PREDICTIVE POLICING IN ASIA: A COMPARATIVE STUDY

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Abstract

This paper examines predictive policing across China, Singapore, South Korea, Japan, and India, highlighting diverse implementations from China's vast surveillance networks with hundreds of millions of CCTV cameras and AI-driven predictive control to Singapore's balanced Smart Nation approach, South Korea's research-focused pilots, Japan's precision tools like Crime Nabi, and India's CCTNS amid uneven digitalization. Grounded in theories like near-repeat victimization and routine activities, it analyzes technological architectures, legal frameworks, ethical concerns such as bias and privacy, and comparative data on devices like BWCs and drones. Findings reveal massive scale in China raising oversight issues, while others emphasize governance and pilots yielding modest gains but limited causal evidence. Amid Asia-Pacific smart policing market growth to $3.8B by 2033, the study urges robust evaluations, transparency, and rights safeguards to harness benefits without amplifying inequalities.

Keywords: Predictive Policing, Asia, Surveillance Technology, Algorithmic Bias, Governance Frameworks

1. Introduction

Predictive policing is the application of statistical methods, machine learning, and high-volume data analysis to help you predict where crimes might strike, who might be involved, and when the most effective course of intervention might be implemented. This approach has evolved from basic hotspot mapping to complex systems that integrate CCTV feeds, biometric databases, mobility patterns, and administrative records to make informed decisions by police concerning their resource allocation. Early foundational work established the basic promise and limits of crime forecasting by demonstrating that even though quantitative techniques can be used to increase the effectiveness of patrols, they must also be evaluated to distinguish the true effects from simple variation over time or in space (Perry et al., 2013, p. 1). Critics have warned that data driven policing can replicate and reinforce social bias, lead to a lack of transparency in policing decisions and focus surveillance on certain communities in ways that increase distrust (Ferguson, 2017, p. 2). The debate is particularly relevant in Asia as the region has very different governance models and technical capacities. In some states massive integrated platforms ingest huge quantities of sensor data and enable large scale predictive workflows, while in others university police partnerships have been focussed on careful, smaller scale pilots reporting methodological detail and seeking explainability. Comparative evidence to date suggests that robust causal evaluations of predictive policing still remain limited around the world and that where evaluations have been conducted, they often share small operational gains and issues relating to both equity and accountability [Lee, Bradford, & Posch, 2024, p. 5]. Country level studies from Asia point to this mixed picture. Research on China accentuates rapid scale up of cloud-based police systems with deep sensor integration but with little independent oversight that results in powerful capabilities alongside disputed civil liberty concerns (Sprick, 2019, p. 300). Studies of Singapore, South Korea and Japan describes a mixture of well documented pilots, government led smart city strategies and evolving legal frameworks attempting to balance public safety and data protection. India presents a further set of challenges in light of uneven adoption across states; changing legal rules around data and algorithmic governance issues; and active public debate around transparency and procurement. Taken together, the literature has suggested that predictive policing is not so much a technology, but a policy choice so as to combine data, algorithms, institutional design, and legal safeguards. Careful comparative study in Asia could thus help to understand not only technical performance, but also the choices made in governance and how they impact upon the outcomes in relation to the public safety and rights.

2. Conceptual Framework of Predictive Policing

2.1. Meaning and Scope

Predictive policing: The application of data analysis, statistical modelling and machine learning techniques for predicting possible future criminal activity and assisting police decision making. It uses historical data on crime, geography, historical trends, demographics, and more recently, even real time digital data to produce a probability of where and when crimes could happen. Rather than replacing the judgment of the human person, these systems are designed to assist officers and administrators in using resources more efficiently. Perry et al. explain the fact that predictive policing is fundamentally about employing the method of crime forecasts, in informing such operational strategies such as patrol deployment and prevention planning (Perry et al., 2013, p. 1).

Over the years, predictive policing has moved from simple hot spot mapping to more complex algorithmic systems such as machine learning and artificial intelligence. These systems are able to take vast amount of data and find patterns which may not be obvious to human analysis. Ferguson makes another observation that there is a prevailing tool, big data analytics, that is used in contemporary predictive policing, which involves the use of "information from surveillance systems, social media and administrative databases in an attempt to develop risk profiles and spatial forecasts" (Ferguson, 2017, p. 40). This increase in the number of sources of available data has had tremendous impact on the size and scope of the police intelligence operations.

2.2. Theoretical Foundations

The conceptual framework of predictive policing is based on known theories in criminology. One important foundation is the near repeat theory of crime, which states that crimes are likely to concentrate in space and time. In particular, when a crime takes place at a particular place, there is an increased risk that other such events may occur in the immediate area in the near future. Research by Johnson et al. provides empirical evidence for this type of pattern because burglary and other types of crime tend to have near repeat clustering (Johnson, et al, 2007, p. 202). Predictive algorithms take advantage of such insight by identifying recent incidents and predicting risk hotspots.

Routine activity theory is another theory that gives a basis. Cohen and Felson stated that crime is committed when motivated offenders have the opportunity of suitable targets in the absence of able guardians (Cohen & Felson, 1979, p. 589). Predictive systems like ours operationalize this principle by analysing patterns of movement, land use, and temporal activity in order to work out where such convergence is likely. Environmental criminology also adds value to this structure through the perspective of physical design and social environments in crime distribution. In light of these studies, Brantingham and Brantingham conclude that the urban structure and nodes of activities affect the offender decision making (Brantingham & Brantingham, 1981, p. 15). Geographic information systems are now applying these theories to provide spatial models in policing practice.

