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Artificial Intelligence and Human Agency in Cultural Transformations of Governance and Decision-Making

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ABSTRACT

The purpose of this article is to examine how artificial intelligence is transforming the cultural and ethical foundations of governance and decision-making processes. It analyzes the phenomenon of algorithmic decision support systems as sociotechnical and cultural mechanisms influencing norms of authority, responsibility, and legitimacy in public administration. The study draws on an interdisciplinary approach that integrates insights from cultural studies, sociology, and political theory. A comparative cultural analytical method is employed to interpret governance as a dynamic space of interaction between human judgment and algorithmic reasoning, shaping new decision-making cultures. The key findings demonstrate that artificial intelligence-enabled digital governance is generating new forms of cultural rationality and redefining the relationship between individuals and institutions. The study identifies three key transformative trends: the normalization of algorithmic mediation in political and governance processes; the erosion and reconfiguration of human agency; and the emergence of hybrid systems of collaborative human-machine decision-making. Through the example of Kazakhstan, artificial intelligence is viewed not only as a technological innovation but also as a cultural actor, reshaping governance practices and moral guidelines. By situating artificial intelligence within the context of social and cultural change, the study contributes to discussions about power, ethics, and human autonomy in the digital age.

Keywords: Artificial Intelligence; Human Agency; Algorithmic Governance; Decision-Making Culture; Digital Society

INTRODUCTION

Artificial intelligence (AI) has evolved from a niche technology to a ubiquitous tool structuring decision-making in various fields. Its diffusion also reshapes cultural perceptions of rationality, authority, and human responsibility in governance. Government agencies, corporations, and public institutions increasingly rely on AI-powered Decision-Support Systems (DSS) to allocate resources, assess risks, and optimize processes (Tretter, 2024; Open Government Partnership, 2021; Future of Life Institute, 2024). In Kazakhstan, AI is viewed as a strategic development resource. President K.-Zh. Tokayev's Address emphasized the need to transform AI into a driver of public administration and economic modernization (Tokayev, 2024). In practice, such systems filter resumes, identify suspicious transactions, predict fraud in social benefits, and even support judicial reasoning by providing probabilistic assessments (Tretter, 2024; Abdelwanis et al., 2024; Romeo and Conti, 2025).

The reference to human agency in the title reflects the central emphasis of this study: while AI-based DSSs improve efficiency and predictive accuracy, they should not diminish the autonomy and responsibility of human

decision-makers. Emphasizing human agency strikes a balance between technological innovation and maintaining accountability, fairness, and democratic values.

A key debate is whether DSSs enhance human decision-making capacity or undermine autonomy by shifting power toward algorithmic inference (Zeiser, 2024; Horowitz and Kahn, 2023; Spatola, 2024). Research demonstrates that people are prone to automation bias – a psychological tendency to accept algorithmic recommendations without proper verification (Tokayev, 2025; Abdelwanis et al., 2024). This biased trust, combined with organizational pressure for efficiency, creates conditions in which human agency risks being reduced to formal control rather than meaningful judgment.

At the regulatory level, the European Union adopted the Artificial Intelligence Act (AI Act), the world's first comprehensive regulation in this area (ArtificialIntelligenceAct.eu, 2025; European Commission, 2025; European Parliament, 2025). The act introduces a risk-based approach by prohibiting unacceptable uses, establishing obligations for high-risk systems, and requiring transparency for limited-risk systems (Future of Life Institute, 2024; European Parliament, 2025; Chee, 2025). However, empirical evidence shows that gaps in implementation remain, particularly with regard to public sector accountability and the maintenance of algorithm registries (Parazzoli, 2024; The Guardian, 2024).

Thus, DSSs transform governance not only by increasing efficiency but also by redistributing agency and responsibility between humans and algorithms (Zeiser, 2024; Horowitz and Kahn, 2023). Using an interdisciplinary approach, this article analyzes the impact of DSSs on governance and proposes strategies for ensuring accountability, fairness, and democratic legitimacy.

LITERATURE REVIEW

Human-AI Interaction and Agency. The classical typology of Human-in-the-loop, Human-on-the-loop, and Human-out-of-the-loop has long framed the discussion of human-machine interaction. However, researchers note that this model does not fully capture the persuasive and probabilistic nature of DSS output (Tretter, 2024; Horowitz and Kahn, 2023). In mass data processing settings such as recruitment or financial services, DSS not only provide neutral information but also guide or constrain choices by ranking candidates, calculating credit scores, or predicting risk (Tretter, 2024; Open Government Partnership, 2021; Abdelwanis et al., 2024).

