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International Journal of Criminal Justice

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[Special article]

Global Developments in Legal Tech and the Pivotal Role of Digital Innovation: Legislative and Governmental Responses in Germany

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Abstract

This paper introduces the state of legal tech development in Germany and outlines the country's regulatory framework for legal tech. Following a conceptual clarification, the paper examines various legal tech applications used in private law as well as in public law by administrative and law enforcement authorities. It then explores the regulatory framework governing legal tech in Germany, which is largely shaped by EU law and supplemented by national regulations. Overall, the analysis reveals that Germany and the European Union tend to regulate legal tech in a sector-specific manner, aiming to anticipate technological developments through legal norms. In the final section, the paper compares this approach to South Korea's "principle of adopting technology first and regulating later," highlighting the advantages and disadvantages of each model and exploring how both countries can learn from one another in shaping legal tech regulation.

Keywords: Comparative Legal Tech Governance; German Legal Tech Regulation; European Legal Tech Regulation; AI Regulation; Law Enforcement and Legal Tech.

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Introduction and Overview

As early as the 1960s, legal scholarship in Germany began discussing the use of computers in the legal field and the automation of legal decision-making.[1] In this discourse, the German sociologist and legal scholar *Niklas Luhmann* observed in 1966 that, ultimately, there were no rational grounds for preferring human over machine performance.[2] More than half a century has passed, and the technological landscape has undergone fundamental changes. Instead of strictly conditionally programmed algorithms, today's artificial neural networks continuously improve themselves, operating in ways that are largely opaque to human understanding. Nevertheless, *Luhmann's* prescient reflections resonate in contemporary debates – particularly when he raises the question of whether there is a right to the involvement of a human brain in decision-making.[3]

Only half a lifetime later, the world of law and technology had undergone a profound transformation. The engagement of law with machines evolved from a niche topic into a subject of broad societal relevance. In 2006, American legal scholar *Lawrence Lessig* made a lasting mark on legal thought with his statement that "code is law,"[4] which has since been quoted in virtually every academic paper on legal technology (colloquially known as "legal tech").[5] By the 2010s, the legal tech market was in full swing. The "disruption" brought by digitalisation and artificial intelligence (AI) has reached every part

1 *See generally* HANS PETER BULL, VERWALTUNG DURCH MASCHINEN [ADMINISTRATION BY MACHINES] (1964); SPIROS SIMITIS, AUTOMATION DER RECHTSORDNUNG [AUTOMATION OF THE LEGAL SYSTEM] (1967).

2 NIKLAS LUHMANN, RECHT UND AUTOMATION IN DER ÖFFENTLICHEN VERWALTUNG [LAW AND AUTOMATION IN PUBLIC ADMINISTRATION], at 60 footnote 24 (1966).

3 *Id.* at 47.

4 LAWRENCE LESSIG, CODE: AND OTHER LAWS OF CYBERSPACE, VERSION 2.0, at 1 (2006).

5 *See, e.g.*, Walter Blocher, *Fehlerhafte Smart Contracts* [*Defective Smart Contracts*], *in* RECHTSHANDBUCH SMART CONTRACTS [LEGAL HANDBOOK SMART CONTRACTS] (Tom H. Braegelmann & Markus Kaulartz eds.), Chap. 10, at para. 17 et seq. (2019); Sebastian Omlor, *Demokratische Blockchain-Alogrithmen: von »Code is Law« zu »Law is Code«?* [*Democratic Blockchain Algorithms: From "Code Is Law" to "Law Is Code"?*], 2022 JURISTENZEITUNG [LAWYER'S NEWSPAPER] [JZ] 649, 649; Björn Steinrötter, *Vermeintliche Ausschließlichkeitsrechte an binären Codes: Justizministerkonferenz spricht sich gegen "Dateneigentum" aus* [*Supposed Exclusive Rights to Pieces of Binary Code: Conference of Justice Ministers Opposes "Data Ownership"*], 2017 MULTIMEDIA UND RECHT [MULTIMEDIA AND L.] [MMR] 731, 734.

of the legal profession[6]; what were once mere buzzwords were transformed into practical applications. Legal action had been simplified for practitioners and consumers alike, improving access to justice, and the profession of paralegals specializing in research and document management was suddenly considered to be under imminent threat from AI.[7]

Even though this phenomenon affects every legal jurisdiction, it finds different fertile ground from country to country, and is subject to varying regulations and restrictions. A pertinent question, then, is whether technological development must adapt to regionally divergent law or whether it is up to the law to change. This article provides insight into the German legal system's reaction to the rise of legal tech and explain how it attempts to frame and control the technical possibilities.

This article first defines the concept of legal technology that underpins this topic, highlights examples of its application, and identifies areas where businesses and legal scholars see further potential for integrating digital tools into legal practice. The article also makes particular reference to the work of German public prosecutors and law enforcement agencies *(Polizeibehörden)* and the legal provisions that govern and frame their work. The main part of the article, however, is an overview of the German and European legal framework for legal tech applications, as this is an indispensable contextualisation. This article considers it particularly important to take into account not only positive law, but also the interests that lie behind it, and aims to clarify which constitutional and economic interests play a role in the regulation of legal tech from a German legal perspective. In other words, amidst the competing interests of promoting innovation and upholding principles such as equality and justice, what emerges as the driving force within the German legal system? Finally, the article ventures a comparison of these findings with the state of

6 The German-speaking world has used the term "technological disruption" primarily since the 2010s. A search in the Beck Online database reveals that of 329 contributions using this term, only two were published before that decade. As one approaches 2024, the number of such contributions increases significantly.

7 One of the foundational studies examining the automation potential of various professions is Carl Benedikt Frey & Michael A. Osborne, The Future of Employment: How Susceptible Are Jobs to Computerisation?, (Sept. 1, 2013, Oxford Martin Sch. Working Paper). Writing even as far back as 2013, the authors describe (at 19) how law firms increasingly rely on algorithms for auxiliary tasks like pre-trial research and drafting case briefs.

legal tech regulation in the Republic of Korea.

1. From Buzzword to Established Legal Field: Defining Legal Tech

"Legal tech" or "legal technology" refers to tools and software that assist legal practitioners and governmental bodies in organizing legal workflows, efficiently providing legal services, and swiftly making decisions. This includes systems capable of independently performing complex legal reasoning and making decisions autonomously, in part or even in whole. However, a clear definition is essential if legal tech is not to devolve into a mere marketing buzzword.[8] Although German jurisprudence is well known for its finely structured doctrinal studies ("Rechtsdogmatik"), it has not yet developed a precise definition. The German understanding of legal tech has evolved in recent years alongside technological advances. Similar to the distinction drawn by their colleagues in the English-speaking world,[9] most German scholars now distinguish between three stages of legal tech evolution[10]:

Legal tech 1.0 primarily encompasses software for data processing and electronic legal transactions. These applications are broadly part of "office tech", with little to distinguish them from those used in medical practices or corporate settings.[11] Legal tech 1.0's core advancement is the optimisation of workflows by law firms and government agencies through such innovations as cloud computing, document automation, and electronic filing. In addition, the advent of legal databases has provided fast access to legal content – Beck Online and Juris are used by German academic institutions, law firms and

8 For this exact criticism, *see* Susanne Hähnchen & Robert Bommel, *Digitalisierung und Rechtsanwendung* [*Digitalisation and the Practice of Law*], 2018 JZ 334, 335.

9 Oliver R. Goodenough, *Legal Technology 3.0*, HUFFINGTON POST CONTRIBUTORS BLOG (Apr. 6, 2015), https://www.huffpost.com/entry/legal-technology-30_b_6603658.

10 Susanne Hähnchen, Paul T. Schrader, Frank Weiler & Thomas Wischmeyer, *Legal Tech*, 2020 JuS 625, 626; CHRISTINA-MARIA LEEB, DIGITALISIERUNG, LEGAL TECHNOLOGY UND INNOVATION [DIGITALISATION, LEGAL TECHNOLOGY UND INNOVATION] 52 et seq. (2019); Frank Remmertz, *Legal Tech und RDG* [*Legal Tech and the Legal Services Act*], *in* BECK'SCHES RECHTSANWALTS-HANDBUCH [BECK'S ATTORNEY HANDBOOK] (Christoph Hamm ed.) § 64 paras. 8 et seq. (12th ed. 2022). For an alternative classification model, *see id.* at paras. 15 et seq.

11 Hähnchen & Bommel, *supra* note 8.

government agencies. These databases have improved access to legal knowledge, profoundly changing the way we think and work, starting in the late 1990s. However, at least in Germany, private lawyers have usually been the driving force behind the adoption of first-generation legal tech. Public authorities have tended to lag behind because of their more cumbersome governance structures and their sheer size.

This is even more pronounced with legal tech 2.0, a term used to describe software applications capable of performing certain tasks autonomously. For instance, such a system can apply legal rules to facts inputted by the user to auto-generate contracts; issue automated[12] administrative acts[13] (*see* Sec. 35a of the Administrative Procedure Act (Ger.)[14]); or give an automated assessment of the likelihood of litigation success in standardised cases (such as speeding offences or passenger rights claims). Second-generation applications can now streamline almost every discrete step in legal practice, from gathering facts to creating legal documents like contracts and complaints for online dispute resolution.[15] In Germany, the legal issues addressed by state authorities are assessed by qualified lawyers and, as such, there appears to be only little need for such software to date. However, minor criminal offences in Germany are dealt with by paralegals (as opposed to qualified lawyers with a state examination in law) and the use of legal tech 2.0 in such matters would be conceivable in principle.

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12 *See generally* Thorsten Siegel, *Automatisierung des Verwaltungsverfahrens - zugleich eine Anmerkung zu §§ 35a VwVfG etc. [Automating Administrative Proceedings; Simultaneously, A Note on VwVfG §§ 35a etc.]*, 2017 DEUTSCHES VERWALTUNGSBLATT [GERMAN ADMINISTRATION GAZETTE] [DVBL.] 24–28; Hans Peter Bull, *Der vollständig automatisiert erlassene Verwaltungsakt – Zur Begriffsbildung und rechtlichen Einhegung von E-Government [Administrative Orders Issued Fully Automatically – On Conceptualising and Legally Limiting e-Government]*, 2017 DVBL. 409–17.

13 For the legal concept of the "administrative act" or "administrative order" (*Verwaltungsak*t), originating in Continental Europe, *see* Florian Becker, *The Development of German Administrative* Law, 24 Geo. Mason L. Rev. 453, 464 (2017); *see generally* Wolfgang Kahl, *Der Verwaltungsakt – Bedeutung und Begriff [The Verwaltungsakt – On its Significance and on the Concept Itself],* 2001 JURISTISCHE AUSBILDUNG [TRAINING IN JURISPRUDENCE] [JURA] 505–13; Michael Fehling, *Der Verwaltungsakt – Begriff und Bedeutung [The Verwaltungsakt – On the Concept and its Significance]*, 1997 JURISTISCHE ARBEITSBLÄTTER [WORKSHEETS IN JURISPRUDENCE] [JA] 482–85.

14 Verwaltungsverfahrensgesetz [VwVfG], May 25, 1976, BUNDESGESETZBLATT [FEDERAL LAW GAZETTE] [BGBL.] Part I No. 59 (at 1253), repromulgated Jan. 23, 2003, BGBL. I at 102, last amended by Gesetz [G.], July 15, 2024, BGBL. I No. 236; available in translation, as last amended by G., May 5, 2004, BGBL. I 718, at https://www.bmi.bund.de/SharedDocs/downloads/EN/gesetztestexte/VwVfg_en.pdf (BMI 2004).

15 Hähnchen et al., *supra* note 10; Remmertz, *supra* note 10 at para. 13.

Legal tech 3.0 represents the integration of AI into existing applications, as well as the emergence of standalone AI applications designed specifically for the legal context. (Besides this, *unspecific* AI applications such as ChatGPT can also be used by lawyers, judges or legal scholars – but this makes them "legal tech" only in a *functional* sense.) AI applications generate novel conclusions from the input provided without relying on strict conditional logic. This notably includes digital assistants that use natural language processing (NLP). Major legal databases are now working to integrate NLP-driven tools, such as chatbots similar to ChatGPT, with their vast repositories of case law. Good results thus far promise significant efficiency gains for legal work in the near future.[16] The aspiration is to create digital paralegals capable of drafting briefs and accurately citing case law. Someday, one imagines, there might be digital judges and digital lawyers who can independently draft judgments or pleadings based on large data sets. Any human involvement after that point could well become a mere formality.

These AI applications, which have the potential to replace core elements of legal work, represent some of the most significant developments in the legal field. When AI begins making decisions that are not strictly governed by conditional logic – decisions that, in turn, serve as the foundation for further AI-driven legal applications – it could be seen as the emergence of a digital perpetual motion machine. This raises a fundamental question: to what extent should both the automated application of the law and the generation of new legal norms be regulated, assuming such processes are permitted at all? Underlying this issue is the more practical question of whether AI can be effectively regulated in the first place.

2. Legal Tech Use Cases in German Civil Law

This section provides an overview of various legal tech applications that have become an integral part of the working methods of both private

16 The American platforms LexisNexis and Thomson Reuters have already successfully integrated such tools; *see generally* Abigail Hopf, Column, *AI's Impact on the Legal Profession*, 67 RES GESTAE IND. B.J. 29 (2024). The German platform Beck Online is currently testing a chatbot in its beta version.

individuals and legal professionals within German civil law. The discussion in *sub* part a) focuses on self-executing contracts, commonly known as smart contracts. *Sub* part b) addresses how claims can be asserted online and enforced digitally. *Sub* part c) considers German labour law, where even legal tech 3.0 applications are already at play.

a) Smart Contracts

In German civil law, legal tech is closely intertwined with the idea of smart contracts. Admittedly, the term "smart contract" is, in some respects, misleading. Contrary to popular assumptions, smart contracts are not inherently "smart"; they do not necessarily incorporate AI or advanced autonomous decision-making functions.[17] For the first time, a legal definition of a smart contract is provided in Art. 2 No. 39 of the EU Data Act, which describes it as a "computer program used for the automated execution of an agreement or part thereof, using a sequence of electronic data records and ensuring their integrity and the accuracy of their chronological ordering." In simplified terms, a smart contract is an agreement that is entered into like any other contract and subsequently translated into machine language.[18] This allows the contract to automatically verify whether certain contractual conditions have been met or not, and to trigger the corresponding legal effects based on that verification.[19]

In practice, smart contracts are already being used in the execution of insurance agreements. For instance, in 2017, the German insurance company AXA introduced a flight delay insurance product based on blockchain

17 David Paulus, *Was ist eigentlich … ein Smart Contract? [Just What Is… A Smart Contract?],* 2020 JuS 107, 107; Sebastian Schnell & Corbinian Schwaab, *Vertragsgestaltung beim Einsatz von Smart Contracts zur Automatisierung von Lieferbeziehungen [Designing Legal Agreements For the Use of Smart Contracts to Automate Performance],* 2021 Betriebs-Berater [Enterprise Advisor] [BB] 1091, 1091; Katharina Kollmann, *Smart Contracts im bürgerlichen Recht [Smart Contracts in Civil Law],* 2024 MMR 137, 138.

18 Dennis-Kenji Kipker, Piet Birreck, Mario Niewöhner & Timm Schnorr, 2020 MMR 509, 509; Maximilian Kloth, *Blockchain basierte (sic) Smart Contracts im Lichte des Verbraucherrechts [Blockchain-based Smart Contracts in Light of Consumer Law],* 2022 Verbraucher und Recht [Consumers and L.] [VuR] 214, 215.

19 Kollmann, *supra* note 17; Nadine Schawe, *Blockchain und Smart Contracts in der Kreativwirtschaft – mehr Probleme als Lösungen? [The Blockchain and Smart Contracts in the Creative Sector – More Problems Than Solutions?],* 2019 MMR 218, 218.

technology, which automatically disburses compensation for flight delays. Additionally, smart contracts are being tested in the form of household items – for example, a smart refrigerator that autonomously manages electricity consumption or an intelligent washing machine that independently orders detergent or schedules repairs.[20]

b) *Digital Enforcement of Claims and Online Dispute Resolution*

Smart contracts are thus, among other things, a tool for avoiding legal disputes, as the specified legal consequences automatically take effect (such as compensation for a delayed flight). However, tools have also been developed to facilitate the enforcement of traditional contracts. This is particularly useful in cases where the legal consequences are straightforward to determine. In Germany, various private websites and legal insurance providers offer such services.[21] These services benefit consumers by enabling them to claim amounts of money to a certain limit through a simple, cost-effective process.[22]

One business model is websites that offer people a quick, AI-supported check of the chances of success of a legal action, such as against a rent increase. Following a positive result of success predicted by AI, the customer has the option of assigning his or her claims against a third party to the operator of the online platform. The operator will then try to enforce the claim and go, if necessary, to court. If successful, the economic benefit is shared between the original customer and the operator of the online platform.[23] The German Federal Court of Justice has endorsed this approach, interpreting professional

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20 For further elaboration on these examples, *see* Kollmann, *supra* note 17.

21 The German Internet platform Conny.de (formerly known as Wenigermiete.de ["lower-rent.de"]) offers automated legal enforcement for various landlord–tenant disputes in both German and English. The German legal claims insurance provider ÖRAG has an integrated online service for its clients, which enforces legal claims in airline travel disputes. The platform Myright.de became famous by providing buyers of manipulated diesel vehicles with an automated service for claiming damages.

22 For this reason, the German law commonly referred to as the "Legal Tech Act," which regulates the legal status of such platforms, is officially titled the Act to Promote Consumer-Friendly Services in the Legal Services Market. *See generally* Tim Günther, *Das neue „Legal-Tech"-Gesetz* [*The New 'Legal Tech' Act*], 2021 MMR 764–769.

23 *See* Markus Hartung, *Legal Tech Sandboxes*, 2021 RECHT DIGITAL [LAW IN DIGITAL FORM] [RDI] 421, 422 para. 3.

legal practice rules in a liberal and technology-friendly manner.[24]

Since 2013, consumers have also been able to assert their claims against online sellers through the EU's Online Dispute Resolution (ODR) system.[25] This process is free of charge for both parties. For consumers who live in an EU member state, Iceland, Liechtenstein or Norway, the platform facilitates communication between the consumer and trader in such cases, as well as searches for a recognised alternative dispute resolution body for the claim. In its first year alone, 24,000 consumers used the ODR platform.[26]

c) Legal Tech in Employment Law

A notable example of a legal tech 3.0 application currently in the testing phase within the realm of employment law involves the use of AI-driven chatbot technology for recruitment. The parent company of the German delivery service *Lieferando* has partnered with *HireVue* to implement an automated interview process using their chatbot service. This system streamlines the first round of candidate interviews, enabling the chatbot to conduct initial screenings by asking a predefined set of questions and evaluating responses based on set criteria. Candidates who meet the required qualifications are then selected for a second-round interview with HR staff.

This shift toward automation is reportedly enhancing the recruitment process by increasing hiring speed by up to 50%.[27] With faster candidate selection and reduced reliance on human recruiters for initial assessments, companies can efficiently process a large volume of applications in less time.

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24 Bundesgerichtshof [BGH] [Federal Court of Justice], Nov. 27, 2019 (docket no. VIII ZR 285/18), *reprinted in* 2020 NJW 208.

25 *See* Regulation (EU) No 524/2013 of 21 May 2013 on Online Dispute Resolution for Consumer Disputes and Amending Regulation (EC) No. 2006/2004 and Directive 2009/22/EC (Regulation on Consumer ODR), 2013 OFFICIAL JOURNAL OF THE EUROPEAN UNION [O.J.] (Series L, no. 165), 1 (18 June 2013).

26 Press Release, European Commission, Buying Online and Solving Disputes Online: 24.000 Consumers Used New European Platform in First Year (Mar. 24, 2017), https://ec.europa.eu /commission/presscorner/detail/en/ip_17_727.

27 Johannes Kätscher & Paulina Jo Pesch, *Automatisierte Entscheidungsfindung mittels großer Sprachmodelle (LLM) im Beschäftigtenkontext [Automated Decision-Making In the Hiring Process Using Large Language Models (LLMs)]*, 2024 KÜNSTLICHE INTELLIGENZ UND RECHT [ARTIFICIAL INTELLIGENCE AND LAW] [KIR] 46, 49.

However, the integration of such technology in employment law brings with it several important considerations.

From a legal perspective, the application of employment law is crucial when adopting AI-driven recruitment tools. Chatbot-based interviews must adhere to strict legal standards designed to ensure fairness and prevent discrimination. For instance, the system must be carefully programmed to avoid any biased questioning or profiling based on personal characteristics such as age, gender, ethnicity, or disability. This is especially important under anti-discrimination laws in Germany, such as the *Allgemeines Gleichbehandlungsgesetz (AGG)*, which aims to prevent discrimination in the workplace.

d) Side Note: The Suitability of German Civil Law for Automation

The suitability of a legal system for implementing legal tech applications is shaped by fundamental legal-cultural choices and methodological frameworks that cannot be altered overnight. A key factor in assessing automation potential is whether the system follows a deductive approach, deriving decisions from established legal norms, or an inductive approach, relying on case-based reasoning and precedent.

The German legal system is rooted in a strong civil law tradition, where laws are created by parliament and implemented by the courts.[28] The idea that areas such as contract law, tort law, or even criminal law could be invented or developed on a case-by-case basis by courts, like they are in a common law system, is unthinkable in German law. This makes digitalisation easier in many respects, as the law functions somewhat more mechanically than in other legal systems. However, even in German law, open questions often remain that are unsolvable without establishing a consistent judicial approach – something akin to case law.

Taking landlord–tenant disputes in Germany as an example: while the law stipulates that rent owed is reduced by the operation of law in the event of

28 Regarding this point and the differences discussed in the following, *see* JOHN HENRY MERRYMAN & ROGELIO PÉREZ PERDOMO, THE CIVIL LAW TRADITION, 34 et seq. (4th ed. 2019).

a breach of contract, it does not specify by how much in each case (see Sec. 536(1) German Civil Code). Courts have thus created categories of cases and today, anyone with relevant legal tech tools can determine the amount they might be entitled to in such a dispute for issues like a broken heater, a leaking roof, or mould.[29] In other areas, the law has already adapted to digitization. EU-wide harmonized travel law serves as a prime example of fully codified law, where legal consequences for specific delays are clearly defined in the legislation itself.[30]

The German legal system, therefore, occupies a middle ground between fully programmed law and flexible judicial law. In recent years, calls for the law to be made more compatible with digital applications have grown louder.[31] Some German federal states have already responded to this demand. For example, Sec. 18(1) of the Hessian E-Government Act states: "In the preparation of legislative initiatives as well as draft laws and regulations, the interests of the digitalisation of government and administration must be taken into account by the responsible authorities." However, there are also reasons to be cautious about fully adjusting the law to the demands of digitalisation. All legal systems share the goal of achieving solutions that are as case-specific as possible – an objective that must be taken into account when reducing the legal application process to algorithms.

3. Legal Tech Use Cases in German Public Law

The use of legal tech is not only widespread in civil law. State actors in

29 These and other case categories, along with references to relevant case law, may be found in Elmar Streyl, *in* SCHMIDT-FUTTERER/BÖRSTINGHAUS MIETRECHT, KOMMENTAR [SCHMIDT-FUTTERER & BÖRSTINGHAUS'S COMMENT. ON RENTAL L.] § 536 paras. 108 et seq. (Ulf Börstinghaus ed., 16th ed. 2024; Article-by-Article Commentary).

30 *See generally* Klaus Tonner, *Die neue Pauschalreiserichtlinie* [*The New Package Travel Directive*], 2016 EUZW 95.

31 *See generally* Annette Guckelberger, *Modernisierung der Gesetzgebung aufgrund der Digitalisierung* [*The Modernisation of Legislation Because of Digitalisation*], 2020 DÖV 797. In Germany, these discussions have been particularly prominent in tax law; *see generally* Julia Ruß, Roland Ismer & Juliane Margolf, *Digitalisierung des Steuerrechts: Eine Herausforderung für die Ausgestaltung von materiellen Steuergesetzen* [*Digitalisation of Tax Law: A Challenge for the Drafting of Substantive Tax Laws*], 2019 DEUTSCHES STEUERRECHT [GERMAN TAX LAW] [DStR] 409.

Germany also increasingly recognize the benefits they can derive from using algorithms. This section in *sub* part a) first provides an overview of the current state of digitalization in public administration in Germany. It then in *sub* part b) examines the specific ways in which German law allows or facilitates the government's use of automation and AI, as well as the legal requirements that limit and condition the use of legal tech for public purposes. Finally, in *sub* part c) this section specifically addresses the use of legal tech in law enforcement and crime prevention.

a) Legal Tech 1.0's Use by the Administration in Germany: The e-Government Picture

The German public authorities are closely monitoring the legal tech market and working to streamline legal processes by integrating legal tech. When public authorities adopt first-generation legal tech tools, this is generally referred to as e-government,[32] rather than legal tech. This is more of a difference in words than in substance.

The United Nations' 2022 E-Government Survey shows Europe leading the world in e-government, scoring the highest on its E-Government Development Index.[33] Yet Germany ranks only slightly above average within Europe and does not belong to the global frontrunners (a group that includes the Republic of Korea).[34] Germany's Online Access Act of 2017 aimed to make 575 different administrative services available online by 2022,[35] an

32 *See generally* Marco Herrmann & Karlheinz Stöber, *Das Onlinezugangsgesetz des Bundes* [*The Federal Government's Online Access Act*], 2017 NEUE ZEITSCHRIFT FÜR VERWALTUNGSRECHT [NEW J. ADM. L.] [NVWZ] 1401; Andreas Voßkuhle & Sonja Heitzer, *Grundwissen – Öffentliches Recht: E-Government* [*Basic Knowledge – Public Law: e-Government*], 2023 JUS 1113. For a detailed breakdown of definitions and overlaps, *see generally* Michael Kolain & Dennis Hillemann, *Government Technology (GovTech) – Rahmenbedingungen für eine Kooperation des öffentlichen und privaten Sektors im Bereich Digitalisierung* [*Government Technology (GovTech) – Parameters for a Cooperation of the Public and Private Sectors on Digitalisation*], 2022 LEGAL TECH [LTZ] 88.

33 U.N. DEP'T OF ECON. & SOC. AFFS., E-Government Survey 2022 – The Future of Digital Government, at 1-8 (p. 39 of the full PDF report), U.N. Doc. ST/ESA/PAD/SER.E/216, U.N. Sales No. E.22.II.H.2 (Sep. 28, 2022).

34 While the Republic of Korea ranked third globally in 2022 with an EGDI value of 0.9529, Germany, with an EGDI value of 0.8770, was positioned only at 22nd place. *See id.* at 1-6, 1-9 (pp. 37, 40 in the full PDF report).

35 Gesetz zur Verbesserung des Onlinezugangs zu Verwaltungsleistungen [An Act to Improve the Online Access to Administrative Services], Aug. 14, 2017, BGBL. I 3122, 3138. *See generally* Herrmann & Stöber, *supra* note 32; Utz Schliesky & Christian Hoffmann, *Die Digitalisierung des Föderalismus* –

objective, however, that Germany failed to meet. As of January 2024, only 153 digital administrative services had been launched nationwide.[36] While numerous government services are now available online, such as applying for a driver's license online or requesting and automatically transmitting digital police clearance certificates (attesting to the existence of a criminal record or lack thereof),[37] further government action is clearly needed. The German legislature has recently responded by enacting the Online Access Act 2.0, which standardises processes across the country in order to rapidly increase access to them.[38]

b) Legislative Regulation, Constitutional Constraints

Second-generation legal tech and beyond is, unlike the classic features of e-government, still the exception in administrative procedures. Its application has advanced furthest in Germany's revenue administration,[39] where there are large numbers of uniform procedures to carry out.[40]

In principle, even acts of public authority that interfere with individual rights – a special doctrinal category in German administrative law – may be issued in a fully automated manner, including by the application of AI.[41]

Portalverbund gem. Art. 91c Abs. 5 GG als Rettung des E-Government? [*The Digitalisation of Federalism – An Association Between the Federal and* Land *Governments for the Purposes of IT Access to Administrative Services, Pursuant to GG art. 91c para. 5, As Saviour of e-Government?*], 2018 DIE ÖFFENTLICHE VERWALTUNG [THE ADMINISTRATION] [DÖV] 193; Thorsten Siegel, *Berlin, Auf dem Weg zum Portalverbund – Das neue Onlinezugangsgesetz (OZG)* [*Berlin: On the Way to the IT Access Portal Association – The New Online Access Act*], 2018 DÖV 185.