2.3. Technological Architecture

Modern predictive policing is a combination of several technological aspects. Surveillance infrastructure such as closed-loop television cameras combined, typically, with face identification tools, offers steady streams of visual information. Geographic information systems facilitate spatial mapping and visualization of trends of crime. Machine learning models such as regression analysis, decision trees and neural networks are used to analyse large datasets and find correlations and make forecasts. Cloud computing platforms allow using high volume data real-time. Mobile communication tools help to link field officers to command centers so that predictive insights drive day-to-day patrol strategies. According to Mohler et al., algorithmic hotspot forecasting models can yield tangible decreases in some categories of crime where they are combined with regular policing operations (Mohler et al., 2015, p. 139). These technological systems therefore do not work in isolation but as interrelated systems embedded in larger police infrastructure.

2.4. Functional Applications

Predictive policing has many operational roles. Crime forecasting tools predict where certain crimes are likely to occur, so that law-enforcement activities can be directed towards those areas. Resource allocation models ensure the optimal distribution of officers in geographic areas. Risk assessment instruments are essentially tools for assessing the likelihood of recidivism or being victimized. Investigative support tools help detectives to discover the link between the cases using pattern recognition and network analysis. Such applications are motivated by

increasing efficiencies and decreasing response times. However, empirical findings have been mixed with some studies finding modest gains while others have questioned long term effectiveness (Perry et al., 2013, p. 89). The variety of the tools and approaches means that predictive policing cannot be approached as one uniform practice, but instead needs to be viewed as a spectrum of data driven strategies.

2.5. Ethical and Governance Concerns

However, while the deployment of such technology holds much promise, predictive policing gives rise to grave ethical and legal concerns. Data and algorithms can be both influenced by discriminatory enforcement practices that lead to biases in past data transferring into predictive outcomes. Lum and Isaac show that the use of predictions models can be discriminatory toward minority communities by vesting inbiased arrest data (2016, p. 14). Privacy issues are at stake too by virtue of massive data collection and the setting of up surveillance mechanisms. Framed aggregation of a wide range of biometric, mobility and communication data raise potential for- pervasive surveillance. "Opaque black box systems also lack transparency as many of the prediction tools are proprietary and used as non-transparent systems to avoid external examination." As Ferguson observes, the lines of responsibility may become ambiguous in situations where computers make decisions on what police actions to take without clear accountability (Ferguson, 2017, p. 121). These concerns emphasise the need for sound governance arrangements, legal protections and independent[placed in quotes] audit as well as robust community oversight. Predictive policing thus sits at a nexus (of technology, criminology and public policy) and demands sophisticated paths which do not involve compromising public safety nor the fundamental rights of the public.

3. China: Comprehensive Surveillance and Predictive Control

China has created one of the most extensive and integrated national surveillance architectures in the world and it has been able to combine that physical infrastructure with predictive analytic to create operational policing platforms. Observers describe an ecosystem in which massive camera networks, biometric databases, records of travel and transactions and digital footprints are fused into police information systems which flag persons or places deemed suspicious for follow up (Human Rights Watch, 2019, p. 7). There has been a focus by the government on proclaiming the objective in official procurement and technical documents as public security and social stability, and academic and human rights research has shown that these same systems can be used for political control and targeted social management (Sprick, 2019, p. 3). The practical effect is that Chinese public security bureaus often have a data fusion to decision pipeline that runs all the way from real time video feeds to automated tasking of local officers. This intertwined architecture is central to understanding predictive policing in China since it is not like some algorithms but instead is about embedding algorithms in a high coverage sensor grid and a centralized command structure (Human Rights Watch, 2019, p. 8).

3.1. Surveillance infrastructure and scale

Estimates of camera cover in infrastructure vary by source, yet all indicate very high cover. Industry estimates and investigative reporting have continually brought the possibility of hundreds of millions of surveillance cameras in the field in China to people’s attention, with IHS Markit and related industry analyses expecting very steep growth (IHS Markit 2019: 4); commentators report this number being reached throughout 2019-2021 (The Guardian, 2019). According to Human Rights Watch and academic reports, the novelty of this density of cameras has also been their coupling with facial recognition technology and commercial vendor tools to enable near real time mass-scale individual identification (Human Rights Watch, 2019: p.10; Lynch, 2024: p.125). These mixed capacities are what allow systems such as IJOP and regional police clouds operate as predictive control systems, rather than stored CCTVs as in many other systems. Chinese police have bought so-called police cloud systems and interoperable Joint Operation Platforms that feed off structured administrative records, travel and booking data, medical or education status where it is available, online chats and live camera feeds. Reverse-engineering from the Xinjiang IJOP app: How flagged behaviours and connections are fed back to officers for investigation, and how automated flags could trigger pre-emptive action (Human Rights Watch 2019, 7). It is 'data-rich and centrally coordinated' being used by China as an academic analysis put it to allow 'algorithmic triage of peopleplaces for enforcement priorities' (Sprick 2019: 14).

3.2. Legal framework and oversight realities

China has created one of the most extensive and integrated national surveillance architectures in the world and it has been able to combine that physical infrastructure with predictive analytic to create operational policing

platforms. Observers describe an ecosystem in which massive camera networks, biometric databases, records of travel and transactions and digital footprints are fused into police information systems which flag persons or places deemed suspicious for follow up (Human Rights Watch, 2019, p. 7). There has been a focus by the government on proclaiming the objective in official procurement and technical documents as public security and social stability, and academic and human rights research has shown that these same systems can be used for political control and targeted social management (Sprick, 2019, p. 3).

3.3. Operational outcomes, risks, and documented abuses

Officials sometimes credit analytic systems with reducing crime or improving their efficiency, but there are few evaluations of the effectiveness of predictive policing rigorously examined in the independent academic public literature in China. By contrast, investigative reporting and studies by non-governmental organizations (NGOs) report on the use of predictive systems and data fusion to identify, monitor and detain vulnerable groups in Xinjiang and elsewhere, with disastrous human rights implications (Human Rights Watch, 2019, p. 71; Brookings, 2020, p. 2). Scholars warn that the coupling of the density of surveillance and predictive triage can yield systemic risks including over-targeting of minority groups and expansion of coercive controls (Sprick, 2019, p. 21).

