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Automated Decision-Making and the Transformation of Bureaucratic Discretion: A Cross-Sector Systematic Review of Empirical Evidence

Abstract

Automated decision-making (ADM) is becoming a significant feature of contemporary public administration, with major implications for how bureaucratic decisions are made and discretion exercised. Existing scholarship has mostly examined ADM within single sectors, leaving a limited cross-sector understanding of how discretion shifts across policy domains. This article addresses this gap by analyzing how empirical studies describe changes in bureaucratic discretion after ADM implementation across sectors. Using a systematic literature review of 21 empirical studies published between 2020 and 2025, this study discovers and examines five sectors: social welfare and public health, labor market governance, administrative systems, policing, and judicial decision-making. The findings show that ADM does not transform discretion uniformly but reconfigures it according to the sectoral decision structures. Three analytical dimensions were identified: level of automation, level of shift, and type of shift. Highly standardized sectors, such as labor market governance, show stronger automation and a greater curtailment of discretion. The social welfare, administrative, and judicial sectors retain stronger human involvement because of their contextual complexity, accountability, and reviewability. Policing shows the strongest continuity of discretion owing to situational judgment and professional autonomy. Overall, this study contributes to ADM scholarship by offering a cross-sector perspective on bureaucratic discretion and suggesting that public organizations tailor ADM design and implementation to sector-specific decision logics to preserve accountability and meaningful human judgment.

Keywords: algorithmic governance; decision complexity; digital discretion; policy sector; socio-technical systems

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Introduction

Public administration has undergone rapid digital transformation over the last decade, with automated decision-making (ADM) systems increasingly embedded in bureaucratic processes in South Korea. These systems range from profiling to predictive analytics and are used to support or execute decisions across policy sectors, reorganizing how routine bureaucratic decisions are produced (Carney, 2023). This shift toward automated governance has significant implications for street-level discretion in public service. Although automated technologies are often adopted to increase efficiency, legal certainty, and consistency, scholars argue that they may also challenge or reduce frontline discretion (Nordesjö et al., 2023). As algorithmic systems become embedded in administrative practices, decision-making authority can shift from individual officials to system designers and coders. This transforms traditional “street-level bureaucracy” into “screen-level bureaucracy” or “system-level bureaucracy,” where discretion is exercised through system design and operation rather than only through human judgment (Bovens & Zouridis, 2002; Grimmelikhuijsen, 2022; Nordesjö et al., 2023). Therefore, ADM does not simply reduce discretion; it redistributes it across human and technological actors, reshaping authority, judgment, and accountability in contemporary decision-making.

Despite the growing scholarship on ADM and discretion, most empirical studies remain sector-specific, limiting systematic comparisons across sectors. A cross-sector analysis is needed because discretion differs substantially across the policy settings. This article addresses this gap through a systematic literature review of empirical cases published between 2020 and 2025. Rather than asking whether ADM generally reduces or preserves discretion, it examines how empirical research describes changes in bureaucratic discretion across public policy sectors. Several studies call for deeper analysis of ADM decision spaces because each produces different discretion configurations (Grimmelikhuijsen, 2022; Nagtegaal, 2021; Rizk & Lindgren, 2025). In response, this study asks the following question: How do empirical case studies from 2020 to 2025 describe changes in bureaucratic discretion following the implementation of automated decision-making systems in different public policy sectors?

This article argues that the differences in how ADM reshapes discretion are not random but are structured by the nature of decision-making in each sector. Sectors vary in how far decisions can be standardized and encoded into the system rules. Therefore, sectoral variation in ADM implementation can be understood as a function of pre-automation decision structures, which shape the extent to which discretion can be reconfigured.

The remainder of this paper is organized as follows. Section 2 presents the background, including the definitions of discretion in street-level bureaucracy, ADM, and sector relevance. Section 3 outlines the methodology, including the PRISMA 2020 framework, sector classification and thematic coding. Section 4 presents the sector-specific findings, while Section 5 compares and explains the discretion shifts across sectors. Section 6 concludes with the limitations and future research directions.

Literature Review

Bureaucratic Discretion and Street-Level Bureaucracy

Bureaucratic discretion has long been central to public administration, particularly in the street-level bureaucracy. In Lipsky’s (1980) classic theory, street-level bureaucrats exercise discretion when interpreting rules and applying policies to individual cases under complex citizen needs, limited resources, and ambiguous guidelines. Discretion refers to the practical judgment exercised by frontline officials, such as welfare officers, police workers, and caseworkers, when translating formal policies into concrete administrative decisions that can be implemented.

The growing use of automated systems has reshaped the conceptualization and study of discretion. These systems do not necessarily remove discretion but reorganize and support it within the socio-technical framework. They can select cases, pre-process information, and reduce officials’ workload, allowing faster responses without requiring officials to start from scratch. This is especially effective in routine and high-volume cases with low variability.

This shift has produced concepts such as digital discretion and digital nudging. Busch and Henriksen (2018) describe digital discretion as a shift in how discretion is understood in public administration. Traditionally, discretion is viewed as an intellectual process performed by bureaucrats when interpreting rules and making decisions. With the increasing use of information and communication technologies (ICT), some of this reasoning may be influenced or replaced by technological systems. Digital discretion therefore refers to how ICT shapes bureaucratic decision-making, from generating decision alternatives to fully automating decisions that were previously made through human judgment.

In this study, street-level bureaucrats are frontline public actors who apply policy rules to individual cases with a degree of judgment. This includes classic caseworkers, employment officers, police decision-makers, administrative officers, and other public actors whose decisions directly affect citizens’ lives. This article examines how discretion in these roles changes, whether it remains in its previous location and function, or becomes reconfigured.

