

National Capability Framework

An open, emerging standard for classifying the capabilities of nations:288 capabilities in 73 capability groups, organised into nine domains across three dimensions drawn from the classical analysis of national power.

HARD

148

CRITICAL TECHNOLOGY

47

Advanced Materials & Manufacturing

7

Connectivity, Cyber & Trust Technologies

5

Energy Technologies

5

Sensing, Timing & Navigation

5

Semiconductors & Advanced Computing

6

Robotics & Autonomous Systems

4

Artificial Intelligence

3

Biotechnology & Health Technologies

5

Quantum Technologies

4

Space Technologies

3

STRATEGIC INFRASTRUCTURE

62

Resource Infrastructure

4

Transport Infrastructure

8

Agriculture & Food Infrastructure

4

Communications & Digital Infrastructure

7

Energy Infrastructure

8

Financial Infrastructure

4

Water, Sanitation & Waste Infrastructure

5

Social Infrastructure

11

Advanced Manufacturing

5

Space, Aerospace & Defence Infrastructure

6

NATIONAL SECURITY

39

Force Generation & Mobilisation

3

Air Power

4

Intelligence & Assessment

6

Strategic Strike & Missile Defence

3

Joint Command, Projection & Sustainment

6

Space Operations

3

Land Power

4

Cyber & Electromagnetic Operations

3

Maritime Power

4

Nuclear Deterrence

3

SOFT

71

HUMAN CAPITAL

25

Early Childhood Development

2

Lifelong Learning & Reskilling

3

Foundational Education

4

Research Talent & Knowledge Creation

3

Advanced Education

3

Population Health

3

Technical & Vocational Skills

2

Health System Capability

3

Digital & AI Competence

2

INFORMATION & INFLUENCE

18

Diplomatic Statecraft & Global Networks

4

Culture, Language & Education Diplomacy

5

Alliances & Security Cooperation

2

Diaspora & Global Communities

2

Development Cooperation & Global Assistance

2

Information Environment & Strategic Communication

3

GOVERNANCE & INTEGRITY

28

Political Institutions & Civic Participation

3

Government Effectiveness & Public Administration

5

Justice System & Fundamental Rights

4

Public Integrity & Anti-Corruption

2

Internal Security & Order

3

Transparency, Oversight & Accountability

3

Regulatory Governance & Strategic Controls

3

National Resilience & Crisis Management

5

ECONOMIC

69

FINANCIAL STRENGTH

24

Monetary & Currency Capability

3

Financial Regulation & Integrity

4

Fiscal Capacity & Public Finance

4

Financial Stability & Crisis Management

3

Financial System Depth & Access

5

Sovereign Capital & External Financial Power

5

PRODUCTION & INNOVATION

23

Economic Output & Productivity

2

Business Dynamism & Entrepreneurship

4

Labour & Employment

4

Innovation & Commercialisation

4

Industrial & Sectoral Base

4

Technology Adoption & Diffusion

2

Structural Transformation & Complexity

3

TRADE & INVESTMENT

22

Trade Facilitation & Logistics

2

Export Capability & Sophistication

3

Trade Policy & Market Access

4

Global Value Chain Position

3

Digital & Services Trade

4

Economic Leverage & Dependence

3

Investment Attraction & Projection

3

The National Capability Framework is the focus of my fellowship at the Blavatnik School of Government, University of Oxford. I build and iterate on prototypes to understand complex problems: their key components and how they connect and depend on one another. The Framework is one such prototype, and it improves each time policy experts, economists and domain specialists test and challenge it.

Many thanks to the academic, industry and government colleagues and experts who have applied, challenged and tested the framework and, in doing so, have contributed to its ongoing development.

A changing world, and a measurement gap

What, for whom, why now

Policy is reorganising around national capability: the know-how a nation holds and can put to work. Global issues such as strategic competition, reconfigured global trade and the arrival of general-purpose AI have revived industrial policy and shifted the question governments ask from ‘how large is a nation?’ to ‘what can it actually do, and what can it do on its own?’. National agendas now include sovereign AI, rearmament, chip sovereignty and energy independence and, in several regions, strategic autonomy. For resource-constrained emerging economies the stakes are arguably higher. Know-how that diffuses through workers, firms and institutions can accelerate development far faster than resources alone. In every case, the priority is to build indigenous capability rather than buy it.