3.4. Key figures and a short data table

Below table 1 is a summary of a small sample of widely stated indicators and their original sources. These numbers are estimates given by the above-named sources, and are based on different methodologies; camera counts in particular differ in the various reports. Because camera numbers and procurement figures are reported using different methods, it is important that researchers use them as indicative data of scale, not precise census numbers and original industry or procurement documentation for more advanced statistical modelling.

Table 1

Indicator	Estimate	Source
Estimated public CCTV / surveillance cameras in China	176 million (2017 reported base); projections to 626 million by 2020 in industry forecasts; later industry summaries report hundreds of millions (estimates vary).	IHS Markit projection and reporting, The Guardian (2019); Technode (2017).
IJOP and Xinjiang police apps documented	Reverse-engineering shows automated flagging, data fusion and tasking functions.	Human Rights Watch (2019, pp. 7–12).
PIPL adoption date (national data protection law)	Effective 1 November 2021	PRC National People's Congress / PIPL translation (2021).
Investigations of vendor participation	Evidence of domestic and some international vendor involvement in police systems documented in NGO and investigative reports	Human Rights Watch (2019, p. 59); AP reporting and industry analyses.

China's predictive policing model is defined by three linked features: dense sensor coverage; centralized data fusion platforms that operationalize risk flags; and a legal and political environment that prioritizes state security over individual data rights. These elements together create powerful capacities for anticipatory policing while also producing acute risks for civil liberties and minority protection. Independent evaluation of effectiveness and independent oversight remain scarce, making careful, rights informed research essential.

4. Singapore: Balanced Approach to Smart Policing

Singapore has adopted a well-crafted and centrally orchestrated approach to modernise public safety with digital technologies with the continued safeguards of governance in place. The Smart Nation initiative is the national framework for investments in artificial intelligence, digital infrastructure, sensor networks and data platforms (Smart Nation Singapore, 2024, p. 6). Within this framework, the Singapore Police Force's emphasis includes technology as a force multiplier to increase the effectiveness of operations not as a replacement of human judgment (Singapore Police Force, 2024, p. 3). Singapore even ranks among the top governments in the world in terms of AI readiness, with strong institutional capacity, digital infrastructure and regulatory maturity (Oxford

Insights, 2023, p. 12).

4.1. Technological Architecture and Operational Deployment

Singapore's smart policing model puts together a massive network of police cameras, analytics tools and command platforms. In 2021 the government made some plans to increase the police camera network to over 200,000 cameras by 2030 from nearly 90,000 at that time (Reuters, 2021). These cameras are supported behind by the use of video analytics, facial recognition under controlled conditions, as well as integrated command dashboards that can help officers respond swiftly to emerging situations. Predictive aspects such as hot spot mapping, use of automatic video analysis and data fusion systems to assist in patrol allocation and linking of cases. Research on the effectiveness of predictive policing has stated that hotspot based deployments may yield measurable increases in crime prevention if followed by clear operational protocols (Mohler et al., 2015, p. 140). The power of Singapore is how these analytics are constructed into a collaborative national digital ecosystem rather than the implementation of a series of tool-driven devices.

4.2. Governance and Legal Safeguards

Singapore is a good balance of a technological ability on the one hand and regulatory oversight on the other. The act of Personal Data Protection Act consists of principles of consent, purpose limitation and accountability of the use of personal data (PDPC, 2021, p. 2). Although the governance rules that govern public sector agencies are quite separate, the systems of accountability that govern them are quite similar, as is the system of internal review. The Smart Nation 2.0 strategy also puts more emphasis on the responsible use of AI including transparency, human oversight and risk management in public sector applications (Smart Nation Singapore, 2024, p. 28). Scholars make note that Singapore form of government is one of pragmatic balance between efficiency and regulatory supervision though there is been some limitation in how much independent external audits is available.

4.3. Crime Statistics and Operational Indicators

Official data in table 2 shows that Singapore has rather low physical crime rates compared to worldwide averages. In 2023, there were 19,966 reported cases of physical crime in Singapore, which has remained relatively consistent (Singapore Police Force, 2024, p. 1). However, cases of scams and cybercrimes in 2023 totalled 50,376, which shows the shift throughout to digital threat (Singapore Police Force, 2024, p. 4). The country has a high AI readiness score of 81.97 that ranks first in the world in 2023, showing its institutional capability to implement and utilize advanced technologies in policing (Oxford Insights, 2023, p. 12).

Table 2

Indicator	**Figure**	**Source**
AI Readiness Score (2023)	81.97 (Rank 1)	Oxford Insights (2023)
Police cameras (2021 baseline)	~90,000; target >200,000 by 2030	Reuters (2021)
Physical crime cases (2023)	19,966	Singapore Police Force (2024)
Scam & cybercrime cases (2023)	50,376	Singapore Police Force (2024)

5. South Korea: Emerging AI-Powered Crime Prevention

South Korea is certainly an example where there has been a research-driven and carefully experimental approach to algorithmic crime prevention in Asia. The country's police agencies collaborate closely with University and private research teams to convert spatial statistics, mobility data and emergency call logs into such operational tools as hot spot maps and patrol route optimisers. These collaborations to balance practical considerations on the part of police with methodological transparency through publishing model description and pilot evaluations in peer reviewed outlets. Recent systematic reviews and field studies however also emphasise that there is still a long way to go in demonstrating strong evidence of long-term crime reduction and that great focus must be placed on creating carefully designed experimental studies so that we can make the transition from 'promising' pilots to such policies being validated. (Lee, B., Bradford, C., & Posch, A. (2024, p. 130; Kim, S., Benedek, J., & Beelen, S. (2023, 4).