36 INSTITUT DER DEUTSCHEN WIRTSCHAFT [GERMAN BUSINESS INSTITUTE], BEHÖRDEN-DIGIMETER: JANUAR 2024 ['DIGITALISATION-METRE' FOR PUBLIC AUTHORITIES: JANUARY 2024] 3 (Klaus-Heiner Röhl Feb. 15, 2024).

37 For further examples and the relevant German legal provisions, *see* Daniel Dürrschmidt, *Digitaler Gesetzesvollzug* [*Digital Execution of the Laws*], 2024 JUS 193, 194.

38 Gesetz zur Änderung des Onlinezugangsgesetzes sowie weiterer Vorschriften zur Digitalisierung der Verwaltung [An Act to Change the Online Access Act As Well As Other Provisions for the Digitalisation of the Administration], July 19, 2024, BGBL. I No. 245. *See generally* Annette Guckelberger, *Das Onlinezugangsgesetz 2.0* [*The Online Access Act, 2.0*], 2024 DÖV 849.

39 A mirror image of the demand for digital and computer-assisted filing by private persons interacting with this part of Germany's administration.

40 Gerrit Hornung, *in* GRUNDLAGEN DES VERFASSUNGSRECHTS [FOUNDATIONS OF CONSTITUTIONAL LAW] (3 vols., Julian Krüper, Mehrdad Payandeh & Heiko Sauer eds., forthcoming 2025–26) (manuscript at Part 4.3.2).

41 *Id*.

However, the authorising provision, Sec. 35a of the German Administrative Procedure Act, limits full automation of administrative acts to ministerial ones that permit no administrative discretion at all.[42] German jurisprudence understands these administrative acts as consisting only of a fully pre-determined execution of the law, with no autonomous element whatsoever.

Fundamental rights thinking defines the German discussion on this issue, with some scholars arguing that the constitutional guarantees of human dignity and the rule of law reserve the issuance of binding decisions to human beings,[43] and not just the Administrative Procedure Act. This, though, is an exaggerated view of the extent of these constitutional principles. That a statutory provision like Sec. 35a is necessary to legalise novel means of asserting public authority over private persons reflects the long-standing German constitutional tradition that requires the legislature's authorisation for any government interference with individual rights, even where it is only mechanically carrying the law into effect.

This means that even when the technology is fully developed, in short order, application in law enforcement and broader administration will come only after parliament makes a political decision in favour of its implementation in Germany.

Even if AI does not have the last word on any decision and only assists authorities by suggesting possible conclusions, human officials may be inclined to appropriate the suggestions presented as their decision without properly considering others. The existence of this "automation bias" could hurt the trust in the judiciary by causing members of the public to doubt that a court's process of decision-making is an open one, not prejudiced by the AI's result.

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42 *See* Lorenz Prell, *VwVfG § 35a Vollständig automatisierter Erlass eines Verwaltungsaktes* [*VwVfG § 35a Fully Automated Issuance of an Administrative Act*], in BECKOK VWVFG [BECK'S ONLINE COMMENT. ON THE VWVFG] (Johann Bader & Michael Ronellenfitsch eds.), at margin note 13 et seq. (64th ed. 2024).

43 *See* Anna K. Bernzen, *Roboter als Richter? – Zur Automatisierung der Rechtsprechung* [*Robots as Judges? – On the Automation of Judicial Decision-Making*], 2023 RECHT DIGITAL [LAW IN DIGITAL FORM] [RDI] 132, 136; DAVID NINK, JUSTIZ UND ALGORITHMEN [COURTS AND ALGORITHMS], at 349 (2021).

Public authorities are subject to far stricter limitations than private actors in terms of legal tech regulation by virtue of their special constitutional and administrative law burdens. Specific legal requirements notwithstanding, the prospects for legal tech in government are also determined by the general regulatory framework in Germany (see Part 4).

All this is not to say that AI could have no place within the administration of justice and enforcement of the laws. It may be prudent to consider administrative and judicial fact-finding and interpretation of the law separately to assess its potential (see Part 4.c).).

Within legal academia, at least, the possibility of supporting – or even replacing – lower-level public officials and, theoretically, even judges is no longer a taboo idea. Numerous projects are underway to model complex human tasks, such as drafting judicial opinions or legal commentaries, using NLP-based algorithms.[44]

Needless to say, AI-driven *legislation* is still science fiction, and the application of legal tech by the courts is, at the least, highly controversial.

c) Legal Tech and Public Safety – Law Enforcement and Crime Prevention

German legal academia is increasingly exploring more advanced potential applications of technology for state functions in the future. For instance, digital law enforcement through public surveillance cameras is under discussion. Here, AI could assist by matching movement patterns and biometric data, alerting police forces to suspects.[45]

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44 Henrik Dietrich, *Auslegen und Subsumieren mit ChatGPT* [*Interpreting the Law and Applying it to Facts with ChatGPT*], 2024 NJW 2092 examines to what extent ChatGPT, from the perspective of a judge, can apply legal rules to a set of facts. He concludes that while the software is not yet fully developed for this purpose, it is suitable for brainstorming. A legal commentary on Art. 8 of the German Basic Law (Grundgesetz [GG]), fully written by a Large Language Model (LLM), has recently been published. For further elaboration on this project, *see generally* Christoph Engel & Johannes Kruse, *Kommentar ohne Autor: Können Sprachmodelle das Kommentieren übernehmen?* [*Commentary Without an Author: Can Language Models Take Over the Job of Providing Article-by-Article Legal Commentary?*], 2024 JZ 997.

45 Dieter Kugelmann & Antonia Buchmann, *Der Algorithmus und die Künstliche Intelligenz als Ermittler* [*The Algorithm and Artificial Intelligence as an Investigator*], 2024 ZEITSCHRIFT FÜR DAS

Tools like predictive policing, aiming to allow for a better assessment of facts in criminal procedures, are seen as a possible danger for the *Allgemeines Persönlichkeitsrecht* (the German legal concept that protects an individual's personal identity and autonomy),[46] the general constitutional right to privacy, unimpeded development of the individual, and self-determination. (*See also* Part 4.b).cc), for restrictions in EU law.) Mainly for this reason, automated criminal proceedings and even automated surveillance systems for sanctioning traffic violations are still unthinkable in the German legal system.

In many other cases, however, the use of AI fails because the criminal files are simply not available in digital form. Many German federal states are therefore currently working on digitising their files. There is such a pilot procedure in Rhineland-Palatinate, for example. The use of AI at the level of identifying legally relevant facts requires that all the facts to be analysed are available in digital form. As a result, AI tools have mainly been used to investigate internet crimes such as child pornography, where the evidence is obtained in digital form. Analogue detection would often no longer be conceivable in this field because it would be far too slow.

4. Legal Framework – How Multi-Level Governance Determines Legal Tech's Role in Germany

The most important regulatory decisions determining the fate of legal tech in Germany, including its use in the justice system, law enforcement, and the prevention of crime, are not, however, the requirements of Germany's constitution and laws that specifically allow, condition, and restrict its use by

GESAMTE SICHERHEITSRECHT [J. SECURITY L.] [GSZ] 1, 2. For a discussion on the constitutional law issues, *see generally* Andreas Kulick, *"Höchstpersönliches Merkmal" – Verfassungsrechtliche Maßstäbe der Gesichtserkennung* [*A "Highly Personal Identifier" – Standards for Facial Recognition in Constitutional Law*], 2020 NVwZ 1622.

46 *See* Timo Rademacher, *Predictive Policing im deutschen Polizeirecht* [*Predictive Policing in German Police Law*], 142 ARCHIV DES ÖFFENTLICHEN RECHTS [ARCHIVE OF PUBLIC LAW] [AöR] 366, 393 et seq. (2017)*;* Florian Zenner, *Algorithmenbasierte Straftatprognosen in der Eingriffsverwaltung - Zu den verfassungsrechtlichen Grenzen und einfachgesetzlichen Möglichkeiten von "Predictive Policing" [Algorithm-Based Crime Predictions in Law Enforcement – On the Constitutional Limits and Statutory Possibilities of* "*Predictive Policing*"*] in* DIGITALISIERUNG RECHTSFRAGEN RUND UM DIE DIGITALE TRANSFORMATION DER GESELLSCHAFT 117, 123-33 (Mirko Andreas Wieczorek ed., 2018).

public authorities and for these purposes.

Rather, it is a distinctive feature of legal tech regulation in Germany that, as a cross-disciplinary matter, there is no single "Legal Tech Act" specifically addressing the issues raised in Parts 2 and 3 of this article.[47] Instead, aspects of legal tech regulation are found across various legal domains, including data protection law, AI regulation, rules on access to courts, and professional law governing qualified lawyers. This results in different regulatory bodies being responsible, which can make the regulatory landscape seem somewhat opaque at first glance.[48]

Furthermore, it is EU law-making that has been most prolific in directly addressing some applications of legal tech, by participants in the European single market as well as by its own member states. Following a distinction between private law and public law regulations, this part outlines the regulations at the European level that are relevant to legal tech in Germany. Following that, it discusses the measures taken by the German Federal legislature and, finally, those implemented by Germany's individual *Länder*, or federated states. The closing subsection brings together the disparate regulatory tendencies to try to find the essence of legal tech regulation in Germany.

a) Preliminary Note: Regulatory Differences Between Private and Public Law

Regarding German and European regulations, a distinction must be drawn between tools implemented by public authorities and those used between private parties. Automated legal processes by the state always carry the risk of unjustified infringements on fundamental rights.[49] A software error,

47 The German law often informally referred to as the "Legal Tech Act" was merely an amendment to professional regulations for qualified lawyers in response to legal tech developments, rather than a comprehensive codification of legal tech law; *see generally* Günther, *supra* note 22. *See also infra* Part 4.c).

48 *See* Robert Freedman, *Tech Companies in EU Face 100 Laws, 270 Regulators*, LEGAL DIVE, Sept. 16, 2024, https://www.legaldive.com/news/eu-tech-companies-face-100-laws-270-regulators-draghi-compliance-complexity/727086/.

49 *See* the examples in Kugelmann & Buchmann, *supra* note 45, at 4 et seq; Claudia Seitz, *Grundrechtsschutz und Künstliche Intelligenz* [*Fundamental Rights Protection and Artificial Intelligence*], 2024

or just an overly superficial simplification of processes, can result in fully automated but incorrect legal outcomes, which then become enforceable using the government's coercive power. Moreover, there is the risk of state surveillance, the dehumanization of legal processes, and a weakening of legal protections against the state.[50] When considering the future of legal tech in public administration, and particularly the full replacement of public officials or even judges, complex and fundamental constitutional questions arise, often discussed under the concept of a "right to a human decision."[51]

From fundamental rights also follows that legislation must expressly authorise the use of AI. The principle of "what is not prohibited is permitted" does not apply; conversely, everything that is not expressly permitted is prohibited. This is what German jurisprudence calls the "reservation of interference with individual rights to statute" (*Vorbehalt des Gesetzes*).

The Federal Constitutional Court reaffirmed this principle in a ruling on the security laws of Hamburg and Hesse and demanded a legal regulation specifically for the use of AI.[52] In a similar case, the Court of Justice of the European Union (EU) ruled that the use of artificial intelligence is not permissible for the automated analysis of Passenger Name Record data.[53] The Court also noted that the reduced traceability associated with the use of artificial intelligence could potentially impair the right to effective judicial

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EUROPÄISCHE ZEITSCHRIFT FÜR WIRTSCHAFTSRECHT [EUR. J. BUS. L.] [EUZW] 836, 839 et seq.

50 For a detailed discussion on the issues of discrimination and limitations in legal protection, *see* Seitz, *supra* note 49.

51 *See* Annette Guckelberger, *E-Government: Ein Paradigmenwechsel in Verwaltung und Verwaltungsrecht?* [*e-Government: A Paradigm Shift in Administration and Administrative Law?*], 78 VERÖFFENTLICHUNGEN DER VEREINIGUNG DER DEUTSCHEN STAATSRECHTSLEHRER [PUBLICATIONS OF THE ASSOCIATION OF GERMAN CONSTITUTIONAL LAW PROFESSORS] [VVDStRL] 235, 272 (2019); MARTIN EIFERT, ELECTRONIC GOVERNMENT 133 et seq. (2006); *see generally* DOROTHEA MUND, DAS RECHT AUF MENSCHLICHE ENTSCHEIDUNG [THE RIGHT TO A HUMAN DECISION] (2022).

52 *See* Bundesverfassungsgericht [Fed. Const. Ct.] [BVerfG], Feb. 16, 2023 (docket nos. 1 BvR 1547/19, 1 BvR 2634/20), 165 ENTSCHEIDUNGEN DES BUNDESVERFASSUNGSGERICHTS [DECISIONS OF THE FED. CONST. CT.] [BVERFGE] 363. *See also* Press Release (No. 18/2023), Fed. Const. Ct., Regelungen in Hessen und Hamburg zur automatisierten Datenanalyse für die vorbeugende Bekämpfung von Straftaten sind verfassungswidrig [Regulations in Hesse and Hamburg on the Automated Analysis of Data for the Preventive Restraint of Crime Are Unconstitutional] (Feb. 16, 2023), https://www.bundesverfassungsgericht.de/SharedDocs/Pressemitteilungen/ DE/2023/bvg23-018.html.

53 "Passenger Name Record (PNR) judgment" – C.J.E.U., June 21, 2022, *Ligue des droits humains ASBL* v *Conseil des ministres*, case no. C-817/19, ECLI:EU:C:2022:491, para 194.

protection (Article 47 of the Charter of Fundamental Rights of the European Union):[54] "[…] given the opacity which characterises the way in which artificial intelligence technology works, it might be impossible to understand the reason why a given program arrived at a positive match. In those circumstances, use of such technology may deprive the data subjects also of their right to an effective judicial remedy enshrined in Article 47 of the Charter […]".

In the realm of private law, the situation is somewhat more complex. Here, the focus is less on unjustified intrusions and more on issues such as consumer protection or the protection of certain professional groups (*i.e.*, qualified lawyers).[55] Of course, online legal enforcement tools are more convenient for consumers than traditional visits to a law firm. Nonetheless, it is essential to ensure that these new online alternatives provide the same quality standards as their traditional counterparts.[56] Similarly, in the area of smart contracts, specific quality standards must be upheld. We must prevent self-executing contracts from triggering unintended or unjustified outcomes and guard against abuse. For instance, a potential issue in landlord-tenant disputes is that a self-executing contract may fail to account for a legally mandated rent reduction.[57] In addition to all these factors, the German legal system also assumes that the state has a duty to protect its citizens from infringements by other private entities.[58] Even in private law, fundamental rights considerations can, therefore, play a role, which becomes more significant the greater the imbalance between the parties to a contract (for example, the user of a platform and the multinational tech giants behind it).

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54 *Id*. at para. 195.

55 *See* Christian Galetzka, Sophie Garling & Johannes Partheymüller, *Legal Tech – "smart law" oder Teufelszeug?* [*Legal Tech – "Smart Law" or Witches' Brew?*], 2021 MMR 20, 22; Günther, *supra* note 22, at 765 et seq.; Hans-Jürgen Hellwig & Wolfgang Ewer, *Keine Angst vor Legal Tech* [*Don't Be Afraid of Legal Tech*], 2020 NEUE JURISTISCHE WOCHENSCHRIFT [NEW LEGAL WEEKLY] [NJW] 1783, 1783 et seq.

56 *See* Hellwig & Ewer, *supra* note 55, at 1783.

57 Hähnchen et al., *supra* note 10, at 631; Christoph G. Paulus & Robin Matzke, *Relativierung der Zwangsvollstreckung durch smarte IT-Lösungen?* [*Are Smart IT Solutions Subverting the Procedure of Court Execution of Creditor Claims?*], 2017 COMPUTER UND RECHT [COMPUTERS & L.] [CR] 769, 772.

58 For a discussion on the constitutional duty to protect, *see*, e.g., THORSTEN KINGREEN & RALF POSCHER, GRUNDRECHTE [FUNDAMENTAL RIGHTS], at margin note 467 (40th ed. 2024).

A commonality between these two categories is, ultimately, the need to ensure the correct functioning of legal tech applications.[59] This could be achieved, for example, through state certification procedures or state-monitored private certification. The following section outlines how legal tech applications are regulated in the EU and Germany.

b) The EU's Role in Regulating Legal Tech

EU law plays a pivotal role for the Member States, as its regulations can directly impact citizens and businesses within these countries (see, *e.g.*, TFEU, art. 288(2)). Particularly in the realm of technology regulation, the EU has enacted a range of measures aimed at establishing a "level playing field" within the European internal market.[60] Of particular relevance for legal tech providers and users are the General Data Protection Regulation (GDPR),[61] the Data Act,[62] and the new AI Act,[63] with the latter's provisions set to fully take effect in August 2026 (see AI Act, art. 113).

aa) The EU General Data Protection Regulation (GDPR)

The GDPR is the EU's central instrument regulating the handling of personal data, both in digital and analogue contexts. It applies to states and

59 *See* Seitz, *supra* note 49, at 839.

60 *See*, e.g., recitals 21, 82, and 106 to the EU AI Act.

61 Regulation (EU) 2016/679 of 27 April 2016 on the Protection of Natural Persons With Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance), O.J. (L 119), 1 (May 4, 2016).

62 Regulation (EU) 2023/2854 of 13 December 2023 on Harmonised Rules on Fair Access to and Use of Data and Amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act) (Text with EEA relevance), O.J. L, 2023/2854, (Dec. 22, 2023).

63 Regulation (EU) 2024/1689 of 13 June 2024 Laying Down Harmonised Rules on Artificial Intelligence and Amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) (Text with EEA relevance), O.J. L, 2024/1689, (July 12, 2024). *See generally* Daniel Becker & Daniel Feuerstack, *Die EU-KI-Verordnung* [*The EU's AI Act*], 2024 KIR 62; Martin Ebers & Chiara Streitbörger, *Die Regulierung von Hochrisiko-KI-Systemen in der KI-Verordnung* [*The Regulation of High-Risk AI Systems in the AI Act*], 2024 RDI 393; Florian Reichert, Kristina Radtke & Hermann Eske, *KI-Verordnung: Rechtsgrundlagen für die Bereitstellung und Nutzung von KI* [*AI Act: Legal Bases for the Furnishing and Utilisation of AI*], 2024 ZEITSCHRIFT FÜR DATENSCHUTZ [J. DATA PROTECTION] [ZD] 483.

companies processing personal data within the EU, as well as to those handling the data of EU residents outside the Union. Like many EU legal acts, it has a broad, extraterritorial scope.[64] The GDPR establishes a general presumption that processing personal data is prohibited unless an exception applies (see GDPR, art. 6). One such exception is consent under Art. 7 of the GDPR.[65] These provisions are crucial when training AI applications for use in legal tech tools, as they largely restrict the use of personal data. The GDPR notably does not apply to data protection in law enforcement, for which there is a separate directive (informally known as the LED, short for "Law Enforcement Directive").[66]

Special provisions within both the GDPR and the LED restrict automated decisions and profiling, thereby ensuring human decisions (GDPR, art. 22 and LED, art. 11).[67] This right applies against the state as well as against private entities when a decision has binding effects. This is particularly relevant for legal tech applications: public authorities and other state entities may only delegate final decisions to a machine where expressly permitted by law (see GDPR, art. 22(2)(b)). Private companies, too, are bound by this provision. For instance, if an employer uses a chatbot for initial interview rounds (like in the earlier mentioned example), the final decision to reject a candidate must be made by a human.[68] Similarly, the automatic rejection of

64 *See generally* Stephan Kolo ßa, *The GDPR's Extra-Territorial Scope*, 80 HEIDELBERG JOURNAL OF INTERNATIONAL LAW [HJIL] 791 (2020).

65 *See generally* Jan Henrik Klement, *in* DATENSCHUTZRECHT – DSGVO MIT BDSG – GROßKOMMENTAR [DATA PROECTION L. – GDPR, ALONGSIDE FED. DATA PROTECTION ACT – ART.-BY-ART. COMMENT.] (Spiros Simitis, Gerrit Hornung & Indra Spiecker genannt Döhmann eds.), DSGVO art. 8 (2nd ed. 2024).

66 Directive (EU) 2016/680 of 27 April 2016 on the Protection of Natural Persons With Regard to the Processing of Personal Data by Competent Authorities for the Purposes of the Prevention, Investigation, Detection or Prosecution of Criminal Offences or the Execution of Criminal Penalties, and on the Free Movement of Such Data, and Repealing Council Framework Decision 2008/977/JHA, O.J. (L 119), 89 (May 4, 2016).

67 For a discussion on whether this also guarantees a genuine right to human decision-making and a corresponding right to injunctive relief, *see* Kai von Lewinski, *Art. 22 DSGVO* [*GDPR art. 22*], *in* BECKOK DATENSCHUTZRECHT [BECK'S ONLINE COMMENT. DATA PROTECTION L.] (Heinrich Amadeus Wolff, Stefan Brink & Antje von Ungern-Sternberg eds.), at margin note 2.2 (49th ed. 2024).

68 Michael Hoffmann, *Möglichkeit und Zulässigkeit von Künstlicher Intelligenz und Algorithmen im Recruiting* [*The Potential and the Permissibility of Artificial Intelligence and Algorithms in Job Recruitment*] 2022 NEUE ZEITSCHRIFT FÜR ARBEITSRECHT [NEW J. EMP. L.] [NZA] 19, 21 et seq.; Clemens Höpfner & Jan Alexander Daum, *Der "Robo-Boss" – Künstliche Intelligenz im Arbeitsverhältnis* [*The 'Robo Boss' – Artificial Intelligence in the Employment Relationship*], 2021 ZEITSCHRIFT FÜR

an online credit application is impermissible.[69] The GDPR thus demonstrates a pronounced caution toward automated decisions, which fundamentally stems from the aforementioned concerns over fundamental rights limitations and digital discrimination.[70]

Last but not least, the impact assessment provided for in the GDPR, which implements strong protection of fundamental rights through procedures, should also be mentioned here. Through this procedure law enforcement authorities and public prosecutors are also subject to data protection supervision.

bb) The EU Data Act

The EU Data Act is a regulation designed to facilitate and encourage data exchange and usage within the European Economic Area. An interesting aspect for the legal tech sector is that, as previously mentioned, the Data Act defines the term "smart contract" for the first time and establishes substantive requirements for it. Art. 38 of the Data Act specifies five criteria that must be met for a smart contract to be permissible. It should be noted that this provision, as part of the Data Act, naturally only pertains to "smart contracts for executing data sharing agreements." Nevertheless, these requirements strongly echo the general concerns raised about smart contracts and, therefore, provide criteria that can be broadly applied. The core aims are to ensure that smart contracts operate coherently (Data Act, art. 36(1)(e)), are accessible and thus technically transparent (Data Act, art. 36(1)(a) and (d)), and that a manual override is always possible (Data Act, art. 36(1)(b)). To streamline the conformity assessment process, the EU plans to publish in its official journal a list of tools that fulfil all these requirements (Data Act, art. 36(4)).

In this specific area of law, a fundamental legal tech application has been almost comprehensively regulated. This further underscores that legal tech,

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ARBEITSRECHT [J. EMP. L.] [ZfA] 467, 481; Flavia Lang & Hubertus Reinbach, *Künstliche Intelligenz im Arbeitsrecht* [*Artificial Intelligence in Employment Law*], 2023 NZA 1273, 1276.

69 This example, as well as the example of automated hiring processes, is explicitly mentioned in recital 71 to the GDPR.

70 *See* generally Emre Bayamlioglu, Contesting Automated Decisions: A View of Transparency Implications, 4 EUR. DATA PROTECTION L. REV. [EDPL] 433 (2018).

both in Germany and Europe, is a legal field dispersed across many specialized areas and rarely addressed holistically.

cc) The EU AI Act

The EU AI Act aims to provide AI developers and deployers with clear requirements and obligations regarding specific uses of AI. It establishes four categories of AI applications: software with unacceptable risk, high risk, limited risk, and minimal risk.[71] Different requirements are imposed depending on the category an application falls into – ranging from transparency mandates, such as code transparency, to outright bans on certain uses. (AI Act, art. 5 "Prohibited AI Practices," for instance, bans individual predictive policing *sub* para. 1, point (d); though evaluation of a person's likelihood of involvement with criminal activity, based on objective and verifiable facts directly linked to actual criminal activity, is permitted.)

Annex III to the AI Act contains a list of applications classified as high-risk, including definitions that may encompass legal tech applications. For instance, category no. 5 includes programs that provide "access to and enjoyment of essential private services and essential public services and benefits," covering areas such as credit provision, as mentioned in the context of automated decision-making (see no. 5(c)). Criminal law enforcement applications and asylum and migration procedures are also classified as high-risk under nos. 6 and 7. Particularly notable is category no. 8, covering the "administration of justice and democratic processes," which effectively classifies the use of AI in judicial settings as especially high-risk.

This suggests that most conceivable legal tech applications would likely be classified as high-risk under the AI Act, meaning the stringent requirements of articles 7 through 15 of the AI Act would apply. Consequently, the software's precise functionality must be guaranteed (AI Act, art. 15), specific record-keeping and transparency obligations must be met (AI Act, art. 11 et seq.), and there must be human oversight capable of intervening when

71 For a vivid illustration, *see* Julia Möller-Klapperich, *Die neue KI-Verordnung der EU* [*The EU's New AI Act*] 2024 NEUE JUSTIZ [NEW JUST. SYS.] [NJ] 337, 338; *see also* Becker & Feuerstack, *supra* note 63, at 64 et seq.

necessary (AI Act, art. 14 et seq.).

dd) Summary

Across these EU legal instruments, there is a recurring pattern rooted in the initial concerns about legal tech and observed previously in data protection law and smart contract regulation: there is a fundamental scepticism toward programs that autonomously apply the law.[72] Special transparency obligations are consistently imposed, and often, final human decision-making is required.

c) German Legal Tech Regulation

The regulation of legal tech in Germany varies significantly depending on whether public or private applications are considered. Public uses have been regulated and implemented for many years under the umbrella of e-government,[73] see Part 3.a). This is particularly evident in administrative law, where the German Administrative Procedure Act, as well as various special laws, include provisions for fully automated administrative acts.[74] However, there is a clear limitation: automation is only permitted where the law is clearly conditionally coded, and no legal interpretation is required (see Part 3.b)).[75]

In contrast, lawmakers have not seen the need for regulating legal tech applications in private law for a long time. Applications, such as smart contracts, are largely covered by existing civil law provisions. Ultimately,

72 *See also* the guiding principles developed by the European Law Institute for automated decision-making in Teresa Rodríguez de las Heras Ballell, Guiding Principles for Automated Decision-Making in the EU, (ELI, Innovation Papers, 2022), https://www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Innovation_Paper_on_Guiding_Principles_for_ADM_in_the_EU.pdf.

73 As early as the 2000s, e-government was widely discussed and covered in the literature; *see generally* Eifert, *supra* note 51; HARALD MEHLICH, ELECTRONIC GOVERNMENT (2002). In 2003, the German legislature introduced Sec. 35a of the Administrative Procedure Act, governing fully automated administrative decisions.

74 *See generally* Nadja Braun Binder, *Vollautomatisierte Verwaltungsverfahren im allgemeinen Verwaltungsverfahrensrecht?* [*Fully Automated Administrative Proceedings in General Administrative Procedure Law?*], 2016 NVwZ 960; Johannes Eichenhofer, *Der vollautomatisierte Verwaltungsakt zwischen Effizienz- und Rechtsschutzgebot* [*The Fully Automated Administrative Act Caught Between the Mandates of Efficiency and Provision of Access to Judicial Relief*], 2023 DÖV 93.

75 *See* Prell, *supra* note 42.

these applications do not raise many new legal issues that were not already addressed in the context of traditional contracts. In general, German federal law tends to encompass new phenomena within existing doctrinal categories. For this reason, there is not much specific legal tech regulation at the federal level in Germany.

It was only after a ruling by the German Federal Court of Justice that parliament felt compelled to adjust the laws to accommodate legal tech.[76] The underlying case involved an internet platform that aimed to enforce tenants' claims against landlords for excessively high rents. The business model relied on assigning the claim to the platform, which would then pursue it in court and give the tenant a share of the proceeds if successful. However, the defendants in the case argued that the assignment was illegal because the business model violated professional legal ethics. The Court, however, ruled that the law must allow for the "development of new professional roles" and that the activities of the platform should therefore be treated in the same way as those of a traditional debt collection agency.[77] The so-called "Legal Tech Act,"[78] passed by parliament in response, was a direct reaction to this ruling.[79] Its primary aim was to impose disclosure and information obligations on the new players in the legal market, especially in terms of consumer protection (see, e.g., Sec. 13b of the German Legal Services Act[80]). Additionally, it allowed qualified lawyers to agree on success fees under certain conditions, ensuring they would not be at a competitive disadvantage to legal tech providers (see Sec. 4a of the German Lawyers' Compensation Act[81]). From this perspective, the law was less a "legal tech act" than a law to curb new technology-based business models in the legal advice market.

