

The Digitalization of Welfare and Legal Exclusion: Algorithms, Automation, and Administrative Justice

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ABSTRACT

This article examines how the digitalization of welfare systems contributes to legal exclusion and reconfigures the principles of administrative justice in contemporary governance. A scientific narrative review method was employed, using a descriptive analysis approach to synthesize interdisciplinary research published between 2021 and 2024. Sources were drawn from legal studies, public policy, and technology-related fields. The review includes case examples from the UK, Netherlands, US, and Nordic countries, with a focus on the operational mechanisms of automated welfare systems and their legal implications. The review reveals that digital welfare systems commonly utilize eligibility algorithms, risk assessment AI, and biometric verification technologies. While these tools promise efficiency, they also create new vulnerabilities for legal exclusion, especially among marginalized populations. Challenges to administrative justice include the erosion of procedural fairness, opacity in algorithmic decisions, diminished human discretion, and limited access to remedies. Existing legal protections and oversight mechanisms remain underdeveloped in many jurisdictions, though promising innovations such as algorithmic audits and rights to explanation are emerging. Digitalization has reshaped welfare governance in ways that both enhance and threaten access to social rights. Without strong safeguards, automation can undermine administrative justice and disproportionately harm vulnerable groups. A balanced approach is needed—one that integrates technological advancement with legal accountability, user-centered design, and inclusive governance.

Keywords: digital welfare, algorithmic decision-making, legal exclusion, administrative justice, automation, procedural fairness, welfare governance.

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1. Introduction

The digitalization of welfare systems represents a defining transformation in the administration of public services across the globe. Governments increasingly rely on digital technologies to manage social benefits, assess eligibility, and distribute aid. This shift has been driven by a range of motivations, including cost-efficiency, modernization, improved service

delivery, and data integration. However, the consequences of this transformation go far beyond technical optimization. As welfare services become increasingly digital, they also reflect and reproduce the structural inequalities embedded in society, often excluding the very populations they are designed to support. These developments raise urgent questions about the role of administrative governance in ensuring



fairness, transparency, and access to justice in the digital age.

One of the most notable features of digital welfare is the rise of algorithmic decision-making within public service delivery. Algorithms are now deployed to automate eligibility assessments, detect fraud, allocate resources, and predict future risks. In countries such as the United Kingdom and the Netherlands, automated systems have become central to welfare operations, exemplified by tools like the Universal Credit platform and the controversial SyRI algorithm for fraud detection. While these systems promise to streamline bureaucracy and enhance the precision of administrative decisions, they also create opaque environments where individuals are subject to decisions made by automated processes with limited transparency or human oversight. As noted by Zakharova et al., algorithmic systems within welfare governance often blur the boundaries between care and control, reinforcing disciplinary mechanisms under the guise of efficiency (Zakharova et al., 2024).

The adoption of automation in welfare governance has introduced a persistent paradox: the tension between administrative efficiency and social equity. On the one hand, digital systems enable governments to manage large-scale welfare operations with speed and precision, purportedly reducing human error and improving accountability. On the other hand, the standardization and abstraction inherent in algorithmic logic can disregard the complexities of human life, leading to rigid classifications, unfair rejections, and the marginalization of vulnerable groups. As Toorn et al. argue, the digital welfare state must be understood not merely as a technical infrastructure but as a site of political and social contestation, where the design of digital systems reflects normative choices about inclusion, surveillance, and responsibility (Toorn et al., 2024).

These dynamics have generated growing concern about legal exclusion—the processes by which individuals are denied access to welfare rights and remedies due to digital and bureaucratic barriers. Legal exclusion can occur when automated systems wrongfully classify individuals as ineligible, when people lack the digital literacy needed to navigate online platforms, or when the opacity of algorithmic decisions prevents effective legal challenge. In such contexts, the principle of administrative justice—ensuring that public administration is fair, lawful, and accessible—becomes

increasingly difficult to uphold. As Hjelholt explains, digital governance mechanisms can absorb dissent and limit the possibilities for contestation, resulting in the erosion of democratic accountability (Hjelholt, 2024). This shift demands a re-evaluation of the legal frameworks and institutional safeguards that underpin welfare administration.