Experimental studies document the tension between automated trust bias and algorithmic rejection. For example, Horowitz et al. (2023) show that human trust in AI fluctuates depending on the context and visibility of errors: in some cases, users overtrust algorithms, while in others, they reject them after identifying errors. In the medical field, Abdelwanis et al. (2024) document that automated trust bias leads to clinical errors, describing the cognitive mechanisms and possible safety measures. Romeo and Conti (2025) also point out that this problem persists even with additional training for users to interact critically with AI. A preliminary conclusion is that DSSs restructure human agency. Instead of making meaningful decisions, people become "validators" who formally retain responsibility, but in practice most often agree with algorithmic recommendations (Zeiser, 2024; Spatola, 2024).

The implications of this transformation are illustrated in Figure 1, which models the flow of information and responsibility between humans and DSS.

Figure 1. Interaction Scheme: Human and DSS

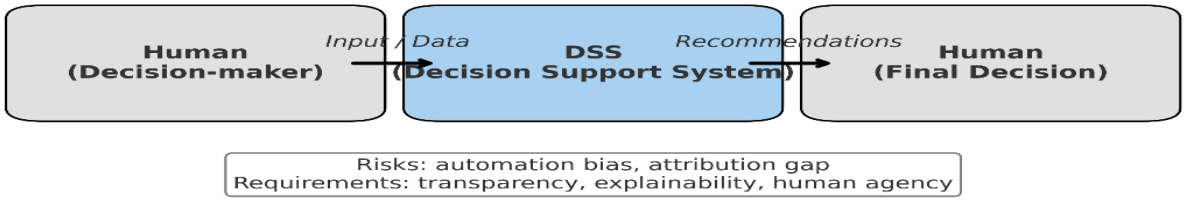

Figure 1. Interaction scheme between human decision-makers and DSS. *The scheme illustrates the flow of data and recommendations between humans and DSS, highlighting potential risks (automation bias, attribution gap) and essential requirements (transparency, explainability, human agency).*

Accountability and the "Attribution Gap." Zeiser (2024) introduces the concept of the "attribution gap" to describe the inability of legal and ethical systems to clearly assign responsibility when outcomes are generated in a hybrid manner – jointly by humans and AI. Unlike traditional tools, DSSs provide recommendations that are probabilistic, opaque, and often protected by commercial secrecy. As a result, when errors or discriminatory outcomes occur, neither developers nor end users can be easily held accountable (Zeiser, 2024; Abdelwanis et al., 2024).

Public sector research reveals similar problems. The Open Government Partnership (OGP) highlights that algorithmic accountability mechanisms – such as AI system registers, public consultations, and the right to appeal decisions – remain either underdeveloped or poorly implemented (Open Government Partnership, 2021). An analysis by Parazzoli (2024) also demonstrates that public institutions often implement DSS without adequate transparency, undermining citizens' ability to challenge algorithm-based decisions. Audits in the UK and Australia confirm these concerns: mandatory registers of AI use in the public sector remain incomplete, and oversight mechanisms often fail to identify ethical risks (The Guardian, 2024; The Australian, 2025). At the same time, research by Earp et al. (2025) demonstrates that DSS function not only as technical tools but also as "social partners" whose behavior is governed by relational norms. These norms, characteristic of human relationships (mentor-student, partner-advisor, controller), shape user expectations but are limited by AI's inability to empathize and exercise moral judgment. Applying a relational framework allows for a better assessment of the risks of dependency, false expectations, and the distortion of human agency. Collectively, these studies emphasize that accountability in the context of DSS is not only a technical but also an institutional challenge. Contemporary research emphasizes that human-DSS interactions extend beyond issues of accountability and transparency.