76 BGH, Nov. 27, 2019 (docket no. VIII ZR 285/18), *reprinted in* 2020 NJW 208.

77 *See id.* para. 142.

78 Gesetz zur Förderung verbrauchergerechter Angebote im Rechtsdienstleistungsmarkt [An Act to Promote Consumer-Friendly Offerings in the Legal Services Market], Aug. 10, 2021, BGBL. I 3415.

79 In the legislative materials, this ruling is referenced a total of ten times; *see* DEUTSCHER BUNDESTAG: DRUCKSACHEN UND PROTOKOLLE [GERMAN FEDERAL DIET: LEGISLATIVE MATERIALS AND PARLIAMENTARY TRANSCRIPTS] [BT], legislative period 19, no. 27673.

80 Gesetz über außergerichtliche Rechtsdienstleistungen [An Act Concerning Legal Services Out of Court], Dec. 12, 2007, BGBL. I 3436, 3450.

81 Gesetz über die Vergütung der Rechtsanwältinnen und Rechtsanwälte [An Act Concerning Lawyers' Fees], May 5, 2004, BGBL. I 718, 788.

However, the German legislature has taken a further step toward regulating certain legal tech applications by advancing the digitalisation of court proceedings. In September 2024, a law was drafted to develop and pilot an online procedure in civil litigation.[82] This law aims to establish standardised portals within local courts across Germany. Through these portals, plaintiffs will be able to navigate an online interface guided by a questionnaire and submit claims independently online. Beginning in 2025, civil disputes valued at €5,000 or less will fall under this system. The trial phase for this procedure is set for a ten-year duration.[83] The state governments of the German federal states are authorised to determine which of their courts shall participate in the pilot phase (see the draft version of Sec. 1123 of the German Civil Procedure Act[84]).

d) Regulation on a Smaller Scale: The Influence of Federal States on Legal Tech Regulation

Finally, it is worth briefly examining Germany's federal states. Germany consists of 16 states, each vested with its own legislative powers and sovereignty. In certain areas, therefore, state regulations exist alongside European and federal laws. This is particularly relevant for the use of legal tech by the state, as the German states hold general legislative authority in policing and parts of administrative law. In other words, within Germany, there are 16 subdivisions, each with distinct rules on legal tech usage, especially in policing and administrative law. For instance, Hesse and Bavaria use digital software for crime prediction (so-called predictive policing) and have set unique thresholds for its application, while other states do not use this software at all.[85] However, in the areas of civil law and civil procedural law,

82 Entwurf eines Gesetzes zur Entwicklung und Erprobung eines Online-Verfahrens in der Zivilgerichtsbarkeit [Draft of An Act to Develop and Test Online Proceedings Under Civil Jurisdiction], BUNDESRAT DRUCKSACHEN [FEDERAL COUNCIL, LEGIS. MATS.] [BR] no. 429/24; *see generally* Marie Herberger, *Per Reallabor zum Online-Verfahren in der Zivilgerichtsbarkeit?* [*Should the Goal of Online Proceedings Under Civil Jurisdiction Be Met by Testing It in the Laboratory of the Real World?*], 2024 ZEITSCHRIFT FÜR RECHTSPOLITIK [J. LEGAL POL'Y] [ZRP] 166; Sachse, 2024 DEUTSCHE RICHTERZEITUNG [GERMAN JUDGES' NEWSPAPER] [DRiZ] 348.

83 For a comprehensive overview, *see* Herberger, *supra* note 82, at 166 et seq.

84 BR, *supra* note 82, at 4.

85 *See* Thorsten Siegel, *Digitalisierungsschleusen im Verwaltungsrecht und seine Offenheit für Künstliche Intelligenz [Administrative Law's Flood Gates for Digitalisation, and Its Openness to*

legislative authority rests solely with the federal government. Consequently, for legal tech applications between private parties, there are no regulatory variations across Germany.

e) Connecting the Dots: The Essence of Legal Tech Regulation in Germany

This brief overview should illustrate the dense regulatory landscape across various areas and levels of law that impact legal tech in Germany. One estimate has shown that technology companies in the EU face approximately 100 laws and 270 regulators.[86]

However, it will prove possible to identify some commonalities and perhaps even overarching themes within these regulations. The clear, yet essential, conclusion from the above discussion is this: a unified approach to legal tech regulation does not exist in either the EU or Germany. Instead, sector-specific requirements are imposed, following a seemingly progressive scale of regulatory intensity. Basic legal tech 1.0 technologies are generally unregulated. Legal tech 2.0, however, faces scrutiny to ensure both the accuracy of the software and the transparency of its technical foundations.[87] Legal tech 3.0, including applications that already utilize AI and aim to automate larger segments of legal processes, encounters extensive concerns. Here, it is not only the correctness of the code that must be guaranteed but also a human final decision and intervention capability are generally required.[88] The driving concerns include digital bias, digital discrimination, loss of consumer protection and legal recourse, and the risk of a dehumanized legal system.[89] In state applications, the regulatory framework is even stricter, as the state is bound by fundamental rights and must continuously justify its actions. Since, to date, machines cannot explain or justify their decisions, the state's use of legal tech is limited to areas where legal interpretation and

Artificial Intelligence], 2024 NVwZ 1127, 1135. *See* also BVerfG, supra note 52.

86 *See* Freedman, *supra* note 48.

87 *See supra* Parts 4.b).bb)–cc).

88 *See supra* Part 4.b).cc).

89 *See supra* Part 4.a).

discretion are unnecessary.

The sector-specific approach also requires legal tech providers to consider a wide range of legal considerations for each application. To illustrate, an online platform intending to assert claims as a debt collection business before a German court is required to undergo registration in accordance with the German standards set out in the Legal Services Act. Additionally, it is subject to the requirements of the Data Act and the GDPR. Furthermore, should the platform employ AI in the assessment of facts or legal implications, it is obliged to comply with the rigorous stipulations pertaining to high-risk systems as outlined in the AI Act. Therefore, the platform is obliged to produce a number of information sheets for consumers, addressing various legal aspects of the same activity. As a result, both the German and European systems can be described as relatively bureaucratic.

Another recurring theme in this article is that German and European regulations aim for software that aligns with their core values and foundational decisions. Accordingly, frameworks are first established (through instruments like the AI Act, Data Act, or the German platform for civil litigation) with the expectation that technology will adapt to these standards. The guiding principle here could be described as "regulating first, adapting technology later."

5. Reflecting on German and Korean Regulatory Strategies

German legal scholars have been closely observing Korea's National Strategy for Artificial Intelligence[90] and have taken note of the Digital Bill of Rights with interest.[91] From a European perspective, the Act on Promotion of

90 S*ee* GOV'T OF THE REPUBLIC OF KOREA, MINISTRY OF SCI. AND ICT, A.I. POL'Y DIV., NATIONAL STRATEGY FOR ARTIFICIAL INTELLIGENCE (Mar. 20, 2023), GPRN 11-1721000-000393-01, *available at* https://www.msit.go.kr/bbs/documentView.do?atchFileNo=30011&fileOrdr=1; *see also* Press Release, Ministry of Science and ICT, National AI Strategy Policy Directions: MSIT Presents Blueprints for Korea's AI Innovation to Achieve AI G3 Status (Sept. 26, 2024), https://www.msit.go.kr/bbs/documentView.do?atchFileNo=47478&fileOrdr=2.

91 *See* Press Release, Ministry of Science and ICT, South Korea Presents a New Digital Order to the World (Sept. 25, 2023), https://www.msit.go.kr/bbs/documentView.do?atchFileNo=42994&fileOrdr=1.

AI Industry and Framework for Establishing Trustworthy AI (AI Act) is particularly intriguing.[92] At first glance, there are many commonalities, such as Korea's risk-based approach, the discussion around a right to human decision-making, and the use of regulatory sandboxes. Yet, Korean laws are reputed to operate according to the "principle of adopting technology first and regulating later,"[93] which, in some ways, turns the EU and German approach on its head. The key advantages of the European and German approaches for businesses are the high level of legal certainty and the broad accessibility of well-established applications. Consumers can, for instance, rely on the fact that a legal tech provider must adhere to high standards across various areas of law. The development of technology is guided by democratically elected parliaments, not by tech companies. In Germany, there is an expectation that AI "made in Europe" will be successful on the global market, especially due to the strict regulations in place. In contrast, the approach taken in Korea prioritises the development of new technologies and allows the innovative potential of society to flourish, leading to significant advancements and fostering societal prosperity. It seems that both societal regulation and private capital are likely needed to shape the future of technology. In the end, as so often, we are faced with the question of the right measure and the right degree.

This paper concludes by reaffirming the importance of the Korean Institute of Criminology and Justice International Forum from which it originated. The EU and Germany, as well as the Republic of Korea, are significant economic forces with the ability to influence the direction in which algorithms, AI and legal tech evolve through their internal regulations. It is also crucial that we engage in dialogue with other stakeholders to ensure that

92 Introduced as National Assembly of the Republic of Korea as the 'Act Fostering the AI Industry and Establishing a Foundation for Trustworthy AI'; *see* Press Release, National Assembly, Subcommittee of the National Assembly Passes the 'Metaverse Act' and the 'Artificial Intelligence Act' (Feb. 14, 2023), https://www.assembly.go.kr/portal/bbs/B0000051/view.do?nttId=2095056&menuNo=600101&sdate=&edate=&pageUnit=10&pageIndex=1#. (This Act passed the Assembly on Dec. 26, 2024, as part of the Act on the Development of Artificial Intelligence and Establishment of Trust (AI Basic Act); *see* Press Release, Ministry of Science and ICT, ingongjineung sidaeui saeloun seomag, AIgibonbeob gughoe bonhoeui tong-gwa [A New Beginning for the Era of Artificial Intelligence: The AI Basic Act Passes the National Assembly Plenary Session] (Dec. 26, 2024), https://www.msit.go.kr/bbs/documentView.do?atchFileNo=48061&fileOrdr=1.)

93 *See* Hwan Kyoung Ko, Il Shin Lee & Matt Younghoon Mok, *Analysis of AI Regulatory Frameworks in South Korea*, Asia Bus. L.J., Apr. 15, 2024, https://law.asia/ai-regulatory-frameworks-south-korea/.

our regulations are predictable for businesses, thereby fostering software development, safeguarding fundamental rights, and protecting consumers globally. Only in this way can we create trustworthy programs and, together, build a better digital future for us all.

[Special article]

Exploring Current AI Applications in the U.S. Criminal Justice System

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Abstract

This paper explores the applications of artificial intelligence (AI) within the United States criminal justice system. The first section establishes a framework for understanding AI and defines common terminology. While the paper highlights how AI can significantly benefit the criminal justice system, it also underscores the risks decision-makers should consider when developing or deploying AI tools. Furthermore, it provides an in-depth examination of AI's role in law enforcement, the criminal court system, and corrections. Overall, the detailed analysis enhances understanding of criminal justice practices in the United States and their broader implications for policymaking worldwide.

Keywords: Artificial Intelligence, law enforcement, court, correction, policymaking

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Introduction

AI is set to transform almost every industry in the coming decade. In fact, it is already influencing our daily lives and seamlessly integrating into many of our routine activities—from facial recognition systems that unlock our phones, to algorithms suggesting movies we might enjoy, to virtual chatbots managing our customer service interactions. AI offers both opportunities and substantial risks for the criminal justice system. These tools can enhance efficiency, lower costs, and broaden capabilities across various criminal justice applications. However, many leaders in the field hold misconceptions about AI's capabilities and the investment needed to develop or implement solutions for specific scenarios.

What is Artificial Intelligence?

AI is often mistakenly seen as a singular technology, but it is a broad field encompassing various methods aimed at creating machines that simulate human intelligence. Recent breakthroughs and media attention have led many to perceive AI as something entirely new. However, researchers like Alan Turing and John McCarthy were exploring systems that could emulate human intelligence as early as the 1950s.[1] The field has a rich history of significant achievements, including inventions like the calculator, spell check, and search engines—innovations once considered cutting-edge AI but now viewed as commonplace technologies.

Although AI research has a long history, recent breakthroughs have led to rapid growth in AI applications, research, startups, and even misinformation. This brief does not provide an exhaustive overview of the different domains or computational techniques behind AI systems. However, it is important for the criminal justice community to understand that terms such as AI, machine learning, and deep learning are not synonymous and should not be used

1 National Research Council. 1997. Computer Science and Artificial Intelligence. Washington, DC: The National Academies Press. https://doi.org/10.17226/5812

interchangeably.

The term **"intelligent system"** typically refers to a network of machines that collaborate to perceive, learn from, and react to their environment. These systems utilize AI to achieve their functionality. ***Artificial intelligence*** is a branch of computer science focused on developing machines that simulate human intelligence by perceiving and acting to achieve specific goals. There are numerous technical methods for building AI systems.

Machine learning is one approach to building AI systems. Unlike rule-based AI or expert systems that rely on explicit programming, machine learning algorithms learn to classify objects or predict outcomes by analysing known examples, known as training data. There are several types of machines learning methods, including supervised learning, unsupervised learning, reinforcement learning, decision trees, certain regression techniques, and deep learning. Both regression and decision tree algorithms are frequently categorized as either AI or machine learning.[2]

Deep learning algorithms are a subset of machine learning that utilize artificial neural networks.[3] Although deep learning is a highly effective method for developing AI, it is generally less transparent than other approaches. In many cases, it is difficult to explain how specific inputs lead to a particular output from a deep learning algorithm.

AI in the Criminal Justice System

Several factors are fuelling the rapid expansion of AI applications. One key driver is the surge in "big data" from sources like smartphones, online activity, transactional records, and personal fitness devices. This data serves

2 For an introductory overview to the various types of machine learning methods available to noncomputer scientists, see Castañón, J. (2019, May 1). 10 Machine Learning Methods that Every Data Scientist Should Know: Jump-start your data science skills. Towards Data Science. Retrieved from https://towardsdatascience.com/10-machine-learning-methods-that-every-data-scientist-should know-3cc96e0eeee9

3 For an introductory overview of artificial neural networks and how they work, see 3Blue1Brown (2017, October 5). But what is a Neural Network? | Deep learning, chapter 1. [Video]. YouTube. https:// www.youtube.com/watch?v=aircAruvnKk

as the fuel for AI systems, and its volume has grown exponentially. Additionally, breakthroughs in deep learning—a specialized area of AI—have enabled applications like machine vision and natural language processing (NLP), paving the way for numerous new use cases. Finally, advancements in computer processors are boosting the computational power and speed needed to run AI systems efficiently. AI systems are already benefiting the criminal justice community and are poised to have an even greater impact in the future. It is essential for criminal justice leaders to understand the various types of AI and how each can be applied within the criminal justice context.

AI Applications for Law Enforcement

While AI use in law enforcement is not yet widespread, many agencies are starting to explore AI and advanced robotics. This section provides examples of AI-enabled products and services to inform law enforcement leaders about these technologies and encourage continued discussion on whether and how they should be adopted.

Automated License Plate Readers (ALPRs) have long been utilized by law enforcement and private companies.[4] Recent advancements in AI-powered machine vision technology have improved the performance and reduced the cost of ALPR systems.[5] As these systems have become more affordable, their applications have expanded. They are now used for tasks ranging from creating "virtual fences" to track vehicles entering or leaving specific areas to automating the issuance of tickets for red light violations. Today, ALPRs are among the most common applications of machine vision in law enforcement.

Video and photo surveillance technologies are rapidly evolving, with hardware manufacturers now integrating AI capabilities—such as chips

4 Roberts, D., Casanova, M., (2012, September) Automated License Plate Recognition (ALPR) Use by Law Enforcement: Policy and Operational Guide, Summary. Retrieved April 3, 2020, from https://www. ncjrs.gov/pdffiles1/nij/grants/239605.pdf

5 Kaplan, J. (2019, July 10). Who's Using License Plate Cameras to Track Cars? Cops, Landlords, and Your Neighbors. Retrieved April 1, 2020, from https://slate.com/technology/2019/07/automatic-licenseplate-readers-hoa-police-openalpr.html

designed to run deep neural networks—directly into cameras. By processing AI algorithms on the camera's hardware instead of relying on cloud computing, these advanced cameras reduce costs, increase processing speed, and minimize bandwidth requirements.[6] This AI-enabled hardware is being utilized in emerging law enforcement applications, including real-time facial recognition in crowded public areas[7] and real-time weapon detection.[8]

For ***Gun Shot Detection and Mapping***, law enforcement agencies utilize systems that detect, record, and pinpoint the location of gunshots. Acoustic gunshot detectors, like ShotSpotter, are already in use by local agencies in over 100 cities.[9] Meanwhile, startups such as Aegis are enhancing these systems with AI by integrating visual gun recognition to identify potential gunfire before it occurs. Although the underlying AI technology of gunshot detection systems is not the primary focus, the National Institute of Justice is actively researching the impact of gunshot detection software.[10]

To combat human trafficking and child predators, the nonprofit startup Thorn leverages Amazon's ***Facial Recognition Technology*** (FRT) to scan online ads and the dark web for images of missing children.[11] Thorn's approach demonstrates how AI can complement, rather than replace, traditional policing methods. Once trafficked children are identified and located, conventional law enforcement tactics are still needed to apprehend

6 Faggella, D. (2019, February 2). AI for Crime Prevention and Detection—5 Current Applications. Retrieved April 1, 2020, from https://emerj.com/ai-sector-overviews/ai-crime-prevention-5-currentapplications/

7 China is using AI in combination with some of its more than 200 million surveillance cameras to identify and track its citizens. https://www.nytimes.com/2018/07/08/business/china-surveillancetechnology.html

8 ZeroEyes is a technology company that has developed AI-enabled video analytics software; this software provides real-time weapon detection and alerts, improving the safety in schools and other settings by detecting when a person enters a facility with a concealed gun. https://zeroeyes.com/

9 Acoustic Gunshot Detection. (n.d.). Retrieved April 1, 2020, from https://www.eff.org/pages/gunshot-detection

10 Lawrence, D., La Vigne, N., Thompson, P., (2019, September) Evaluation of Gunshot Detection Technology to Aid in the Reduction of Firearms Violence. Retrieved December 3, 2024, from https://nij.ojp.gov/library/publications/evaluation-gunshot-detection-technology-aid-reduction-firearms-violence

11 Simonite, T. (2019, June 18). How Facial Recognition Is Fighting Child Sex Trafficking. Retrieved December 1, 2024, from https://www.wired.com/story/how-facial-recognition-fighting-child-sex-trafficking

offenders and rescue victims.

Predictive policing and hotspot mapping systems have long been used to optimize law enforcement resources. Recently, AI technologies have been integrated into some of these systems to enhance their predictive accuracy.[12] AI is typically used to improve two types of predictive policing models: place-based and individual-based. Place-based predictive policing identifies specific locations and times at higher risk for crime or disorder, while individual-based predictive policing assesses a person's risk of involvement in future incidents—either as a victim or an offender—based on their history with the criminal justice system. Both models have inherent limitations, including the risk of perpetuating systemic bias and over-policing certain communities. Additionally, AI can analyse crime databases to automatically detect patterns and clusters, potentially linking multiple crimes to the same perpetrator or suggesting suspects based on historical data.

As technologies like the Internet of Things, 5G, autonomous vehicles, and robotics advance, the range of AI applications in law enforcement will continue to expand. International organizations, including the United Nations, are already assessing potential AI uses in law enforcement and engaging in crucial discussions about their tactical, legal, and ethical implications.[13] However, many so-called "future" applications may be closer to reality than anticipated. For example, Dubai is testing robotic police officers, tech companies are developing voice-activated digital assistants for police work[14], and China is using its extensive network of 200 million surveillance cameras for crime tracking and prevention.[15] Meanwhile, the National Institute of

12 Baron, E. (2019, March 11). Predictive Policing Using AI Tested by Bay Area Cops. Retrieved December 1, 2024, from https://www.govtech.com/public-safety/Predictive-Policing-Using-AI-Tested-by-Bay-AreaCops.htm

13 United Nations Interregional Crime and Justice Research Institute. (n.d.). New Report: Artificial Intelligence and Robotics for Law Enforcement. Retrieved December 1, 2024, from http://www.unicri.it/in_focus/on/interpol_unicri_report_ai

14 Westrope, A. (2019, October 25). New Radio Brings AI Voice Assistant to Law Enforcement. Retrieved April 1, 2020, from https://www.govtech.com/biz/New-Radio-Brings-AI-Voice-Assistant-to-LawEnforcement.htm

15 China is using AI in combination with some of its more than 200 million surveillance cameras to identify and track its citizens. https://www.nytimes.com/2018/07/08/business/china-surveillancetechnology.html

Justice (NIJ) is actively funding AI research in areas such as public safety video and image analysis, DNA analysis, gunshot detection, and crime forecasting.[16]

AI Applications for Court

Courts are essential to the criminal justice system, ensuring fair and impartial justice for everyone. With the growing presence of AI across society, many criminal justice leaders are exploring whether AI technologies can enhance court operations. In other sectors, AI has significantly improved efficiency, expanded capabilities, and automated routine tasks. Looking forward, AI is expected to influence various aspects of the court system, including crime prosecution and defence, as well as legal practice in both public and private sectors.

As the various participants in the criminal court system strive for justice, they encounter an increasing array of challenges specific to their roles. For instance, prosecutors and defence attorneys must manage the expanding volumes of evidence produced by modern technology, all while adhering to evolving standards like those outlined in *Brady and Giglio*.[17] Additionally, prosecutors and state-appointed public defenders in many states often face higher caseloads and lower salaries compared to their counterparts in other fields. These and other difficulties are making it harder for many states to attract and retain new talent.[18]

Managing Staffing and Resources While many staffing challenges in the criminal courts are unique, the difficulty of finding qualified talent is not. Other industries are already using AI to streamline the process of sourcing,

16 Christopher Rigano, "Using Artificial Intelligence to Address Criminal Justice Needs," October 8, 2018, nij.ojp.gov: https://nij.ojp.gov/topics/articles/using-artificial-intelligence-address-criminal-justiceneeds

17 U.S. Department of Justice. (2020). 9-5000: Issues related to trials and other court proceedings. Retrieved from https://www.justice.gov/jm/jm-9-5000-issues-related-trials-and-other-court-proceedings

18 Lawrence, D. S., Gourdet, C., Banks, D., Planty, M. G., Woods, D., & Jackson, B. A. (2019). Prosecutor priorities, challenges, and solutions. Santa Monica, CA: RAND Corporation. Retrieved from https://www. rand.org/pubs/research_reports/RR2892.html

validating, and hiring qualified candidates.[19] Although there are concerns about AI introducing bias into hiring practices, some argue that AI can help eliminate such bias.[20] Additionally, AI's potential to increase diversity in certain fields has been highlighted[21], particularly in the prosecutorial sector, which is a key focus of the NIJ's Priority Criminal Justice Needs Initiative. In addition to hiring challenges, resource constraints and the demands of the profession may contribute to high turnover rates. AI has the potential to enhance the efficiency of repetitive or routine prosecutorial tasks, allowing resources to be reallocated to more impactful activities. Many corporate law firms are already using AI to automate such tasks. For instance, corporate counsel at JPMorgan Chase automated parts of their contract review process, saving over 360,000 hours of lawyer time.[22]

Improving Court Operations Court operations encompass various functions, including docket management, scheduling, security, cyber-security, facilities management, evidence handling, and juror and witness coordination. AI and other digital technologies have the potential to enhance court operations in several ways. Robotic process automation (RPA) can streamline routine tasks and improve overall efficiency. Software providers like eCourtDate aim to boost operational efficiency and user convenience by offering SMS reminders for court dates, payment alerts, and victim notifications.[23] AI-powered language translation could also expand interpreter services in courtrooms. For example, in March 2020, Google Translate introduced its real-time transcription feature for Android users, which records speech in one

19 Heilweil, R. (2019). Artificial intelligence will help determine if you get your next job. Vox. Retrieved from https://www.vox.com/recode/2019/12/12/20993665/artificial-intelligence-ai-job-screen

20 Polli, L. (2019). Using AI to eliminate bias from hiring. Harvard Business Review. Retrieved from https://hbr.org/2019/10/using-ai-to-eliminate-bias-from-hiring

21 Fisher, A. (2019) A.I. for hire: 4 ways algorithms can boost diversity in hiring. Fortune. Retrieved from https://fortune.com/2019/06/01/ai-artificial-intelligence-diversity-hiring/

22 Son, H. (2017). JPMorgan software does in seconds what took lawyers 360,000 hours. Bloomberg. Retrieved from https://www.bloomberg.com/news/articles/2017-02-28/jpmorgan-marshals-an-armyof-developers-to-automate-high-finance

23 eCourtDate. (2020). Everyone Needs a Reminder. Court date reminders, victim notifications, case alerts, payment notices. Washington, DC: eCourtDate. Retrieved from https://ecourtdate.com/

language and provides live translations.[24]

Processing and Managing Digital Information The management and processing of digital information is one area where AI could have the greatest impact on the court system soon. As the volume of digital evidence continues to grow—driven by sources like social media, body-worn cameras, and other digital devices—the need to handle this data is expanding rapidly. Following the 2012 *Monique Da Silva Moore, et al. v. Publicis Groupe* decision, which allowed the use of technology-assisted review[25], e-discovery tools were developed to help attorneys sift through large volumes of electronic data to identify relevant information for cases. AI is enhancing these e-discovery tools and may play a crucial role in helping attorneys manage the growing volume of case-related data. Video redaction and audio transcription are two repetitive and time-consuming tasks that reviewers often face. Recent advancements in machine vision and natural language processing have enhanced software designed to automate video redaction and audio transcription. These tools have accelerated the law enforcement reporting process, helping to speed up the review of criminal court cases. While these AI-driven solutions still require human oversight before public release, they are likely to improve further as AI technologies continue to advance.

Improving Case Management and Outcomes Case management encompasses various tasks such as evidence handling, analysing case law, engaging with witnesses and the community, managing multimedia, plea bargaining, risk assessments, pretrial legislation, sentencing guidelines, and more. AI is enhancing case management by boosting the efficiency of legal research. As natural language processing technology advances, software tools will become more sophisticated in assisting with legal research. Leading legal software vendors are already promoting their AI-enabled products, which help prosecutors conduct legal research and find relevant case law more

24 Statt, N. (2020, March 17). Google Translate's real time transcription feature is out now for Android. The Verge. Retrieved from https://www.theverge.com/2020/3/17/21182640/google-translatetranscription-android-feature-real-time-ai

25 Verga, M. (2018, July 31). In the beginning was da Silva Moore (Technology-assisted Review Series, 2). XACT Data Discovery. Retrieved from https://www.xactdatadiscovery.com/articles/in-thebeginning-was-da-silva-moore/

efficiently.[26] AI may also play a role in shaping litigation strategies. After charges are filed, decisions about how to proceed are among the most crucial and impactful choices a prosecutor must make. These decisions typically involve evaluating available evidence alongside the attorney's experience. While still in its early stages, AI has the potential to predict trial outcomes based on existing evidence, offering valuable insights to guide prosecutorial decision-making and strategy. For example, some researchers have employed machine learning and predictive analytics to forecast outcomes in court cases, including rulings from the European Court of Human Rights[27] and the U.S. Supreme Court.[28]

Maintaining Accountability Requirements related to Brady and Giglio, data management protocols, and pressures from conviction integrity units highlight the need for maintaining accountability in the criminal justice system. Some district attorneys are exploring innovative ways to leverage AI to enhance accountability. For instance, the San Francisco District Attorney's office is using AI-powered redaction software to reduce bias in prosecutorial decisions. Prosecutors employ a "bias mitigation" tool, developed by Stanford, which automatically removes information from police reports that could reveal a suspect's race. The tool is designed to prevent racial bias from influencing decisions about charging individuals with crimes. In addition to removing racial descriptors, it also eliminates details like eye color and hair color, as well as names, locations, and neighbourhoods that could subconsciously suggest a suspect's racial background.[29]

Creating Partnerships and Collaboration Criminal court leaders can greatly benefit from collaborating with others in the development and

26 2020 legal analytics study: Bringing value into focus. (n.d.). Retrieved from https://www.lexisnexis.com/en-us/products/lexis-analytics.page

27 Medvedeva, M., Vols, M. & Wieling, M. (2019). Using machine learning to predict decisions of the European Court of Human Rights. Artificial Intelligence and Law. https://doi.org/10.1007/s10506-019- 09255-y

28 Katz, D. M., Bommarito, M. J., II, Blackman, J. (2017). A general approach for predicting the behavior of the Supreme Court of the United States. PLOS One. https://doi.org/10.1371/journal.pone.0174698

29 Hollister, S. (2019). San Francisco says it will use AI to reduce bias when charging people with crimes. The Verge. Retrieved from https://www.theverge.com/2019/6/12/18663093/ai-sf-district-attorneypolice-bias-race-charge-crime

implementation of AI tools. Those seeking to adopt AI may partner with data scientists, researchers, and other experts to support its integration into court functions. These collaborators can assist in translating data between systems, coding information to train AI algorithms, analysing AI's implications, and assessing whether AI systems can enhance efficiency while preserving fair and individualized justice. Partnerships can also help unlock value from the vast amounts of data managed by prosecutors and courts. Additionally, partners can assist in addressing key questions that promote public transparency, such as examining whether decision-making is consistent across jurisdictions or analysing the characteristics of cases resolved through plea bargains versus those that go to trial.[30]

AI Applications for Correction

The following examples showcase AI applications that are being developed, tested, or implemented globally. Agencies must carefully weigh both the benefits and costs of adopting AI, as they would with any other technological innovation. Presenting these examples does not imply that these applications (1) will succeed or (2) have been implemented in an ethical or cost-effective manner. Rather, these examples are meant to demonstrate new approaches, allowing decision-makers to track progress or engage in further discussions with those leading the trials.