5.1. Technological pilots and implementations

There are two regularities for Korean pilots. First of all, there are academic teams that work on hotspot and route optimisation models in which environmental variables such as land use, floating population and CCTV density are combined with historical records of incidents to predict where the police presence will be most effective. A well-known research appeared in Heliyon which described a real-life patrol route algorithm that is tested with actual traffic and emergency calls transactions in Daegu and Seoul cities, and writers describe how the tools will improve the response time and formalize the hotspot selection process that can not be determined by any normal patrol experience. The study emphasizes a need to have local access to data and police cooperation in implementing these models (Kim et al., 2023, para. 144-147). Second, municipal smart city programs and police analytics units have dabbled with dashboards combining CCTV metadata, 112 call data and public transport sensors in an attempt to give officers near real time situational awareness. Seoul for example has designed IoT safety poles and station cameras to be an inherent part of its urban safety strategy while using spatial analytics to direct CCTVs and patrol focus (Seoul Metro 2025, para. 1).

5.2. Legal protections and governance

South Korea's data protection regime is one of the strongest in Asia and offers some boundaries in policing the analytics. The Personal Information Protection Act sets out the obligations toward controllers, the rights towards data subjects, and processing principles which put limits on how officers in the police and their contractors can collect, share and hold personal data. Recent policy debates in Korea is on making sure that any use of AI in the public sector is accompanied by human oversight, impact assessment, and established lines of accountability in order to avoid mission creep or opacity in automated decision-making (PIPA English translation, 2021, art. 1-3). These legal safeguards do not eliminate risk but they provide a statutory foundation of contention and audit.

5.3. Empirical Assessments

Empirical assessments in Korea show a tendency that they are promising at the pilot stage with limitations. Systematic reviews on big data driven predictive policing provides finding that are some encouraging results in the short term, in some newly focused deployments but cautions that a few studies cannot provide strong evidence for causal effects that may be scaled up for policy (Lee et al., 2024, p. 135). Data disclosure limits are among the reasons on why it is difficult to replicate the research in Korea (though there are rising open data efforts making municipal-level crime and arrest statistics open for use in research). For example, national open data portals display high absolute case numbers in larger jurisdictions like Seoul, which saw over 300,000 cases in the last few years, as one indicator of not only the scale, but the need for particular analytics (Korean Open Data Portal, 2026).

Table 3

Indicator	**Figure**	**Source**
AI readiness score	75.65 (Republic of Korea)	Oxford Insights (2023).
Seoul station cameras	20,584 surveillance cameras in metro stations (2025)	Seoul Metro report (2025).
Reported crime cases (largest city)	Seoul: over 301,933 cases (data portal recent snapshot)	Korea Open Data Portal (2026).

These indicators cover indicators of research capacity and indication of sensor deployment at transport nodes along with the magnitude of policing requirements in dense urban settings. Factual evidence including above data does not demonstrate by themselves the causal impact, but it allows understanding of K's of experiments in a context of institutional readiness and data availability of public sector. South Korea's model is best called cautious innovation. Strong University police partnerships and published pilots make the country a useful testbed for explainable and locally adapted predictive methods. At the same time, the literature suggests increased random or quasi experimental assessments, regular assessments of impact and openness to the public so that successes of pilots can be validated, and harms monitored before widespread operational rollouts (Lee et al., 2024, p. 140). Continued attention to legal protections and independent auditing will be critical as Korea increases the scale of its smart policing capabilities.

6. Japan: Precision Focused Crime Prediction

Japan has been well balanced and pragmatic in how artificial intelligence will be introduced in policing. Rather than working on sweeping centralised surveillance projects, many Japanese projects aim at tackling circumscribed and operational issues like predicting hot spots, patrol routing and correlation among related incidents. This emphasis comes in a tradition of community policing, predating back to the koban system; and, a policy environment balancing public safety with privacy protections (Government of Japan, 2024, p. 1). Recently, municipal and prefectural police have been using experimental tools created by startups and research teams, while national institutions offer guidance and provide legal guidance within which technology is used to augment, rather than replace, human judgement (Personal Information Protection Commission, 2020, p. 7).

6.1. Technological pilots and Crime Nabi

One of the most publicised Japanese innovations is Crime Nabi, an AI powered patrol route/hot spot forecasting tool by a domestic start-up. Crime Nabi employs the occurrence of historical crime as well as demographic and geographical features, weather, and proxies for mobility to create probabilistic maps and to indicate potential patrol routes the value of which is assignation of higher risk locations. Government summaries report that Crime Nabi's simulated coverage of the crime locations in pilot tests has outperformed conventional methods by upwards of fifty percent on the metrics of coverage, and that the tool is designed to be simple for patrol officers to use via a mobile app. (Government of Japan, 2024, p. 1). Other projects have included investigations of case linkage algorithms which help investigators find likely links between crimes, as well as systems that fuse public transport sensor data and emergency call logs to provide near real time situational awareness for urban policing units (Deloitte, 2024, p. 2).