Automated Decision-Making (ADM) in Public Bureaucracies

Automated Decision-Making and Automation Degrees

ADM refers to the automation of decision-making through digital technologies (Roehl, 2023). It includes systems or software that use computer-based processes to assist or replace government decisions and policy actions that affect people’s opportunities, access, rights, freedoms, or safety. These systems may predict outcomes, classify individuals, optimize processes, identify patterns, or generate recommendations (Richardson, 2022).

ADM is increasingly used in public bureaucracies to support and produce administrative decisions. Some scholars argue that ADM constrains discretion by standardizing decision criteria and narrowing interpretive space, while others argue that discretion is relocated or adapted through human-in-the-loop mechanisms (Boos, 2024).

In human-in-the-loop mechanisms, humans rely on technology to varying degrees, from semi-automated to fully automated arrangements (Roehl, 2023). This study uses Boos’s typology, which identifies four ideal types: preparation, suggestion, offloading, and superseding. In the preparation of systems, algorithms provide information, whereas humans retain full control. In suggesting systems, algorithms recommend decisions, but humans must approve or override them. In offloading systems, algorithms execute decisions unless humans intervene in the process. In superseding systems, decisions are fully automated, and humans are effectively removed. This typology matters because automation exists on a spectrum, and its degree shapes whether discretion is constrained, relocated or eliminated.

Table 1. Boos’s ideal types capturing various levels of automation in algorithm-supported decision making

Degree of automation	Type	Role of algorithm	Decision loop
non-automated	(1)	preparing	Machine-out-of-the-loop
semi- automated	(2)	suggesting	Human-in-the-loop
	(3)	offloading	Human-on-the-loop
fully automated	(4)	superseding	Human-out-of-the-loop

Source: (Boos, 2024)

Automated Decision-Making Shifts

Three concepts help identify how discretion is reconfigured: Buffat's (2013) article explains the curtailment and enablement theses, while Marienfeldt (2024) adds the continuation thesis. The curtailment thesis argues that technology reduces or replaces human discretion by automating decisions and constraining the judgment of the front line. The enablement thesis argues that digital tools support decision-making by supplying information and resources, allowing bureaucrats to make more informed judgments and decisions. The continuation thesis argues that discretion is not eliminated because street-level bureaucrats adapt to digital systems through coping strategies, such as adjusting, ignoring, or working around ADM recommendations to maintain professional judgment.

Therefore, ADM reorganizes street-level discretion rather than removing it. First, it may reduce discretion by narrowing the space for judgment and standardizing decision processes, especially at the front line. When criteria are coded into software, possible decisions become more structured, reducing the variation among officials. For bureaucrats, this can increase consistency, but it can also reduce sensitivity to contextual factors that cannot be translated into codes.

Second, discretion may relocate upstream to system designers, policymakers, data analysts, and others who shape the algorithms, variables, and decision limits. Discretion can shift from "street-level" to "screen-level" or "system-level." Bovens and Zouridis (2002) explains screen-level bureaucracy as bureaucrats retaining decision-making discretion, but their choices are heavily constrained by systems. System-level bureaucracy refers to a further transformation in which decisions are mostly automated and discretion shifts to system designers and rule coders.

Third, the ADM can create a hybrid human-algorithm judgment. Officials may retain discretion by applying their judgment in complex circumstances. Whether discretion remains meaningful depends on officials' prior autonomy and whether the decision-making environment supports independent judgment.

Importance of Sector Analysis

Sector analysis is important because discretion is not structured similarly across domains. Each sector has distinct legal frameworks, professional norms, risk orientations, and institutional cultures (Faber, 2021), shaping how discretion operates before and after ADM. First, the legal structures differ across sectors. Taxation or immigration may involve formal rules and strict procedures, while social welfare often involves broader mandates requiring officials to assess needs and eligibility (Volckmar Eeg & Andresen, 2025). In rule-bound sectors, ADM may strengthen existing structures, whereas in more flexible sectors, it may produce larger changes. Second, the sectors differ in their risk orientation. Policing and national security prioritize risk prevention and public safety, making predictive systems more attractive (Afzal & Panagiotopoulos, 2024). Welfare sectors may prioritize equity and individualized assessment (Ranerup & Svensson, 2022; Stone, 2012). These priorities influence both the design and acceptance of the ADM. Third, the professional norms vary. Judges and healthcare professionals may have stronger traditions of expertise and judgment (Kolkman et al., 2024). In other administrative contexts, decision-making may already follow fixed procedures, making decisions more structured from the beginning. Therefore, the interaction between ADM and professional identity depends on the perceived importance of discretion. Finally, public scrutiny differs among countries. Judicial and policing sectors often face intense legal and public accountability (Afzal & Panagiotopoulos, 2024), while administrative sectors may operate under managerial oversight. These conditions shape the implementation of ADM systems and the monitoring or contestation of discretionary authority. Therefore, a comparative approach is necessary to describe sectoral differences.

Method

Search Scope and Review Boundaries

Scopus was used as the primary database because it offers broad international journal coverage and structured metadata, making the search easier to organize, document and systematically repeat. It also ensures access to high-quality, peer-reviewed publications (Baas et al., 2020). Scopus is also widely

recognized as one of the two major bibliographic databases used in academic research; therefore, using it as a single source is methodologically reasonable given the study’s clear scope and inclusion criteria.