Monitoring Prisoner Communications AI technologies can support human reviewers by analysing hours of inmate communications and flagging potentially concerning content for further inspection. Some of the country's largest phone service providers for prisons and jails are developing advanced call analytics, with these providers showcasing instances where the technology has successfully identified problematic behaviour.[31]

30 National Research Council 2001. What's Changing in Prosecution? Report of a Workshop. Washington, DC: The National Academies Press. https://doi.org/10.17226/10114

31 Francescani, C. (2019, October 24). US prisons and jails using AI to mass-monitor millions of inmate calls. ABC News. Retrieved from https://abcnews.go.com/Technology/us-prisons-jails-ai-mass-monitormillions-inmate/story?id=66370244

Monitoring prisoner locations, biometrics, and internal communications The governments of China and Hong Kong recently revealed plans to use AI to monitor prisoners with devices like Fitbits, which always track location and biometrics such as heart rate.[32] In the U.S., corrections leaders will need to continue discussions about the potential advantages and challenges of implementing such systems. In other Chinese prisons, networked cameras equipped with facial recognition and other AI technologies are used to "recognize, track, and monitor every inmate around the clock," generating detailed reports, including behavioural analysis, through AI functions like facial identification and movement tracking.[33]

Detecting contraband Machine vision and image analysis are widely used AI applications. The same tools developed for other industries are now being applied to enhance contraband detection in correctional facilities.[34] Technology providers also highlight the system's ability to identify unusual activity in security footage, enabling the use of existing data—data that many correctional facilities already gather.[35] Contraband remains a top priority for administrators in correctional facilities. AI-powered image analysis tools can enhance contraband detection and improve officer efficiency by (1) relieving correctional officers from reviewing all video footage and (2) flagging suspicious videos for further manual review.[36] While biometric systems have long been known to streamline inmate monitoring, other countries are now investing in a combination of biometric and facial recognition technologies to

32 Bala, N., & Trautman, L. (2019, April 30). "Smart" technology is coming for prisoners, too. Slate. Retrieved from https://slate.com/technology/2019/04/smart-ai-prisons-surveillance-monitoring-inmates.html

33 Chen, S. (2019, April 1). No escape? Chinese BIP jail puts AI monitors in every call 'to make prison breaks impossible.' South China Morning Post. Retrieved from https://www.scmp.com/news/china/science/article/3003903/no-escape-chinese-vip-jail-puts-ai-monitors-every-cell-make

34 Berry Johnson, B. (2019, October 24). How new technology takes the guesswork out of inmate screening. Corrections One. Retrieved from https://www.correctionsone.com/products/facility-products/body-scanners/articles/how-new-technology-takes-the-guesswork-out-of-inmate-screening-sF76p9oqjXkLfqwX/

35 Cox, L. (2016, December 14). Using AI to combat contraband in prison. Disruption Hub. Retrieved from https://disruptionhub.com/uk-prison-using-ai-stop-contraband/

36 Miles, C. A.; Cohn, J. P. (2006, January 1). Tracking Prisoners in Jail With Biometrics: An Experiment in a Navy Brig. National Institute of Justice Journal. Retrieved from https://nij.ojp.gov/topics/articles/tracking-prisoners-jail-biometrics-experiment-navy-brig

track prison visitors, aiming to combat drug trafficking within prisons.[37]

Enabling more efficient operations Some of the most significant AI applications in other industries have focused on streamlining operations and automating routine administrative tasks. While these applications may not receive as much media attention or have the same visibility as other AI tools, their impact is equally substantial. One example is comprehensive jail or prison management software. Many correctional facilities already use databases or information management systems to collect data, and AI can often be integrated into these existing systems to boost efficiency, automate routine paperwork, and generate reports. Other examples include software that manages visitation scheduling or sends automated reminders to individuals under community supervision. AI-powered transcription software can also automate the notetaking and reporting tasks required of community supervision officers (CSOs), reducing their reporting workload and freeing up time for more impactful activities.

Assessing recidivism risk One of the most debated AI applications in criminal justice is AI-driven risk assessment tools. These tools are used in various stages of the criminal justice system to evaluate recidivism risk and inform decisions related to pretrial detention or sentencing. In community corrections, they help determine the appropriate level of supervision for individuals on probation or parole. In institutional settings, they can guide programming assignments for inmates and inform parole decisions. Supporters of these systems emphasize their potential to reduce human bias in decision-making[38], while critics point to examples where these tools have exhibited systemic bias due to the data used to train them.[39] However, it's important to note that many departments already rely on guidelines or tools to inform decisions regarding offender risk. The goal of integrating AI into these

37 Burt, C. (2019, March 6). Biometrics and AI vision technologies deployed in Hong Kong and UK prisons to prevent drug use. Retrieved from https://www.biometricupdate.com/201903/biometricsand-ai-vision-technologies-deployed-in-hong-kong-and-uk-prisons-to-prevent-drug-use

38 Watney, C. (2017). It's time for our justice system to embrace artificial intelligence. Brookings. Retrieved from https://www.brookings.edu/blog/techtank/2017/07/20/its-time-for-our-justicesystem-to-embrace-artificial-intelligence/

39 Hao, K. (2019). AI is sending people to jail—and getting it wrong. MIT Technology Review. Retrieved from https://www.technologyreview.com/s/612775/algorithms-criminal-justice-ai/

decision-making processes is to facilitate data-driven decisions and reduce personal biases. Nonetheless, the corrections community should remain actively engaged in ongoing discussions about how and whether these systems should be implemented.[40]

Enabling chatbots for community supervision Virtual assistants and chatbots are becoming increasingly common in customer service across various industries. Advancements in AI and natural language processing have enabled these digital assistants to take over many routine tasks that were previously handled by humans. For instance, medical providers use automated text reminders for appointments, and customer service chatbots manage simple inquiries while directing more complex issues to human agents. Several startups in Silicon Valley are even developing AI-driven chatbots to provide initial mental health support.[41] In the corrections field, apps like cFIVE Catalyst and Scram Systems simplify appointment scheduling, messaging, and questionnaires to aid remote supervision. Similarly, companies like TrackTech offer software that automates aspects of rehabilitative support and compliance monitoring, while also utilizing advanced analytics to enhance platform functionality. While in-person interactions are often essential in community supervision, chatbots can play a useful complementary role alongside face-to-face meetings between community supervision officers (CSOs) and offenders. Further research is necessary, but it's possible to envision new ways of engaging with formerly incarcerated individuals to support their successful reintegration into society.

Considerations for Successful Use of AI

Successful implementation of AI-enabled technology must address several key factors: ***technical feasibility***, which involves data quality and the

40 Additional resources related to risk assessment tools, see Handbook of Recidivism Risk/Needs Assessment Tools, First Edition, and Report on Algorithmic Risk Assessment Tools in the U.S. Criminal Justice System.

41 de Jesus, A. (2019, December 13). Chatbots for mental health and therapy: Comparing 5 current apps and use cases. Emerj. Retrieved from https://emerj.com/ai-application-comparisons/chatbotsmental-health-therapy-comparing-5-current-apps-use-cases/

systems storing the data; ***ethical appropriateness***, evaluating the potential benefits and risks for all stakeholders; and ***operational achievability***, ensuring that the technology can be seamlessly integrated into existing workflows.

Technical Feasibility Developing an AI system for many new applications requires a substantial amount of high-quality data, known as training data, to "teach" the system and enable accurate identification and prediction. Insufficient or poor-quality data often pose significant challenges to the successful adoption of AI in various applications.[42] It is essential to differentiate between AI applications tailored to criminal justice and those with broader applicability. Criminal justice-specific applications rely on criminal justice data to develop and train AI systems. For instance, designing an AI system to predict the likelihood of a conviction in a trial based on specific evidence would require a substantial amount of court-related training data. In contrast, some AI applications are universally applicable and may not require criminal justice-specific data for training. For instance, AI-powered transcription software is used across various sectors such as education, healthcare, and entertainment. Adapting this technology for criminal justice purposes—like automating the transcription of depositions—requires less court-specific data, as much of human language remains consistent across industries. AI systems using general industry data are likely to evolve more quickly and be easier for the criminal justice field to adopt. As a result, criminal justice leaders can benefit from staying informed about AI developments in other sectors to identify potential opportunities for near-term implementation.

Ethical Appropriateness While technology can enable certain capabilities, it does not necessarily mean that AI use is always ethically suitable in the criminal justice context. Key ethical concerns—such as privacy, fairness, transparency, security, and accountability—are frequently discussed within the AI community. Recently, the Department of Defence outlined five ethical principles for AI applications, emphasizing that AI should be responsible,

42 Ghosh, Paramita (Guha). "Challenges of Data Quality in the AI Ecosystem." Dataversity, 12 Nov. 2019, http://www.dataversity.net/challenges-of-data-quality-in-the-ai-ecosystem/#

equitable, traceable, reliable, and governable.[43] Establishing ethical guidelines for AI in criminal justice will require continuous dialogue among criminal justice leaders and relevant stakeholders. Decisions on the appropriate use of AI may vary by community. For instance, in 2019, California prohibited law enforcement from using facial recognition technology (FRT).[44] That same year, a federal study revealed that FRT has racial accuracy discrepancies, misidentifying people of color more frequently than white individuals.[45] Bias—such as sampling and social bias—remains a significant concern for prediction and recommendation systems in the criminal justice field.[46] Many international bodies, like the Institute of Electrical and Electronics Engineers (IEEE), and public-private partnerships, such as the Partnership on AI, are collaborating on establishing ethical standards for AI use.[47] Criminal justice leaders considering the adoption of AI systems should carefully evaluate the ethical ramifications of their chosen approach.

Operational Limitations Even when technical feasibility and ethical considerations are met, implementing AI tools often requires changes in behaviour, processes, or other operational adjustments. Outside of the criminal justice system, many business leaders have discovered that overcoming operational, cultural, and systems integration challenges is often more difficult than addressing technical obstacles. The operational challenges criminal justice leaders may face vary depending on the specific application and the organizational context in which AI tools are introduced. Even seemingly

43 DOD Adopts Ethical Principles for Artificial Intelligence. (2020, February 24). Retrieved March 27, 2020, from https://www.defense.gov/Newsroom/Releases/Release/Article/2091996/dod-adoptsethical-principles-for-artificial-intelligence

44 Metz, R. (2019, September 13). California lawmakers ban facial-recognition software from police body cams. Retrieved November 27, 2024, from https://www.cnn.com/2019/09/12/tech/california-bodycam-facial-recognition-ban/index.html

45 Face Recognition Vendor Test (FRVT) Part 3: Demographic Effects (December 2019). Retrieved November 27, 2024, from https://nvlpubs.nist.gov/nistpubs/ir/2019/NIST.IR.8280.pdf From the study: Using the higher quality Application photos, false positive rates are highest in West and East African and East Asian people, and lowest in Eastern European individuals. This effect is generally large, with a factor of 100 more false positives between countries. However, with several algorithms developed in China this effect is reversed, with low false positive rates on East Asian faces. With domestic law enforcement images, the highest false positives are in American Indians, with elevated rates in African American and Asian populations; the relative ordering depends on sex and varies with algorithm.

46 AI Now Institute. (n.d.). Retrieved November 27, 2024, from https://ainowinstitute.org/

47 Ethically Aligned Design, First Edition: IEEE Standards Association. (2020, January 21). Retrieved March 27, 2020, from https://ethicsinaction.ieee.org/

straightforward factors, such as altering existing workflows, can meet resistance from individuals who favour the status quo or data collection methods that don't align with effective AI usage. Ignoring these operational considerations, alongside technical and ethical feasibility, can hinder the successful impact of AI technologies in criminal justice settings, including police agencies, courts, prisons, and community-based corrections.

Conclusion

While AI has made significant advancements in recent years, it still faces numerous technical and operational limitations. Two of the main challenges in developing new AI applications are data quality and availability. Since AI-generated predictions and classifications rely on the data used to inform them, any issues with the data—such as missing, unusable, improperly stored, or biased data—will affect the outcomes. Training new AI systems typically requires thousands of high-quality labelled examples for the algorithm to learn from, a process that can be time-consuming and costly. Additionally, implementing AI systems often necessitates changes in processes or behaviours, which can be difficult to execute and may face resistance from stakeholders involved in the ecosystem.

Even when technical and operational limitations are not present, many AI applications raise important ethical concerns, including issues of fairness, transparency, accountability, privacy, and security. These concerns are especially significant for prosecutors and other court officials, as ensuring a fair and just legal process is their primary responsibility. The first brief in this series outlines key ethical questions, providing a useful framework for criminal justice leaders and decision-makers to assess the potential impact of AI solutions on the community and other stakeholders.

Prison Staff's Opinions Toward Prisons for Older Inmates in South Korea

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Abstract

This study uses a survey of 279 prison staff in South Korea to explore their views on prisons for older inmates and contributing factors to their support of them. Most prison staff in the sample supported the development of prisons for older inmates. The staff who perceived care as being more important for older than younger inmates and who had experienced prison management problems due to older inmates were more likely to support building these prisons.

Keywords: older inmates, prisons for older inmates, segregated housing for older inmates, prison management problems with older inmates, prison staff's view of older inmates.

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Introduction

There is no single cut-off age for older inmates; the ages that have been established previously vary from 45 to 65 (Merkt et al., 2020; Mashi, Viola, & Sun, 2012; Stevens et al., 2018). However, in the United States and several other Western countries, ages 50 and 55 have been more commonly used as the cut-off than others (Aday & Krabill, 2012; Cipriani et al., 2017; Hayes, 2017). The reason behind designating 50 or 55 is that older inmates' physiological age is generally considered 10 years older than their chronological age (Prison Reform Trust, 2014).

The number of older inmates has significantly increased in the United States and many other countries (Aday & Krabill, 2012; Baidawi, Trotter, & Flynn, 2016; Cipriani et al., 2017; Hayes, 2017). For example, the inmate population aged 50 and older in state and federal prisons in the U.S. increased from 33,499 in 1990 to over 200,000 in 2010. Inmates aged 50 and older comprised 8.2% of the total state and federal prison populations in the United States in 1990, rising to 13.0% in 2010 (Aday & Krabill, 2012). In addition, older inmates aged 50 and older comprised 18.8% of the total U.S. prison population in 2017 (Merkt et al., 2020). More recent information indicates that older inmates aged 55 and older increased to 15% in 2021 from 3% of all inmates in U.S. federal prisons in 1991 (Widra, 2023). In the United Kingdom, the older inmate population aged 60 and older grew by 120% between 2002 and 2013 (Cipriani et al., 2017), and in Japan, inmates aged 60 and older increased by 216% between 2000 and 2006 (Mashi et al., 2012).

Several factors may contribute to the rising older inmate population. These include the increase of older individuals in the general population, an increase of older people who commit crimes (primarily for murder, sexual assaults, and drug offenses), and tough-on-crime policies and sentencing laws, such as mandatory minimum sentencing law, war on drugs, truth in sentencing law, and decreased use of parole (Aday & Krabill, 2012; Cipriani et al., 2017; Hayes, 2017; Hayes et al., 2013; Mashi et al., 2012; Luallen & Cutler, 2017; Porporono, 2014).

The rapid rise of the older inmate population has led to various problems

in prisons (Kerbs & Jolley, 2007). For instance, prison facilities are not well equipped to care for older inmates because they are primarily designed to house younger people (Aday & Krabill, 2012; Baidawi et al., 2016; Hayes, 2017). In addition, some older inmates have mobility issues and require wheelchairs, handrails, and other assistance from prison staff or fellow inmates (Trotter & Baidawi, 2015). Many older inmates also have chronic health conditions even before incarceration due to their lifestyles (e.g., alcohol and drug use, lack of nutrition, and lapsed medical care; Aday & Krabill, 2012; Cipriani et al., 2017; Mashi et al., 2012). Indeed, Hayes et al. (2012) reported that 83–95% of older inmates had a chronic illness or disability in the United Kingdom. Williams et al. (2009) report that 5% of older inmates in 11 state prisons in the US sustain daily activity impairment.

Additionally, older inmates are subject to stress and depression due to isolation and deprivation of freedom (Aday & Krabill, 2012; Baidawi et al., 2016; Lee et al., 2019; Stevens et al., 2018). As a result, this group suffers from mental health issues (e.g., depression, anxiety disorder, and dementia) and physical health concerns (Cipriani et al., 2017; Hayes et al., 2013; Porporino, 2014). One nationwide survey in the United States indicated that 40% of older inmates were subject to a form of mental illness (James & Glaze, 2006). According to the National Institute of Mental Health (2024), 15% of adults over 50 years old in the U.S. had mental illnesses in 2021. Therefore, mental illnesses among older inmates are more than doubled compared to general older populations. Hur (2017) indicates that 43% of inmates who took their own lives were aged 60 or older in South Korea. Some researchers have additionally raised concerns about older inmates' victimization by younger inmates (e.g., through bullying and physical and sexual assaults; Kerbs & Jolley, 2007; Mashi et al., 2012; Stevens et al., 2018). For example, Kerbs and Jolley (2007) found that 40.0% of older inmates experience insults. They further reported that 80.6% of older inmates are cut in line, and 10.8% are sexually harassed by younger inmates.

Many traditional prisons also lack medical staff and facilities for frail older inmates. A doctor's visit outside a prison interrupts prison operation and management because multiple correctional officers are meant to accompany

them. Many correctional officers are also not well-trained to handle older inmates dealing with mental and physical illnesses (Cipriani et al., 2017; Stevens et al., 2018). Specifically, it is challenging for prison staff to supervise older inmates living with depression and dementia (Crawley, 2011; Mashi et al., 2012; Stevens et al., 2018). Furthermore, many prisons are inadequately prepared for palliative and hospice care, and prison staff are subject to emotional distress (Aday & Krabill, 2012; Mashi et al., 2012; Porporino, 2014; Turner & Peacock, 2017).

Another issue with the increased older inmate population is raised medical costs to treat older inmates' diseases, including terminal-stage cancer (Hayes et al., 2012). It costs approximately $70,000 per year to incarcerate an older inmate, which is double or even triple the price of incarcerating a younger one (Cipriani et al., 2017; Lee et al., 2019; Williams, 2012). Most of these expenses go to health care, which federal and state governments in the United States spent $16 billion on in 2012 (Luallen & Cutler, 2017).

Several solutions have been suggested to address the problems associated with the increase in older inmates. These include building entire prisons for older inmates, adding a specialized unit for older inmates inside existing prisons, and utilizing compassionate release and medical parole (Aday & Krabill, 2012; Kerbs & Jolley, 2007; Luallen & Cutler, 2017). However, two different positions exist regarding prisons for older inmates. On the one hand, proponents argue that these institutions will meet the special care needs of older inmates and reduce the regular prisons' burden of managing this more demanding age group. Additionally, prisons for older inmates can protect older inmates better from verbal and physical violence than consolidated housing with younger inmates (Aday & Krabill, 2012; Hayes, 2017; Hayes et al., 2012; Kerbs, Jolley, & Kanaboshi, 2015; Thivierge-Rikard & Thompson, 2007; Trotter & Baidawi, 2015). On the other hand, opponents of prisons for older inmates postulate that prisons must mirror the general population to ensure older inmates' integration into the community. This group further believes that it is important to guarantee access to geriatric and non-geriatric medical care and for older inmates to be role models for younger inmates (Kerbs et al., 2015; Wangmo et al., 2017).

Given the arguments by proponents and opponents of prisons for older inmates, it is necessary to understand prison staff's opinions on the concept. Prison staff play an important role; they are responsible for day-to-day operations and have direct contact with younger and older inmates alike (Beijersbergen et al., 2015; Farkas, 2000). As such, they are likely to have hands-on knowledge of the issues associated with older inmates. This study examined the extent of prison staff's support for prisons specifically meant for old inmates and the factors contributing to that support. It did so by using survey data from 279 staff members in 10 prisons in South Korea (Korean Institute of Criminology, 2014b).

Overview of the Prison System and Older Inmates in South Korea

Like many other countries, South Korea has experienced a rapid increase in its older inmate population. According to KIC (2014b), the Korea Department of Justice defines older inmates as those 65 or older. The older inmates in South Korea comprised 1% of the total prison population (33,486) in 2003, which increased to 4.7% (29,634) in 2012. Using 60 as the cut-off age for older inmates, older inmates were 9.4% of all inmates in South Korea in 2015 (Chung, 2017). It may be reasonable to present inmate populations aged 50 and older in South Korea because many Western countries set that as the cut-off age. Accordingly, inmates aged 51 or older in South Korea comprised 9.4% of the country's total prison population in 2003, 25.5% in 2012 (KIC, 2014b), and 34.2% in 2015 (Hur, 2017).

The increase in older inmates may be related to the rise in older individuals among the general population and the aging of criminals (KIC, 2014b). Individuals aged 65 or older comprised 7.3% of the Korean population in 2000 and 11.0% in 2010. Common types of convicted crimes for older inmates in 2012 were fraud and embezzlement (208; 23.1%), murder (196; 21.8%), and theft (108; 12.0%). In comparison, theft (17.0%), fraud and embezzlement (12.7%), murder (12.0%), and robbery (11.6%) were common types of convicted crimes among inmates of all age groups in South Korea (Korea Correctional Services, 2012). Therefore, fraud/ embezzlement and

murder were more commonly convicted crimes for older inmates than offenders of all age groups. Finally, the most common prison sentence lengths were 1–3 years (30.2%) and 3–5 years (25.5%; KIC, 2014b).

The present survey information was collected in 2013. The discussion of prisons in South Korea, therefore, focused on 2013 and 2015. As of 2015, the country housed 38 prisons and 11 jails, and 15,936 prison staff supervised 55,123 inmates. On average, one correctional officer supervised 3.45 inmates.[2] The Korean Institute of Criminology (2014b) described the prison system in South Korea as having two central classification systems: basic and security-level classification. The basic classification is based on offenders' sex, nationality, age (juveniles or adults), and sentence length. Security-level classification is based on inmates' dangerousness, escape risk, and criminal history. Prison security has four levels: open prison (security level 1), low (security level 2), medium (security level 3), and maximum security (security level 4).[3]

Inmates with tuberculosis and mental illnesses go to Jinjoo Prison, whereas juveniles are assigned to the Kimchun Juvenile Detention Center, and Chungjoo Prison is only for women (KIC, 2014b). There are also separate classifications for physically and mentally handicapped prisoners as well as age. Inmates 65 or older are considered older inmates ("aged inmates"). Korean law requires inmates aged 65 or older to be incarcerated in prisons for only older inmates or in cells with special facilities (special heating system) when placed in a regular prison. However, no separate prison for older inmates exists in South Korea, though policymakers have discussed the possibility of building one.

Older inmates have extended bathing and exercise hours in consideration of their age and health condition. They also have a medical check-up once

2 https://www.chosun.com/site/data/html_dir/2015/11/04/2015110400766.html.

3 The primary goal of open prisons is for inmates' reintegration into the community. An open prison in South Korea is for model inmates whose prison sentence completion is near. Inmates in an open prison can work outside a prison to make income, and the security is loose. Chunan Prison is the only open prison in South Korea. A low-security prison has a lower security system for monitoring inmates and preventing escape than a medium-security prison. A medium-security prison has a lower security system than a maximum-security prison. Finally, a maximum-security prison is the highest security level with tight supervision, and interaction between inmates is prohibited (Yoo, 2017).

every six months. Korean law further requires special educational, rehabilitative, and recreational programs for older inmates by external experts. Additionally, older inmates have priority in family visitation and furloughs (Chung, 2017). KIC (2014b), however, indicated that older inmates rarely participate in education, rehabilitation, prison work, and job training because many have chronic illnesses and lack motivation. Each prison also has medical staff (e.g., physicians, pharmacists, and nurses).[4] However, there was a shortage of physicians, and only 79% of the needed physicians were available in 2015 (Hur, 2017). Moreover, the Korea Department of Justice designates 373 hospitals and clinics for those needing medical care outside prisons.

Arguments on Prisons for Older Inmates

Proponents of segregated prisons for older inmates argue that the older age group wants to have segregated housing. Furthermore, they feel that specialized prisons will allow facilities to be designed for inmates with mobility issues (e.g., handrails, wheelchair access, lowered bunker beds, adequate ventilation, and temperature setting). They also provide opportunities to include health care options inside the prison (e.g., kidney dialysis, dental care, and hospice care) and protect older inmates from bullying and physical assaults by younger inmates (Aday & Krabill, 2012; Hayes, 2017; Hayes et al., 2012; Kerbs et al., 2015; Thivierge-Rikard & Thompson, 2007; Trotter & Baidawi, 2015). Indeed, Kerbs and Jolley (2007) examined inmates in the U.S. and found that 75% of their sample preferred a segregated unit or a designated prison for older inmates.

According to Kerbs and Jolley (2007), 90% of older inmates want to have a choice between placement in a consolidated housing unit with younger inmates and a segregated unit or facility. Kerbs and Jolley (2007) further argued that prisons for older inmates would protect prisons from lawsuits about their failure to provide adequate care. By contrast, opponents of prisons for older inmates have suggested that prisons must mirror the general

4 KIC indicates that 89 physicians, eight pharmacists, 93 nurses, 33 medical technicians, and 67 public health doctors in South Korean in 2012.

population because society at large does not segregate people by age group (Wangmo et al., 2017). Furthermore, consolidating housing with younger inmates helps rehabilitate older inmates and integrate them into the community (Thivierge-Rikard & Thompson, 2007). Wangmo et al. (2017) suggested that older inmates may feel isolated and want to be housed with younger inmates, with half of the older inmates in their study reporting a desire to be housed with younger inmates. Additionally, those in prisons specifically for older inmates do not have access to programs available for younger ones (Aday, 2003). Likewise, consolidated housing with younger inmates could help maintain order and present opportunities for older inmates to become role models for younger ones. Additionally, in a consolidated housing unit, younger inmates have the potential to assist frail older ones (Wangmo et al., 2017). Opponents also argue that special treatment for older inmates is unfair toward their younger counterparts (Wangmo et al., 2017).

The Current Study

Prisons for older inmates have emerged as a potential response to the increasing older inmate population and issues associated with it. Prison staff's view of institutions for older inmates may be important because they work directly with older inmates themselves. That is why this study examined survey information on prison staff's perception of prisons for older inmates in South Korea (KIC, 2014b).

Factors Related to the Prison Staff's Support of Prisons for Older Inmates

Several factors may explain the prison staff's support of older inmates. Prison staff members who believe that care is more important for older than younger inmates are likely to support prisons for older inmates. This is because such specialized prisons are primarily designed to provide care and meet the needs of older inmates with mobility and health issues. Similarly, prison staff with favorable and compassionate attitudes toward older inmates

are more likely to support these specialized institutions than those without. The same is likely true for prison staff who perceive that older inmates behave well in prisons, who support compassionate release or medical parole, and who believe that some older inmates receive improper medical care due to a lack of money. Finally, prisons for older inmates might be preferred by staff who perceive that their prisons struggle to supervise and manage older inmates and who have found that younger inmates complain about unfair management.

Factors Related to Opposing Prisons for Older Inmates

Prison staff are likely to oppose prisons for older inmates when they see that their current prisons provide adequate care for chronic diseases. Additionally, some might believe that older inmates want to consolidate housing with younger inmates and that consolidated housing contributes to maintaining order in prisons (Wangmo et al., 2017). Another reason a staff member might oppose prisons for older inmates is if they possess an unfavorable attitude toward inmates in older age groups. For example, someone with this opinion might perceive that older inmates tend to exaggerate their illnesses. Finally, prison staff may not believe in the necessity of prisons for older inmates when they are concerned that prisons will become more like nursing homes than correctional facilities.