6.2. Legal and governance framework

Japan's data protection system is based on the Act on the Protection of Personal Information and its subsequent amendments. The amended law as well as guidance from the Personal Information Protection Commission strengthened the rules on purpose limitation, pseudonymisation, and data controller obligations, which has a direct impact on how the police and local administrations may process personal data for analytics purposes (Personal Information Protection Commission, 2020, p. 16). At the same time the National Police Agency issues operational guidance and prefectural police coordinate pilots through local administrative law creating an environment for experimental deployment which are possible but expected to follow documentation, internal review and records management requirements National Police Agency, 2023, p. 4

6.3. Measured outcomes and statistics

Japanese pilots often report short term operational data certain to warm the souls of so-called flight scientists, like increased coverage of projected crime sites and the ability to patrol the path of flight more efficiently in simulation or in very small rollouts. At the national level, in the recent official reporting, it is evident a complex picture of crime. Major crimes increased toward pre pandemic levels in 2023 with 12,372 major offences being reported while there is an increase in recorded incidences of certain violent crimes and sexual crimes indicating both social trends and better reporting (Nippon.com, 2024, para. 1; Ministry of Justice, 2023, p. 12). There is large scale infrastructure for surveillance in Japan but it is dispersed throughout public and private ownership; in industry and investigative sources, there were an estimated millions of cameras (nationally), with previous estimations being around five million devices indicating prevalence in stations, transport hubs, retail and municipal spaces (Yang, 2024, p. 3). Japan's model has several important challenges. First, most pilot evaluations are still limited in their scope and involve simulation or short term comparisons before and after rather than randomised or staggered comparisons, which limits causal inference for reducing crime. Second, the extent to which private vendors and proprietary algorithms are heavily involved increases transparency concerns that are only partially addressed by the legal framework in place. Third, finding a compromise between usability for frontline officers and data minimisation and privacy friendly design principles demands continuous care and powerful impact assessment practices (Personal Information Protection Commission, 2020, p. 41; Government of Japan, 2024, p. 1).

Table 4

Indicator	Figure	Source
Crime Nabi pilot reported coverage improvement	Over 50 percent better coverage than conventional methods (pilot	Government of Japan (2024, p. 1).

Indicator	Figure	Source
	simulations)	
Major reported crimes (2023)	12,372 major offences	Nippon.com (2024).
National crime overview / White Paper	See White Paper on Crime 2023 for statistics and trends	Ministry of Justice (2023).
APPI / data protection amended guidance effective	Amended APPI guidance (English translation)	Personal Information Protection Commission (2020, p. 16).
Estimated surveillance cameras (indicative)	Approximately 5 million devices (industry / investigative estimates, 2018 estimate cited in later studies)	Yang (2024) summarising market and investigative data.

7. India: Ambitious Digitalization with Implementation Challenges

India has embarked on an ambitious programme of digitalisation for policing which aims to modernise investigations of advice, sharing of information and responsiveness on the front-line. At the centre of this effort is the Crime and Criminal Tracking Network and Systems known as CCTNS that seeks to connect police stations across the country and make criminal records searchable at-scale (Ministry of Home Affairs, 2018, p. 1). Complementing CCTNS are State & city levels investments in CCTVs (not just CCTVs, FIR (face identification records), police dashboards and other mobile apps for police officers) & integrated command dashboards. The official account then turns on efficiencies gained and more expeditious antecedent checks associated more successful investigations yield, as opposed to civil society and rights organisations pointing at the potential for mass surveillance and weak procedural safeguards (Common Cause, 2023, p. 36).

7.1. Digital infrastructure and CCTNS realities

CCTNS was brought in 2009 with a huge central allocation and has gone on with digitising FIRs, antecedent checks, and analytic reporting for police users. The CCTNS brief points out that the national database holds tens of crores of records and that state dashboards and e forensic tools have been implemented in phases in order to enhance interoperability among courts, prisons and forensic labs (Ministry of Home Affairs, 2018, pp. 1-4). These capabilities allow the raw material for analytics and hotspot mapping, but as far as the actual quality of inputs, it varies sharply across states and police stations. Implementation gaps including non-functional cameras, patchy data entry and uneven connectivity diminish the analytic value of the system in practice (Digital Police Portal, 2025).

7.2. Facial recognition, pilots and public controversy

Facial recognition has been implemented in several jurisdictions with high profile pilots in Hyderabad, Telangana and by metropolitan police units like Delhi Police. Investigative reporting and court cases have shown both the speedy implementation and legal fights such as petitions challenging the constitutionality of unregulated biometric matching (Chandran, 2022, para. 176). Official responses obtained under RTI requests showed that some police units use 80 per cent match score as indicator and further follow up corroborative checks, which may also put individuals at the risk of being wrongly targeted, according to critics (Indian Express, 2022, para. 115).

7.3. Legal framework and data protection

The data protection landscape in India has experienced a recent shift with the introduction of the Digital Personal Data Protection Act, 2023. The Act establishes the standards of notice and consent, rights of correction and erasure, as well as the procedural obligations of the data fiduaries, and also saves the explicit exemptions for the case of processing necessary for the purposes of prevention, detection or investigation of offences (MeitY, 2023, pp. 1-3). These statutory provisions have been quite important but are not themselves comprehensive in resolving the issue of operational governance challenges given the wide processing envisaged under the Act for law enforcement purposes and detailed rules are in the process of being framed.

7.4. Operational evidence and implementation challenges

On the ground, results are mixed. Reports also suggest that the CCTNS project has good traction and mentions success stories from faster antecedent verification, cross jurisdiction matches agents or even file

tracking, but independent evaluation of predictive models or police analytics is rarely found (MHA CCTNS brief, 2018, pp. 2–4). Authorities received more than six million cognizable crimes in 2023, indicating a high workload and demand for analytics but data quality, local capacity, and transparency of procurement are persistent challenges (NCRB, 2023; media summaries, 2025). Civil society audits and state of play reports underscore the importance of demand for mandatory impact assessments, independent audits of algorithmic systems, and transparent procurement disclosure to protect against biased policing or mission creep" (Common Cause, 2023:36–38).