The resulting decisions go well beyond resource allocation and the choice to build, buy or partner. They extend to sequencing, alliances and blocs and cross-domain trade-offs, where capabilities in one domain may depend on or interact with those in another. Yet the main classifications that inform these decisions each cover a single domain, and few frameworks look across the full spectrum of national capability.

Data is not necessarily the constraint. There is an abundance of traditional measures of inputs and outputs, stocks and flows: GDP, reserves, fleets, population, trade, investment, energy, patents and publications. What is missing is a comprehensive and consistent way to measure know-how, the capacity to convert resources into action. Know-how is where capability lives, and existing measurement serves it least well.

Two nations with similar stocks and flows can differ sharply in what they can do with them. A nation with fewer resources but superior or novel know-how can outperform one that dominates it on paper, as Taiwan in chip fabrication, South Korea in shipbuilding, the Netherlands in lithography, Estonia in digital government, Israel in cyber and Ukraine in battlefield drones have shown. Know-how can also transform the value of resources. American advances in horizontal drilling and hydraulic fracturing turned long-known shale deposits into the largest oil and gas output in the world. China’s mastery of rare-earth separation and refining, rather than the deposits themselves, gives it control of roughly 90 per cent of global processing. India’s hyper-efficient space engineering made it the first nation to land a spacecraft near the Moon’s south pole, in 2023, for less than the budget of many Hollywood films.

What stakeholders will do without a shared framework

Existing tools, and their limits

The Framework is designed for three primary audiences. The first is governments and policy institutions, which increasingly make decisions on industrial strategy, alliances and strategic investment that span domains. The second is researchers and analysts working on national power, technology competition and state capacity, who currently reconcile difficult to align taxonomies with little visibility of how each was built. The third is the wider community of builders, including data providers, standards bodies and civil-society organisations, for whom an open, versioned classification is a precondition for work that fits together. What unites all three is a need for a common language for national capability, and that is what the Framework sets out to provide.

In the absence of a shared classification of national capability, stakeholders fall back on four traditional approaches. They reconcile single-domain taxonomies (critical technology, military balance, governance, research fields) informally, which works until a question spans them. They rely on composite indices of state capacity, which are typically low in resolution and do not expose their internal classifications for reuse; many reducing a complex system to a handful of country-level

scores, which can show that one nation governs ‘better’ than another but not which specific capabilities it holds or lacks. They commission bespoke taxonomies that leave no durable public reference. Or they fall back on traditional stock and flow metrics, which are plentiful and comparable but measure inputs and outputs rather than the capacity to act.

The fourth approach is the default, and its limitation is the point. Traditional metrics are indispensable, but on their own they generally reduce national capability to size.

Decision-makers need two things these tools do not yet provide together: the granularity to see discrete capabilities, and a holistic structure that places those capabilities side by side across the full spectrum of national capability. Meeting both needs means balancing breadth and depth. A framework broad enough to span defence, technology, human capital, institutions and the economy risks becoming shallow; one deep enough to support measurement risks becoming unmanageable. A primary objective of the National Capability Framework is to strike that balance, so that the existing abundance of data can be read as capability.

Nations, capabilities and the classification

What is classified, what is observed, and how

The National Capability Framework distinguishes between what it classifies and what it observes. The Framework classifies capabilities, while nations are the unit of analysis, observed against each capability. Each observation is therefore a nation–capability pair: Taiwan’s capacity to fabricate leading-edge semiconductors, for example, or Estonia’s capacity to deliver public services digitally. The same split underpins established statistical standards. The International Standard Industrial Classification (ISIC), for example, classifies economic activities, while the establishment is the unit that is counted.

A capability is the capacity to act. It is distinct from resources (the inputs available), performance (observed results), power (capacity realised through will and opportunity) and outcomes (downstream effects). Capability is the conversion layer between resources and results, which is why know-how sits at its centre. To keep definitions consistent, every capability in the Classification is described as ‘the capacity to...’.

The Classification currently organises 288 capabilities into 73 capability groups, nine domains and three dimensions (hard, soft and economic) drawn from the classical analysis of national power. The levels run from broadest to most specific: dimension, domain, capability group and capability. Every capability carries an identifier so that, once the Classification is stable, indices, research and AI systems built on it can be compared and combined.

Measures sit in a separate indicator catalogue linked to each capability. It covers both traditional measures of inputs and outputs, stocks and flows, and new measures of know-how as they are developed. Keeping the two apart means measurement can evolve without changing the structure. It also means the Classification organises capabilities without evaluating them, much as a library classification organises books without reviewing them.