Prison Staff's Characteristics and Support of Prisons for Older Inmates

Researchers have reported mixed results (Lambert & Hogan, 2009; Tewksbury & Mustaine, 2008), but some have found that female, older, and longer-tenured prison staff are likelier to maintain lenient attitudes toward older inmates than male, younger, and shorter-tenured prison staff (Antonio & Young, 2011; Beijersbergen et al., 2015; Lambert & Hogan, 2009). For example, researchers have observed that female prison staff are likely to display empathy, support human services, and encourage inmate rehabilitation (Beijersbergen et al., 2015; Tait, 2011). Similarly, prison staff with longer

tenures tend to focus more closely on caring for inmates than those with shorter tenures (Tait, 2011). In addition, security prison staff are more likely to oppose prisons for older inmates than treatment and medical staff. This is because security staff prioritizes securing custody over treatment and caring for inmates (Lee et al., 2019).

Data and Method

Sample

The KIC (2014b) surveyed prison staff because, like the United States and other countries, South Korea has experienced increasing numbers of older inmates and associated problems. However, research on older inmates in South Korea remains scarce. The KIC (2014b) targeted a collection of 302 prison staff from 10 prisons throughout South Korea (approximately 30 staff from each prison) from August 19 to September 13, 2013.[5] The KIC attempted to include diverse types of prisons, including a female prison (i.e., Chungjoo Female Prison) and focused on surveying security staff. However, the organization also surveyed other staff (e.g., classification, medical, treatment, and administrative staff). It sent a mail survey questionnaire to each prison. It collected information on the statuses of older inmates, treatment, problems with older inmates, and prison staff's opinions on policies for older inmates. However, the KIC (2014b) did not articulate how respondents in prison were selected for the survey. The final sample included 279 participants due to incomplete answers by the remaining respondents.

Dependent Variable

The dependent variable was the prison staff's support of prisons for older inmates. The survey asked staff whether they think prisons for older inmates are needed. Prison staff could answer "yes" or "no." The variable was,

5 An actual number of respondents differs slightly from the targeted 30 staff for some prisons in the present study.

therefore, binary; a one was assigned to yes, and a zero was assigned to no.

Independent Variables

Possible factors contributing to increased support of prisons for older inmates. Six variables were hypothesized to positively relate to prison staff's support of prisons for older inmates. These variables came from the following questions in the survey (KIC, 2014a):

- Older inmate's behaviors: Older inmates behave better than younger inmates.
- Care is more important: Care is more crucial for older than younger inmates.
- Younger inmates' complaints: Younger inmates complained about unfair treatment and care because older inmates receive special care.
- Supervision and management problems with older inmates: Older inmates lead to prison supervision and management problems.
- Compassionate release and medical parole: Compassionate release and medical parole should be used for older inmates more often than they are now.
- Lack of medical care: Some older inmates do not receive medical care due to lack of money.

These six variables were measured using a five-point Likert scale: strongly disagree (1), somewhat disagree (2), neither disagree nor agree (3), somewhat agree (4), and strongly agree (5).

Possible factors contributing to lowering the support of prisons for older inmates. Five variables were hypothesized to be negatively connected to prison staff's support of prisons for older inmates. The following questions in the survey were employed for each variable (KIC, 2014a):

- Exaggerate illnesses: Older inmates tend to exaggerate their illnesses.

- Readiness for chronic disease: Our prison is treating chronic diseases well.
- Nursing homes: Prisons for older inmates will be more like nursing homes than correctional institutions.
- Older inmates want consolidated housing: Older inmates want consolidated housing with younger inmates.
- Consolidated housing benefits: Consolidated housing helps maintain order in prisons.

The above five variables were also measured on a five-point Likert scale.

Staff characteristics. Staff characteristic variables included prison staff's sex, age in years, tenure in years, and types of assignments. A one was assigned to male staff and a zero to female staff. Prison staff's assignments were dichotomized into security staff (1) and all other assignments (0; e.g., medical and administrative staff).

Analytic Strategy

Prison staff's support of prisons for older inmates, the dependent variable, was binary. Consequently, this study employed binary logistic regression analysis. The prison staff in the current sample belonged to 10 different prisons. Multilevel modeling with only 10 level-2 units (prisons) is not optimal. A minimum of 20–40 level-2 units is desirable for consistency (McNeish & Stapleton, 2016). As a result, this study created dummy variables indicating 10 prisons instead of using multilevel modeling (McNeish & Stapleton, 2016). Finally, prison staff's sex and Chungjoo Female Prison were highly correlated, possibly because more female staff worked there than in other prisons to meet the needs of female inmates (r = -0.85). Additionally, prison staff's age and tenure were highly correlated (r = 0.88). These three variables were introduced in different regression models to avoid multicollinearity issues.

The Results

Descriptive Statistics

Table 1 shows the distribution of variables. Of the 279 respondents, 169 (60.6%) supported prisons for older inmates. In addition, 92 (33%) somewhat or strongly agreed, while 77 (27.6%) either strongly or somewhat disagreed that older inmates behave well. Most respondents (168; 60.2%) either somewhat or strongly agreed that care is more important for older than younger inmates. More respondents either strongly or somewhat disagreed (92; 32.9%) than either somewhat or strongly agreed (83; 29.8%) that younger inmates complained about unfair treatment against them. Moreover, most prison staff (200; 70.7%) responded that they either somewhat or strongly agreed that older inmates lead to prison supervision and management problems. A greater number of respondents either strongly or somewhat disagreed (107; 38.3%) than either somewhat or strongly agreed (80; 32.2%) that more compassionate release or medical parole must be used in the future than they have been used. Similarly, more respondents (117; 42%) either somewhat or strongly agreed that some older inmates do not receive medical care due to a lack of money than either strongly or somewhat disagreed (84; 30.1%).

Most respondents (206; 73.8%) either somewhat or strongly agreed that older inmates exaggerate their illnesses. In addition, more respondents (135; 48.4%) either somewhat or strongly agreed than strongly or somewhat disagreed (35; 12.6%) that their prisons treated chronic diseases well. A majority (193; 69.1%) also either somewhat or strongly agreed that prisons for older inmates would be like nursing homes rather than correctional institutions. Another finding was that most respondents (193; 69.2%) either strongly or somewhat disagreed that older inmates want to consolidate housing with younger inmates. Finally, more respondents (124; 44.4%) either strongly or somewhat disagreed than either somewhat or strongly agreed (56; 20.1%) that consolidated housing with younger inmates helps maintain order in prison.

Regarding respondents' demographics, 239 (85.7%) were male, and 205 (73.5%) were security officers. While the ages ranged from 25 to 59, with a mean of 38.1, prison staff's tenure ranged from 0 to 33 years, with a mean of

9.9 years. Furthermore, a little more respondents came from Daegu Prison (31: 11.1%) than other prisons. The lowest number of respondents, 25, were obtained from Kwangjoo Prison and Busan Prison, respectively.

Table 1. Distribution of Variables

Binary Variables					
Support of prison for older inmates	Support (1): 169 (60.6%) No support (0): 110 (39.4%)				
Male staff?	Yes (1): 239 (85.7%), No (0): 40 (14.3%)				
Security officer assignment?	Yes (1): 205 (73.5%), No (0): 74 (26.5%)				
Five-point Likert scale variables					
Likert Scale Variables	1 (strongly disagree)	2 (somewhat disagree)	3 (neither disagree nor agree)	4 (Somewhat agree)	5 (Strongly agree)
Older prisoners behave well.	17 (6.1%)	60 (21.5%)	110 (39.4%)	87 (31.2%)	5 (1.8%)
Care is more important for older inmates than younger inmates.	12 (4.3%)	40 (14.3%)	59 (21.1%)	144 (51.6%)	24 (8.6%)
Younger inmates complain about unfairness.	9 (3.2%)	83 (29.7%)	104 (37.3%)	77 (27.6%)	6 (2.2%)
Older inmates lead to problems with prison supervision and management.	1 (0.4%)	25 (9.0%)	53 (19.0%)	159 (57.0%)	41 (14.7%)
Compassionate release and parole should be used more for older inmates.	31 (11.1%)	76 (27.2%)	82 (29.4%)	79 (28.3%)	11 (3.9%)
Some older inmates do not receive medical care due to lack of money.	21 (7.5%)	63 (22.6%)	78 (28.0%)	99 (35.5%)	18 (6.5%)
Older inmates tend to exaggerate illnesses.	1 (0.4%)	14 (5.0%)	58 (20.8%)	134 (48.0%)	72 (25.8%)

Our prison provides treatment for chronic disease well.	3 (1.1%)	32 (11.5%)	109 (39.1%)	98 (35.1%)	37 (13.3%)
Prisons for older inmates will be like nursing homes.	7 (2.5%)	29 (10.4%)	50 (17.9%)	117 (41.9%)	76 (27.2%)
Older inmates want consolidated housing with younger inmates.	37 (13.3%)	156 (55.9%)	66 (23.7%)	18 (6.5%)	2 (0.7%)
Consolidated housing helps maintain order.	23 (8.2%)	101 (36.2%)	99 (35.5%)	54 (19.4%)	2 (0.7%)

Continuous Variables	Min.	Max.	Mean	Std. dev.
Prison staff age	25	59	38.1	7.0
Tenure (years)	0	33	9.9	7.6

Prisons	Anyang Prison: 28 (10.0%), Daegu Prison: 31 (11.1%), Daejun Prison: 30 (10.8%), Kwangjoo Prison: 25 (9.0%), Chungjoo Women's Prison: 30 (10.8%), Kyungbook North Prison: 29 (10.4%), Wonjoo Prison: 26 (9.3%), Uijongboo Prison: 26 (9.3%), Junjoo Prison: 29 (10.4%), Busan Prison: 25 (9.0%).

Binary Logistic Regression Result

Table 2 presents the result of the binary logistic regression analysis. Model 1 provided the result without sex or tenure. It shows that "Care is more important for older inmates" and "older inmates lead to problems with prison supervision and management" were positively related to the support of prisons for older inmates at a 0.01 level. Additionally, one unit increase in the support of care for older inmates and "older inmates lead to problems with supervision and management" were linked to 53.3% and 76.0% increases in the odds in the support of prison for older inmates, respectively. The support for compassionate release and medical parole for older inmates was also positively connected to prison support at 0.05. One unit increase in the support for compassionate release was associated with a 31.2% increase in the odds of

support for prisons for older inmates. By contrast, "prisons for older inmates will be more like nursing homes than correctional institutions" was negatively linked to the support of prisons for older inmates at the 0.01 level. One unit increase in "prisons for older inmates will be more like nursing homes rather than correctional institutions" was associated with a 37.7% decrease in the odds of support of prisons for older inmates. Finally, being security staff was related to a 50.8% decrease in the odds of supporting prisons for older inmates. Other variables, including dummy variables for prisons, failed to reveal a significant relationship with the support of prisons for older inmates.

Table 2. Binary logistic regression result for prison staff's support of prisons for older inmates (n = 279)

Variables	1	2
Older prisoners behave well.	-0.205 (0.192) [0.815]	-0.226 (0.194) [0.798]
Care is more important for older inmates than younger inmates.	0.428** (0.163) [1.533]	0.436** (0.163) [1.547]
Younger inmates complain about unfairness.	0.009 (0.173) [1.009]	0.022 (0.173) [1.022]
Older inmates lead to problems with prison supervision and management.	0.565** (0.193) [1.760]	0.579** (0.195) [1.784]
Compassionate release or parole should be used more for older inmates.	0.271* (0.153) [1.312]	0.279* (0.153) [1.321]
Some older inmates do not receive medical care due to lack of money.	0.049 (0.146) [1.050]	0.057 (0.146) [1.059]
Good chronic disease care in current prison.	-0.150 (0.167) [0.861]	-0.140 (0.167) [0.870]
Older inmates tend to exaggerate illnesses.	-0.021 (0.198) [0.979]	-0.015 (0.198) [0.985]
Prisons for older inmates will be more likely to be nursing homes than correctional institutions.	-0.473** (0.165) [0.623]	-0.451** (0.166) [0.637]
Older inmates want consolidated housing with younger inmates.	-0.053 (0.188) [0.949]	-0.003 (0.192) [0.997]
Consolidated housing helps maintain order.	-0.229 (0.181) [0.796]	-0.245 (0.181) [0.782]
Male	—	0.734 (0.503) [2.084]
age	-0.002 (0.023) [0.998]	—

Tenure (years)	—	-0.005 (0.021) [0.995]
Security assignment	-0.747* (0.410) [0.474]	-0.709* (0.412) [0.492]
Prisons	No prison is significant.	No prison is significant.
Chi-square	55.8***	57.7***
Nagelkerke R square	0.24	0.25

Note: 1. Regression coefficients are shown; standard errors are in parentheses; odd ratios are in brackets.
2. One-tailed test; * < 0.05, ** < 0.01.
3. Prison dummy variables are not shown to save space; Anyang Prison is not in Model 1, and Chungjoo Female Prison is not in Model 2.

Model 2 introduced prison staff's sex and tenure while removing age and the dummy variable for Chungjoo Prison. "Care is more important for older inmates than younger inmates," "Older inmates lead to problems with prison supervision and management," and compassionate release for older inmates were still significantly and positively coupled with the support of prisons for older inmates at the same significance levels. On the other hand, "Prisons for older inmates will be like nursing homes rather than correctional institutions," and security staff assignments were inversely linked to the support for prisons for older inmates with the same significance levels. The remaining variables, including prison staff's sex and tenure and dummy variables for prisons, however, were still not significantly associated with the support for prisons for older inmates.

Discussion and Conclusion

Interpretation of Regression Analysis

Prisons for older inmates have risen as one of several remedial methods for addressing the increasing older inmate population and associated problems. Prison staff's view of prisons for older inmates may be noteworthy because they directly interact with inmates during daily prison operations. The present study explored this topic by examining South Korean prison staff's view of

prisons for older inmates and the factors contributing to those views. Most prison staff (60.6%) in South Korea supported the development of prisons for older inmates.

Two factors that significantly related to prison staff's support for prisons for older inmates were their beliefs that care is more important for older than younger inmates and that older inmates lead to problems with prison supervision and management. In other words, the prison staff supported prisons for older inmates because they believed that such institutions contribute to the improved care of older inmates. Additionally, prison staff expressed that prisons for older inmates will help reduce prison management problems associated with older inmates, such as special medical care, treatments, programs, and facilities for those with mobility issues. Moreover, the support of compassionate release and medical parole was also significantly associated with increased odds of favorable attitudes toward prisons for older inmates. This finding may suggest that prison staff who have a lenient attitude toward older inmates, in general, are likely to support both compassionate release and prisons for older inmates.

Unlike these three variables, some prison staff's perceptions had a nonsignificant relationship with the support of prisons for older inmates. These perceptions included the idea that older inmates behave well, younger inmates complain about unfairness, and some older inmates do not receive medical treatment due to a lack of money. Likewise, prison staff did not consider these factors in supporting or non-supporting prisons for older inmates.

One variable connected to the reduced support for these specialized prisons is the concern that they will be like nursing homes rather than correctional institutions. Many prison staff (69.1%) expressed this apprehension. Similarly, prison staff responsible for security were less likely to support prisons for older inmates than those not. This finding implies that the type of assignment is associated with staff members' support or non-support of age-segregated prisons. Prison staff's views that some older inmates exaggerate their illness, that prisons treat chronic disease well, that older inmates wanted consolidated housing with younger inmates, and that consolidated housing helps maintain order were not significantly correlated to the support or non-support of prisons

for older inmates. This is explained by the notion that distrust of older inmates, owing to the exaggeration of their illnesses, did not significantly alter their support or non-support. Similarly, treatment readiness for chronic illnesses was not an important factor in prison staff's attitude toward prisons for older inmates. According to KIC (2014a), only a small number of prison staff (20; 7.2%) reported that older inmates want to consolidate housing with younger ones. Similarly, only a small number of prison staff (56; 20.3%) perceived that consolidated housing helps maintain order in prison.

Demographic variables such as sex, age, and tenure were not significant predictors of the support of prisons for older inmates. Some researchers have suggested that female, older, and longer-tenured prison staff are likelier to have a lenient attitude toward inmates (Antonio & Young, 2011; Beijersbergen et al., 2015; Lambert & Hogan, 2009). However, regarding the support of prisons for older inmates, these demographics were unimportant. It is possible, then, that prison staff support the development of prisons for older inmates because of their potential to address prison management problems and care concerns regardless of sex, age, and tenure.

Limitations of the Study

A few limitations in the present work warrant a brief discussion. This study conducted a secondary analysis based on the information collected by KIC in 2013 because it is the only available information. Therefore, it is somewhat dated information. Another limitation is that the KIC (2014b) indicated they attempted to include prisons in different areas of South Korea. That said, KIC (2014b) did not articulate the selection method of respondents within each prison. Next, the characteristics of the prison staff in this study were limited in number. For example, the prison staff's rank, education, and political orientation were omitted from the present analysis. Finally, KIC (2014a) did not utilize open-ended questions in the survey. Therefore, prison staff could not freely state their thoughts, feelings, and beliefs using their words. Future research must add more open-ended questions to allow participants to express their opinions with more depth of thought.

Research and Policy Implications

The sample for this study was obtained from South Korea. As such, the current findings do not necessarily apply to other countries. For instance, the lenient attitude toward older inmates may be higher in South Korea than in other Western countries because of the influence of Confucianism. Similarly, verbal and physical attacks against older inmates by younger inmates may not be as common as they are in other Western countries. Future researchers must consequently further explore prison staff's view on prisons for older inmates in other countries, as well as the factors contributing to their support.

Readers must exercise caution when interpreting this study's findings. This analysis did not attempt to contrast consolidated and segregated housing for older inmates. A few different forms of segregated housing are available, such as segregated cells and units (areas) in prison for older inmates. These are more commonly used than entire prisons for older inmates. Consequently, prison staff who expressed a lack of support for prisons for older inmates did not necessarily support consolidated housing. Many instead supported special cells and units for older inmates, with only 9.6% of prison staff having supported consolidated housing. Finally, it is possible that some prison staff opposed prisons for older inmates because a reshuffling of older inmates to separate facilities may result in fewer inmates in previously used facilities that house both older and younger inmates. Therefore, building prisons for older inmates serves against their interests in sustaining the current work opportunities.

It may be safe to send older inmates to prisons for older inmates on a volunteer basis. However, mandatory assignment to prisons for older people may also be possible, facilitating better treatment, medical care, and the safety of older inmates (Kerbs et al., 2015). In addition, prisons for older inmates might be needed to care for older inmates and reduce prison management problems with older adults. Most prison staff also reported that older inmates tend to want to be housed separately from younger ones. In that same vein, many prison staff shared that consolidated housing does not help maintain order in prison. This finding, therefore, is not consistent with an argument that consolidated housing benefits both older and younger inmates because older inmates can be role models to younger inmates (Wangmo et al., 2017).

Hur (2017) proposes that a special law must be enacted to create prisons for older inmates. Next, Lee (2015) recommends private prisons for older inmates in South Korea, providing correctional programs according to older inmates' gender, age groups, criminal history, and cognitive abilities. Lee (2015) emphasizes that prisons for older inmates must be in a place with a good landscape to assist them with depression or other mental illnesses. Finally, prisons for older inmates should provide improved prison medical care and prison labor wages because they are related to older inmates' reduced recidivism rate (Hong, Cho, & Sim, 2018).

A discouraging factor in the support of prisons for older inmates was the concern that these institutions would be like nursing homes rather than correctional institutions. Policymakers and prison administrators should respond by designing and managing prisons for older inmates to provide these older adults with security and a chance to face consequences for their criminal acts. Quite a few older inmates have committed serious offenses, such as murder and sexual assault; their security and rehabilitation should be essential considerations when developing these specialized correctional facilities. Finally, moving older prisoners with violent convictions to facilities that are more like a nursing home may look "soft on crime" for some constituents. Therefore, housing older prisoners in specially designed prisons also has political implications.

Conclusion

Many more prison staff in South Korea expressed support for prisons for older inmates than those who did not. Many prison staff perceive that prisons for older inmates provide proper medical care and facilities for frail older inmates and lessen prison management problems in the same age group. Prison staff did, however, express concern that prisons for older inmates will be more like nursing homes than correctional institutions. Policymakers and prison administrators both need to design and manage prisons for older inmates to avoid compromising security and rehabilitation in correctional institutions. Notably, most prison staff did not favor consolidated housing

with younger inmates. This finding may be explained in two ways. First, it could be that prison staff simply do not believe that older inmates want to be housed with younger inmates. Second, they could feel that consolidated housing does not help maintain order in prison. Hence, prisons for older inmates are an achievable option, along with an increased use of segregated housing in special cells and units for older inmates. In future studies, researchers should explore the perceptions of prison staff in other countries to glean their support for these specialized institutions.

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An agent-based model of counterinsurgency: Soft versus hard approaches

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Abstract

This article uses an agent-based simulation model to investigate the effectiveness of hard (attrition), balanced, and soft (hearts and minds) counterinsurgency approaches. The model involves a combination of irregular geography and social networks with four different types of agents: civilian, military, civil servant, and insurgent. After running 900 simulations (each with up to 3,650 iterations and 5,000 agents) in nine different experimental conditions, the authors reach the following conclusions. First, it is nearly impossible to eliminate an insurgent group if the popular support for the group is high, even when using a 'hard' approach. Second, a counterinsurgent government can eliminate an insurgent group only if it uses a 'hard' approach and when the popular support for the insurgency is low or medium. Third, a counterinsurgent government can decrease the popular support for the insurgency if it uses a 'soft' or a 'balanced' approach when the initial support is not already low. Fourth, although it

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is difficult to eliminate an insurgent group, it is possible to decrease the number of insurgents when the support level is low. The number of insurgents increases when the support level is high, regardless of the counterinsurgency approach.

Keywords: Counterinsurgency, agent-based modeling, attrition, hearts and minds

Introduction

An insurgency is a revolt against an established government to correct a perceived or real injustice. A counterinsurgency is the target government's response to an insurgency. It is the sum of all activities carried out by that government to defeat the insurgency. There are two broad approaches to counterinsurgency: hard versus soft. These are also known as 'attrition' versus 'hearts and minds' approaches (Findely & Young, 2007) or military versus humanitarian and political non-military efforts (van der Zwet et al., 2022). In the hard approach, a counterinsurgent government tries to defeat the insurgency by increasing the costs of supporting the insurgency using violent countermeasures and intelligence collection efforts (Findley & Young, 2007; van der Zwet et al., 2022). The military and police forces are used most often in the hard approach. In the soft approach, the counterinsurgent government tries to win the hearts and minds of the population that may support the insurgency by distributing benefits (e.g., social and welfare programs) (Heath et al., 2000). In most cases, governments probably use both approaches simultaneously to maximize the effectiveness of counterinsurgency strategies (Findley & Young, 2007).

A critical question for any counterinsurgent government to address is determining which of these two approaches is more effective and, if both are necessary, the optimum balance in using hard vs. soft approaches in counterinsurgency (Pechenkina & Bennett, 2017). The literature suggests that both approaches have been used successfully in some counterinsurgencies (Findley & Young, 2007). Both have worked in some cases but not in others. For example, the British successfully used the soft approach in Malaya but less successfully in Burma (Findley & Young, 2007; cf. Dixon, 2009). Similarly, the hard approach was largely successful against Native Americans in the US and Shining Path in Peru, but it was less successful in Vietnam (Findley & Young, 2007).

According to Findley and Young (2007), the inconsistent findings regarding the effectiveness of hard vs. soft approaches can be explained by incorporating the level of popular support into the equation. Popular support

is the resources and strength that an insurgent movement receives from the civilian population, such as approval, money, food, weapons, intelligence, hiding places, *et cetera*. The civilian population provides the insurgents with fewer of these resources when the level of popular support is low and more of them when the level of popular support is high. Findley and Young (2007) argued that a hard approach is more effective if the level of popular support is low, while a soft approach is more effective if the level of popular support is high. They tested these hypotheses using agent-based modeling (ABM) technique and found support for them.

ABM is a computational technique for answering questions about complex systems. It has advantages over other modeling techniques, such as linear, non-linear, and differential mathematical equations (Axtell, 2000; Epstein, 1999 & 2006; Moss & Edmonds, 2005; O'Sullivan, 2004). An agent-based model comprises an environment and agents—mini-programs with pre-defined properties (i.e., inner states) and functions (Macal & North, 2005). Agents act (or run) many times simultaneously and interact with each other and the environment. Each interaction can potentially change the environment and the agents' properties. Using an ABM, one can simulate the macro-level patterns based on the micro-level rules and states of the agents and compare those patterns to theoretical predictions (Epstein, 1999).

Agent-based models have been used in modeling various forms of political and communal violence (Bhavnani & Choi, 2012; Bhavnani et al., 2014; Epstein, 2002; Fonoberova et al., 2019; Li et al., 2015; Martinez-Vaquero et al., 2019; Weidmann, 2016; Weidmann & Salehyan, 2013; Weisburd et al., 2022). Scholars have used agent-based models to study terrorism and insurgency as well (Bennett, 2008; Collins et al., 2014; Geller & Alam, 2010; Ilachinski, 2012; Li et al., 2015; Lim et al., 2007; Pechenkina & Bennett, 2017; Yates et al., 2014). These models have contributed significantly to literature. However, a crucial element of the counterinsurgency environment – human intelligence – was missing in these models (e.g., Bennett, 2008; Cioffi-Revilla & Rouleau, 2010; Moro, 2016; Pechenkina & Bennett, 2017; Yates et al., 2014). Human intelligence is the type of intelligence collected from people.

The main research questions the study aims to answer are (1) whether a

hard or soft approach to counterinsurgency is more effective and (2) how the civilians' support level for the insurgency moderates the effects of hard and soft approaches. The present study contributes to the literature by creating an agent-based model of counterinsurgency that incorporates human intelligence. The new agent-based model expands on those created by Findley and Young (2007) and Bennett (2008). The study results somewhat contradict Findley and Young's (2007) findings, and they will be discussed in the final section.

Literature Review

Insurgency

An insurgency is a form of political violence, and the term is used interchangeably with other forms of political violence, including terrorism. However, there are a few significant differences between terrorism and insurgency. According to Unal (2012), five of these differences are as follows: First, terrorism is a method, while insurgency is a movement. Insurgents sometimes use terrorism as a method in their struggle. Second, insurgents enjoy support from a large civilian popular base while terrorists do not. According to Findley and Young (2007), insurgents need popular support because they need supplies and safe havens, and the population provides recruits for the struggle. Insurgents also need a silent population that will not sell them out to the counterinsurgents (Berman et al., 2011). Since they are small, marginal, clandestine groups, terrorists do not necessarily need popular support (Unal, 2012).

Third, terrorist organizations are clandestine and usually have cell structures. Insurgents have non-clandestine and broad organizations, with political and military wings acting simultaneously. Fourth, terrorists usually do not aim to control a territory. Insurgents do. Findley and Young (2007) state that an insurgency is a 'protracted political-military conflict over control of the state or some portion thereof using irregular military forces' (p. 380). Although insurgents want to control a geographic territory (i.e., the state or some portion of it), it is not the only thing that they want to control. They also want to control the population that resides in that territory.

Fifth, terrorists attack symbolic and civilian targets the most, while insurgents attack military targets. The strategy in terrorism is usually to communicate with or coerce the opponent by employing violence and intimidating a civilian population (Kydd & Walter, 2006). Therefore, terrorist violence is usually directed towards a group target (Goodwin, 2006), and it is not always discriminate (i.e., any person from the enemy group can be a suitable target of terrorist violence). However, a big part of the insurgents' goal is to assert control over a geographic region or a population residing in that region (Findley & Young, 2007; Unal, 2012). Therefore, their violence against civilians is expected to be more discriminatory. Insurgents use violence against two groups of people: their enemy (i.e., counterinsurgent government) and the population they want to control (Kydd & Walter, 2006). In the first case, the goal is attrition, and they can use terrorism and guerilla tactics to achieve that goal. In the second, the goal is to assert control over a population. To achieve that goal, they need to be very selective since indiscriminate violence can backfire (i.e., reduce popular support which the insurgents badly need).