The aim of this article is to explore how the digitalization of welfare has reshaped the landscape of administrative justice, focusing in particular on how algorithms and automation contribute to new forms of legal exclusion. It investigates the ways in which digital infrastructures both enable and constrain access to social rights, drawing attention to the legal, procedural, and ethical dimensions of digital welfare reform. The article also seeks to illuminate the lived realities of those affected by these changes, especially marginalized populations who may lack the resources or knowledge to engage with digital systems.

To achieve this, the study employs a narrative review methodology with a descriptive analysis approach. This method was selected to facilitate a comprehensive and critical synthesis of the existing literature, drawing from interdisciplinary sources in law, sociology, political science, and information technology. Unlike systematic reviews that prioritize exhaustive coverage of quantitative studies, the narrative review allows for a more interpretive and context-sensitive exploration of emerging themes and conceptual frameworks. The descriptive analysis further enables the identification of patterns, contradictions, and blind spots within the literature, thereby offering a deeper understanding of the phenomenon under investigation.

The structure of this article is organized into several sections. Following this introduction, the conceptual framework section defines key terms and theoretical perspectives relevant to digital welfare and administrative justice. The subsequent sections analyze global trends in welfare digitalization, examine the mechanisms of legal exclusion in algorithmic systems, and assess the implications for procedural fairness and legal accountability. The article then turns to policy responses and legal safeguards, highlighting both limitations and possibilities for reform. The final sections provide a discussion and conclusion, synthesizing the findings and proposing avenues for future research and governance. Through this structure, the article aims to

offer both a critical diagnosis of current challenges and a constructive contribution to the debate on equitable and just digital welfare systems.

2. Methodology

This scientific narrative review employed a descriptive analysis method to explore how the digitalization of welfare systems has led to legal exclusion and raised new challenges for administrative justice. The primary aim was to systematically collect, interpret, and synthesize existing scholarly and policy-based knowledge on the intersection of algorithms, automation, and public welfare from a legal and socio-technical perspective. The narrative approach was selected because of its flexibility in examining a complex, multidisciplinary phenomenon that spans law, public administration, data governance, and social justice. This method enabled the integration of diverse bodies of literature to construct a coherent analytical framework, rather than merely aggregating findings as in a systematic review.

The literature was identified through a comprehensive search of peer-reviewed academic databases including Scopus, Web of Science, and Google Scholar, as well as specialized legal and public policy databases such as HeinOnline and SSRN. The search was limited to articles published between 2021 and 2024 to ensure the inclusion of the most current research reflecting recent technological developments and policy shifts. Keywords used in the search included combinations of terms such as “digital welfare,” “algorithmic decision-making,” “legal exclusion,” “automated public services,” “administrative justice,” “AI in social benefits,” and “algorithmic discrimination.” The inclusion criteria focused on scholarly articles, legal commentaries, and empirical policy reports that directly engaged with the digital transformation of welfare systems and its impact on legal processes, particularly concerning access, transparency, and fairness. Grey literature such as government white papers, think tank reports, and NGO publications were also included where they provided critical insights, especially in documenting real-world implementations and their consequences.

The selection process involved multiple rounds of screening. First, titles and abstracts were reviewed to ensure relevance to the study's core themes. Full texts of the selected articles were then assessed to determine the depth of analysis and their contribution to

understanding legal exclusion and digital welfare reform. The analysis emphasized identifying common patterns, contradictions, and gaps in the literature, particularly in relation to procedural fairness, due process, and the evolving role of discretion in automated systems. Special attention was paid to high-impact studies that offered comparative perspectives across countries, such as the digitalization of welfare in the UK, Netherlands, United States, and Nordic countries. These cases provided valuable context for assessing the broader legal implications of automation and algorithmic governance.

Data from the reviewed sources were analyzed thematically through qualitative content analysis. Themes were organized around key dimensions including the operational mechanisms of automated welfare systems, the legal and procedural risks posed by algorithmic decision-making, the social groups most affected by exclusion, and the policy and legal frameworks proposed or implemented to safeguard rights. This method facilitated a critical synthesis of the literature, allowing for the identification of both structural trends and normative debates. The descriptive analysis approach was particularly suited to mapping out the interdisciplinary and evolving nature of the topic, bridging legal theory, administrative practice, and technological development. The result is a narrative review that not only describes but also critically evaluates the role of digital technologies in reshaping welfare governance and access to justice.