The current reference set covers 197 nations: the 193 UN member states, the two UN observer states (the Holy See and Palestine) and two states with limited recognition (Kosovo and Taiwan). ‘Nation’ is used deliberately rather than ‘state’. It admits polities that are not universally recognised as sovereign but whose capability is highly consequential. The set is drawn from the 249 ISO 3166-1 codes plus Kosovo, and excludes dependent territories, special administrative regions and the Antarctic Treaty area.

Although nations are the reference unit of analysis, the Classification does not depend on the unit. In principle, it can be applied equally to sub-national jurisdictions, economic zones and groupings of nations, which is essential for questions such as the combined capability of AUKUS, BRICS or the European Union.

Every capability in the first five domains, in framework order: 191 of 288.

CRITICAL TECHNOLOGY	STRATEGIC INFRASTRUCTURE	NATIONAL SECURITY	HUMAN CAPITAL	INFORMATION & INFLUENCE
Hard - 47 capabilities	Hard - 62 capabilities	Hard - 39 capabilities	Soft - 25 capabilities	Soft - 18 capabilities
Advanced Materials & Manufacturing - Structural & Composite Materials - Functional Materials & Coatings - Nanomaterials & Metamaterials - Superconducting, Magnetic & Photonic Materials - Energetic Materials - Additive & Precision Manufacturing - Advanced Chemical & Process Manufacturing	Resource Infrastructure - Mining & Quarrying - Oil & Gas Extraction - Processing & Refining - Storage, Transport & Export Agriculture & Food Infrastructure - Irrigation & Agricultural Water - Livestock & Veterinary - Fisheries & Aquaculture - Storage, Cold Chain & Markets Energy Infrastructure - Thermal Generation - Nuclear Generation - Nuclear Fuel Cycle & Radioactive Waste - Hydropower - Renewable Generation - Transmission & Distribution - System Control & Dispatch - Storage & Fuel Supply Water, Sanitation & Waste Infrastructure - Dams, Reservoirs & Flood Defence - Water Supply & Treatment - Bulk Water Transfer & Desalination - Wastewater & Sanitation - Solid Waste & Recycling	Force Generation & Mobilisation - Standing Force Generation & Training - Reserve & Mobilisation Systems - Territorial & Paramilitary Forces Intelligence & Assessment - Imagery & Geospatial Intelligence - Signals & Cyber Intelligence - Technical & Measurement Intelligence - Open-Source & Financial Intelligence - Human Intelligence & Counterintelligence - All-Source Analysis & Warning Joint Command, Projection & Sustainment - Command, Control & Communications - Strategic Lift & Mobility - Expeditionary & Peace Operations - Operational Sustainment & War Reserves - Defence Industrial Mobilisation - CBRN Defence Land Power - Combined Arms Manoeuvre - Land Fires - Battlefield Aviation & Uncrewed Systems - Special Operations & Irregular Warfare Maritime Power - Maritime Security & Constabulary - Sea Denial & Undersea Warfare - Sea Control - Amphibious & Expeditionary Operations Air Power - Air Sovereignty & Policing - Control of the Air - Air Strike & Interdiction - Airborne ISR, Early Warning & Battle Management	Early Childhood Development - Child Health & Nutrition - Early Learning & School Readiness Foundational Education - Universal Schooling - Foundational Learning - Inclusive Reach - Teaching Workforce Advanced Education - Tertiary Access & Participation - Graduate Formation & Employability - Doctoral & Research Training Technical & Vocational Skills - Foundational Digital Skills - Advanced Digital & AI Skills LifeLong Learning & Reskilling - Adult Learning - Employer-Provided Training - Workforce Reskilling at Scale Research Talent & Knowledge Creation - Research Workforce - Talent Attraction & Retention - Knowledge Production Population Health - Physical Health & Longevity - Mental Health & Wellbeing - Nutrition & Preventive Health Health System Capability - Health & Care Workforce - Service Delivery & Coverage - Public Health Functions	Diplomatic Statecraft & Global Networks - Diplomatic Network & Consular Reach - Multilateral Leadership & Norm Setting - Agenda-Setting & Convening - Mediation & Crisis Diplomacy Alliances & Security Cooperation - Alliance & Treaty Networks - Security Cooperation & Defence Diplomacy Development Cooperation & Global Assistance - Development Cooperation & Finance - Humanitarian Assistance & Response Abroad Culture, Language & Education Diplomacy - Cultural & Language Institutes - Creative Industries & Cultural Export Reach - Heritage & Cultural Institutions - Education Diplomacy & Alumni Networks - Sports & Major Events Diaspora & Global Communities - Diaspora Engagement & Institutions - Diaspora Knowledge Networks & Circulation Information Environment & Strategic Communication - Strategic Communications & Public Diplomacy - International Media & Broadcasting - Information Defence & Counter-Interference
Semiconductors & Advanced Computing - Semiconductor Design & EDA - Advanced Semiconductor Fabrication - Semiconductor Equipment & Materials - Advanced Packaging & Heterogeneous Integration - Compound & Power Semiconductors - High-Performance & AI Computing	Advanced Manufacturing - Materials & Inputs - Chemicals & Hazardous Process Industry - Production Systems - Supply Chain & Ecosystem - Workforce & Innovation	Strategic Strike & Missile Defence - Long-Range Strike - Integrated Air & Missile Defence - Counter-Uncrewed & Low-Altitude Defence		
Artificial Intelligence - Machine Learning & Foundation Models - Applied AI & Advanced Analytics - AI Safety, Security & Evaluation	Transport Infrastructure - Seaports & Terminals - Air Infrastructure - Air Navigation & Traffic Management - Inland Waterways & Ferries - Rail Infrastructure - Roads & Bridges - Logistics, Multimodal & Border Infrastructure - Postal & Parcel	Space Operations - Assured Space Access - Space Support to Operations - Space Domain Awareness & Control		
Quantum Technologies - Quantum Computing - Quantum Communication - Quantum Sensing & Metrology - Post-Quantum Cryptography	Communications & Digital Infrastructure - Subsea Cables & International Gateways	Cyber & Electromagnetic Operations - Defensive Cyber Operations - Offensive Cyber Operations - Electronic Warfare & Spectrum Operations		
Connectivity, Cyber & Trust Technologies - Advanced Optical Communication & Photonics - Advanced Wireless Communication - Resilient & Infrastructure-Independent Networks - Protective Cybersecurity Technologies - Privacy, Identity & Trust Technologies	Financial Infrastructure - Currency & Reserves - Payments & Settlement Systems - Markets, Exchanges & Depositories - Banks, Insurers & Systemic Institutions	Nuclear Deterrence - Nuclear Command, Control & Communications - Nuclear Forces - Stockpile Stewardship & Sustainment		
Sensing, Timing & Navigation - Precision Timing & Atomic Clocks - Resilient Positioning & Navigation - Advanced Imaging & Photonic Sensing - Radar & Radiofrequency Sensing - Acoustic & Undersea Sensing	Social Infrastructure - Health Infrastructure - Public Health & Laboratories - Medical Supply & Stockpiles - Education & Skills Infrastructure - Research & Scientific Facilities - Housing, Community & Social Services - Government & Public Administration - Cultural, Community & Recreational Infrastructure - Justice & Corrections - Emergency Services & Civil Protection - Hydrometeorology & Early Warning			
Robotics & Autonomous Systems - Advanced Robotics - Autonomous Systems & Trusted Autonomy - Uncrewed & Collaborative Systems - Human-Machine Interfaces	Space, Aerospace & Defence Infrastructure - R&D & Testing Facilities - Manufacturing Facilities - Launch, Maintenance & Support - Satellites & Orbital Systems - Ground Segment & Tracking - Military Bases & Installations			
Biotechnology & Health Technologies - Genomics & Biological Data - Synthetic Biology & Genetic Engineering - Biomanufacturing - Nuclear Medicine & Radioisotope Technologies - Advanced Therapeutics, Vaccines & Medical Countermeasures				
Space Technologies - Space Launch & Reusable Systems - Advanced Propulsion & Hypersonic Systems - Satellite & Constellation Technologies				

Every capability in the remaining four domains, in framework order: 97 of 288.

