small extent and planned a draft bill to reform procurement law for the autumn (Federal Government of Germany, 22 September 2023, p. 16).

The Apple decision was a good policy: it puts under special abuse control a platform owner suspected of favouring its own offers over those of firms on its platform, a kind of entry into complementors' markets found to discourage them (Zhu & Liu, 2018). The rest was a mixed policy. The Office would watch large firms' stakes in young AI companies, a kind of acquisition found in pharmaceuticals to end rival projects (Cunningham, Ederer, & Ma, 2021), but the partnership escaped merger control, and the procurement reform was a plan.

3 ANALYSIS OF THE POLICIES

3.1 CONTEXTUAL ANALYSIS: ORIGINS, BACKGROUND AND RATIONALE OF THE POLICIES

Policy in 2023 was made amid reorganisations of the bodies responsible for digital policy. China's work report called 2023 the year of the change of government, and the institutional reform of 16 March created a National Data Administration (CPC Central Committee & State Council, 16 March 2023, item (14); State Council, 5 March 2023, part on this year's work); and in the United Kingdom the Spring Budget set indicative budgets for DSIT, DBT and other departments created in February (HM Treasury, 15 March 2023, para. 2.8).

The fiscal setting was tight for research and digital programmes in Korea and Germany and for new broadband commitments in France. Korea's budget for 2024 raised total expenditure by 2.8 %, which MOEF called the lowest growth on record, and cut research and development from KRW 31.1 trillion to KRW 26.5 trillion (MOEF, 29 August 2023, release of 21 December); Germany's draft budget would cut its grant for SMEs' digital investment and federal AI research (Federal Government of Germany, 18 August 2023, pp. 1094–1095, 3049); and France's budget request would cut new commitments for broadband by 37.35 % while raising payments by 6.11 % (MEFIDS, 2023, p. 15). Japan and China planned more: Japan's economic package of 2 November proposed a supplementary budget with JPY 13.1 trillion of general-account spending (Cabinet of Japan, 2 November 2023, p. 74), and China's work report proposed a deficit of 3 % (State Council, 5 March 2023, part on this year's targets). Each government represented the problem of digital entrepreneurship in its own way, and the representation shaped the solutions it chose (Bacchi, 2009; Rochefort & Cobb, 1993)(Table 2).

Table 2: How the governments represented the problem

Country	Problem represented	Presupposition	Left unsaid
Korea	Hyperscale AI needs vast computing resources (MSIT, 14 April 2023, plan, part VI.1); dominant platforms keep start-up platforms out of the market (KFTC, 12 January 2023, release of 19 December, p. 1)	Public computing, AI services and regulatory exemptions will let firms build and adopt AI	The cut in research and development; a route for foreign founders
Japan	Domestic computing falls far short of demand (Cabinet Office of Japan, 26 May 2023, p. 15); the foreign-born are 1 % of highly skilled workers (Cabinet of Japan, 16 June 2023, p. 19)	Guardrails, support for computing and visa reform will raise AI development without a statute	Who bears the harms of AI under voluntary rules; start-ups' route to funded compute
China	Traditional industries and SMEs must speed up digital transformation (State Council, 5 March 2023, part on this year's work, item 2)	State direction of data, computing and pilots spreads digital technology through industry	New ventures and founders, who are not named

Country	Problem represented	Presupposition	Left unsaid
United Kingdom	Legislating too early would place undue burdens on business (DSIT, 29 March 2023, foreword); access to compute is key to AI (HM Treasury, 22 November 2023, para. 4.81)	Existing regulators and public compute can make the United Kingdom an AI leader without new law	Start-ups' route to public compute; a successor to the closed voucher scheme
United States	Dominant firms' control of chips, computing power, cloud storage and data puts competition in AI at risk (President of the United States, 30 October 2023, sec. 2(b))	Executive direction to agencies can keep the AI market open without a statute	The role of Congress; the tax treatment of software costs
France	Three providers hold 71 % of the cloud market and switching costs 125 % of a year's subscription, the impact assessment said (Government of France, 10 May 2023, impact assessment, pp. 103, 129)	Cloud rules and public calls will build national AI and cloud firms	Routes for digital talent; the cut in broadband commitments
Germany	Public contracts go to start-ups only to a very small extent (Federal Government of Germany, 22 September 2023, p. 16)	Bills, a data institute and immigration law will free firms to grow	The cuts in the draft budget; computing power for start-ups

Source: IFEED analysis after Rochefort and Cobb (1993) and Bacchi (2009) of the sources cited.