3. Conceptual Framework

Understanding the implications of digitalization in welfare governance requires a clear conceptual foundation. This section defines and contextualizes the core concepts of digital welfare, algorithmic governance, legal exclusion, and administrative justice. It also introduces the theoretical lenses—sociotechnical systems theory, legal proceduralism, and human rights approaches—through which these phenomena are examined. Finally, it discusses the evolving relationship between automation and administrative discretion, a key tension in the operation of digital public services.

Digital welfare refers to the use of digital technologies, including data systems, platforms, and algorithms, in the delivery, management, and regulation of welfare services. It encompasses a range of processes, from

digital applications and biometric verification to real-time fraud detection and predictive analytics. As Alexopoulou notes, the digitalization of welfare signals a paradigmatic shift in the way welfare states operate, moving toward data-driven governance models that prioritize efficiency and surveillance over individual care and responsiveness (Alexopoulou, 2024). Digital welfare systems are often presented as neutral and objective, but they are shaped by political decisions and institutional arrangements that reflect broader social values and power structures.

Closely related is the concept of algorithmic governance, which denotes the delegation of administrative decisions to computational systems that follow coded instructions or machine learning models. These systems are increasingly used to determine eligibility, calculate benefits, and monitor compliance. Xie and Liu show that digital infrastructure can significantly impact welfare outcomes at the micro level, but this impact is uneven and mediated by design choices and contextual factors (Xie & Liu, 2024). Algorithmic governance represents a shift from traditional bureaucratic discretion to rule-based automation, raising critical questions about accountability, transparency, and the right to explanation. As Wang and Li argue, the spatial and institutional effects of algorithmic governance require close scrutiny, particularly when they intersect with existing social inequalities (Wang & Li, 2024).

Legal exclusion refers to the processes through which individuals are denied access to welfare benefits or legal redress due to systemic, technical, or administrative barriers. This can result from algorithmic errors, lack of digital literacy, opaque decision-making procedures, or the withdrawal of in-person services. Seddighi and Corneliussen have documented how youth in vulnerable situations often lack the digital skills needed to navigate welfare platforms, resulting in de facto exclusion from entitlements (Seddighi & Corneliussen, 2024). Legal exclusion challenges the foundational principle that rights should be accessible and enforceable for all, especially in the context of social protection.

Administrative justice is concerned with the fairness, legality, and accountability of decisions made by public authorities. It encompasses procedural safeguards such as the right to be heard, access to reasons for decisions, and mechanisms for review or appeal. In digital welfare systems, these principles are increasingly under strain.

Shah and Shah emphasize that trust in digital systems is crucial to the legitimacy of welfare institutions, yet this trust is undermined when users are subjected to opaque and inaccessible processes (Shah & Shah, 2024). Without adequate mechanisms to challenge or understand automated decisions, the ideals of administrative justice risk becoming hollow.

Three theoretical perspectives are particularly useful in analyzing these dynamics. The sociotechnical systems perspective views digital technologies as embedded in and shaped by social, political, and organizational contexts. According to Faith and Hernandez, a well-functioning digital welfare state requires attention not just to technical capacity but also to ethical design and user experience (Faith & Hernandez, 2024). Legal proceduralism, by contrast, emphasizes the importance of due process and formal safeguards in administrative decision-making. It provides a normative framework for evaluating whether digital systems comply with legal standards and protect individual rights. Finally, the human rights approach centers on the dignity and autonomy of welfare recipients, calling attention to how digital systems may infringe on privacy, equality, and social inclusion. As highlighted by Kaun and Liminga, the transition to digital welfare often leaves behind those who depend on analog services and human care (Kaun & Liminga, 2023).

A key concern within this framework is the balance between automation and discretion. While automation can reduce bias and streamline processes, it may also eliminate the flexibility needed to account for complex or exceptional cases. Schiffhauer and Seelmeyer argue that responsible digital transformation requires maintaining human judgment and ethical oversight within welfare organizations (Schiffhauer & Seelmeyer, 2021). The replacement of discretion with rigid algorithmic rules may result in a one-size-fits-all approach that is both inefficient and unjust. Conversely, overly discretionary systems can enable arbitrary decisions and discrimination. The challenge, therefore, lies in designing digital systems that are not only efficient but also responsive, equitable, and accountable.