The review is limited to post-COVID-19 publications because the pandemic accelerated digital transformation, forcing public administrations to shift services online and speed up organizational change, digital adoption, and innovation (Agostino et al., 2020; Moser-Plautz & Schmidhuber, 2023). Pre-COVID literature often focused on foundational debates, such as the promise of automation, legal and ethical concerns, and adoption barriers (Zuiderwijk et al., 2021). Post-COVID literature more directly captures acceleration, implementation, and organizational consequences because governments digitized more quickly and at a larger scale. This does not render pre-COVID studies unimportant, but post-COVID studies better capture ADM under intensified and normalized digital transformation.

PRISMA 2020 Framework

In curating the retrieved studies, the author applied the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to maintain objectivity. The first PRISMA stage was identification of studies. A systematic search was conducted in Scopus using keywords related to the ADM and public administration. Boolean operators captured variations in the description of ADM while ensuring relevance to public-sector contexts. The search string was as follows: TITLE-ABS-KEY (“automated decision” OR “algorithmic decision” OR “AI-driven decision”) AND (“public administration” OR “public management” OR “public sector” OR bureaucracy). This identified studies that explicitly addressed ADM in public bureaucratic settings.

The first search yielded 272 records. After applying limits for field (social sciences), language (English), and accessibility (open access), the number of records was reduced to 93. These records were

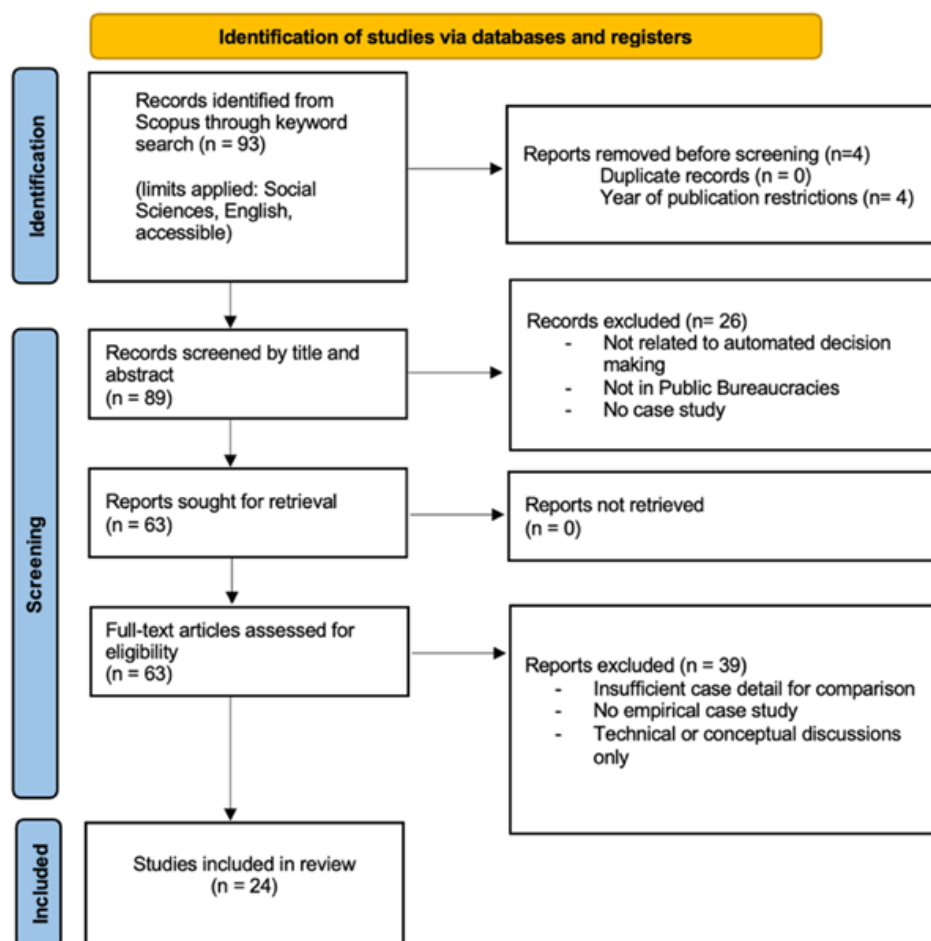


Figure 1. PRISMA Diagram illustrating the document collection process

Source: Processed by Author

assessed using an Excel spreadsheet that compiled the title, abstract, year, and keywords. Four records were removed because they were published before 2020, leaving 89 records for title and abstract screening to be reviewed.

Records were assessed using predefined inclusion and exclusion criteria. Studies were excluded if they were unrelated to ADM, outside public bureaucracies, or lacked case studies. Empirical case studies were required because this research examines how discretion changes in actual public implementation settings, not only conceptual debates about it. Empirical studies are especially important because they contribute to a deeper understanding of theoretical phenomena in context and can provide actionable knowledge for legislation, policy, and implementation (Wessels & Zongozzi, 2024). The empirical literature also enables comparisons of ADM cases across countries, regions, and sectors. Theoretical papers remain useful for framing but do not provide the case-level evidence needed for cross-sectoral comparisons.

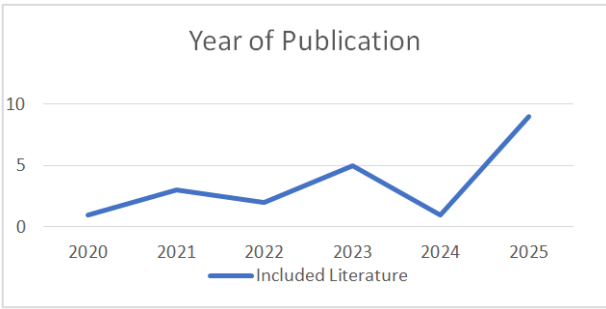
Next, 63 full-text articles were retrieved for eligibility assessments. Thirty-nine were excluded because they had insufficient case details, lacked empirical case studies, or relied only on technical or conceptual discussions. After all PRISMA stages, the final sample consisted of 24 studies before thematic coding was conducted.