The governments largely shared a rationale: they treated AI and data as organising technologies of the economy and sought national capacity in them – Korea's K-Cloud project on domestic chips (MSIT, 26 June 2023, table of phase-1 projects), the United Kingdom's AI Research Resource (DSIT, 31 October 2023, release of 1 November), France's cloud strand for emerging players (MEFIDS, 4 April 2023, p. 2) and China's National Data Administration (CPC Central Committee & State Council, 16 March 2023, item (14)). This is the market-creating rationale of mission-oriented innovation policy (Mazzucato, 2016) rather than the correction of particular market failures that entrepreneurship policy has traditionally required (Acs, Åstebro, Audretsch, & Robinson, 2016).

3.2 THEORETICAL ANALYSIS: THEORETICAL VALIDITY AND RELEVANCE

Theories of digital entrepreneurship set the first test. They argue that digital ventures arise where infrastructure, users and rules let them reach markets and recombine resources beyond any one place (Autio, Nambisan, Thomas, & Wright, 2018; Nambisan, Wright, & Feldman, 2019; Sussan & Acs, 2017). The policies of 2023 passed this test in public services and public markets, such as Korea's Digital Service Mall, China's services delivered without application and Germany's planned organisation account, but less so in access to computing, which outside Korea was aimed at researchers or remained a promise.

The evidence on regulation sets the second test. After the European Union's data protection regulation took effect, venture investment fell most for young and data-related ventures (Jia et al., 2021) and websites concentrated on the largest technology vendors (Johnson et al., 2023), whereas entry into the United Kingdom's financial sandbox raised fintech firms' capital raising and survival (Cornelli et al., 2024). Korea's and Japan's sandboxes and China's contract route for small

exporters pass this test; China's filing duties and the US proposal for certifying defence contractors are in tension with it. Table 3 applies these tests more widely.

Table 3: Theoretical validity of the main policies

Theory	Claim	Policies consistent with it	Policies in tension with it
Digital entrepreneurial ecosystems (Autio et al., 2018; Nambisan et al., 2019; Sussan & Acs, 2017)	Digital infrastructure and open platforms let ventures reach markets	Digital Service Mall (Korea); services without application (China); organisation account bill (Germany)	No route for start-ups to public compute (United Kingdom); research pilot (United States)
Platforms (Cutolo & Kenney, 2021; Parker et al., 2017; Zhu & Liu, 2018)	Platform owners hold power over dependent firms and enter their markets	Apple decision (Germany); DMCC Bill (United Kingdom); mobile ecosystem report (Japan)	Microsoft and OpenAI outside merger control (Germany); platform act a plan (Korea)
Data regulation and sandboxes (Cornelli et al., 2024; Jia et al., 2021)	Uniform data rules cut investment in young ventures; sandboxes raised fintech funding	Sandboxes (Korea, Japan); contract route for small exporters (China)	Security assessment and app filing (China); proposed CMMC rule (United States)
AI investment (Babina et al., 2024)	Gains from AI investment accrue mostly to larger firms	Computing for SMEs (Korea); small-business directions (United States)	Taskforce priority on compute (United Kingdom); compute without a route (Japan)
Grants and R&D tax relief (Dechezleprêtre et al., 2023; Howell, 2017)	Early-stage grants raise venture funding; tax relief raises the R&D of smaller firms	AI calls (France); SME pilot funds (China)	Capitalised software costs (United States); innovation box (Japan); AI research cut in the draft (Germany)
Immigrant talent (Hunt, 2011)	Immigrants start firms at higher rates than similar natives	Skilled Immigration Act (Germany); J-Find and start-up visa (Japan); Innovator route (United Kingdom); H-1B proposal (United States)	Nomad visa without local work (Korea); Start-up route closed (United Kingdom)
Public procurement (Edler & Georghiou, 2007)	Procurement can create early markets for innovation	Digital Service Mall (Korea); Alliance incubator (France)	Small share of contracts for start-ups (Germany); procurement reform announced (Japan)

Source: IFEEED assessment of the policies reviewed in Section 2, against the sources named in the first column.

3.3 PRACTICAL ANALYSIS: PERFORMANCE, CONTRIBUTION AND IMPACT

By the end of 2023 much of the year's digital policy had not yet reached firms (Table 4): the AI bills, the platform regimes and most of the rules that would give start-ups computing power were bills, plans or proposals. Where governments reported performance, they reported outputs: 200 exemptions under Korea's ICT sandbox, 70 of which led to rule changes (MSIT, 28 March 2023, release of 21 December), and KRW 1.17 trillion of purchases through its Digital Service Mall (PPS, 17 April 2023, para. 1); 30 sandbox plans in Japan (Cabinet Secretariat of Japan, 12 December 2023, p. 7); and nearly 38,000 people trained by France Num since 2021 (DGE, 23 January 2023, release of 21 June). The United Kingdom reported the uptake of its closed voucher scheme: 1,527 applications and about GBP 31.4 million spent (DBT, 9 May 2023, written answers of July). Performance measures serve to evaluate, to control, to celebrate or to promote (Behn, 2003);

those of 2023 served mostly to celebrate and to promote. Table 5 summarises the assessments of Section 2.