Agent-based Models

ABM is a relatively new computational technique, but it is becoming more prevalent with the advancement of computer technology. Scholars have used agent-based models to study a wide range of phenomena, including flows and evacuations (Helbing et al., 2000), market dynamics (Palmer et al., 1994), organizations (Bonabeau, 2002; Prietula et al., 1998). Scholars in criminal justice and criminology also have used agent-based models to study drug market dynamics (Dray et al., 2008), street robbery (Groff, 2007 & 2008; Groff & Mazerolle, 2008; Liu et al., 2005; Wang et al., 2008), burglary (Birks et al., 2008; Birks et al., 2012; Hayslett-McCall et al., 2008; Johnson, 2008; Malleson et al., 2018), victimization risk (Park et al., 2011), cybercrime (Gunderson & Brown, 2000), organized crime (Nardin et al., 2017), the efficacy of law enforcement strategies (Dray et al., 2008; Groff & Birks, 2008; Zhang & Brown, 2013), and race gap in incarceration rates (Hawdon et al., 2017; Lum et al., 2014).

An agent-based model comprises an environment and many agents in computer memory. The environment is the virtual space where the agents 'live.' It can represent physical geography or something else (e.g., a social network) in the real world. It can have local variables and rules. Agents are autonomous mini-programs with properties (i.e., inner states) and functions (i.e., rules of action) (Macal & North, 2005). In an ABM simulation, agents run simultaneously for a pre-defined number of times (i.e., iterations) and interact with each other and the environment. In each iteration, they can affect other agents and the environment or be affected by them. The goal of an agent-based model is to create macro-level patterns based on micro-level properties and rules. Thus, ABM is called generative science since the scientist generates (or grows) macro-level patterns with micro-level (local) rules (Epstein, 1999).

ABM has many advantages. Agent-based models can be used to test the inner consistency of theories. ABM is a way to formalize theoretical assumptions and produce the expected aggregate-level outcomes based on those assumptions. According to Birk and Davies (2007), agent-based models provide a means to assess theoretical causal sufficiency and 'the degree to which a proposed construct is capable of generating outcome patterns compatible with reality' (p. 909). Using agent-based models, researchers can see the outcomes (or consequences) of their assumptions before testing their hypotheses using real-world data (Birks & Davies, 2017). In other words, they can see whether the theoretical mechanism works and how it works.

An agent-based model can be a *candidate* explanation of a phenomenon if its outcome is congruent with empirical reality, empirical signatures, or 'stylized facts' (Epstein, 1999). However, such congruence does not mean that the model is *the* explanation. Instead, it is one possible explanation of the phenomenon, among many, since other models may also generate congruent outcomes with the empirical signature. As Birks and Davies (2017) point out, the outputs of agent-based models 'represent only the consequences of the assumptions upon which the models are grounded' (p. 907). Thus, they cannot replace empirical studies. However, they can be considered one other way of triangulation.

Previous Research on (Counter)Insurgency Using ABM

Scholars have used ABM to study various forms of political violence, including insurgencies. The present study is based on two of the previous studies by Findley and Young (2007) and Bennett (2008). In Findley and Young (2007), the research question was whether a hard (i.e., attrition) or soft (i.e., hearts and minds) approach was more effective in counterinsurgency. Findley and Young (2007) concluded that it depends on the level of popular support – the size and willingness of the population to support the insurgent goal. Bennett (2008) studied the early dynamics of an insurgency conflict using ABM, but his study was not about the hard versus soft approach in counterinsurgency. He studied how insurgencies grow or decline in response to various combinations of government accuracy and effectiveness in targeting insurgents (Bennett, 2008). Bennett's (2008) model has some essential components that any agent-based model of an insurgency should have.

In Findley and Young's (2007) model, there were three types of agents: insurgent, counterinsurgent, and civilian. Most of the agents were civilian agents; insurgent and counterinsurgent agents made up smaller proportions of the population. The environment was a two-dimensional grid that the agents moved through, representing a physical geographic terrain. Insurgent and counterinsurgent agents were endowed with vision; they could see one another from afar. The insurgent agents tried to evade counterinsurgent agents, and the counterinsurgent agents tried to catch and eliminate (or kill) the insurgent agents. Also, the insurgent and counterinsurgent agents inter~~re~~acted with civilian agents in adjacent cells to sway their allegiances by imposing costs and benefits. In other words, the insurgent and counterinsurgent agents tried to influence the civilian agents' support level (or commitment) for the insurgency. The goal of the counterinsurgent was to eliminate that support.

In Bennett's (2008) model, there were two types of agents: civilian and soldier. The civilian agents had several properties that could make them latent or active insurgent agents: fear, anger, and violence threshold. The civilian agents became latent or active insurgents when their anger exceeded their fear and violence threshold. The soldier agents did not proactively seek to eliminate insurgent agents. Instead, the insurgent agents attacked first, and the

soldier agents counterattacked. The soldier agents could hit civilian agents and cause collateral damage when they counterattacked, and collateral damage was more likely when the soldier agents were less accurate. Thus, accuracy was one of the crucial elements of Bennett's (2008) model. The collateral damage caused civilian agents' anger levels to increase, making them more likely to become insurgent agents.

Findley and Young (2007) and Bennett (2008) are valuable contributions to the literature on insurgencies, but they are incomplete for the following reasons. First, both models assume that insurgent and counterinsurgent agents are clearly visible from the outside. In other words, they assume that anyone can (or will) know who the insurgent or counterinsurgent agents are at first sight, which is not always true. Although insurgents sometimes wear uniforms and insignia, they are expected to be evasive against a superior enemy. They will hide in the crowds. Second, the insurgent and counterinsurgent agents in Findley and Young (2007) move randomly within the environment. In the real world, counterinsurgents do random patrolling in the conflict region for various reasons, mainly to find and eliminate the insurgents. However, random patrolling is not the only or the best way to find the insurgents. Counterinsurgents are expected to spend a large amount of their time and resources collecting intelligence from various sources, including human sources. Findley and Young's (2007) model does not consider that. Third, in Bennett (2008), the counterinsurgent agents are all reactive; they attack back only after being attacked by an insurgent agent. However, counterinsurgents also proactively seek insurgents to eliminate them in the real world.

The Current Study

The current study builds on Findley and Young (2007) and Bennett (2008) and tries to overcome some of their limitations. Its model borrows from both of these studies, and also incorporates human intelligence, making it more realistic than the previous models. The model has four types of agents: civilian, insurgent, military, and civil servant. Most of the agents are civilian agents. The model's environment has two components: an irregular geographic

terrain (i.e., a two-dimensional grid with missing cells) and a social network of friendship ties. The grid cells in the geographic terrain represent settlements where the agents live (e.g., villages or neighborhoods). The movement across grid cells represents residential movement. Multiple agents can occupy a grid cell, and agents within the same grid cell are considered neighbors. Agents can become friends with other agents. Thus, the second component of the environment is a social network of friendship ties. During the simulation, combatant agents try to find and attack their enemies using human intel in every iteration. Their actions affect civilian agents and shift the level of civilian support for the insurgency.

The current model differs from the previous models as follows. First, in the previous models (Bennett, 2008; Findley & Young, 2007), the agents randomly move through the environment in every iteration. In the present model, they do not move in every iteration. The agents do move from one cell to another but with a low probability. The movement of agents in the present model is residential movement. Second, in Findley and Young's (2007) model, only the counterinsurgent agents proactively seek and attack the insurgent agents. In the present model, both the counterinsurgent and the insurgent agents seek and attack their enemies. Moreover, combatant agents in the present model, both insurgent and military, use human intelligence to find their enemies. Third, in Findley and Young's (2007) model, both insurgent and non-combatant government agents impose costs and benefits on civilian agents, which, in turn, influences the civilian agents' support level for the insurgency. In the current model, non-combatant agents impose only benefits without any costs, while combatant agents impose only costs without any benefits on civilian agents. Fourth, in Bennett's model (2008), counterinsurgent agents can cause collateral damage while attacking insurgent agents. A similar process happens in the present model. However, while the counterinsurgent agents hit civilian agents by mistake while aiming for an insurgent agent in Bennett's (2008) model, they misidentify civilian agents as insurgents and attack them in the current model. In other words, counterinsurgent agents hit civilian agents and cause collateral damage not because of inaccurate aim but because of an intelligence failure.

As Berman et al. (2011) argue, critical information and intelligence are crucial for counterinsurgency because they make defensive and offensive operations more effective (Kalyvas, 2006). Intelligence is probably one of the most important resources counterinsurgents use to identify their enemies. Intelligence can help counterinsurgents target their enemies more accurately as well. Accuracy is important because less accurate targeting may cause collateral damage (Bennett, 2008) and negatively affect civilian support for counterinsurgency. Although intelligence is essential in modeling an insurgency environment, neither of the previous studies has incorporated it into their model. The current model has human intelligence as one of its main components, which is the main contribution of this study to literature.

Methods

The Environment

The environment has two components: (1) an irregular geography and (2) a social network of friendship ties. The first component is a rectangular grid with missing cells (Flache & Hegselmann, 2001). Figure 1 is an example of what it looks like in a random simulation. Each cell in the figure represents a settlement (e.g., village, town) where agents live. Multiple agents occupy a cell, typically about a hundred. Agents can move from one cell to another, and such movement represents residential movement. The second component is a network of friendship ties between agents. Each agent forms friendship ties with other agents; the total sum of those ties is a social network.

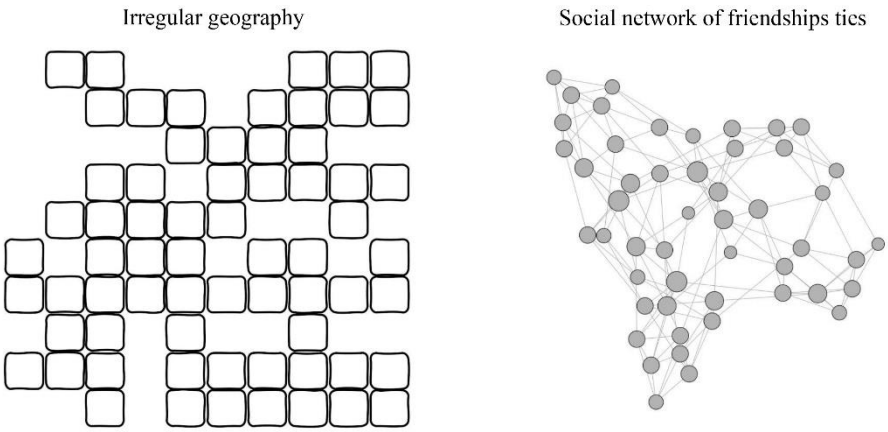


Figure 1. Components of the model's environment

Types of Agents and Their Common Properties/Functions

There are four types of agents: (1) civilian, (2) insurgent, (3) military, and (4) civil servant. Most of the agents are civilian agents. Galula (2006) argues that most people in a conflict environment are neutral; a small portion of the population is active for or against the insurgency. The military agents represent the military/police personnel of the counterinsurgent, and civil servant agents represent civil servants who distribute social benefits to win the hearts and minds of the civilian population. Each agent has a set of properties (i.e., inner states) and functions (i.e., local rules). Some properties and functions are common to every agent, while others are specific to the agent type. Table 1 shows properties and functions by agent type.

Table 1. Agents' properties/functions

Property	Civilian	Civil servant	Military	Insurgent
Support level	V [.02 - .98]	C [.02]	C [.02]	C [.98]
Memory (list, length = 40)	V	V	V	V

Property	Civilian	Civil servant	Military	Insurgent
Residence location	V	V	V	V
Social DNA (random bit array)	C	C	C	C
Friends (list, length = V)	V	V	V	V
Resource	V [0 – 1]	C [1]		
Function				
Make friends	X	X	X	X
Talk	X	X	X	X
Move	X	X	X	X
Distribute resources		X		
Share resources	X			
Attack			X	X

C = Constant, V = Variable, X = Exists.

Every agent has the following properties: (1) support level, (2) memory, (3) residence location, (4) social DNA, and (5) friends. The *support level* indicates how much the agent supports the insurgent cause. It ranges from zero to one. It is close to zero for the government agents and close to one for insurgent agents. The civilian agents' support levels vary and can change by their interactions with other agents. A civilian agent can become an insurgent agent if its support level exceeds a threshold (0.98). *Memory* is a local storage area where agents keep their perceptions about other agents' support levels. Initially, agents' memories are empty; they fill up as they receive intel from other agents. Agents have a limited memory; they can store intel about up to 40 agents' support levels. If an agent's memory is full, the agent discards the oldest intel to store new intel. The *residence location* is the grid cell in the environment (i.e., irregular geography) in which the agent lives. It is important because agents are more likely to communicate and make friends with other agents in the same grid cell. The *social DNA* is a random bit array that indicates the type of person an agent is (see Figure 2 for an example). It can

be considered the outcome of a series of yes/no questions about the agent's social demographics and personality. Agents with similar social DNA are more likely to be friends with each other. The *friends* is a list of pointers to the agent's friends. Agents interact with other agents (e.g., share information) through these pointers.

Every agent has the following common functions: (1) make friends, (2) talk, and (3) move. Every agent can *make* new *friends*. Two factors influence this process. First, agents can become friends with other agents in the same grid cell (i.e., residence location). Thus, agents who live (or have lived) in the same grid cell are more likely to be friends. Second, for two agents to become friends, at least a certain number of bit locations in their social DNAs must have the same value. In the current model, that number is set to 70% of the bit locations in the social DNA. Also, agents with similar social DNA are more likely to remain friends[1]. For example, consider Figure 2. Agents A and C in the figure are more likely to remain friends than agents A and B because the similarity between agents A and C is greater than between agents A and B.

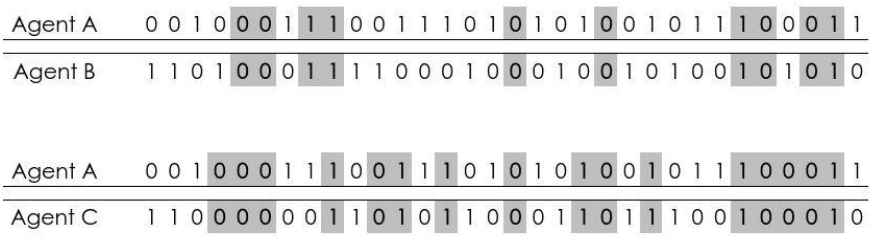


Figure 2. Social DNA

Every agent can *talk* to other agents. When agents talk, they exchange intel—a data package with two fields: (1) an agent's unique ID and (2) its

1 The agents in the model cannot have an infinite number of friends. Each agent has a tolerance for friendship ties and thus has a maximum number of friends they can have. If they become friends with another agent and their number of friends exceeds the maximum with that new friend, they unfriend one of their existing friends. They pick the friend whose social DNA is the most dissimilar to their own social DNA to unfriend.

support level for the insurgency. Intel pieces are stored in the agents' memories. Intel represents an agent's (e.g., agent A) perception of another agent's (e.g., agent B) support level for the insurgency. Therefore, it does not have to be accurate. Agents can create new intel (i.e., create a new package and load it with their own unique ID and support level) and give it to other agents. Or they can pull existing intel from their memory and relay it to other agents[23]. It is important to note that agents are not truthful when sharing intel about their own support level. Depending on who they are talking to, they may over- or understate their support level. For example, suppose Agent A is talking to agents B and C, and Agent B's support level is higher than Agent A's, and Agent C's support level is lower than Agent A's. Agent A will overstate their support level while talking to Agent B and understate it while talking to Agent C. While agents misrepresent their own level of support when disclosing it to another agent, they refrain from doing so when discussing another agent's support level. In other words, they transmit information received from one agent to a third agent without altering its content. Intel is not a useful commodity for non-combatant agents. However, it is crucial for combatant agents since they find their targets using intel.

Every agent can *move* from one grid cell to another in the geographic terrain. Civilian and civil servant agents move with a low random probability in each iteration. The movement represents a residential movement for civilian agents. In addition to random movement, combatant agents move to attack their targets.

2 Creating a new piece of intel is analogous to revealing their own support level to another agent. On the other hand, picking an intel piece from memory and relaying that intel is like gossiping about third persons. Once an intel piece is created, it can travel the entire environment, and an agent at one end of the landscape can learn the support level of another agent at the other end.

3 Every agent lives in a residence location--i.e., a grid cell in the environment. When they establish new friendship ties with other agents, it naturally happens between agents who reside in the residence location. However, agents also move from one grid cell to another with a small probability. Therefore, two agents who are friends may live in different residence locations, and friends can talk to each other even if they live in different residence locations. Thus, although intelligence mostly flows within the same residence location, it can also flow across them. Thus, an intel piece created on one side of the landscape can travel all the way to the other side.

Special Agent Properties/Functions

In addition to common functions that every agent has, some functions are unique to certain agent types. Only combatant agents can attack or die. Only civilian agents can cry and receive/consume/share government benefits. Only civil servant agents can distribute government benefits.

Combatant agents (i.e., insurgent and military) can *attack*. In every iteration, combatant agents check their memory and see if they know of another agent whose support level is too low or too high. Insurgent agents go after agents whose support levels are too low, and military agents go after those whose support levels are too high. If they can find a suitable target, they move to the target's grid location and attack. The possible outcome of the attack depends on the agent types. Table 2 shows attack scenarios and possible outcomes.

Table 2. Attack scenarios and possible outcomes

Attacker	Target	Possible outcome
Military	Insurgent	The target dies (i.e., removed from the model).
Military	Civilian	The civilian agent cries (see below) and increases its support level for the insurgency.
Insurgent	Military	Either the target or the attacker dies (i.e., removed from the model) with random probability. If the target dies, a new military agent is recruited from the population.
Insurgent	Civil servant	The target dies, and a new civil servant agent is recruited from the population.
Insurgent	Civilian	The civilian agent may die. If it survives, it cries (see below) and decreases its support level for the insurgency.

Note that combatant agents can never certainly know their enemy; they can only guess based on intel they have about agents' support levels.

Civilian agents *cry* after being attacked by a combatant agent. That is, they announce their victimization to their neighbors and friends. In turn, their neighbors and friends change their support level for the insurgency. If the attacker is an insurgent agent, the target agents' and their neighbors' and

friends' support level for the insurgency decreases. If the attacker is a military agent, the opposite happens. However, the change in neighbors' and friends' support levels is less than the change in the target agent's support level.

Civil servant agents *distribute* government *benefits* to non-government agents (i.e., civilians and insurgents). Note that nobody knows who the insurgent agents are except themselves. Thus, civil servant agents can unknowingly distribute benefits to insurgent agents as well. Civil servant agents distribute benefits only to the agents with more than a .5 support level for the insurgency.

In turn, civilian agents who receive government benefits *consume* most of them and *share* the rest with other agents (i.e., their neighbors and friends). When agents consume benefits distributed by the government, they decrease their support level for the insurgency proportionate to the amount they consume. Thus, a civilian agent who receives benefits directly from a civil servant agent decreases its support level more than an agent who receives benefits from a civilian agent.

Lastly, only civilian agents have a *resource* property where they store government benefits they receive from civil servant agents or other civilian agents. Although civil servant agents also have a resource property, it is just a constant flag to prevent civilian agents from sharing resources with civil servant agents. When civilian agents share resources, they prefer agents with the highest need (i.e., those with the least resources).

Initialization of the Model

First, a random geographic terrain is created. Then, a pool of civilian agents with random support levels is created (N = 5,000). The agents in this pool do not have any memory, friends, or resources and are distributed randomly across residence locations (i.e., the grid cells of the terrain). Then, a certain number of military and civil servant agents are recruited from this pool. Their support levels for the insurgency are set to a low value (i.e., .02). Then, a certain number of insurgent agents are recruited from the pool. Their support levels for the insurgency are set to a high value (i.e., .98).

Iterations

In each iteration, agents take some actions depending on their type. Each agent moves if a random number r drawn from a uniform distribution $\underline{U}(0,1)$ is less than 0.05. Each agent talks to another agent and makes friends if their social DNAs fit. They exchange intel when they talk. Combatant agents check their memory to find suitable targets and move to those target's residence locations. If they are already in that location, they attack the target. Civil servant agents distribute resources (i.e., government benefits), and civilian agents who receive (or already) have resources consume them. Resource consumption reduces the agent's support level for the insurgency. If a combatant agent attacks a civilian agent, the civilian agent changes their support level for the insurgency and cries. When they cry, their neighbors and friends also change their support levels to the insurgency. Misidentifying a civilian agent as an insurgent and attacking it is costly for the government. It is called collateral damage. Collateral damage not only increases the victim's support level for the insurgency, but it also increases the support level among the victim's friends and neighbors.

Model Parameters and the Outcome Variables

The main research questions of the present study are (1) whether a hard or soft approach to counterinsurgency is more effective and (2) how the civilians' support level for the insurgency moderates the effects of hard and soft approaches. To answer these questions, nine experimental conditions were specified based on the support levels (low, medium, high) and the counterinsurgency approaches (soft, balanced, hard). One hundred simulations were run for each experimental condition. Thus, the total number of simulations was 900 (9x100=900). The model parameters varied in each condition.

Table 3 shows the model parameters by the condition. The mean civilian support level for the insurgency was ~0.35 in low support, ~0.46 in medium support, and ~0.70 in high support conditions. In the soft counterinsurgency approach condition, 0.8% of the agents were civil servants, and 0.3% were

military agents. In the hard counterinsurgency approach condition, 0.3% of the agents were civil servants, and 0.8% were military agents. In the balanced approach, 0.3% of the agents were civil servants, and 0.3% were military agents.

Table 3. Experimental conditions' specifications

		Counterinsurgency approach		
		Soft	**Balanced**	**Hard**
Level of support for the insurgency	Low	~.35[a] **0.8%**[b] 0.3%[c]	~.35 0.3% 0.3%	~.35 0.3% **0.8%**
	Medium	~.46 **0.8%** 0.3%	~.46 0.3% 0.3%	~.46 0.3% **0.8%**
	High	~.70 **0.8%** 0.3%	~.70 0.3% 0.3%	~.70 0.3% **0.8%**

[a] Initial average support level for the insurgency, [b] the proportion of non-combatant government agents, [c] the proportion of combatant government agents. Note: The proportion of insurgent agents is .08% in all conditions.

Each simulation could run up to 3,650 iterations, or ten years (1 iteration=1 day, 365 iterations=1 year). At the end of each year, the main engine counted the number of insurgent agents still alive. If there were no insurgent agents alive, the simulation would stop. Otherwise, it would run until the end of the tenth year.

Each simulation was initialized with the following registers that were updated as the program ran.

1. number of insurgent attacks
2. number of deadly insurgent attacks
3. number of military attacks
4. number of military attacks against civilians (i.e., collateral damage)
5. number of years the simulations ran
6. number of insurgents at the end of the simulation
7. percent difference between the civilian agents' average support level at the beginning and end of the simulation

The model was created using the R programming language, and the code is available on the first author's GitHub page.

Results

Tables 4 to 8 show the simulations' results. The tables are formatted similarly; the column headings show the counterinsurgency approach (soft, balanced, hard), and the row headings show the support level for the insurgency (low, medium, high). The cell values show the mean values of the dependent variables for that specific experimental condition (e.g., low support level X soft counterinsurgency approach). The F and Chi-square statistics and p values are in the last two columns of the tables.

Table 4 shows the percentage of simulations in which the insurgency was eliminated within ten years. The results show that the hard approach was more effective in eliminating an insurgency. The percentage of simulations where all insurgents were eliminated was much higher in the hard counterinsurgency approach than in the other two approaches. However, that is true only when the civilian support level for the insurgency is low or medium. When it is high, it is nearly impossible to eliminate the insurgency, and the differences between hard, balanced, and soft approaches are not statistically significant (p = 0.604).

Table 4. Percentage of simulations in which the insurgency is eliminated within ten years

Support level	Counterinsurgency Approach				
	Soft	**Balanced**	**Hard**	**Chi-square**	**p-value**
Low	5.0	1.0	42.0	76.0	0.000
Medium	3.0	3.0	17.0	18.5	0.000
High	0.0	1.0	1.0	1.0	0.604

N = 900 (100 simulations for each experimental condition).

Table 5 shows the average number of insurgent attacks in different experimental conditions. A clear pattern apparent in Table 5 is that the number of insurgent attacks is highest when the support level for the insurgency is low and lowest when the support level is high. Table 6 shows the average number of fatal insurgent attacks in different experimental conditions. The numbers in Table 6 show two patterns. First, the average number of fatal attacks is highest when the support level for the insurgency is low and lowest when it is high. Second, the average number of fatal attacks is lowest in the soft counterinsurgency approach conditions and highest in the hard counterinsurgency approach conditions.

Table 5. The average number of insurgent attacks per year

	Counterinsurgency Approach				
Support level	**Soft**	**Balanced**	**Hard**	**Chi-square**	**p-value**
Low	62.0	71.7	64.6	4.3	0.015
Medium	21.2	24.7	21.7	2.2	0.115
High	6.0	3.1	3.4	23.2	0.000

N = 900 (100 simulations for each experimental condition).

Table 6. The average number of fatal insurgent attacks per year

	Counterinsurgency Approach				
Support level	**Soft**	**Balanced**	**Hard**	**Chi-square**	**p-value**
Low	3.2	3.9	4.0	9.7	0.000
Medium	1.2	1.6	2.0	24.1	0.000
High	0.3	0.3	0.7	32.4	0.000

N = 900 (100 simulations for each experimental condition).

Table 7 shows the average number of times military agents attacked civilian agents instead of insurgent agents in each experimental condition. Such mistakes by military agents are called collateral damage in this paper. However, it is not like the death or injury of a civilian in the real world. Instead, it is more like interactions between military/police personnel and civilians that

are perceived as harassment by the targeted civilians. Table 7 shows that the average number of collateral damages is related to both civilian support level for the insurgency and counterinsurgency approach. As the civilian support level for the insurgency increases, the number of collateral damages also increases. Military agents cause the highest number of collateral damages in the hard counterinsurgency approach and the lowest number of collateral damages in the soft counterinsurgency approach.

Table 7. The average number of collateral damages* per year

Support level	Counterinsurgency Approach			Chi-square	p-value
	Soft	Balanced	Hard		
Low	6.0	8.8	30.5	128.4	0.000
Medium	14.8	17.9	52.8	328.4	0.000
High	23.9	26.5	66.2	1372.2	0.000

N = 900 (100 simulations for each experimental condition). *Military attacks against civilians.

Table 8. Average percent change in the support level for the insurgency

Support level	Counterinsurgency Approach			Chi-square	p-value
	Soft	Balanced	Hard		
Low	3.2	8.3	8.5	77.8	0.000
Medium	-2.8	1.8	4.5	1046.8	0.000
High	-4.6	-0.8	1.1	4655.5	0.000

N = 900 (100 simulations for each experimental condition).

Lastly, Table 8 shows the average percentage change in the civilian support level for the insurgency in each experimental condition. The table shows that the average percent change is related to both the initial support level for the insurgency and the counterinsurgency approach. If the initial support level is low, it increases over time regardless of the counterinsurgency approach. However, it increases significantly more in hard or balanced than in soft counterinsurgency approach conditions. On the other hand, if the initial support level is high, a soft or balanced counterinsurgency approach may

reduce the initial support level. In other words, a hard counterinsurgency approach never reduces the support level, but a soft or balanced approach may reduce it, especially when the initial support level for the insurgency is high.

Discussion and Conclusions

The current study aimed to understand whether a hard or soft approach was more effective in counterinsurgency and whether the civilian support level for the insurgency mediated the effects of hard, balanced, and soft approaches. An agent-based model was created to answer the research questions, and 900 simulations were run in nine experimental conditions. The results showed that an insurgency can only be defeated with a hard counterinsurgency approach. However, it could happen only if the civilian support level for the insurgency was not high. Therefore, an initial soft or balanced approach may be necessary to defeat an insurgency before using the hard approach. This means that the effectiveness of hard/balanced/low counterinsurgency approaches depends on the civilian support level for the insurgency.

Several conclusions can be drawn from the simulation results. First, it is nearly impossible to defeat an insurgency when the civilian support level is high. When the support level is low or medium, then the hard approach is much more effective than the soft and balanced approaches. However, even with a hard approach, insurgents could be defeated in 42% of the simulations when the support level was low and in 17% when the support level was medium. Nevertheless, the policy implication of this finding is clear: counterinsurgent governments must use their military extensively to defeat insurgencies. Policies intended to win the hearts and minds of the civilian population alone cannot help to defeat an insurgency.

Second, the total number of insurgent attacks and the number of fatal attacks increase as the civilian support level for the insurgency decreases. This finding may be an artifact of the ABM model used since the insurgent agents in the model attack civilians who are suspected of having low support for the insurgency. Thus, the low overall support level for the insurgency means more suitable targets for the insurgents. However, the finding also makes theoretical

sense in real-world insurgencies. Since insurgencies want to assert control over the civilian population, they are expected to be more active in environments with low support for the insurgency.