To complement the PRISMA selection, the included studies were mapped using several classifications. The temporal distribution was uneven, with more studies in later years, particularly in 2023 and 2025. The sample was concentrated in Global North contexts, while Global South cases were limited. This descriptive mapping provides context for the sample and highlights the uneven temporal and geographical distribution of empirical ADM research.

Table 2. Journals Included in the Literature Review

Source	Count
Government Information Quarterly	3
Public Policy and Administration	2
Proceedings of the ACM on Human-Computer Interaction	2
Data & Policy	2
Nordic Social Work Research	2
Others (n = 13) with each consisting of 1 document	13
Total	24

Source: Processed by Author



Graph 1. Distribution of Literature Based on Year of Publication

Source: Processed by Author

Table 3. Distribution of Countries and Regions

Country	Region	Count
Sweden	Global North	6
Netherlands	Global North	4
United Kingdom	Global North	2
Australia	Global North	1
Belgium	Global North	1
Estonia	Global North	1
Germany	Global North	1
Poland	Global North	1
Portugal	Global North	1
United States	Global North	1
China	Global South	1
Chile	Global South	1
Total		21

Source: Processed by Author

Sector Classification Method

Table 4. Distribution of Literature Based on Sectors

Sector	Percentage (%)	Count
Social Welfare & Public Health	54.17%	13
Labor Market Governance	16.67%	4
Administrative	8.33%	2
Policing	4.17%	1
Judicial	4.17%	1
Cross-Sectoral	12.50%	3
Total		24

Source: Processed by Author

The initial sample comprised 24 articles: social welfare and public health (13), labor market governance (4), administrative (2), policing (1), judicial (1), and cross-sectoral (3). The author classified each article according to the public policy sector in which the ADM system was implemented. Studies covering more than one sector were removed because the

review focused on shifts within sectors and required detailed sectoral data. Cross-sector empirical studies prioritize breadth and provide insufficient detail for robust, sector-specific analyses. After removing these studies, 21 articles remained.

Thematic Coding

The author used thematic coding to identify patterns in the way discretion changes under ADM. Each full-text article was assessed to determine how the authors described ADM's impact of ADM on discretion. The coding focused on recurring patterns of discretionary changes within sectors. The process was initially guided by existing research on ADM and discretion but was adjusted as the themes emerged. Cases describing reduced ability to override system outputs were coded as "curtailed," while cases emphasizing support for decision-making were coded as "enabled." This enabled consistent cross-sector comparisons while remaining open to variations within policy domains.

Results

Sector 1: Social Welfare & Public Health

Social welfare and public health ADM appear in the literature as high-stakes governance sectors responsible for essential services, resource allocation, and decisions that directly affect citizens, especially vulnerable populations (Kaun, 2021). Social welfare is value-laden and oriented toward redistribution, care, and social protection (Ranerup & Svensson, 2022). These orientations involve eligibility assessments, individualized judgments, and ethical considerations regarding fairness and human needs. Both domains operate within complex, multi-level bureaucratic systems shaped by accountability, political oversight, public trust, and multiple actors with different roles and authorities. Therefore, decision-making cannot be purely technical; it must be integrated with legal, ethical, and organizational contexts.

The literature highlights three major shifts in this field. First, traditional street-level discretion is reconfigured. Whereas pre-ADM discretion involved frontline bureaucrats throughout the administrative process, ADM-supported discretion is now often exercised only in exceptional cases. Frontline officials

remain important in "edge cases" (Weerheijm et al., 2025), including atypical eligibility conditions, system anomalies, incomplete data, conflicting records (Kaun, 2025), appeals, and complex cases (Ranerup & Svensson, 2022). ADM can also reduce and increase time with citizens. In Swedish RPA social assistance systems, direct interaction with citizens has been reduced, weakening the contextual interpretation and emotional and relational dimensions of Lipskian discretion. In that case, and in the US Child Welfare System's CANS algorithm, standardized decision-making and predictive scoring reduce discretion by replacing human judgment with fixed rules and predictive outputs. In the CANS case, 80% of practitioners reported that the algorithm contradicted their expertise and turned them into "data brokers" rather than decision-makers (Saxena et al., 2021).

The human aspect of discretion is also reduced, and practitioners no longer decide entirely from scratch. Snow (2021) describes this as a shift from "satisficing," or traditional human discretion, to "artificing," where algorithmic outputs are combined with human judgment. The CANS case also shows that discretion can become strategic manipulation, or "gaming," when caseworkers manipulate input scores to increase foster-care payments. Discretion shifts from legitimate professional judgment to manipulation of the system.

The second shift concerns responsibilities and accountability. Duties once held by street-level bureaucrats are now distributed across actors, including IT specialists, as seen in the Chilean Instituto de Previsión Social and Trelleborg cases. In the Universal Credit Program and Swedish RPA cases in Landskrona and Mölndal, decision chains are distributed among actors, and welfare decisions emerge from interconnected data flows that move away from street level. These cases also show a hybrid public-private mechanism in which discretion is partly relocated to employers, landlords, tax authorities and private data providers. These actors feed data into systems that automatically shape outcomes, even if they do not see themselves as decision makers. Responsibility becomes diffused, harder to trace, and more difficult to challenge.