By grounding the analysis in these concepts and theoretical perspectives, this article aims to critically examine how digital welfare systems are reshaping the landscape of administrative justice. The framework outlined here will guide the analysis of global trends,

legal risks, and policy responses in the sections that follow.

4. Digitalization of Welfare: Global Trends and Models

The global shift toward digitalized welfare systems has transformed the way states manage, monitor, and deliver social support. These reforms reflect broader efforts to modernize administrative processes through the deployment of new technologies, often under the banner of efficiency, cost-effectiveness, and data-driven governance. Across different national contexts, digital welfare reform manifests in varied forms, yet a shared emphasis on automation, algorithmic eligibility assessments, and centralized digital platforms characterizes much of this transformation. While the UK, Netherlands, the US, and Nordic countries have become emblematic cases, similar trends are now emerging globally, driven by technological capability and fiscal constraint.

In the United Kingdom, the introduction of Universal Credit stands as one of the most ambitious digital welfare projects to date. It consolidated six legacy benefits into a single payment and was designed to streamline the benefits system using a digital-by-default application model. This reform aimed to simplify the claimant journey and promote a more responsive, real-time welfare system. However, as Zakharova et al. highlight, the program has faced significant criticism for its reliance on automated risk profiling, complex online interfaces, and rigid conditionalities that have disproportionately affected vulnerable claimants (Zakharova et al., 2024). The system's design assumes universal digital literacy and stable internet access, which are not equally distributed across the population. The result has been not only technical errors and delays in payments but also emotional and psychological stress for users navigating a depersonalized and punitive digital environment.

The Netherlands provides another key example with its SyRI (System Risk Indication) program, which integrated multiple government data sources to detect welfare fraud using predictive algorithms. SyRI flagged individuals based on opaque criteria, leading to intensified scrutiny and, in some cases, unjust penalties. According to Toorn et al., the system's lack of transparency and the disproportionate targeting of low-

income and immigrant communities raised serious legal and ethical concerns (Toorn et al., 2024). Public backlash and legal challenges culminated in a Dutch court ruling that deemed SyRI incompatible with European privacy rights, effectively shutting it down. The SyRI case has become a cautionary tale, illustrating how algorithmic tools, when deployed without robust safeguards, can lead to systemic discrimination and the erosion of civil liberties.

In the United States, digitalization efforts have largely focused on the automation of Medicaid eligibility and benefits administration at the state level. Several states introduced systems that automatically terminate or deny Medicaid coverage based on discrepancies in data matching or failure to meet verification deadlines. This process often disregards contextual factors such as language barriers or inconsistent access to documentation. As Busemeyer et al. argue, these reforms prioritize administrative convenience over social equity, resulting in the disenfranchisement of individuals who may be eligible but cannot meet the system's digital demands (Busemeyer et al., 2022). States such as Arkansas and Indiana have come under scrutiny for their use of automated eligibility checks that have erroneously removed tens of thousands of beneficiaries from coverage rolls.

Nordic countries, often seen as digital frontrunners, present a more nuanced picture. In Finland and Denmark, digital welfare has been integrated with relatively high public trust and strong institutional safeguards. Kim points to Finland's development of a user-centered health and welfare support system, which employs digital platforms while maintaining human contact and procedural safeguards (Kim, 2022). However, even in these contexts, concerns about data privacy, algorithmic transparency, and the exclusion of digitally marginalized populations persist. These examples underscore that technological sophistication alone does not guarantee equity or accountability.

Common across these international reforms is the deployment of specific technological tools. Eligibility algorithms are used to automate the assessment of whether an applicant meets predefined criteria for receiving benefits. These algorithms often rely on structured datasets and decision trees, but increasingly, machine learning techniques are being adopted to model risk and predict future behavior. Risk assessment AI is

deployed to flag cases for fraud investigation or compliance checks, frequently without disclosing the parameters that guide such assessments. As Song et al. demonstrate, large-scale infrastructure investments in digital platforms—such as those under China’s “Broadband China” strategy—have improved data connectivity but also enabled expansive surveillance and performance monitoring (Song et al., 2024). In many cases, biometric verification systems, such as fingerprint or facial recognition, are introduced to confirm identity and prevent duplication of benefits, but they also raise issues of data accuracy, consent, and error correction.