Fourth, the number of fatal insurgent attacks increases when moving from a soft to a hard counterinsurgency approach. Although the differences between the counterinsurgency approaches are small, they are highly significant for all levels of civilian support (see Table 6). The authors are unaware of any theoretical argument in the literature regarding this relationship. This pattern can be a valuable topic of research for future studies.

Fifth, military agents cause significantly more collateral damage in a hard counterinsurgency approach than in soft or balanced approaches. The amount of collateral damage increases as the support level for the insurgency increases. These two findings are well aligned with the theoretical expectations. In the hard counterinsurgency approach, there are many more military agents than in the soft and balanced approaches. More frequent military activity naturally leads to more mistakes and collateral damage. Also, military agents target civilian agents with high support for the insurgency. Thus, in environments with many civilian agents with high support for the insurgency, there are many suitable targets for military action.

Sixth, depending on the initial support level, a soft or balanced counterinsurgency approach may decrease the civilian support for the insurgency. In contrast, a hard counterinsurgency approach increases it regardless of the initial support level. This finding aligns with the expectations from the ABM model and real-world counterinsurgency scenarios. The main contributor to the decrease in civilian support for the insurgency is the government benefits distributed by civil servant agents. The number of civil servant agents is higher in the soft counterinsurgency approach in the ABM model. Thus, civilian support may decrease in the soft counterinsurgency approach.

Overall, the ABM model's results present clear guidance for counterinsurgency conditional on the level of civilian support. A counterinsurgent government can defeat the insurgency in two phases. Phase I: If the civilian support level is high, use a soft approach until it decreases to medium or low. Phase II: Use a

hard approach to finish the insurgency. However, using a hard approach always increases the civilian support level for the insurgency. Therefore, the counterinsurgent government has a limited time window to defeat the insurgency in Phase II. If it misses that window, it must go back to Phase I and repeat the cycle.

Anderson (2011) argued that counterinsurgency forces should emphasize intelligence-gathering efforts and avoid direct combat action against the insurgents at the initial stages of a counterinsurgency effort. The simulation results support that argument, especially when the civilian support level for the insurgency is high. It is nearly impossible to defeat an insurgency when the civilian support level is high. Thus, if the support level is high, the counterinsurgent government should first use a soft approach to decrease the civilian support for the insurgency and collect intelligence. Intelligence-gathering at that stage may also help the counterinsurgency efforts later when the counterinsurgent government must use a hard approach to finish the insurgency. Better intelligence allows military agents to attack the correct targets and avoid collateral damage.

In the ABM model, both the soft and hard approaches were more costly than the balanced approach, which may also be true in real-world counterinsurgency environments. There were more civil servant agents in the soft counterinsurgency approach conditions and more military agents in the hard counterinsurgency approach conditions. Thus, a second piece of advice that could be derived from the ABM model is that a counterinsurgent government can use a balanced approach if it has limited resources. Although it cannot finish an insurgency with a balanced approach, it can still reduce the civilian support level if that is high.

Kress and Szechtman (2009) argued that it is impossible to eradicate an insurgency by force, even in the best-case scenario, because of the intelligence problem. According to Kress and Szechtman (2009), when the insurgent group is large and more active, it emits much information into the environment. The counterinsurgent government can use that information for more discriminate targeting of the insurgents. Thus, it can weaken the insurgency without causing collateral damage. However, when the insurgency is small (or weakened to a certain level), it gives little information because of being small and less active.

Therefore, with very little information to act on, the counterinsurgent government is less discriminate in targeting the insurgents and causes much collateral damage, which increases the level of support for the insurgency.

The simulation results seem to contradict Kress and Szechtman's (2009) arguments. The results showed that it was possible to defeat an insurgency with a hard approach when the civilian support level was low or medium. However, the simulation results may not necessarily contradict Kress and Szechtman's (2009) arguments. In the present study, the defeat of an insurgency was defined as "no insurgents left alive" at the end of the year. The insurgency was considered defeated when there was no agent in the environment with a support level of 0.98 or above, even if there were many agents with a 0.97 support level. The difference between an insurgent agent and a civilian agent with a support level was an arbitrary number (i.e., 0.98). Civilians with high support for the insurgency can easily become insurgents with a small nudge. Therefore, as Kress and Szechtman (2009) argued, eradicating an insurgency by force may not be possible until the civilian support for it is eradicated.

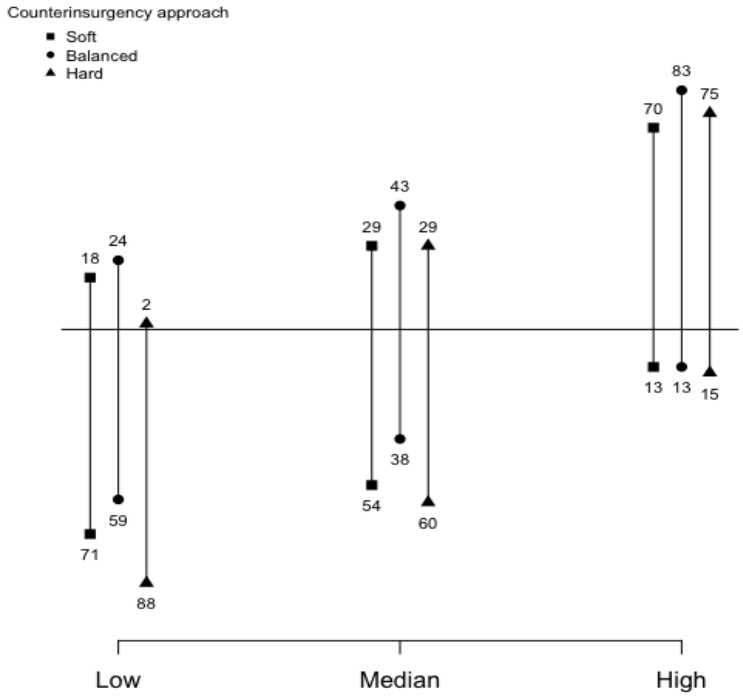
The current study was motivated by Findley and Young's (2007) ABM model on counterinsurgency. Therefore, it is proper to compare the simulation results with their findings. Findley and Young (2007) argued that the effectiveness of a soft vs. hard approach depends on the level of support for the insurgency. Findley and Young (2007) stated that the number of insurgents would increase if the support level for the insurgency was high, regardless of whether the counterinsurgent government used a hard or soft approach. However, the increase in the number of insurgents would be greater if the government used a hard rather than a soft approach[4]. Figure 3 shows the

4 Findley and Young (2007, p. 385) (emphases in the original):

> Proposition 3a: When a population's commitment to an insurgency is *high* and counterinsurgents pursue a strategy that is based on increasing *costs*, the number of insurgents will *increase*.
>
> Proposition 3b: When a population's commitment to an insurgency is *high* and counterinsurgents pursue a strategy that is based on increasing *benefits*, the number of insurgents will *increase*.
>
> Proposition 3c: When a population's commitment to an insurgency is *high* and counterinsurgents pursue a strategy that is based on increasing *benefits*, the number of insurgents will increase, *but at a lower rate than based on a costs strategy*.

Note: Findley and Young (2008) say 'increasing benefits' or 'increasing costs' to refer to soft versus hard approaches.

number of simulations in which the number of insurgents increased/decreased in different experimental conditions in the present study. It shows that, in most simulations, the number of insurgents decreased over time when the support level was low (see the three lines on the left side). On the other hand, when the support level was high, the number of insurgents increased over time in most simulations (see the three lines on the right side). Thus, contrary to what Findley and Young (2007) suggested, the present study's findings show that the number of insurgents increases over time when the support level is high in soft, balanced, or hard counterinsurgency conditions. Moreover, there seems to be no substantial (or significant) difference in the increase between soft versus hard approaches (compare the first and third lines from the left in Figure 3).



The horizontal line represents no change in the number of insurgents over time. The numbers above the horizontal line show the number of simulations in which the number of insurgents increased over time. The numbers below the horizontal line show the number of simulations in which the number of insurgents decreased over time. The x-axis shows the support level for the insurgency (i.e., low, medium, high).

Figure 3. The number of simulations where the number of insurgents increased/decreased over time by support level and counterinsurgency approach.

Figure 4 shows the median number of insurgents still alive at the end of the simulations in the nine experimental conditions. Note that the simulations were initialized with 5,000 agents, and 0.008% (N=4) of the agents were insurgent agents in each condition. Thus, the horizontal line in Figure 4 indicates no change between the first and last iteration. The numbers below the line indicate a decrease in the number of insurgents, and the numbers above the line indicate an increase. Figure 4 shows that the median number of insurgents still alive at the end was less than four in low and medium support level conditions but higher than four in the high support level condition. Thus, the numbers in Figure 4 also contradict Findley and Young's (2007) assertion that the number of insurgents increases over time when the support level is low or high.

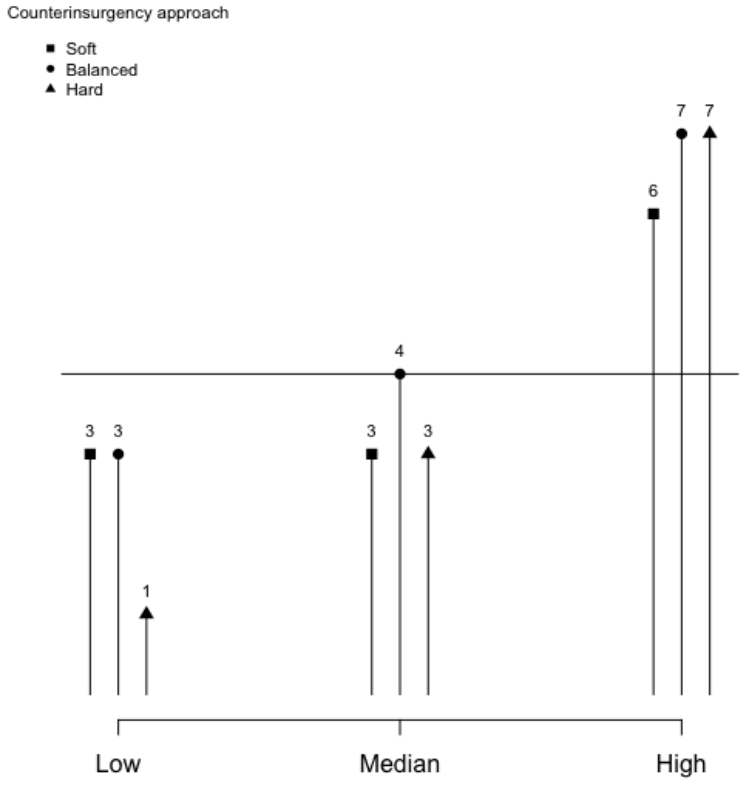


Figure 4. The median number of insurgents still alive at the end of the simulation by support level and counterinsurgency approach

This study has strengths and limitations, which readers should consider when interpreting the conclusions. First, the current ABM model had more agents than most previous ABM models on the insurgency. However, it still had a relatively small number of agents (N=5,000). Population sizes are much larger in real-world conflict zones. Second, the agents in the current model had few properties and functions. A more complex model could be closer to reality. For example, in the real world, counterinsurgent military forces do random patrolling or set up checkpoints on the roads to find insurgents. Also, not only civil servants but also military personnel or even insurgents distribute benefits to win the hearts and minds of the civilian population. Third, the insurgent agents in the current model were very selective in targeting; they targeted civilians who they thought were on the enemy's side. Such targeting is expected behavior in the real world. However, real-world insurgents also use terrorism tactics where they injure/kill people less discriminately. The insurgent agents in the current model did not have that function. Fourth, most military agents and sometimes even insurgent agents wear uniforms or insignia in the real world. Thus, combatants sometimes encounter each other while patrolling, for example, and clashes happen. Human intel is not the only way that combatant agents find their enemies. However, the military agents in the current ABM model did not have a random patrolling function. Fifth, only the civil servant agents in the current model distributed government benefits to civilian agents. In the real world, military personnel and insurgents may also distribute material benefits to civilians to win their hearts and minds. Sixth and most importantly, the model parameters in the current ABM model were selected arbitrarily. For example, the thresholds to differentiate low, medium, and high support levels or the percentage of military or civil servant agents in different counterinsurgency approaches. Unfortunately, the authors did not have access to any data that could be used as model parameters.

Although it has some limitations, the current study contributes to the ABM-counterinsurgency literature in two important ways. First, it incorporates human intel into the model and shows how it can be used by the military and insurgents to fight each other. Second, assuming the results are correct, it provides clear guidance for counterinsurgents for different levels of civilian support. In the future, researchers can build on the current ABM model and use real-world data for initializations.

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Korean Americans' Perceptions of Police Legitimacy and Cooperations with Police: Normative and Instrumental Pathways

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Abstract

The current study examines the willingness of cooperate with police among Korean Americans through the lens of the normative and instrumental pathways of police legitimacy. Using a survey of 183 Korean residents in the Atlanta Metropolitan area, this study tests how normative factors (i.e., procedural fairness) and instrumental factors (i.e., police effectiveness) mediate the relationship between past victimization experiences and language proficiency, and the willingness to cooperate with the police. The findings indicate that procedural fairness had a significant influence on the willingness of cooperate with police while police effectiveness affected the willingness of cooperate with police only in hate crime incidents. Also, prior victimization experience and language proficiency directly affected the willingness to cooperate, not indirectly through perceptions of police legitimacy. Policy implications are suggested based on the findings.

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Keywords: Police legitimacy, Willingness to cooperate with police, Hate crime, Korean American, Immigrants, Language proficiency, Prior victimization.

Introduction

In March of 2021, 21-year-old Robert Long was arrested and charged with killing eight people, mostly Korean women in three different Atlanta-area spas. This tragic incident happened amid an increase in hate crimes against Asian Americans nationwide (Lantz & Wenger, 2022). Less than 24 hours after the shooting, a spokesman for the Cherokee County Sheriff's Department stated that the suspect had a "really bad day," downplaying the possibility of a racially motivated hate crime despite a nationwide surge in hate crimes against Asian Americans due to the COVID-19 pandemic. Meanwhile, reporters discovered that the officer had a history of anti-Asian posts on his Facebook account, which later caused him to be taken off from the spokesman role (Kornfield & Knowles, 2021). Asian-American community leaders criticized the spokesman's comment as misogynistic and anti-Asian, arguing that the sheriff's office investigation would be biased and questioning the integrity of the inquiry (Lenthang, 2021). With already increasing anti-Asian hate crimes, this incident sparked the attention of the major news media and of the Korean government regarding the safety of Koreans living abroad, ultimately prompting the Korean Ministry of Foreign Affairs to meet with consuls and diplomats gathered in Los Angeles to discuss countermeasures (Park, 2022; Seo, 2022).

The aftermath of these tragic events and law enforcement officer's responses has triggered debates on the question of police legitimacy, whether citizens can trust law enforcement to fulfill their role within this diverse contemporary society. In response to police legitimacy crises, akin to the fallout from the killing of Michael Brown and other unarmed minority suspects by police officers (Silver, 2020), the U.S. government has invested significantly in research on procedural justice, recognizing its potential to enhance public perception of legitimacy (Tammy & Skogan, 2021). Procedural justice, marked by fair and transparent law enforcement practices, is posited as a direct pathway to bolstering legitimacy, which, in turn, correlates with increased compliance and cooperation with the police (Hough et al., 2013; Tyler, 1990; Tyler & Jackson, 2014). While community-level data indicate some success in improving public perceptions of police legitimacy, it is

imperative to examine the micro-level dynamics to comprehensively understand this ongoing legitimacy crisis. Research suggests that legitimacy within one area or with one demographic group does not necessarily extend to other regions or groups (Jackson et al., 2020). In light of this, a nuanced exploration of how different segments of the American population perceive the police becomes essential.

Based on the recent emphasis on distinguishing between normative and non-normative forms of police legitimacy and the obligation to cooperate with the police (Pósch et al., 2021; Tankebe, 2013), we examined how Korean Americans perceived police legitimacy through the lens of normative and instrumental pathways. While previous research has extensively explored objective measures of police performance, our focus is on subjective perceptions of police fairness and effectiveness, which shape public cooperation with law enforcement. In addition, this study aims to explore how perceptions of legitimacy influence the willingness of individuals, specifically Korean Americans, to cooperate with law enforcement in the context of various crimes, including hate crimes. While procedural justice remains a focal point in understanding normative pathways, the instrumental pathway considers the effectiveness of police investigations and prior interactions.

Drawing on existing literature on police legitimacy in multicultural contexts, we investigated how past victimization experience, language proficiency, and other demographic factors intersect to shape the perceptions of Asian Americans regarding police legitimacy and their willingness to cooperate with police. Notably, language proficiency emerges as a critical factor influencing cooperation and perceptions of legitimacy, affecting diverse communities (Chu & Song, 2015; Sohn et al., 2024). In unraveling the normative and instrumental pathways of police legitimacy among Korean Americans, this research aspires to contribute valuable insights to the broader discourse on police-community relations and assist in crafting targeted strategies for enhancing trust and cooperation between law enforcement and diverse communities. It also seeks to assist in developing targeted strategies for enhancing trust and cooperation between law enforcement and diverse communities, ultimately contributing to the safety of Koreans living abroad.

Literature Review

Police Legitimacy in Multicultural Contexts

In the wake of the killing of unarmed minority suspects by police officers, the President's Task Force on 21st Century Policing (2015) investigated and reported that building trust and legitimacy is the foundational principle of relations between police agencies and the communities. Legitimacy scholarship indicates that people are more likely to obey the law when they believe that authorities are viewed as legitimate (Tyler, 1990; Tyler & Jackson, 2014). Defining the concept of police legitimacy, however, is complicated and contested (Cao & Graham, 2019). Tankebe (2013) criticized Tyler's single-dimensional definition of obligation to obey measures and argued that police authority is "legitimate if it meets three conditions: legality, shared values, and consent" (p. 7). To support his argument, Tankebe and his colleagues (Tankebe, 2013, 2014; Tankebe et al., 2016) developed a four-dimensional police legitimacy model. Furthermore, police legitimacy is viewed as continuous interactions between police officers and citizens in the community, and in this interactive process, police officers and citizens will share their understanding of legitimate power. Hence, this interactive process may vary across cultural contexts, leading to varied interpretations of police legitimacy within different societies (Cao & Graham, 2019; Tankebe, 2014).

Following officer-involved fatalities of several unarmed minority Americans, law enforcement agencies in the United States facedcalls either to divest funds from their offices for the provision of other social services or for the outright abolition of their departments (Phelps et al., 2021). Citizens of the United States have voiced valid concerns regarding the trustworthiness of the police in performing their roles within contemporary society. This question about legitimacy predominantly centers around the idea of how officers ought to behave during their interactions with citizens. Hence, much of this discourse centers around the use of force by officers. In plainest terms, perceptions of officer legitimacy are at their highest level when they are not using any form of a weapon during their interactions (Gerber & Jackson, 2017; Johnson & Kuhns, 2009; Kyprianides et al., 2021). However, when a weapon

becomes involved in the situation or if the use of force used to quell the suspect begins to be considered improper, then the perception of the police as a legitimate and beneficial actor has an associated decrease (Silver, 2020).

Thus, the current legitimacy crisis that officers find themselves embroiled in is not too dissimilar from the 2014 legitimacy crisis that officers faced after the unjust killing of Michael Brown. This instance of police brutality resulted in the Obama administration divesting millions in funds towards research involving procedural justice (President's Task Force on 21st Century Policing, 2015; Tammy & Skogan, 2021). This divesting of funds into procedural justice programs stems from an understanding that strict adherence to a procedural justice framework provides a straightforward pathway for a perception of legitimacy for police (McKlean, 2020). This is especially relevant considering that an increase in the perception of legitimacy is associated with an increased likelihood of compliance with an officer's directions, as well as an increased willingness to co-operate with the police (Hough et al., 2013; Tyler, 1990; Tyler & Jackson, 2014). However, this newfound commitment to procedural justice is hardly the only tactic employed to bolster perceptions of legitimacy. Police departments have widely adopted the usage of body worn cameras (Braga et al., 2023), established citizen review boards (Holliday & Wagstaff, 2022), implemented youth outreach programs (Fine et al., 2022), and employed specialized patrolling strategies, such as hot spot policing (Koper et al., 2022), with the aim of enhancing police legitimacy in the eyes of the public. Thus far, the employment of the above strategies has shown some promise in boosting public perception of police legitimacy.

Normative and Instrumental Pathways for Police Legitimacy

Perceptions of police legitimacy stem from one of two inputs, either the normative pathway or the instrumental pathway (Hough et al., 2013; Sunshine & Tyler, 2003; Tyler & Jackson, 2014; Tankebe, 2013). In the normative pathway, police legitimacy is based on social norms, which arises from the belief that the laws ought to be followed and that the police truly protect and

serve the communities they patrol (Pósch et al., 2021). However, for this norm to develop, officers must have demonstrated prior commitment to being trustworthy and beneficial for the communities they serve (Martin & Bradford, 2021). This perception of legitimacy can stem from a variety of activities, and the most prominent is an adherence to a procedural justice framework (Pósch et al., 2021; S.U. Lee et al., 2022). By employing such methods, officers can better fulfill the roles required by the community (Ruano-Chamorro et al., 2021). Through serving the communities they patrol, the perception of officers can evolve into a belief that they are beneficial parts of the community.

Conversely, the instrumental pathway of police legitimacy is based on the effectiveness of the police in resolving investigations. (Kyprianides et al., 2022; Sunshine & Tyler, 2003). Much like the discussion surrounding the normative pathway, the instrumental pathway is also informed by a variety of inputs. The two most prominent factors are prior contact and police effectiveness (Na et al., 2023). Regarding prior contact with the police, if the police have previously demonstrated a willingness to work with an individual and offer assistance, then that individual will be more likely to perceive them as legitimate (Charman et al., 2023; Na et al., 2023). With regards to perception of police effectiveness, if the police have proven proficient in carrying out their duties, then they will be perceived as more legitimate by the communities they serve (Y.H. Lee & Cho, 2020, 2021). Thus, the instrumental pathway of legitimacy hinges on an effective and efficient police force that handles cases with competence.

Police Legitimacy and Willingness to Cooperate with the Police

As police officers remain a constant presence in communities regardless of the levels of trust placed in them, interaction with law enforcement becomes an inevitable aspect of daily life for many Americans (Harrell & Davis, 2023). Consequently, public cooperation with law enforcement becomes necessary and is often influenced by perceptions of police legitimacy, rather than objective measures of police performance. Research has shown that individuals' experiences, interactions, and socio-cultural contexts shape these perceptions,

which may not always align with the actual quality of policing (Tyler, 2003; Sunshine & Tyler, 2003). This emphasizes the importance of understanding how perceptions of legitimacy influence people's willingness to cooperate with the police. This cooperation represents a symbiotic relationship, where the police depend on working with the public to carry out their duties, while simultaneously serving a vital civic role (O'Brien & Tyler, 2020; Tyler, 2017). This interdependence is crucial as police rely on public reporting of crime within their communities. Without such cooperation, criminals are empowered to cause harm, leading to rampant crime, particularly in lower-income areas (Bolger & Walters, 2019). In lower-income neighborhoods, the willingness to cooperate is often based on personal considerations (Jackson et al., 2020). Residents of these neighborhoods are willing to co-operate with police if they believe that this co-operation is in their own or community's best interests (Camero et al., 2023). This willingness to co-operate is also derived from trust in the police or a belief in the legitimacy of the police as an institution that works for the public benefit (Kearns et al., 2020). In truth, this idea on how police ought to operate is a well-known framework, referred to as the normative pathway of police legitimacy (Hough et al., 2013; Reisig et al., 2023; Tyler & Jackson, 2014).

The normative pathway of police legitimacy hinges on the assumption that the use of a procedural justice framework is key to being seen as legitimate by the public (Sunshine & Tyler, 2003; Tyler & Jackson, 2014). However, there are several barriers that hinder the effectiveness of procedural justice in enhancing perceptions of police legitimacy. Race is one such barrier, as Black children and adolescents often perceive procedural justice programs less favourably, leading to similar negative perceptions among Black adults (Foster et al., 2022; Wu & Miethe, 2024). Language is another barrier since ineffective communication presents a significant obstacle, making interactions and cooperation with the police more challenging. (Chu & Song, 2015; Sohn et al., 2024).

These challenges in public interactions are especially harmful, given that officers are known to use procedural justice tactics when the public cooperates with them more readily (Pickett & Nix, 2019). Therefore, if someone finds it

hard to interact with the police, they're less likely to experience procedural justice. Consequently, this lack of procedural justice fosters a negative perception of both the police and procedural justice, causing people to hesitate in cooperating with law enforcement (Henry & Franklin, 2019). This reluctance is evident in lower socio-economic communities, where residents are less likely to call the police after homicides compared to other areas (Brantingham & Uchida, 2021). Cooperation is thus a two-way street; it depends on mutual trust. Furthermore, the failure to cooperate contributes to the emergence of high-crime areas within these neighborhoods (Bolger & Walters, 2019). This underscores the critical need to foster a perception of legitimacy towards the police, as the absence of such trust allows the cycle of distrust and crime to persist unchecked.

Perceptions of Police Legitimacy and Willingness to Cooperate with Police for Asian Americans

Understanding perceptions of police legitimacy and willingness to cooperate with police at both macro and micro levels is crucial. Current research indicates that the legitimacy recognized in one area or among one group of people is not always generalized to other regions or groups. (Jackson et al., 2020). Prior studies reported that racial and ethnic minorities tend to have more negative views of the police and are less inclined to cooperate with law enforcement than White individuals (Lee, 2024; Schuck et al., 2008; Weitzer & Tuch, 2005; Wu et al., 2009).

For Asian Americans, who may have distinct experiences, concerns, and expectations of the police as newly immigrated minorities, this is particularly relevant. Furthermore, the surge in anti-Asian hate crimes amid the COVID-19 pandemic has led to increased reluctance among Asian victims to report their hate crime victimization to the police due to perceptions of incompetence or illegitimacy (Lantz & Wenger, 2022; Lee, 2024). An increasing body of research has emphasized the need to include Asian individuals in studies on public cooperation with law enforcement (Lantz & Wenger, 2022; Wu, 2014). Especially, the recent Atlanta spa shooting, which targeted Asian women, and

the subsequent revelation of the suspect and law enforcement officer's anti-Asian social media history highlight the urgency of understanding how Asian Americans perceive the police amid this ongoing legitimacy crisis.

Sociodemographic factors, such as age and socioeconomic status (e.g., income and education), may play a role in shaping Asian American perceptions of police legitimacy and willingness to cooperate with police, (Brown & Benedict, 2002; Cao et al., 1996; Ha & Sun, 2023; Kochel, 2013; Lee, 2024; Sampson & Bartusch, 1998). Prior victimization experience has been reported to predict a willingness to cooperate with police (Bennett & Wiegand, 1994; Jackson & Bradford, 2010; National Institute of Justice, 2003; Sohn et al., 2024; Tankebe, 2009). These findings are, of course, highly concurrent with existing literature that discusses the normative and instrumental pathway for cooperation with the police relying on community perceptions of legitimacy (Jackson et al., 2020). This pathway serves as one of the primary determinants influencing both perceptions of police legitimacy and willingness to cooperate with law enforcement. However, there are also other factors that are important to consider when gauging Asian American's perception of the institution of policing.

Language proficiency, as previously mentioned, is a crucial factor to consider (Chu & Song, 2015; Sohn et al., 2024). Without the ability to communicate effectively, cooperation with the police becomes significantly more challenging. Moreover, this communication barrier also affects perceptions of police legitimacy and procedural justice (Chu & Song, 2015; Culver, 2004; Sohn et al., 2024). This suggests that language proficiency serves as a major predictor for both police legitimacy and willingness to cooperate with law enforcement. However, this effect is not exclusive to the Asian community; similar findings have been observed among other immigrant groups (Lantz & Wenger, 2022; Murphy et al., 2022).

Current Study

Using measures of two dimensions of police legitimacy, that is perceived procedural fairness and perceived police effectiveness (Tankebe et al., 2016),

the current study examined the mediating effect of the normative (procedural fairness) and instrumental (police effectiveness) process on the relationship between individual victimization experiences and English proficiency, and the willingness to cooperate with the police. Using a sample of 183 Korean American, the following hypotheses were tested in the current study:

H1: Procedural fairness would have a positive effect on the willingness to cooperate with the police.

H2: Police effectiveness would have a positive effect on the willingness to cooperate with the police.

H3: Crime victimization experience and language proficiency would positively affect perceptions of police legitimacy, particularly regarding procedural fairness and effectiveness.

H4: Crime victimization experience and language proficiency would positively influence the willingness to cooperate with the police, either directly or indirectly via procedural fairness and effectiveness.