Other cases show similar accountability deficits. In Västerby, the ADM reduced caseworker

discretion and shifted control to ADM systems and job coaches, who cannot make the same law-based administrative decisions as caseworkers. Previously, frontline bureaucrats exercised discretion and were controlled through legal rules, supervisors, and appeals. Discretion is now shaped by systems, data flows, and multiple actors, making oversight slower, weaker, and harder to assign. Wieringa (2023) notes that when *ex-ante* political accountability fails, mitigation becomes difficult. Difficult accountability is also evident in Robodebt and the SyRI. In the Trelleborg Model, ADM contestation creates a new arena of discretion: contestation shifts from individual decisions to the underlying system logic, involving actors beyond the administrative domain of the agency.

The third shift concerns the mechanism of discretion, especially the movement from the frontline into the system. The Trelleborg Model shows a shift from street-level discretion toward system-level discretion, with discretion moving upstream into system design and rule encoding. Practitioners noted that “RPA makes about one third of the decision,” with many other decisions being partially automated. The SyRI case similarly shows officials no longer deciding whom to investigate; the system preselects cases through risk profiling. Systems such as REDI are built with assumptions and values, meaning that the algorithm does not simply calculate needs but shapes welfare decisions. Therefore, key discretionary choices occur during system design and policy decisions regarding rules. Overall, the value-laden and context-dependent nature of social welfare limits the extent to which discretion can be fully standardized or automated.

Sector 2: Labor Market & Employment

The labor market and employment sector operate at the intersection of economic regulation and social policy, managing workforce participation through job matching, risk assessment, and the allocation of employment support. Unlike more care-oriented sectors, many decisions in the public sector are structured around classification, profiling, and standardized eligibility criteria. Individuals are sorted into categories such as employability levels, risk of long-term unemployment, or intervention groups (Sztandar-Sztanderska & Mazur, 2025; Zejnilović

et al., 2020). These processes are embedded in legal and administrative frameworks but also aligned with economic objectives such as efficiency, labor market optimization, and resource allocation (Carlsson, 2023). Because decisions are repetitive, data-driven, and oriented toward prediction and categorization rather than individualized or relational judgment, the sector is comparatively compatible with automation. Frontline workers still interpret and apply classifications but with narrower discretion than before.

Four shifts are observed in this sector. First, most studies show curtailed discretion, with some exceptions. In the Swedish Public Employment Service, officials can no longer make individual assessments and report that their professional judgment is undervalued, making them “operators of the system” rather than decision-makers. Although officials formally make final decisions, deviation from algorithmic recommendations is strongly restricted (Carlsson, 2023). In Poland’s Public Employment Service, overrides occurred in fewer than 4% of cases, showing that formal authority does not translate into practical power. ADM is treated as the “zenith of legal and rational authority,” replacing imperfect administrative control and heavily curtailing discretionary practice (Sztandar-Sztanderska & Mazur, 2025).

The Portuguese Public Employment Service differs because of the high human discretion that remains central. Workers may accept system results only to justify decisions or comply with requirements. Zejnilović et al. (2020) found different shifts because the ADM system was immature and weakly integrated and used outdated 2009–2010 data.

Second, discretion is distributed and relocated to the public. Poland’s PES illustrates a major redistribution of funds. Before the ADM, caseworkers had more control over the process. After the ADM, key decisions shifted upward to policymakers who designed rules, scoring systems, and categories. Discretion was also built into the algorithm. Statisticians played a small role in system adjustment, while caseworkers retained limited discretion regarding data entry, interpretation, and rare overrides. In the Estonian Employment Insurance Fund, discretion occurs only at the legislative stage because the law is strict and leaves nothing to interpret at the decision-making stage. Discretion moves earlier into rule writing. In

SPES, discretion shifts from the frontline to ADM systems and designers, with decision-making shaped by statistical models, while officials apply system outputs.

Third, the discretion mechanism changes when the law begins to follow the system rather than discretion operating under the law. In Poland's PES, the ADM introduced policy rules absent from legislation, including criteria related to motivations for registering, willingness to accept working conditions, and willingness to relocate or commute long distances. Without a legal basis, discretion becomes arbitrary and difficult to account for. Overall, the classification-based and standardized nature of labor market decision-making makes it more compatible with automation and curtailment of discretion.

Sector 3: Administrative

The administrative sector implements public law through routine rule-based procedures, such as permits, licenses, and approvals. Decision-making relies on defined legal criteria, standardized workflows, and structured data, with many tasks involving repetitive verification and eligibility checks (Long & Gil-Garcia, 2023). It also operates under strong requirements for transparency, accountability, and reviewability (Yurrita et al., 2025). Because it is formalized, procedural, and rule-bound, the sector is generally suited to automation, provided that automated systems meet legal and procedural standards.

Two main shifts appear. First, discretion and final human decisions remain relevant and often required, but socio-technical mechanisms now work alongside street-level bureaucrats. The initial steps may be fully automated with little or no human intervention. In the Netherlands' illegal rental detection system, automated systems provide risk scores, while bureaucrats decide whether to investigate. Officials remain decision-makers, using intuitive judgment and the law alongside automated results. In China's Smart Examination and Approval system, which supports business registration, licensing, and document verification, the initial stage standardizes rules and requires no manual intervention, eliminating discretion. However, human intervention remains important for final decisions.

Second, the discretion horizon expands and is distributed across the relevant parties. In illegal rental detection cases, street-level bureaucrats no longer act only as frontline officers; they become intermediaries between ADM systems and citizens. Discretion also shifts to earlier stages because ADM systems prioritize cases. Therefore, crucial decision-making occurs during system development. These shifts reflect the rule-based and procedural nature of administrative decision-making, which enables automation while preserving the legal accountability requirements.