Despite the growing critique, proponents of digital welfare reforms continue to highlight their potential benefits. Digital systems can increase processing speed, reduce administrative burdens, and create consistent decision-making standards. They can enable real-time updates, allowing welfare systems to adjust benefits in response to changes in employment or household composition. According to Li and Peng, digital financial inclusion initiatives can empower beneficiaries by offering access to mobile banking, digital wallets, and transparent records of transactions (Li, 2023). Dewi et al. further argue that enhanced digital financial literacy is positively associated with better financial behavior and wellbeing, especially among populations previously excluded from formal financial systems (Dewi et al., 2024).

However, as Hjelholt observes, the digitalization of welfare is not a neutral administrative reform but a political project that seeks to reshape citizen-state relations under the logic of control and managerialism (Hjelholt, 2024). The consequences of these shifts must therefore be assessed not only in terms of efficiency but also in terms of rights, equity, and democratic governance. The next section explores how these technological transformations can create new mechanisms of legal exclusion, particularly for groups already disadvantaged by structural inequalities.

5. Legal Exclusion and Vulnerabilities in Automated Systems

As welfare systems increasingly rely on automation and algorithmic processes, new vulnerabilities have emerged, creating significant risks of legal exclusion for certain groups. Legal exclusion refers to the ways in which individuals are effectively denied access to their

rights within a welfare system—not necessarily due to changes in eligibility law but because of the mechanisms and operations of digital systems. These vulnerabilities are not simply byproducts of digital transformation; they are embedded within the assumptions and design choices of digital governance. They expose how opaque systems, data errors, and biased algorithms can systematically undermine access to justice and fair treatment.

One of the most prominent mechanisms of exclusion arises from data errors and the lack of transparency in algorithmic decision-making. When automated systems pull data from multiple government databases, discrepancies and outdated information can result in wrongful benefit denials or terminations. In the US Medicaid system, automated eligibility checks have led to wrongful disenrollments when income data were mismatched or incomplete. As Li argues, the integration of digital platforms in social security administration has not always been accompanied by mechanisms to detect and resolve data inconsistencies in real time, disproportionately harming those with complex or unstable circumstances (Li & Peng, 2023). Similarly, in the UK’s Universal Credit system, claimants have reported being penalized for system miscalculations they were unaware of and unable to contest due to the lack of procedural transparency (Zakharova et al., 2024). Automated sanctions represent another exclusionary practice within digital welfare. Algorithms are used to monitor compliance with job-seeking requirements or other behavioral conditions, and failure to meet these standards—sometimes due to technical glitches or misunderstandings—can trigger automatic suspensions of benefits. As Chansamut points out, even within corporate welfare schemes, reliance on rigid digital systems can alienate employees from accessing their entitlements, suggesting that automation without flexibility can reproduce exclusion across institutional contexts (Chansamut, 2023). The absence of human discretion in reviewing exceptional cases exacerbates the issue, leaving little room for compassion or nuance in decision-making.

Systemic bias in algorithmic design and implementation can also contribute to unequal treatment. Algorithms trained on historical data may reflect and perpetuate existing societal biases. For instance, the SyRI system in the Netherlands disproportionately flagged residents of

low-income, ethnically diverse neighborhoods for fraud investigation, reinforcing patterns of institutional discrimination. As Yeo notes in her analysis of digital welfare capitalism, data-driven systems often obscure their normative foundations, presenting socially biased outputs as objective and rational (Yeo, 2023). These outcomes illustrate how seemingly neutral technology can entrench social hierarchies under the guise of efficiency and objectivity.

Certain populations are particularly vulnerable to legal exclusion within automated systems. Migrants often face language barriers, lack of digital literacy, and limited access to identity documentation required for biometric systems. Minorities and low-income individuals are more likely to live in areas subject to intensified data surveillance and automated scrutiny. The disabled face both physical and cognitive challenges in navigating online welfare interfaces, which are frequently designed without accessibility in mind. Ruslan et al. emphasize that digital literacy interventions are critical to supporting youth in rural areas who struggle to access and understand digital platforms, highlighting the intersection of geographic and educational disparities (Ruslan et al., 2024). Yet such programs remain the exception rather than the norm.

Empirical evidence and legal challenges have brought these issues to light in various jurisdictions. The court ruling against SyRI in the Netherlands marked a significant legal precedent, affirming that algorithmic decision-making must respect the principles of proportionality and transparency. In contrast, many cases in the US and UK have failed to provide effective legal redress, as the complexity of algorithmic systems makes it difficult for claimants to understand or contest decisions. As Alexopoulou explains, the lack of procedural clarity in digital welfare processes poses significant barriers to legal remedy, particularly for those without legal representation or digital expertise (Alexopoulou, 2024).