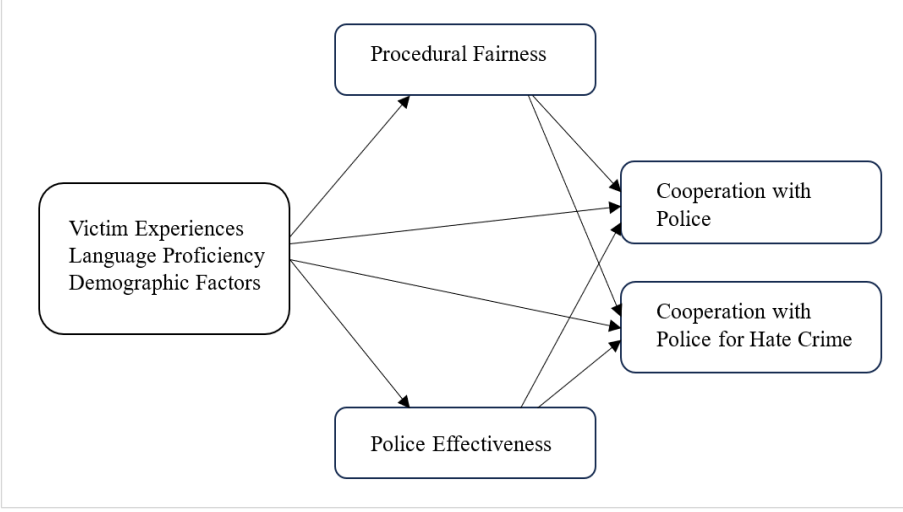

Figure 1. Normative and Instrumental Pathway Model

Methods

Data

The data were collected from the Korean community in the Atlanta area. Given the absence of an exhaustive registry detailing individuals identifying as Korean ethnicity, we found it necessary to utilize purposive and convenience sampling techniques in order to recruit participants. Our approach involved identifying locations hosting regular community gatherings among Korean residents in Atlanta, followed by actively recruiting participants from these venues. The selected service organizations, vital for assisting newly arrived immigrants and long-time settled individuals alike, have attracted a substantial number of Korean immigrants and individuals of Korean ethnicity by offering diverse social services such as support for newly immigrated families, business facilitation, and religious activities (Choy, 1979; Min, 1992; Patterson, 1988). Participants for our study were thus sourced from these meetings, yielding a quasi-representative sample of the Korean population residing in the Atlanta Metropolitan area.

Participants were randomly selected from among the attendees of these community meetings as they dispersed from the gatherings. Our focus centered on individuals aged 18 and above, irrespective of their immigration status. We consciously refrained from probing into participants' immigrant status, recognizing the potential discomfort or emotional unease it may induce in both participants and non-participants alike. Time and resource constraints led us to adopt a mixed-method approach, utilizing both pencil-and-paper and online survey methods for efficient distribution.

The survey instrument comprised 31 questions designed to confidentially evaluate participants' cooperation with law enforcement, experiences of victimization, perceptions of police legitimacy, and personal characteristics such as age, education level, household income, and self-assessed English proficiency. The questionnaire was made available in both English and Korean languages, with each question and item presented side-by-side in both languages to accommodate participants' language preferences. To ensure linguistic accuracy, the initial translation of the survey was undertaken by the

authors, with native speakers of each language consulted for validation. Ethical approval for the study was obtained from the University of Akron Institutional Review Board, and all participants provided informed consent prior to participation. Throughout the study, strict measures were taken to uphold the confidentiality and anonymity of participants, with all data securely stored. No compensation was provided to participants upon completion of the survey. A research paper was published using the same data. The dataset utilized in this study was previously employed in Sohn et al. (2024).

A total of 183 cases were examined in our analysis. The majority of respondents were aged 60 and above (54.1%) and proficient in English at a basic level (44.3%). Additionally, 58.5% held an associate's or undergraduate degree, and 37.2% reported an annual household income between $60,000 and $99,000. Regarding victimization experiences, a larger proportion of participants had not experienced direct victimization of crime (59.5%) or direct victimization of hate crime (69.1%).

Measures

We conducted confirmatory factor analysis (CFA) to establish latent variables, namely General Cooperation with the Police, Cooperation with the Police on Hate Crime, Procedural Fairness, and Police Effectiveness, in order to ensure the validity and reliability of key constructs (Table 2).

General cooperation with the police. This measure gauges individuals' willingness to cooperate with law enforcement across crime-related activities involving police interactions (Reisig et al., 2012). It consists of five questions rated on a 4-point Likert scale (from 1=very unlikely to 4=very likely): "Imagine that you were out and saw someone steal a wallet. How likely would you be to call police?"; "If the police were looking for witnesses in a case where someone's wallet was stolen, how likely would you be to volunteer information if you witnessed the theft?"; "Imagine you had evidence that someone bribed a government official. How likely would you be to report this behavior to the police?"; "How likely would you be to call the police if you saw someone break into a house or car?"; and "How likely would you be to

volunteer to serve as a witness in a criminal court case involving a crime that you witnessed?" (Cronbach's α=0.89). Please refer to Table 1 for more information about the scale and item-specific estimates.

Cooperation with the police on hate crime. This measure evaluates cooperation with law enforcement specifically concerning hate crimes. It comprises two questions rated on a 4-point Likert scale (from 1=very unlikely to 4=very likely): "Imagine that you saw someone being subjected to a hate crime. How likely would you be to call the police?" and "Imagine that you saw another Asian person being subjected to a hate crime. How likely would you be to call the police?" (Cronbach's α=0.86).

Procedural fairness. This measure gauges public perception of the procedural conduct of the police (Tankebe et al., 2016). It comprises of seven questions rated on a 4-point Likert scale (from 1=strongly disagree to 4=strongly agree): "The police treat citizens with respect"; "The police take time to listen to people"; "The police treat people fairly"; "The police respect citizens' rights"; "The police are courteous to citizens they come into contact with"; "The police treat everyone with dignity"; and "The police make decisions based on the facts" (Cronbach's α=0.86).

Police effectiveness. This variable measures how individuals perceive the efficacy of police efforts in maintaining community security and addressing crime (Tankebe et al., 2016). It comprises of three questions rated on a 4-point Likert scale (from 1=strongly disagree to 4= strongly agree): "Crime levels in my neighborhood have changed for the better in the last year"; "These are not many instances of crime in my neighborhood"; and "I feel safe walking in my neighborhood at night" (Cronbach's α=0.81).

Victimization experience. Binary questions (yes/no) were used to generate two variables: "Direct victimization of any crime" and "Direct victimization of hate crime." These variables ask if individuals have experienced either general crime or hate crime in the U.S.

English proficiency. This variable was evaluated through a self-assessed measure using an ordinal scale ranging from 1 (little to no understanding of English) to 4 (fluent in English).

Socio-demographic characteristics. They include 1) education level (coded as 1=less than high school, 2=high school, 3=associate/undergraduate, and 4=graduate); 2) annual household income (1=less than $20,000, 2=$20,000-$59,999, 3=$60,000-$99,999, 4=$100,000-$139,999, and 5=$140,000 or over); and 3) age groups (1=under 18, 2=18–29, 3=30–39, 4=40–49, 5=50–59, and 6=60 or over).

Analytic Strategy

The first step of the analysis was to initially estimate the measurement model through CFA and then testing the hypotheses using structural equation modeling (SEM). We performed regression imputation to handle missing values by estimating a regression model using observed data and then using this model to predict and replace missing values in a variable with the help of the observed data in the other variables. This process helps to fill in missing values with estimated values based on the relationships present in the data (Yu et al., 2020). Bivariate correlation analysis was used to check for potential collinearity among the study variables. We examined skewness and kurtosis to ensure that data meet the necessary assumptions for our latent variable analyses. A model-fit test was performed to assess the degree of alignment between the hypothesized model and observed data. Statistical analyses were conducted using SPSS and Mplus software packages.

Table 1. Descriptive statistics (N=183).

	M	SD	Mn	Mx	Skew	Kurt
General Cooperation with Police						
1. Imagine that you were out and saw someone steal a wallet. How likely would you be to call police?	2.90	.86	1	4	-.42	-.44
2. If the police were looking for witnesses in a case where someone's wallet was stolen, how likely would you be to volunteer information if you witnessed the theft?	2.92	.79	1	4	-.64	.32
3. Imagine you had evidence that someone bribed a government official. How likely would you be to report this behavior to the police?	2.64	.87	1	4	-.19	-.55
4. How likely would you be to call the police if you saw someone break into a house or car?	3.27	.77	1	4	-1.13	1.28
5. How likely would you be to volunteer to serve as a witness in a criminal court case involving a crime that you witnessed?	2.61	.85	1	4	.13	-.63
Cooperation with Police on Hate Crime						
1. Imagine that you saw someone being subjected to a hate crime. How likely would you be to call the police?	3.05	.76	1	4	-.76	.73
2. Imagine that you saw another Asian person being subjected to a hate crime. How likely would you be to call the police?	3.21	.76	1	4	-1.0	1.17
Procedural Fairness						
1. The police treat citizens with respect.	2.60	.75	1	4	-.28	-.14
2. The police take time to listen to people.	2.41	.79	1	4	.14	-.31
3. The police treat people fairly.	2.34	.77	1	4	.03	-.37
4. The police respect citizens' rights.	2.59	.72	1	4	-.51	.07
5. The police are courteous to citizens they come into contact with.	2.52	.74	1	4	-.02	-.22
6. The police treat everyone with dignity.	2.39	.73	1	4	.18	-.12
7. The police make decisions based on the facts.	2.57	.78	1	4	-.20	-.28
Police Effectiveness						
1. Crime levels in my neighborhood have changed for the better in the last year.	2.33	.66	1	4	.19	.38

	M	SD	Mn	Mx	Skew	Kurt
2. These are not many instances of crime in my neighborhood.	2.75	.62	1	4	-.90	1.56
3. I feel safe walking in my neighborhood at night.	2.56	.67	1	4	-.51	.29
Direct Victimization of Any Crime	.40	.46	0	1	.43	-1.68
Direct Victimization of Hate Crime	.31	.44	0	1	.88	-1.13
Self-assessed English proficiency	2.77	.92	1	4	-.07	-.96
Age	4.96	1.07	2	6	-1.06	.68
Education	3.04	.68	1	4	-.37	.19
Household income	3.31	1.22	1	5	-.09	-.88

Results

Descriptive Statistics

Table 1 shows the descriptive statistics of the sample. The skewness and kurtosis values of all variables are within the acceptable range, as recommended by Gravetter and Wallnau (2014). Responses to questions concerning general cooperation with the police predominantly clustered around the middle, slightly favoring the "somewhat likely" category. This suggests that participants were generally neutral to somewhat inclined to cooperate with the police across various scenarios. However, the average ratings for items related to cooperation with the police on hate crimes exceeded a score of 3 (somewhat likely), which is higher than the average ratings for most of the general cooperation items. This may suggest that individuals might feel a moral obligation to stand against hate and discrimination, leading to increased willingness to assist law enforcement in addressing hate crimes. The average scores for procedural fairness and police effectiveness items mostly clustered around the middle (neutral), suggesting that individuals neither strongly agree nor disagree with the notion of police legitimacy.

Table 2. Confirmatory factor analysis results

	Factor loading
General Cooperation with Police (a = .89)	
1. Imagine that you were out and saw someone steal a wallet. How likely would you be to call police?	.821
2. If the police were looking for witnesses in a case where someone's wallet was stolen, how likely would you be to volunteer information if you witnessed the theft?	.897
3. Imagine you had evidence that someone bribed a government official. How likely would you be to report this behavior to the police?	.774
4. How likely would you be to call the police if you saw someone break into a house or car?	.734
5. How likely would you be to volunteer to serve as a witness in a criminal court case involving a crime that you witnessed?	.729
Cooperation with Police on Hate Crime (a = .86)	
1. Imagine that you saw someone being subjected to a hate crime. How likely would you be to call the police?	.772
2. Imagine that you saw another Asian person being subjected to a hate crime. How likely would you be to call the police?	.975
Procedural Fairness (a = .94)	
1. The police treat citizens with respect.	.832
2. The police take time to listen to people.	.786
3. The police treat people fairly.	.857
4. The police respect citizens' rights.	.882
5. The police are courteous to citizens they come into contact with.	.826
6. The police treat everyone with dignity.	.830
7. The police make decisions based on the facts.	.811
Police Effectiveness (a = .81)	
1. Crime levels in my neighborhood have changed for the better in the last year.	.784
2. These are not many instances of crime in my neighborhood.	.874
3. I feel safe walking in my neighborhood at night.	.753

Note(s): All factor loadings were significant.

Table 3. Correlation matrix of latent factors and variables.

	1	2	3	4	5	6	7	8	9	10
1. General Cooperation	1									
2. Hate Cooperation	.06	1								
3. Procedural Fairness	.22**	.24**	1							
4. Police Effectiveness	.15*	.24**	.32**	1						
5. Crime Victimization	.15*	-.05	.03	.02	1					
6. Hate Victimization	-.06	-.01	-.01	.08	.37**	1				
7. Age	-.09	-.02	.06	.06	.04	.11	1			
8. Education	.23**	.14	.1	.05	.09	.03	-.11	1		
9. Income	.14	.14	.02	-.05	-.01	-.04	-.19*	.31**	1	
10. English	.31**	.09	.06	.04	.03	-.08	-.31**	.39**	.2**	1

Structural Model

This study performed a SEM analysis to assess the hypothesized model. As indicated above, data from the measures of cooperation with police and police legitimacy were subjected to CFA. The results of factor loading are shown in Table 2. As to the overall reliability, the Cronbach's alpha value is considered as for all the latent variables (General cooperation=0.89; Hate cooperation=.86; Procedural fairness=.94; Police effectiveness=.81; Taber, 2018). All items were loaded significantly on their latent variables.

Table 3 presents correlations among the variables used for analysis. It is notable that both cooperation variables were found to have significant correlations with all police legitimacy variables. Of latent variables, general cooperation was significantly correlated with several exogenous variables, such as crime victimization, education, and English proficiency. There was a significant correlation between police legitimacy variables. Additionally, none of the variables exhibited high levels of correlation with each other.

Table 4. SEM fully saturated model estimation

Variable	Unstandardized			Standardized (STDYX)		
	b	S.E.	p	b*	S.E.	p
General Cooperation						
Procedural fairness	.18*	.09	.05	.16*	.08	.05
Police effectiveness	.18	.13	.18	.12	.09	.17
Crime victimization	.26*	.12	.03	.17*	.08	.03
Hate victimization	-.18	.12	.14	-.11	.08	.14
Age	.00	.05	.94	.00	.08	.96
Education	.10	.08	.22	.10	.08	.21
Income	.04	.04	.35	.07	.08	.35
English	.19**	.06	.00	.25**	.08	.00
Hate Cooperation						
Procedural fairness	.19*	.08	.02	.19*	.08	.02
Police effectiveness	.25*	.14	.05	.19*	.09	.04
Crime victimization	-.07	.11	.49	-.06	.08	.47
Hate victimization	-.04	.11	.72	-.03	.08	.73
Age	.00	.04	.98	.00	.08	.98
Education	.08	.07	.24	.10	.08	.24
Income	.05	.04	.27	.10	.08	.24
English	.02	.05	.75	.03	.08	.75
Procedural Fairness						
Crime victimization	.04	.11	.74	.03	.08	.74
Hate victimization	-.04	.12	.76	-.03	.08	.76
Age	.05	.05	.25	.09	.08	.25
Education	.09	.08	.26	.10	.09	.25
Income	.00	.04	.98	.00	.08	.98
English	.03	.06	.62	.04	.08	.62
Police Effectiveness						
Crime victimization	-.03	.09	.76	-.03	.09	.76
Hate victimization	.09	.09	.34	.08	.09	.33
Age	.03	.04	.34	.08	.09	.34
Education	.05	.06	.40	.08	.09	.40
Income	-.02	.03	.51	-.06	.09	.51
English	.04	.05	.40	.08	.09	.40

*p<0.05, **p<0.01

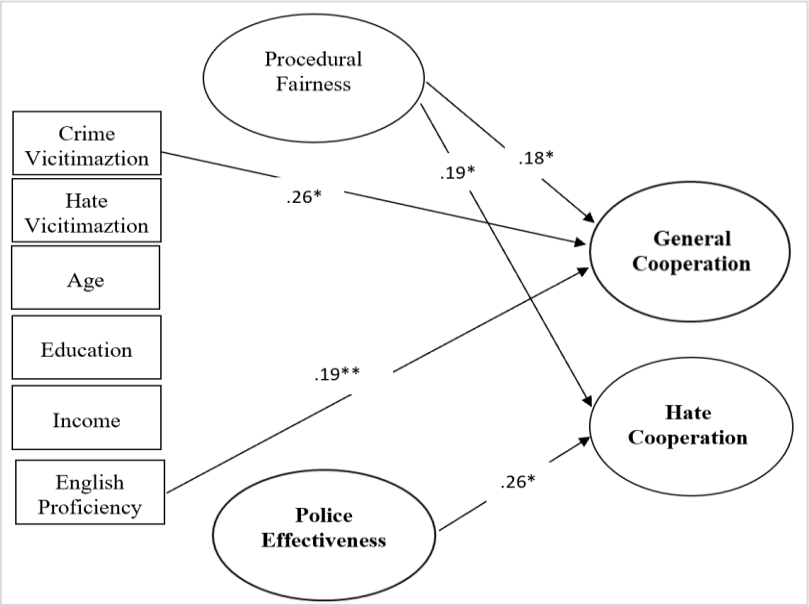

Figure 2. SEM Results Showing Significant Relationships Among Key Constructs

AIC=5276.08; BIC=5536.05; $\chi 2$=211.70; CFI=.99; TLI=.99; RMSEA=.02; SRMR=.04; *p<0.05, **p<0.01; Note: displays only significant pathways

The findings of the SEM analysis are detailed in Table 4 and visually depicted in Figure 2, which displays only significant pathways. Table 4 presents both unstandardized and standardized model outcomes. The result of model-fit test for the hypothesized model, showing that this model demonstrates very good fit to the data (AIC=5276.08; BIC=5536.05; χ^2=211.70; CFI=.99; TLI=.99; RMSEA=.02; SRMR=.04). It reveals that procedural fairness emerged as a predictor for both general cooperation (b = .18, b* = .16 p < 0.05) and hate crime cooperation (b = .19, b* = .19 p < 0.05), while police effectiveness was a predictor for cooperation with police on hate crime (b = 0.25, b* = 19, p < 0.05). Additionally, both general crime victimization (b = 0.26, b* = .17, p < 0.05) and English proficiency (b = 0.19, b* = .25, p < 0.01) were significant predictors of general cooperation. No exogenous variable was a significant predictor of hate cooperation and both police legitimacy factors. It is notable that all effect sizes were deemed to be small.

Discussions and Implications

The overarching theme of this study is to examine normative and instrumental models that are empirically driven from the policing literature (e.g., Lee et al., 2022; Na et al., 2023; Reisig et al., 2023) to seek Korean Americans' perceptions on general cooperation with police and cooperation with police on hate crime. We also included victimization experiences of general/hate crime, language proficiency, and socio demographic factors that have been reported as significant predictors in predicting ethic minorities' perceptions of police and their willingness to cooperate with police (e.g., Chu & Song, 2015; Kochel, 2013; Jackson et al., 2020; Lantz & Wenger, 2022; Sohn et al., 2024). Several notable findings are discussed below.

First, procedural fairness was significantly associated with both general cooperation and hate cooperation, providing support for Hypothesis 1. Positive perceptions of procedural fairness may reinforce the belief that reporting crimes, including hate crimes, which can lead to positive outcomes, such as justice and increased safety. This finding highlights the importance of procedural fairness that police departments should prioritize in all interactions with the community. This includes treating individuals with respect, transparency in decision-making processes, and providing clear explanations for actions taken by police.

Second, the police effectiveness showed a significant relationship only with hate crime cooperation, but not on general crime cooperation, which partially supports Hypothesis 2. Hate crimes are often perceived as more personal and community-oriented threats compared to general crimes (Perry, 2002). For Korean Americans, hate crimes might directly target their identity and community, especially amid growing concerns about Anti-Asian hate crime due to the COVID-19 pandemic and the Atlanta spa shooting incident. In tight-knit communities like the Atlanta Korean American communities, individuals who believe in the effectiveness of the police may feel a stronger sense of responsibility to protect one another and want to leverage this effectiveness to protect their community from such significant threats. Therefore, effective response to hate crimes can foster a sense of security and

responsibility within the community.

Third, unlike Hypotheses 3 and 4, we only observed direct effects of prior victimization experience and language proficiency on general cooperation. The findings indicated that prior victimization experience and language proficiency directly influenced Korean Americans' perceptions of the importance of cooperating with the police, regardless of their perceptions of police legitimacy. Previous crime victims might be already familiar with police procedures and have an increased personal safety concern and a heightened sense of urgency to prevent further crimes, which leads to a greater willingness to cooperate with the police (National Institute of Justice, 2003). This direct impact bypasses the need for perceptions of police legitimacy as a mediator. Since prior victimization experience directly influences cooperation, supporting victims can help them feel more secure and knowledgeable about police procedures, thereby increasing their willingness to cooperate with police. Programs such as counseling services, victim advocacy programs, and educational workshops on interacting with law enforcement can provide ongoing support and resources for victims of both general and hate crimes.

Moreover, language proficiency can boost confidence in interacting with authorities. When individuals feel comfortable speaking the language, they are more likely to engage with the police and participate in cooperative efforts (Chu & Song, 2015). On the other hand, language barriers may hinder individuals from effective cooperation due to the risk of miscommunication, which could lead to an undesirable legal consequence. Effective communication enables individuals to report crimes and cooperate with police more readily without necessarily influencing broader perceptions of police legitimacy. Another implication therefore is ethnic diversity in police employment. We suggest for police departments, especially in multicultural communities, to enhance language access services by hiring multilingual officers, providing translation and interpretation services, and ensuring that all informational materials are available in multiple languages. There is a few research on Asian American police officers and their impact on communities in connection with the recent nationwide worry on violence against Asians. Hiring Asian American police officers in local police has been underestimated (Schroedel

et al., 1994; Yu, 2022). Recruiting and employing more Asian officers can have several benefits. Residents' perceptions of police can be improved when they are helped by the same racial/ethnic officers, and there is a linguistic benefit of minority officers when they interact with local minority residents (Contreras & Chen, 2021; Yu, 2022). In our study, respondents' language proficiency was the significant factor for general cooperation with the police, which suggests that having Asian American officers who can communicate in residents' native languages would lead to increase positive thoughts on police.

We reflect the non-relationships between the exogenous factors and hate cooperation as the following: General cooperation with police constructed with five questions, whereas cooperation with police on hate crime were measured with two questions, therefore, overall variability to estimate between factors of general cooperation was relatively higher than that of hate cooperation. In addition, residents in the sample might have already experienced the police service in the Metro Atalanta before conducting the survey, and they have had positive experiences with the local police to begin with that have drawn more significant links with general cooperation over hate cooperation. We also reflect that residents in this sample might have not had previous experiences on hate crime, nor need to report such incident to police (review hate crime victimization in Table 1), which caused no relation between language proficiency, crime victimization by general/hate crimes, and cooperation with police on hate crime.

In summary, our findings highlight the positive association between procedural fairness and perceived effectiveness with the willingness to cooperate with the police. Both normative and instrumental factors were significant predictors of higher levels of cooperation. Practically, the results suggest that increasing procedural fairness, defined as perceiving police as respectful, attentive listeners, and protectors of citizens' rights, will facilitate greater cooperation and reporting behavior. Enhancing transparency in police decisions and actions, and providing detailed explanations, will also be beneficial. As also highlighted in our research, effective communication will be particularly important for educating minority communities about policing actions, processes, and rationales, enabling them to interact more effectively

with individual officers and police agencies. The individual items for the procedural fairness and police effectiveness are also informative in finding out the specific areas that need most improvement: among the individual items constituting procedural fairness, the ratings for whether the police treat people fairly and with dignity were the lowest. Therefore, efforts to increase perceived fairness should focus on ensuring fair treatment and respect, especially towards racial and ethnic minorities. Examples could be developing specialized training and resources for handling hate crimes more effectively, such as dedicated hate crime units, community liaison officers, and increased presence in areas with higher risks of hate crimes.

Our results contribute to the scholarship on police legitimacy by demonstrating the applicability of normative and non-normative legitimacy to the Korean American communities in the United States. With the growing diversity in immigrant communities in worldwide, it is increasingly important to examine whether existing theories of police-community relations can be applied to different minority groups. Our findings show a positive relationship between perceived legitimacy and willingness to cooperate, even after controlling demographic factors. Additionally, the results reveal specific concerns within the Korean community, such as relatively low ratings of fair treatment and dignity for diverse groups, and the lack of increased safety over time.

Asians including Korean Americans in the U.S. are considered model minorities who are working hard and not complaining to the authority figures when they face "biases" (Chou & Feagin, 2015). Even though the Spa Shooting in Atlanta, GA has drawn attention from the Media, academics, and criminal justice authorities, there is a lack of clear policies to proactively protect Asian Americans, and some authorities may not classify some incidents as hate crime (Kornfield & Knowles, 2021); police may not give much effort for gathering information about hate crime (Perry & Samuels-Wortley, 2021); or there are different factors that shape hate crime investigation in police (Bell, 2022), which all in turn may aggravate this problem. Nolan and Akiyama (2002) shared their insight about changing the climate inside police organizations, such as the education of the seriousness of hate crime, the efficiency of police involvement in hate crime, and positive

organizational support inside police that can alleviate the problem. Few cities and states have implemented specific policies to protect the vulnerable Asian populations during this sensitive era. For example, Los Angeles, CA and New York, NY, where relatively more Asians reside, have initiated hate crime hotlines (Chen et al., 2020). Such policies are crucial to many cities in America and other countries. These implications may be of interest not only to agencies in the United States, but also to foreign government entities seeking to protect their nationals living in the U.S.

The pandemic has negatively impacted individuals' perceptions due to fear and doubt caused by the excessive media and politics. In addition, the sense of separation due to the lockdown has blocked interactions between community members. Achieving higher quality of life is not an interest of only Asian Americans but all residents' desire to have. This can be achieved through the holistic stance, such as intimate and regular interactions between residents and police as well as between residents. We wish to suggest more open public forums that all people can attend and share their experiences and feelings to embrace neighbors rather than separating them from one another. This effort should stretch toward not only sectors in public administration and government office, but also non-profit organizations, community centers, and schools to have more welcoming policies (Lee et al., 2018; Yu, 2020) and empathy toward ethnically minority populations to include all members of the community in this new era of America.

Limitations

Although this study has provided valuable insights, its findings should be interpreted with consideration of certain limitations. The dataset or methodology used in the study may not have captured the full complexity of the pathways between victimization experience, language proficiency, perceptions of police legitimacy, and cooperation. Direct effects may have been more readily observable or easier to measure compared to indirect effects. Also, the study population, Atlanta Korean communities, may have unique social, cultural, or historical dynamics that prioritize certain factors, such as

personal experiences and language skills, in influencing cooperation with the police over perceptions of police legitimacy. Another limitation would be younger generations' response rates were significantly lower compared to relatively older generations' (40s to older) participation rates (M=4.96, *SD*=1.07) in the survey. Thus, younger generations' perceptions on general/hate crime victimization experiences were underestimated, even though younger people might have had more experiences on these crime types because they are more active in general in interacting with others. This indicates that the results might have skewed toward perceptions of relatively mature generations. Thus, future studies should expand the scope of surveys over the study's approach to include more younger participants. In addition, scholars and practitioners looking to apply implications of the current study should be mindful of the nature of our sample of Korean Americans in Atlanta area as well as the characteristics of the target population.

We also suggest that future studies include other ethnic groups within the Asian community to offer more comprehensive understanding of how various factors influence willingness to cooperation with police. Further, comparative studies across different Asian communities or with other minority groups would help to identify shared and unique factors of perceived legitimacy and cooperation. Finally, the baseline of the survey results regarding policy legitimacy for general and hate cooperations is already high – most respondents have had positive sentiments on the police that led smaller effect sizes for the hypothesized models we attempted to estimate. However, our main aim to further understand the relationships between policy legitimacy (fairness and efficiency) and cooperations with the police in this ethnic group was fulfilled by the data and methodology we approached. We hope this line of research continues to confirm and refine the theory of police legitimacy and expand its applicability to diverse communities. By addressing these limitations and incorporating more diverse and comprehensive perspectives, we hope that future endeavors can build on our findings and contribute to a more nuanced understanding of police-community relations.

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