GOVERNANCE & INTEGRITY	FINANCIAL STRENGTH	PRODUCTION & INNOVATION	TRADE & INVESTMENT
Soft - 28 capabilities	Economic - 24 capabilities	Economic - 23 capabilities	Economic - 22 capabilities
Political Institutions & Civic Participation (3) - Electoral Management & Integrity - Legislature & Deliberative Institutions - Citizen Participation & Civic Space	Monetary & Currency Capability (3) - Monetary Policy & Price Stability - Exchange Rate & External Account Management - Currency Issuance & Digital Money	Economic Output & Productivity (2) - Productive Scale & Market Size - Productivity Growth & Allocative Efficiency	Trade Facilitation & Logistics (2) - Customs & Border Management - Maritime & Logistics Services
Justice System & Fundamental Rights (4) - Judicial Independence & Court Capability - Access to Justice & Legal Services - Fundamental Rights Protection - Human Rights Institutions & Equality Bodies	Fiscal Capacity & Public Finance (4) - Revenue Mobilisation & Tax Administration - Public Expenditure & Budget Management - Sovereign Debt & Treasury Management - Public Investment Management	Labour & Employment (4) - Employment & Labour Force Participation - Labour Market Institutions & Wage Setting - Employment Services & Skills Matching - Labour Adjustment, Transition & Formalisation	Trade Policy & Market Access (4) - Trade Policy & Negotiation Capability - Market Access & Agreements Network - Trade Law & Enforcement - Standards, Conformity & Quality Infrastructure
Internal Security & Order (3) - Policing & Law Enforcement - Criminal Justice & Corrections - Organised Crime & Illicit Economy Response	Financial System Depth & Access (3) - Banking System Capacity - Capital Markets Depth & Development - Long-Term & Institutional Capital - Financial Inclusion & Household Access - Development & Policy Finance	Industrial & Sectoral Base (5) - Manufacturing & Advanced Industry - Foundational & Process Industries - Agrifood & Primary Production - Services Economy	Digital & Services Trade (4) - Services Trade Capability - Digital Trade & E-Commerce - Data Flows & Digital Trade Governance - Tourism & Visitor Economy
Regulatory Governance & Strategic Controls (3) - Regulatory Quality & Better Regulation - Regulatory Delivery & Independent Regulators - Strategic Controls & Economic Security Administration	Financial Regulation & Integrity (3) - Prudential Regulation & Supervision - Financial Integrity & Illicit Finance Control - Market Conduct & Consumer Protection - Payment & Market Infrastructure Oversight	Structural Transformation & Complexity (4) - Economic Complexity & Capability Breadth - Economic Diversification - Regional & Place-Based Development	Investment Attraction & Projection (3) - Investment Attraction & Facilitation - Investment Absorption & Linkages - Outward Investment & Global Corporate Presence
Government Effectiveness & Public Administration (5) - Centre of Government & Policy Coordination - Civil Service & Public Workforce - Digital Government & Service Delivery - Legal Identity & Civil Registration - Statistical & Data Capability	Financial Stability & Crisis Management (2) - Macroprudential & Systemic Oversight - Crisis Management, Resolution & Deposit Insurance - External Liquidity & Financial Safety Nets	Business Dynamism & Entrepreneurship (3) - Entrepreneurship & Firm Creation - Risk Capital & Scale-Up Finance - Firm Growth, Exit & Renewal - Competition & Market Contestability	Export Capability & Sophistication (3) - Export Promotion & Market Development - Export Credit & Trade Finance - Export Quality & Upgrading
Public Integrity & Anti-Corruption (2) - Anti-Corruption Institutions & Enforcement - Public Sector Ethics & Integrity Systems	Sovereign Capital & External Financial Power (2) - Official Reserves Management - Sovereign Wealth & Public Asset Management - Currency Internationalisation & Reserve Status	Innovation & Commercialisation (5) - Business Innovation Capability - Research Commercialisation & Knowledge Transfer - Intellectual Property & Intangible Assets - Innovation Ecosystems & Clusters	Global Value Chain Position (4) - Value Chain Participation & Integration - Value Chain Position & Upgrading - Regional Integration & Hub Anchoring
Transparency, Oversight & Accountability (3) - Right to Information & Open Government - Independent Oversight & Supreme Audit - Independent Media & Journalist Safety	International Financial Centre Capability (3) - Capital Account & Flow Management - International Financial Centre Capability	Technology Adoption & Diffusion (2) - Digital Economy Adoption - Industrial Technology Diffusion	Economic Leverage & Dependence (3) - Strategic Supply Security - Concentration Risk & Revenue Stabilisation - Economic Leverage & Coercion Resistance
National Resilience & Crisis Management (5) - National Risk Assessment & Early Warning - Crisis Leadership & Coordination - Civil Protection & Emergency Management - Social Protection & Household Resilience - Recovery, Continuity & Adaptation			