Sector 4: Policing

The policing sector focuses on public order and security through risk assessment, surveillance, and enforcement, often under uncertain and high-stakes conditions. Decision-making relies on incomplete and dynamic information, requiring situational judgment beyond fixed rules (Weerheijm et al., 2025). At the same time, policing operates under strict legal and accountability measures. These features shape how the sector engages with ADM, making use dependent on the system's ability to support complex judgment and remain interpretable by humans.

In the Netherlands' national security advisory ADM system, shifts are minimal but visible. Decision-makers describe ADM as non-binding support and insist that human judgment should override system outputs. Discretion remains necessary for complex cases because systems lack human "gut feeling." Decision-makers strongly reject claims that their profession undermines professional identity or job meaning and resist becoming "rubber stampers." AI is used for routine tasks, such as checking data or verifying whether similar conclusions are drawn. Socio-technical mechanisms therefore exist, but the sector remains heavily reliant on human discretion. These patterns reflect the uncertainty and situational judgment required in policing, thereby limiting full automation.

Sector 5: Judicial

Judicial sector shifts are illustrated through the "Moulder Cases" (Kolkman et al., 2024), where ADM takes over repetitive parts of legal preparation before a hearing, especially inventory, selection, and assessment. Judges resemble street-level bureaucrats

because they interact directly with appellants in hearings, whereas paralegals become screen-level bureaucrats because they prepare cases behind a screen. The preparatory stage of discretion becomes ADM-supported, whereas the final decisions remain with the judges. Traditionally, contextual judgment was always required; now, decisions are prepared before hearings through file scanning and data analysis, creating a hybrid initial decision-making mechanism.

The ADM also changes how experience shapes discretion. Previously, decisions were influenced by each bureaucrat’s experience; now, they are supported by larger case volumes for reference, standardizing the initial stage. However, bureaucrats do not surrender to ADM suggestions. Paralegals correctly identified judges’ decisions 67% of the time without the system but only 48% with ADM (Kolkman et al., 2024). One paralegal stated that ADM results would never be perfect because system recommendations influence judgment; however, humans still check and override them. Most importantly, street-level discretion remains at the final-hearing stage. Judges retain the final authority, interact directly with citizens, and may disregard initial drafts.

Cross-Sector Comparison

Table 5. Sector Comparison Table

No.	Sector	General Level of Automation (Preparing, Suggesting, Offloading, Superseding)	Level of Shift (Street, Screen, System)	Type of Shift (curtailed, enabled, or continuous)	Cases
1.	Social Welfare and Social Protection	Suggesting (Human-in-the-loop)	Screen-Level	Curtailed	(Weerheijm et al., 2025); (Mahroof et al., 2025); (Kaun, 2025); (Petroons et al., 2025); (Adelmant & Raso, 2025); (Rinta-Kahila et al., 2023); (Nordesjö et al., 2023); (Ranerup & Svensson, 2022); (Wieringa, 2023); (Ranerup & Henriksen, 2020); (Kaun, 2021); (Saxena et al., 2021); (Snow, 2021)
2.	Labor Market and Employment	Offloading (Human-on-the-loop)	System-Level	Curtailed	(Carlsson, 2023); (Sztandar-Sztanderska & Mazur, 2025); (Zolkin et al., 2023); (Zejnilović et al., 2020)
3.	Administrative	Suggesting (Human-in-the-loop)	Screen-Level	Enablement (with partial curtailment)	(Yurrita et al., 2025); (Long & Gil-Garcia, 2023);
4.	Policing	Preparing (Machine-out-of-the-loop)	Screen - Level	Continuation	(Weerheijm et al., 2025)
5.	Judicial	Suggesting (Human-in-the-loop)	Screen - Level	Enablement (with partial curtailment)	(Kolkman et al., 2024)

Source: Processed by Author

Discussion

Automation Level Variation

Suggesting (Human-in-the-loop)

The comparison in Table 5 shows that sectors differ significantly in their levels of automation; however, these differences are shaped by the nature of decision-making within each sector rather than by technology alone. The social welfare, administrative, and judicial sectors are all categorized as operating at a “suggesting” (human-in-the-loop) level of automation. Although they share this classification, their underlying conditions differ. In social welfare systems, automation remains limited because, as Stone (2012) stated, “decisions depend partially on hard-to-measure intangible factors..... welfare depends on being able to fulfill one’s need to belong, to care for others, and to give and receive help”. As shown in cases such as Swedish RPA systems and CANS, algorithmic tools can categorize and score cases, but they cannot fully capture the relational and contextual aspects of decision-making. To do this, continued human involvement is required, particularly in handling “edge cases. In contrast, administrative and judicial systems operate at the same level of automation for

different reasons. The decisions made in this sector are often more structured and rule-based, making them easier to automate in the earlier stages (such as data processing and verification). However, full automation is constrained by accountability and responsibility measures that require human validation in the final stages. For example, in the Netherlands illegal rental detection system, algorithmic outputs guide decision-making, but officials must still decide whether to act on them. Similarly, in judicial Moulder Cases, pre-processing of cases is done using ADM systems and assisted by paralegals, but judges can override any of the recommendations. Thus, although these sectors are classified as “suggesting” social welfare, they require human involvement due to complexity, whereas administrative and judicial systems require it due to accountability.