Table 4: Status of the main measures at the end of 2023

Country	In force or launched in 2023	Adopted, in force from 2024	Pending or announced
Korea	Personal information law; sandboxes; computing for SMEs; K-Cloud; Digital Service Mall; platform guideline	Virtual Asset User Protection Act; sandbox amendment; nomad visa; budget for 2024	AI bill; security tokens; platform act
Japan	Stablecoin regime; sandbox; J-Find; start-up visa confirmation by private bodies; trial DAO; desk for training data	—	Guardrails (guidance); tax outline; longer start-up visa stay; platform rules; procurement reform
China	Generative AI measures; standard contract; app filing; SME city pilots; green procurement standard; data administration	Non-bank payment regulations; data resource accounting	Inclusive computing; contests; talent plans
United Kingdom	Unicorn Kingdom; widened Innovator route; closures of the voucher scheme and the Start-up route	Digital Securities Sandbox	Online Safety Act and Financial Services and Markets Act 2023 (commencement by regulations); Airlock; AI white-paper response and sandbox; DPDI and DMCC Bills; compute access; cryptoasset rules; AI visa scheme
United States	Executive Order 14110; SBIC rule; NIST framework; AI Cyber Challenge; Notice 2023-63	—	OMB memorandum (draft); CMMC, H-1B and open-banking rules (proposed); House bills; NTIA recommendations; NAIRR
France	AI and cloud calls; AI Booster; Cyber SME; Finance Act for 2024; Alliance	Registration of digital-asset providers	Digital-space bill; AI challenge; broadband commitments cut (request)
Germany	Apple decision; Blue Card changes; Future Financing Act; Digital Summit	Founder permit; opportunity card	Online access, digital services and Growth Opportunities bills; real-world laboratories act; draft budget; procurement reform; Data Institute

Source: IFEED compilation from the sources cited in Section 2.

Table 5: Assessment of the policies by domain and country

Domain	Korea	Japan	China	United Kingdom	United States	France	Germany
Regulation and Law	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed
Finance	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed
Culture	Mixed	Mixed	Poor	Mixed	Mixed	Poor	Mixed
Support	Good	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed
Human Capital	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Good
Market	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed	Mixed

Source: IFEED assessment of the policies reviewed in Section 2. Where a subsection assessed its policies differently, Mixed is shown.

4 POLICY LIMITATIONS

4.1 POLICY DEBATES, CONTESTED POINTS AND ISSUES

The policies of 2023 raised six points of contention, set out in Table 6. The first two concerned the state's role in AI: whether AI should be governed by binding rules, an executive order, guardrails or principles for existing regulators; and whether public computing power should be built for researchers or opened to firms. Korea offered SMEs and ventures access to 1 petaflop for up to three months (MSIT, 14 April 2023, plan, part VI.1), whereas the United Kingdom promised about GBP 900 million subject to the usual business case processes and gave the Frontier AI Taskforce priority access to its machines (DSIT, 31 October 2023, release of 1 November; HM Treasury, 15 March 2023, para. 3.92).

The other four concerned data, markets, money and people: how far data rules should be relaxed for small and cross-border flows; whether platform power should be checked by rules set in advance, as the United Kingdom's bill and Japan's report proposed, or case by case, as Germany's Federal Cartel Office did; how crypto-assets should be licensed; and whether migration control should yield to the supply of founders.

Table 6: Debates and contested points in the policies of 2023

Issue	What the governments set out	Point at issue
AI law	Binding measures (China), executive order (United States), guardrails (Japan), principles for regulators (United Kingdom), bill pending (Korea) (Cabinet of Japan, 9 June 2023; CAC et al., 10 July 2023; DSIT, 29 March 2023; MSIT, 14 April 2023; President of the United States, 30 October 2023)	Certainty and trust against compliance costs that fall most on young firms
Public computing power	Access offered to SMEs and ventures (Korea), compute with start-ups named (United Kingdom), recommended resource and pilot (United States), compute without a route (Japan) (Cabinet Secretariat of Japan, 26 December 2023; HM Treasury, 22 November 2023; MSIT, 26 June 2023; NAIRR Task Force, 24 January 2023)	State capacity against access for start-ups on open terms
Data rules	Contract route for small exporters (China), revised privacy law (Korea), DPDI Bill (United Kingdom), open-banking proposal (United States) (CFPB, 31 October 2023; CAC, 22 February 2023; DSIT, 8 March 2023; PIPC, 29 December 2023)	Protection of data against the costs of data-intensive ventures
Platform power	Apple decision (Germany), DMCC Bill (United Kingdom), rules recommended (Japan), act planned (Korea), recommendations (United States) (DBT & DSIT, 25 April 2023; Digital Market Competition Council, 16 June 2023; Federal Cartel Office, 28 March 2023; KFTC, 12 January 2023; NTIA, February 2023)	Rules in advance against enforcement case by case