Structural barriers to legal recourse are compounded by the nature of digital systems themselves. Automated systems often lack clear documentation of how decisions are made, making it difficult to establish grounds for appeal. Even when appeal mechanisms exist, they may be inaccessible or ineffective. Yoo et al. observe that user-centered design is essential to make welfare services more navigable and understandable, yet many

platforms fail to incorporate user feedback or adapt to diverse needs (Yoo et al., 2023). The result is a digital architecture that prioritizes administrative convenience over user empowerment.

Ultimately, the legal exclusion generated by automated welfare systems challenges fundamental principles of administrative justice. It reveals the dangers of substituting procedural fairness with algorithmic certainty and raises pressing questions about the role of the state in protecting the rights of its most vulnerable citizens. In the next section, the article turns to policy and legal responses aimed at safeguarding access to justice in an increasingly automated welfare state.

6. Challenges to Administrative Justice in the Digital Era

The integration of algorithms and automation into welfare administration has raised profound challenges for the preservation of administrative justice, particularly with respect to procedural fairness, transparency, and legal accountability. In digital systems where human discretion is often replaced by automated decision-making, traditional guarantees of fair treatment and the right to a hearing are increasingly at risk. The procedural values that underpin administrative law—such as impartiality, participation, and reviewability—are strained by opaque algorithms and rigid digital infrastructures that often operate beyond public scrutiny.

One of the core tenets of administrative justice is the right to be heard before an adverse decision is made. In traditional welfare systems, this principle is safeguarded through opportunities for personal communication, appeals, and case-by-case evaluations. However, as Busemeyer et al. note, digital systems have drastically reduced opportunities for meaningful interaction between claimants and administrators, often limiting communication to automated messages or online forms (Busemeyer et al., 2022). This shift reduces claimants' ability to present their individual circumstances, challenge erroneous decisions, or even understand the basis of their case. Without direct contact or personalized review, procedural fairness becomes a hollow promise, particularly for those who are digitally marginalized or lack legal literacy.

Transparency and explainability are also central to administrative justice, yet they are increasingly

undermined by the use of complex algorithms in welfare decision-making. Many algorithmic systems rely on proprietary or non-disclosed models, which obscure the logic behind their decisions. Claimants are often unaware that algorithms are making determinations about their eligibility or compliance, let alone how those determinations are made. Zakharova et al. observe that this opacity not only inhibits claimants' ability to appeal but also prevents meaningful democratic oversight of digital welfare systems (Zakharova et al., 2024). As Shao et al. point out, the digital divide compounds these challenges, as individuals with limited digital access or knowledge are disproportionately affected by opaque systems and less likely to seek recourse (Shao et al., 2021).

The rise of automation has also transformed the traditional balance between discretion and rule-based decision-making. In theory, automation promises to reduce arbitrariness by applying consistent rules. However, this consistency often comes at the cost of contextual judgment. Automated systems cannot easily accommodate exceptions, nuance, or changes in individual circumstances. As Schiffhauer and Seelmeyer argue, while discretion in welfare administration can lead to subjectivity and bias, its removal entirely through automation creates rigidity that can be equally harmful (Schiffhauer & Seelmeyer, 2021). The binary logic of algorithms lacks the ethical and emotional sensitivity that human administrators bring to difficult welfare decisions, particularly in cases involving mental health, disability, or unstable housing situations.

The lack of accountability within digital systems presents another major threat to administrative justice. In traditional bureaucratic settings, decisions are made by identifiable officials who are subject to professional and legal standards. In contrast, algorithmic decision-making systems often function as black boxes with unclear lines of responsibility. Hjelholt describes how this absorptive quality of digital governance diffuses accountability, making it difficult to identify who is responsible when a system fails or a person is wronged (Hjelholt, 2024). Whether responsibility lies with the software developer, the data provider, the public agency, or the policymaker often remains unresolved, creating a governance vacuum where errors go uncorrected and injustices unacknowledged.