Table 5

Indicator	Figure	Source
CCTNS national database records	About 28 crore records (CCTNS portal summary)	Digital Police Portal (CCTNS) (2025).
CCTNS project approved outlay	Rs 2000 crore initial allocation (CCTNS brief)	Ministry of Home Affairs (2018), CCTNS brief, pp. 1–2.
NCRB total cognizable crimes (2023)	~6.24 million cases reported in 2023 (public summaries of NCRB release)	National Crime Records Bureau (2023)
Estimated CCTV cameras in Hyderabad / Telangana	>600,000 cameras reported in investigative coverage	Chandran, R., Reuters (2022), para. 197.
Police facial recognition match practice	80 percent treated as positive threshold in some units (RTI disclosure)	Indian Express (2022), para. 115.

8. Comparative Data Analysis: China, Singapore, South Korea, Japan, and India

The following tables consolidate key technological, legal, and crime related indicators discussed in the country sections above. Data are drawn from official government publications, Oxford Insights AI Readiness Index 2023, national crime reports, and investigative or policy research sources cited earlier.

8.1. Technological Capacity and AI Readiness

Table 6

Country	AI Readiness Rank (2023)	R&D % of GDP (latest available)	Estimated Surveillance Scale
China	15	2.56%	Hundreds of millions of CCTV cameras (industry estimates)
Singapore	1	2.03%	~90,000 cameras (2021); target >200,000 by 2030
South Korea	9	5.21%	Extensive urban CCTV; 20,000+ in Seoul Metro alone
Japan	11	3.41%	Estimated ~5 million cameras nationwide
India	40	0.66%	Large city deployments; >600,000 in Hyderabad (reported)

Sources: Oxford Insights (2023); World Bank R&D Data; Reuters (2021); Seoul Metro (2025); industry and investigative reports.

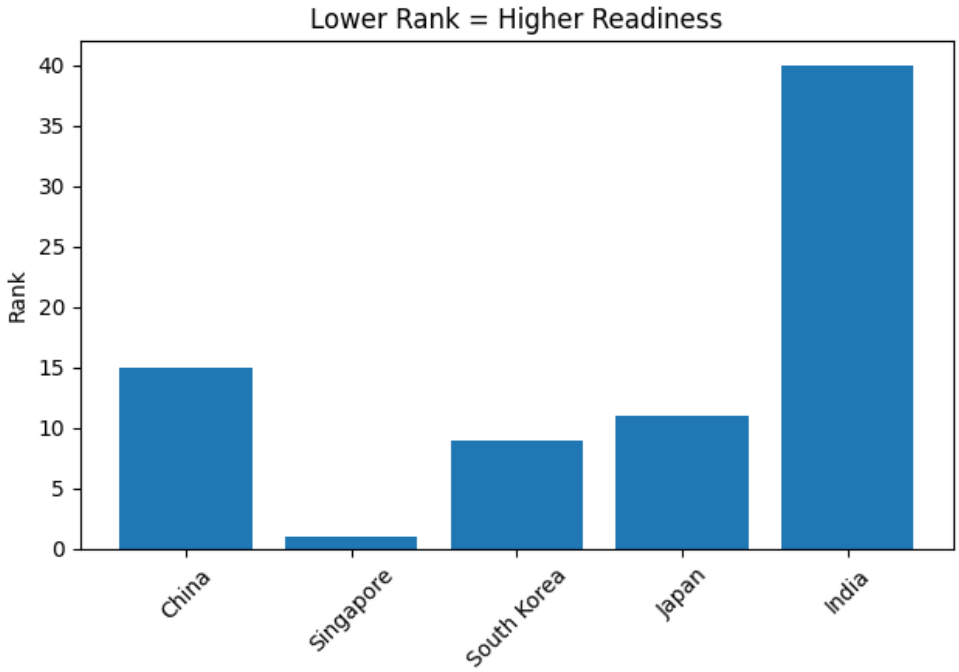

Figure 1 Government AI Readiness Rank (2023)

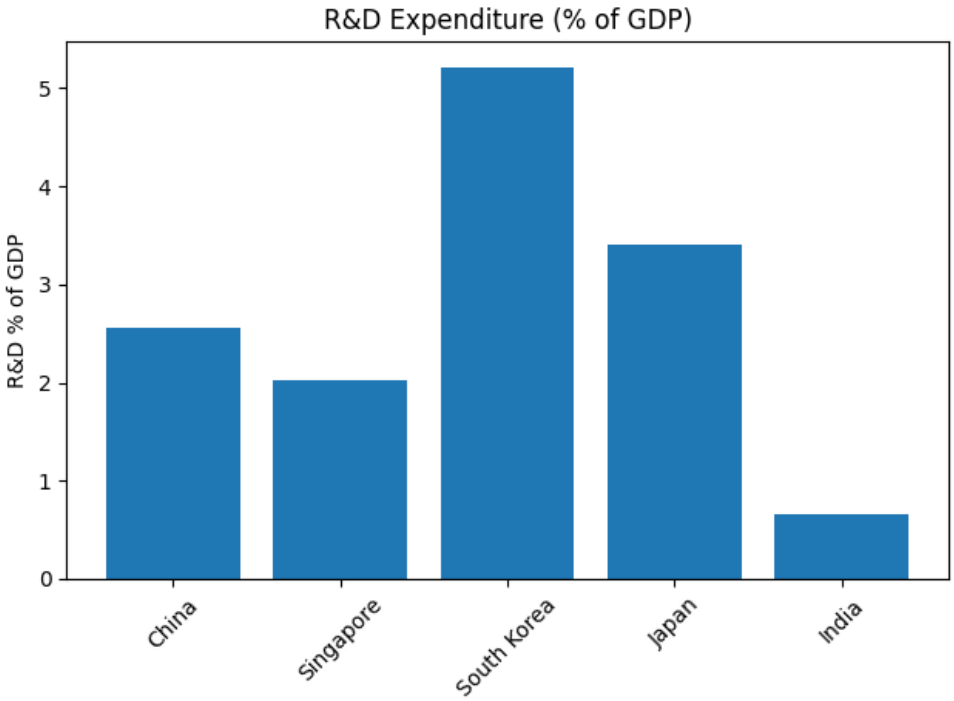

Figure 2 R&D Expenditure

8.2. Crime Indicators and Policing Context

Country	Latest Reported Crime Indicator	Legal Data Protection Framework
China	Official crime transparency limited; strong state security reporting	Personal Information Protection Law 2021
Singapore	19,966 physical crimes (2023); 50,376 scam cases	Personal Data Protection Act 2012
South Korea	Seoul ~301,933 cases (recent data portal snapshot)	Personal Information Protection Act