Issue	What the governments set out	Point at issue
Crypto-assets	User protection act (Korea), stablecoin regime (Japan), phased regime (United Kingdom), registration (France), bills (United States) (FSA, 26 May 2023; FSC, 30 June 2023; HM Treasury, 30 October 2023; Parliament of France, 9 March 2023; United States House of Representatives, 20 July 2023)	Licensed innovation against investor protection
Talent	Blue Card for IT specialists (Germany), H-1B for founders proposed (United States), J-Find and start-up visa (Japan), nomad visa without local work (Korea), Innovator route widened and Start-up route closed (United Kingdom) (DHS, 23 October 2023; German Bundestag, 16 August 2023; Home Office, 23 November 2023; Immigration Services Agency of Japan, 21 April 2023; MOJ, 24 August 2023)	Migration control against the supply of founders and first employees

Source: IFEEED analysis of the sources cited.

4.2 THEORETICAL LIMITATIONS OF THE POLICIES

The first limitation is that the policies treated AI and data as technologies to be adopted rather than as sources of new ventures. Digital affordances, it has been argued, let new firms find and pursue opportunities beyond place (Autio et al., 2018; Nambisan, 2017), but the year's instruments for culture and support – summits, campaigns, advice, vouchers and pilots for SMEs – aimed mostly at users of digital tools, and few reached founders. It has been argued that the weakest condition limits the system (Ács, Autio, & Szerb, 2014), yet the governments assumed, without showing it, that computing power and adoption were the binding conditions.

The second is concentration. The gains from AI investment go mostly to larger firms (Babina et al., 2024), yet public computing outside Korea was aimed at researchers or lacked a route for start-ups and, in the United Kingdom, gave priority to a government taskforce, and China's metaverse plan aimed at a few ecosystem firms, although high-growth firms, it has been argued, are too varied to be picked in advance (Mason & Brown, 2013). Germany's review of Microsoft and OpenAI showed that a deep partnership with an AI start-up can escape merger control, although in pharmaceuticals 5.3–7.4 % of acquisitions ended overlapping projects and clustered below review thresholds (Cunningham et al., 2021).

The third is the uniformity of duties. China's security assessments, algorithm filing and app filing, and the US proposal to certify the cybersecurity of defence contractors, would apply to small firms as to large ones, although uniform rules fall hardest on young and data-intensive ventures (Jia et al., 2021) and concentrate markets (Johnson et al., 2023). The instrument with evidence behind it, the regulatory sandbox (Cornelli et al., 2024), was in 2023 a working scheme in Korea and Japan, a promise for AI in the United Kingdom and a consultation in Germany.

The fourth is the weakness of evaluation. Entrepreneurship policy has long been criticised for counting the number of firms rather than their quality and for lacking evaluation (Ács et al., 2016), and mission-oriented policy, it has been argued, needs organisations that learn through discovery and new ways of evaluating it (Mazzucato, 2016). The figures of 2023 repeat the counting.

5 POLICY IMPLICATIONS

First, public computing power should reach start-ups by rule. A share of public capacity should be reserved for young firms chosen by competitive calls, as Korea's offer of access to SMEs and ventures does; the United Kingdom should state how start-ups will reach the AI Research Resource, the US research resource should open a track for firms, Japan should state how start-ups will reach the computing it funds, and Germany should turn its goal of access for start-ups into a programme.

Second, digital duties should be scaled to the size of firms and settled before they apply. China's filing and assessment duties and the US certification rule for defence contractors should spare or phase in small firms, as the United Kingdom's Online Safety Act does by judging proportionality partly by size; Korea and France should enact their AI and digital-space bills with duties scaled in the same way. Sandboxes should run rather than be proposed, as Korea's and Japan's do.

Third, platform rules should be set in advance and should reach AI. The United Kingdom should enact its digital markets regime, Japan should legislate on the mobile ecosystem and Korea should table its platform act, and competition authorities should be able to review partnerships between large platforms and AI start-ups that escape merger thresholds, as Germany's review of Microsoft and OpenAI shows.

Fourth, governments should act as paying first customers. Korea's Digital Service Mall, Japan's planned contracts with J-Startup firms and France's Alliance incubator show how public buyers can reach new suppliers; Germany should table its procurement reform, and governments should publish every year the share of their digital purchases made from young firms.

Finally, talent rules and evaluation should serve digital founders. The United States should finalise H-1B status for founder-owners, Korea should open a route for foreign founders, Japan should lengthen the stay under its start-up visa, and the United Kingdom should detail its visa scheme for AI researchers. Competitive calls and staged pilots allow effects to be measured, and governments should commit to measuring and publishing them, as the United Kingdom did for the uptake and spending of its closed voucher scheme.

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