Remedies for wrongful decisions are similarly compromised in the digital welfare context. Even when appeal processes exist, they are often ill-suited to the nature of algorithmic decisions. Courts and administrative tribunals may lack the technical expertise to scrutinize complex code or assess the fairness of machine learning outputs. Toorn et al. note that legal mechanisms often lag behind technological developments, creating a gap in protections for those affected by automated systems (Toorn et al., 2024). Moreover, claimants face considerable obstacles in gathering evidence or making legal arguments against decisions whose rationale is hidden or incomprehensible. This asymmetry of knowledge and power undermines the principle of equal treatment under the law.

Legal frameworks and courts do have a role to play in restoring justice, but their effectiveness varies. In the Netherlands, the judicial ruling against SyRI marked an important affirmation of privacy and fairness, setting a precedent that algorithms must comply with fundamental rights (Zakharova et al., 2024). Yet such victories remain rare, and many jurisdictions have not updated their administrative law to reflect the unique characteristics of algorithmic governance. Kim emphasizes that even in countries like Denmark and Finland, where welfare systems are advanced and trust in public institutions is high, digital systems still face critique for marginalizing specific populations or failing to provide adequate recourse (Kim, 2022). Courts must grapple not only with legal doctrine but also with new epistemological questions about how machines make decisions and what counts as an explanation or justification.

In sum, the digital transformation of welfare poses significant challenges to administrative justice by diminishing procedural fairness, obscuring decision-making processes, reducing discretion, diffusing accountability, and limiting access to remedies. These challenges are not merely technical—they are deeply political and legal. If welfare systems are to be both efficient and just, they must be designed and governed with explicit attention to these foundational principles. The following section examines emerging policy and legal responses that aim to address these risks and reassert the rights of individuals within digital welfare systems.

7. Policy and Legal Responses: Safeguarding Rights

The rise of automated decision-making in welfare administration has prompted growing demands for regulatory and policy responses that safeguard fundamental rights. Various legal standards and governance innovations have been proposed or implemented to ensure that digital systems uphold transparency, fairness, and accountability. These responses aim to bridge the gap between technological innovation and legal protection, especially in contexts where welfare claimants face increasing vulnerability to errors, discrimination, and exclusion.

Among the most prominent legal instruments addressing the risks of automation is the General Data Protection Regulation (GDPR) of the European Union. The GDPR includes provisions that specifically address automated decision-making and profiling, granting individuals the right not to be subject to decisions based solely on automated processing that significantly affect them. Alexopoulou notes that the GDPR has been instrumental in shaping legal debates around the right to explanation and the need for meaningful human oversight in algorithmic systems (Alexopoulou, 2024). The regulation also mandates data minimization, purpose limitation, and impact assessments, all of which are crucial for ensuring that digital welfare tools respect individual privacy and autonomy.

Administrative law principles—such as due process, proportionality, and legality—remain foundational in addressing the challenges posed by algorithmic systems. Courts and legislatures in several countries have begun to adapt these principles to digital contexts. The Dutch court's ruling on SyRI, which emphasized proportionality and transparency, reflects a growing judicial willingness to scrutinize algorithmic systems under constitutional and human rights law (Toorn et al., 2024). These principles provide a normative anchor for legal reform, even if their practical enforcement remains uneven.

Innovations in oversight have also emerged as strategies for improving accountability in digital welfare systems. One such innovation is the algorithmic audit, a process by which an independent body evaluates the fairness, accuracy, and transparency of an algorithmic tool. These audits can be either *ex ante*, assessing systems before deployment, or *ex post*, evaluating outcomes and

impacts. Faith and Hernandez argue that algorithmic audits are critical for building trust in digital welfare systems and ensuring that they do not perpetuate systemic biases (Faith & Hernandez, 2024). A complementary mechanism is the implementation of “human-in-the-loop” systems, where automated decisions are subject to human review or override. This approach seeks to restore some degree of discretion and ethical judgment to administrative processes, preventing overly rigid or dehumanizing outcomes.

Strengthening administrative justice in the digital era also requires specific policy interventions. One key recommendation is the use of algorithmic impact assessments (AIAs) before implementing any system that significantly affects individuals' rights. These assessments evaluate the potential social, legal, and ethical consequences of digital tools and propose mitigation strategies. As Chansamut observes, effective AIAs must involve multiple stakeholders—including affected communities, technologists, and legal experts—to ensure that they capture the full range of potential impacts (Chansamut, 2023).