Offloading (Human-on-the-loop)

In contrast, labor market governance can operate at a higher level of automation, classified as “offloading” (human-on-the-loop). This is possible because the nature of decisions within this sector is already standardized and data-driven, such as profiling job seekers. In the case of SPES and PES in Poland, the ADM models directly execute decisions with little or no human intervention. The nature of these tasks makes them more compatible with automation, which enables a stronger discretion shift.

Preparing (Machine-out-of-the-loop)

Lastly, policing represents the lowest level of automation or referred to by Boos (2024) as “preparing” (machine-out-of-the-loop). This is because of the sector’s reliance on professional judgement and situational awareness (Afzal & Panagiotopoulos, 2024). As shown in the Dutch security case, systems are only used to help confirm decisions or provide information for officers. In this case, decision-makers retain full authority and often resist relying on automation. This shows the need for officials to have strong professional autonomy and contextual judgement, thus limiting the adoption of higher automation levels.

In summary, the variation in automation levels across sectors can be interpreted through the lens of

decision complexity and the perceived role of digital tools in decision-making. Research shows that ADM practices tend to be viewed more positively in low-complexity practices, whereas human involvement in complex cases are difficult to formalize (Nagtegaal, 2021). Similarly, public servants tend to regard digital tools as meaningful when they automate common task or provide information, but less so when they take over decision-making authority (Marienfeldt, 2025). In addition, Nasciemento et al. (2025) also warns that the long-term automation effects depend not only on technical capability, but how efficiency is balanced with concerns of bias, accountability and displacement of human roles. This helps explain why labor market governance can operate at a higher level, while welfare, administrative, policing, and judicial sectors retain stronger involvement.

Shift Level Variation

The level of shift illustrates that, despite differences in automation, the social welfare, administrative, policing, and judicial sectors can be identified as being at the screen level. Meanwhile, the labor market sector is the only one that shifts towards the system level. Although they have different ranges and configurations for the screen level.

Screen-Level Shift

In the social welfare and health sector, their discretion is located at the screen level because their decision-making mechanism is shaped by risk scoring and standardized categories, but humans still intervene only in exceptional cases. In administrative and judicial systems, discretion also operates at this level, but in a different way. Here, human actors use their judgement to interpret and validate system recommendations to ensure that the final decision is in line with strict mandates. In policing, screen-level classifications reflect a weaker form of system influence, where digital tools support decisions when needed but do not constrain them in any way. In this case, discretion remains close to traditional street-level practice. Therefore, the similarities of the shift do not mean that the degree of system influence is also uniform, and the level varies in its level of dependence on the ADM results.

System-Level Shift

In contrast to all three sectors, the labor market sector is the only one classified as system-level because of its high integration with the deployed automated system. This shift is driven not only by its high level of automation but also by the previously standardized nature of decision-making tasks pre-ADM. Therefore, allowing the discretion level to move further up in its reliance. In cases such as the Poland PES, discretion is mainly deployed through system design. While frontline actors still possess the formal authority to exercise discretion, in reality, discretionary influence is limited. This presents a clear illustration of the significant relocation of discretion away from the frontline. This also suggests that the level of shift is influenced by the structure of decision authority and the extent of autonomy frontline actors have to retain in practice.

Overall, the distinction between screen- and system-level shifts should not be understood as purely technical. Marienfeldt (2025) suggested that digital tools are more likely to be experienced as meaningful when public servants retain influence during implementation and can still use technology to support rather than replace their judgement. At the same time, several literature states that increasingly important gatekeeping functions are now located at screen-based interfaces, such as prescreening tools and chatbots, which mediate access to services before a citizen ever reaches a frontline official (Kaun & Männiste, 2025; Tarkkala et al., 2025). This means that a system-level shift is not simply a stronger version of screen-level bureaucracy but a deeper relocation of authority towards coded rules, system design, and upstream policy choices. In contrast, screen-level settings may still preserve meaningful human judgement, even if decision-making is heavily mediated through ADM systems.

Shift Type Variation

The last cross-sector analysis is through their shift type, which includes curtailment, enablement, and continuation. The empirical case findings show that the type of shift can take different forms across sectors despite the similarities in the level of automation or level of shift.

Curtailed Discretion

In the social welfare and labor market sectors, the shift is classified as experiencing curtailment, but the degree is different. In social welfare systems, curtailment is linked to risk scoring and data categorization, reducing both contextual and relational judgments. In this case, discretion is not eliminated, but the space to exercise it is limited to exceptional cases. In contrast, the labor market sector curtailment takes on a stronger form. It is deployed through statistical profiling and predefined scoring systems, which are mostly determined by system logic. These results suggest that the limited overrides are actually exercised in practice. Here, discretion is not only constrained but is effectively replaced by ADM systems.

Enabled Discretion

In contrast, both administrative and judicial were classified as enabled (with partial curtailment). Although these sectors operate at the same level of automation and shift as social welfare, discretion is enabled because human validation remains the key to the final stages of decision-making. Officials actively interpret and decide to use system recommendations, meaning that discretion continues to serve its purpose in shaping the outcomes. This shows an important difference: the degree of human involvement (during the initial processes) alone does not determine whether discretion is enabled or curtailed, but what determines it is the extent to which human judgement influences the final decision.

Continued Discretion

Finally, the policing sector is classified under continuation, meaning that discretion remains mostly the same prior to ADM implementation. This occurs mainly because of the high resistance to relying on these systems as a core judgement. In this case, discretion is not reshaped through interaction with the system (enablement) but maintained through strategies to work against the system and retain their discretion (continued).