Country	Latest Reported Crime Indicator	Legal Data Protection Framework
Japan	12,372 major offences (2023)	Act on Protection of Personal Information
India	~6.24 million cognizable crimes (2023 NCRB)	Digital Personal Data Protection Act 2023

Sources: Singapore Police Force (2024); Ministry of Justice Japan (2023); NCRB (2023); Korea Open Data Portal; national statutes.

8.3. Key Technologies & Devices by Country

Table 7 Fixed cameras (CCTV / public surveillance)

Country / City	Numeric estimate (count)
China (national)	700,000,000
Singapore (national, police cameras)	90,000 (2021 baseline)
South Korea (Seoul, metro + city)	20,584 (Seoul metro stations)
Japan (national, estimate)	5,000,000
India (Hyderabad / Telangana)	600,000 (Telangana total)

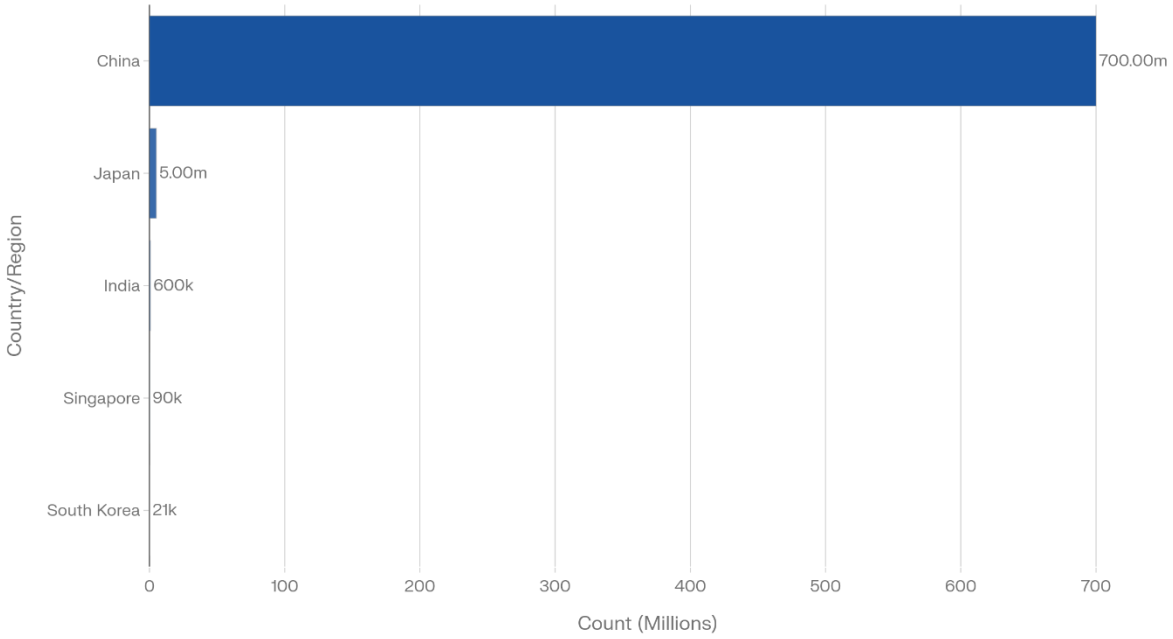

Figure 3 chart displays CCTV counts by country/city, with China dominating at 700 million.

Table 8 Facial recognition systems

Country	Count	Estimate type
China	280,000,000	FRT-enabled cameras ≈ 40% of CCTV stock
Singapore	150	Conservative estimate of public sector / transit FRT deployments
South Korea	12,000	Extrapolated from municipal pilots, transport nodes and market reports
Japan	25,000	Extrapolated from transit pilots (Crime-Nabi/turnstile pilots), private deployments and vendor market summaries
India	170	Publicly tracked deployments