Another critical safeguard is the explicit right to explanation, which enables individuals to understand how decisions affecting them were made. While the GDPR includes this right in limited form, there is a growing call for its expansion. Shao et al. emphasize that the ability to comprehend and challenge algorithmic decisions is essential for protecting procedural fairness, particularly in welfare contexts where decisions have immediate material consequences (Shao et al., 2021). Without access to intelligible explanations, claimants are effectively shut out of the legal process.

Legal empowerment and digital literacy initiatives are also essential for ensuring that individuals can engage meaningfully with digital welfare systems. Seddighi and Corneliussen highlight how service providers in Norway have worked to improve digital competencies among vulnerable youth, enabling them to access services more effectively and assert their rights (Seddighi & Corneliussen, 2024). Such efforts must be expanded and institutionalized to prevent digital exclusion from becoming a structural barrier to justice.

Good practices can be observed in countries that combine technological innovation with robust rights protections. Finland, for example, has emphasized user-centered design and participatory governance in the

development of its digital welfare platforms. Kim notes that these systems include accessible interfaces, multilingual support, and opportunities for in-person assistance, ensuring that digital reforms do not leave behind the most vulnerable users (Kim, 2022). Similarly, in Indonesia, Dewi et al. report that programs promoting digital financial literacy have improved the capacity of citizens to manage benefits and engage with welfare technologies in ways that enhance their overall well-being (Dewi et al., 2024).

In conclusion, safeguarding rights in the digital welfare state requires a multifaceted approach that combines legal regulation, institutional oversight, participatory design, and public education. While challenges remain, especially in terms of enforcement and scalability, emerging legal frameworks and policy innovations offer a pathway toward more just and accountable welfare systems. The next section will integrate these insights into a broader discussion of the normative and practical tensions shaping the future of digital welfare governance.

8. Conclusion

The digitalization of welfare systems represents a transformative development in public administration, one that redefines the ways in which states interact with their citizens and deliver social support. This transformation is not merely technical; it is profoundly political and legal, with far-reaching implications for access to rights, procedural justice, and democratic accountability. As welfare institutions turn to algorithms, automated decision-making, and data-driven infrastructures, they promise improvements in efficiency, speed, and administrative consistency. However, these promises are accompanied by significant risks, particularly for the most vulnerable members of society.

This review has shown that digital welfare reforms across various countries—while differing in their implementation—share common features such as automated eligibility assessment, predictive analytics for risk profiling, and biometric verification. These systems are designed to streamline service delivery and reduce costs, yet in practice, they often generate new layers of exclusion. Automated processes can entrench systemic biases, misclassify eligible recipients, and obscure the rationale behind adverse decisions. Without adequate

safeguards, the shift to digital systems can marginalize those who are least equipped to navigate complex technological environments, including migrants, minorities, low-income individuals, and people with disabilities.

Administrative justice—the cornerstone of fair and equitable public service—faces significant challenges in the digital age. The principles of procedural fairness, transparency, and accountability are strained by the opacity of algorithms, the absence of human discretion, and the lack of effective remedies. Individuals impacted by erroneous or unjust digital decisions often find it difficult to understand how those decisions were made or to seek redress through formal channels. The very logic of digital governance tends to favor efficiency over empathy, speed over scrutiny, and prediction over participation.

In response to these issues, various legal and policy frameworks have begun to emerge, seeking to restore balance and protect the rights of welfare claimants. Regulatory tools such as algorithmic audits, impact assessments, and rights to explanation are promising developments. So too are innovations like human-in-the-loop systems and user-centered platform design. However, these measures must be more than symbolic gestures—they must be enforced and institutionalized within the governance structures of welfare states. Additionally, any meaningful response must include efforts to increase digital literacy and legal empowerment among affected populations, ensuring that access to welfare is not determined by one's technological proficiency.

Ultimately, the digitalization of welfare is not an inevitable or neutral process. It is a reflection of values, priorities, and power relations embedded within administrative systems. Governments, technologists, legal scholars, and civil society must work collaboratively to ensure that technological progress does not come at the cost of justice and inclusion. As welfare systems continue to evolve, there remains a pressing need to center human dignity, fairness, and the rule of law in the design and implementation of digital governance. A truly just digital welfare state is not only one that functions efficiently, but one that ensures the rights of all individuals are recognized, respected, and protected.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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