Taken together, these three shift types suggest that ADM does not produce a uniform discretionary effect across the public sector. Rather, whether dis-

cretion is curtailed, enabled, or continued depends on the interaction between the type of task being automated, the degree of contextual judgement required, and the broad legitimacy conditions under which decisions are made. Studies on automation in public administration emphasize that digital systems raise recurring concerns about transparency, legal certainty, accountability, and democratic legitimacy, especially when decisions affect rights, welfare or vulnerable groups (Goossens et al., n.d.; Johansson et al., 2022). Moreover, research on technologized public services also show that trust in government may be damaged when automated systems are opaque or unreliable (Bodó & Janssen, 2022). In this sense, the shift type reflects not only feasibility but also the extent to which a sector can tolerate standardization without compromising fairness, trust, and professional judgement.

Why Do Cross-Sectoral Variations Occur

Cross-sector variation is shaped not only by technology but also by decision complexity, legitimacy demands, and implementation conditions. ADM is viewed more positively in lower-complexity cases, while higher-complexity sectors still require human judgment where context, compassion, and interpretation are difficult to formalize (Nagtegaal, 2021). This explains why labor market governance shows stronger automation and curtailment, whereas welfare and public health retain more human involvement. In welfare, ADM is also used to reallocate time and resources toward activation and support work, reflecting values of service delivery, efficiency, and professionalism (Ranerup & Svensson, 2022).

The ADM should not be viewed as a simple replacement of discretion. Public servants are less likely to perceive ADM tools as meaningful when they take over final decisions (Marienfeldt, 2025). This helps explain the administrative and judicial sectors, where automation supports earlier or repetitive stages, but the final judgment remains human because accountability constrains full automation. This is also consistent with Boos's (2024) distinction between ADM that prepares, suggests, offloads, or supersedes human judgment, each with different implications for responsibility and action. Enabled discretion emerges

when automation supports, rather than displaces, judgment.

Cross-sectoral variation also reflects different legitimacy requirements. Research on digital automation in public administration highlights transparency, integrity, legal certainty, accountability, democratic legitimacy, and constitutional protection (Al-Kasasbeh et al., 2025; Busroh et al., 2025; Johansson et al., 2022). These concerns are especially visible in the welfare and administrative sectors, where decisions affect benefits, rights, and public resources. Trust in government may weaken when public services rely on systems that are hard to contest (Bodó & Janssen, 2022). This is especially important for vulnerable populations, as automated systems can generate exclusion, distrust, and additional burdens for those who do not fit standardized categories. Welfare centers and pre-screening systems show that seemingly simple digital systems often still depend on human assistance and can function as gatekeeping mechanisms (Kaun & Liminga, 2023; Kaun & Männiste, 2025; Palukka et al., 2025; Tarkkala et al., 2025). Therefore, socially vulnerable populations are less compatible with strong system-level automation because the costs of standardization are social and democratic, not merely technical.

Finally, discretionary outcomes are influenced by organizational conditions. Implementation is more effective when public servants retain influence and when digital transformation is supported by adequate competencies, adaptability, and organizational support (Marienfeldt, 2025; Vesolovska et al., 2025). Cross-sector variation should therefore be understood as the product of both structural differences across policy domains and the socio-technical conditions under which automation is introduced into work processes.

Conclusion

This article examines how bureaucratic discretion is reconfigured under ADM across public policy sectors through a systematic review of empirical studies published between 2020 and 2025. The findings show that discretion changes through three dimensions: the level of automation, the level of shift, and the type of shift. ADM does not simply remove discretion but reorganizes it differently, depending on decision-making structures.

Highly standardized sectors, such as labor market governance, show stronger automation, movement toward system-level bureaucracy, and pronounced curtailment of discretion. The social welfare, administrative, and judicial sectors retain stronger human involvement, but for different reasons. In welfare, human discretion remains important because decisions are context sensitive and ethically loaded. In administrative and judicial settings, automation supports routine and preparatory stages; however, the final judgment remains human because accountability, reviewability, and reasoned justification constrain full automation. Policing shows the strongest continuity of discretion, as uncertainty, situational assessment, and professional judgment continue to limit the use of automated systems.

More broadly, cross-sector variation is shaped not only by technical feasibility, but also by decision complexity, legitimacy demands, and implementation conditions. Sectors differ in how far decisions can be standardized without undermining fairness, trust, accountability and professional judgment. Therefore, ADM should be understood as a socio-technical reconfiguration of discretion rather than a uniform replacement of bureaucracy. These findings contribute to ADM scholarship by demonstrating that the transformation of discretion is sector-dependent and inseparable from the institutional and normative context in which automation is introduced.

This study had several limitations. First, the literature was restricted to Scopus, and specific inclusion criteria may have excluded relevant studies from other sources. Second, owing to the limited available literature, the author could not classify each ADM system by sector in greater detail; future studies should examine the impact of different ADM system types. Third, regional variation could not be fully covered despite the importance of national legal frameworks and regulatory environments in shaping whether discretion is preserved or constrained. Fourth, differences in the implementation stage, such as early stage or fully embedded ADM, could not be systematically assessed because of limited data, although they likely shape discretionary shifts.

Future research should extend this analysis using more comparative and detailed approaches.

Cross-country and cross-regional studies are needed to examine how legal and institutional contexts shape discretion in the ADM. Future work should differentiate between ADM system types, especially advanced machine learning systems, and examine how discretion evolves across implementation stages. More empirical research is needed in underrepresented sectors to improve sectoral comparisons. Finally, future studies should examine intra-organizational variation, as different units within the same organization may produce different discretion configurations depending on how ADM systems are implemented and governed.

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