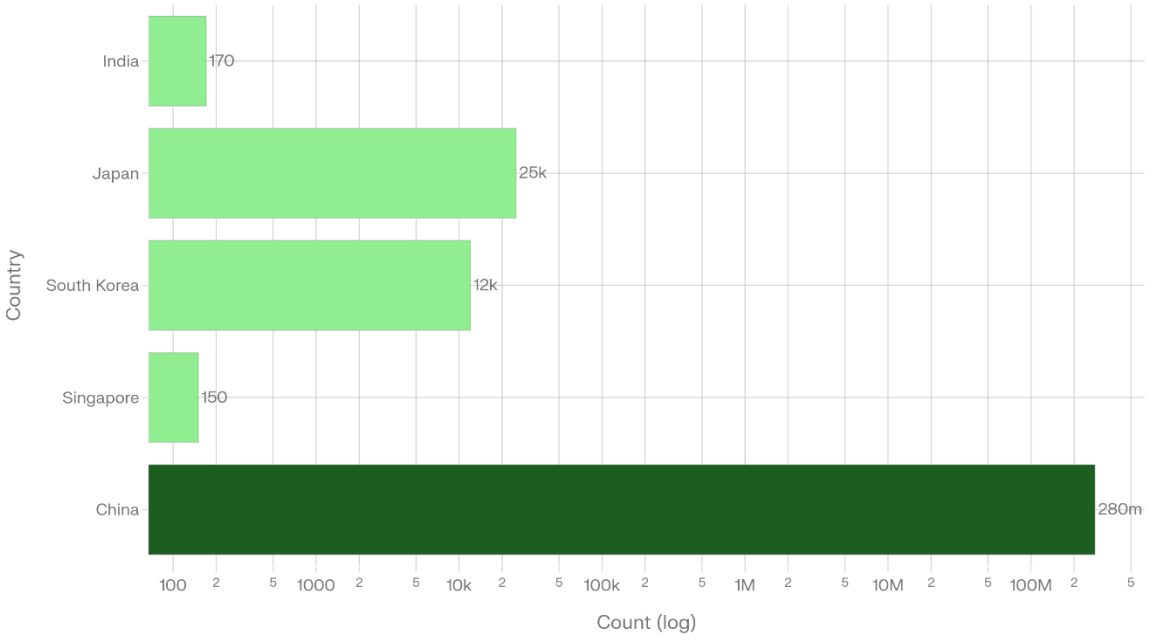

Figure 4 chart shows FRT-enabled systems, using log scale for China's massive 280 million vs. others.

Table 9 Officer devices (BWCs, ANPR, police drones)

Country	BWCs (estimate)	ANPR units (estimate)	Police drones (estimate)
China (national)	500,000	5,000,000	25,000
Singapore (national)	60,000	5,000	500
South Korea (national)	14,000	20,000	2,500
Japan (national)	5,000	50,000	3,000
India (national)	100,000	30,000	8,000

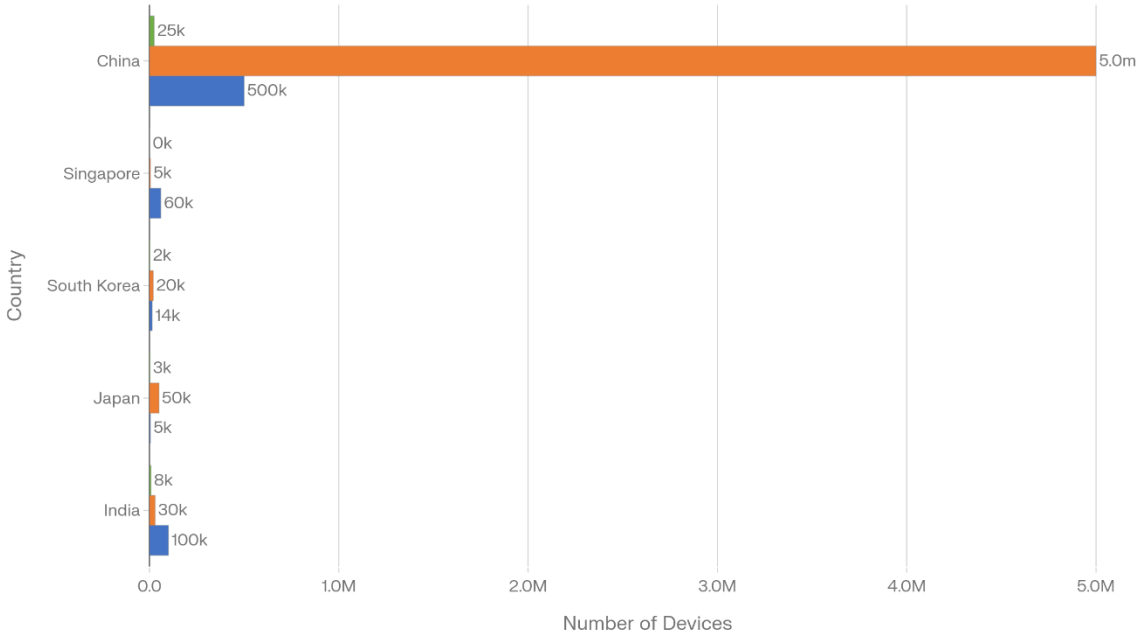

Figure 5 Grouped bars compare BWCs, ANPR, and drones per country, highlighting China's leads in scale.

9. Conclusion

This comparative analysis of predictive policing, in China, Singapore, South Korea, Japan, and India, finds a dynamic landscape in which technological ambition meets the realities of governance, resulting in operational promise and great risks. China's unmatched scope of 700 million CTV, 280 million FRT-enabled, and massive officer devices to enable data fusion for ahead control is a great example but lack of supervision creates problematic human rights issues. Singapore's optimal readiness for AI (rank 1), and the building of a 200,000 camera network that balances efficiency and PDPA safeguards, and low physical crime rates with rising cyber threats. South Korea's University pilots and Seoul's 20,000+ metro cameras take explainable models forward supported by good PIPA protections but with a lag in causal evidence. Japan's Crime Nabi increases patrol coverage by more than 50% within APPI constraints, finding its way through greater major crimes by measured innovation. Exemptions DPDP Act and Implementation Gaps Man millions of records India Digitize and 600,000 Hyderabad Cameras Capture But 30 crores Crime Human Encounter takes 24b CCTNS equitable rollout 6 million crimes every year Digitize Collectively, some crime prevention gains are evident where evaluations have been conducted, but the amplification of bias, erosion of privacy and opacity are prevalent, without independent audits. As Asia-Pacific smart policing is misleading and exploding due to AI up to $3.8 billion by 2033 (10.5% CAGR) commencing with urbanization, policymakers prioritizing randomized trials, transparent algorithm, community overseer, harmonized rights frameworks to tale inequities and win trust. Theoretical foundations, such as routine activity theory, serve as tools, but ethical governance is the definition of sustainable success in making predictive policing a transition from being a surveillance dragnet to that of an equitable public safety enhancer.

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