Efficiency Versus Vigilance. Organizations often implement DSS to improve efficiency, but this often comes at the expense of reducing the level of human critical evaluation. N. Spatola et al. describe this phenomenon as the "efficiency-accountability trade-off": DSS integration allows institutions to process information faster, but simultaneously weakens human control (Spatola, 2024). Romeo and Conti (2025) confirm that overreliance on DSS is most likely under time pressure, when decision makers lack the opportunity to thoroughly check results. Thus, a paradox arises: the very conditions that make DSS attractive (speed, scalability, limited resources) simultaneously reinforce the automation bias (Horowitz and Kahn, 2023; Spatola, 2024; Romeo and Conti, 2025). Redistributing the cognitive load – from active analysis to passive oversight – leads to the risk of reducing the human role in decision-making to a formality.

Regulatory Framework. The EU AI Act is the most ambitious attempt to regulate DSS and AI in general. It introduces a multi-layered system of obligations: a ban on inappropriate applications (e.g., social rating), strict compliance assessment procedures for high-risk areas (e.g., employment, healthcare, law enforcement), and transparency requirements for low-risk applications. General-purpose AI is also included in the scope of regulation, reflecting concerns about model pools and systemic risks (Future of Life Institute, 2024; Chee, 2025; Earp et al., 2025). Unlike the EU with its AI Act, Kazakhstan has approved the Concept for the Development of AI for 2024–2029 (Government of the Republic of Kazakhstan, 2024), setting out the main regulatory principles and priority application areas. A government press release details plans for the creation of infrastructure, including supercomputers and data centers (Government of the Republic of Kazakhstan, 2024).

However, critics point out that national administrations are struggling to implement these requirements. For example, The Guardian notes that the UK government has failed to maintain a comprehensive register of AI systems, undermining its transparency commitments (European Commission, 2025). Similarly, the Queensland Chamber of Auditors has warned of ethical risks in public sector DSS, identifying discrepancies between regulatory principles and practical application (The Guardian, 2024).

Researchers also emphasize that DSS influence governance structures beyond legal frameworks. Mahroof et al. (2025) demonstrate that AI integration alters power dynamics in public administration, redistributing authority between departments and creating new mechanisms for interacting with stakeholders. Public opinion polls reveal ambivalence: some citizens perceive algorithms as more objective than humans, especially in areas where corruption or favoritism are widespread, while others consider DSS opaque and "depersonalizing" (Eslami et al., 2025).

Cognitive and Moral Dimensions. Finally, DSSs influence not only institutional practices but also cognitive and moral processes. A. Salatino et al. demonstrated that AI behavior can directly shape human moral decisions and perceptions of responsibility, raising concerns about hidden "nudges" in ethically relevant contexts (Salatino et al., 2025). Beck et al. (2025), in their study "Bias in the Loop: How Humans Evaluate AI-Generated Suggestions," shows that people evaluate AI-generated suggestions differently depending on their framing, introducing new

levels of bias into human-algorithm collaboration (Beck et al., 2025). These findings highlight that preserving human agency is not only a matter of law or governance but also a challenge related to the psychology and sociotechnical design of DSSs.

AI Policy and Regulation in Kazakhstan. The development of AI governance in Kazakhstan has accelerated significantly since 2024, when the government approved the Concept for the Development of AI for 2024–2029. This document defined strategic directions for integrating AI into the economy, public administration, and society. The concept emphasizes the need to create a national AI ecosystem, develop digital infrastructure, and ensure ethical and legal guarantees. Thus, this is the country's first comprehensive policy document in the field of AI, aligning Kazakhstan with global trends in digitalization and AI governance.

An important step was the publication of the draft Bill of the Republic of Kazakhstan "On Artificial Intelligence" in early 2025. This draft Bill is one of the first legislative initiatives in Central Asia dedicated to AI. It enshrines principles such as the protection of human rights, transparency, accountability, and fairness in the use of AI. The draft Bill also defines the responsibilities of developers, implementers, and users of AI systems, including requirements for documentation, data quality, and risk classification. It draws on international discussions on AI governance, particularly the European AI Act, while taking into account Kazakhstan's institutional and socio-political context. In September 2025, President K.-J. Tokayev, in his Address to the Nation, presented AI as a driver of modernization, emphasizing the country's need to remain competitive in the global digital economy. He emphasized the importance of a human-centered approach, digital sovereignty, and the creation of a new Ministry of AI and Digital Development, which would coordinate the activities of government agencies. This political positioning reinforces the notion of AI not only as a technological innovation but also as a transformative tool for governance, state legitimacy, and citizen engagement.

Along with legislative initiatives and policy statements, the Kazakh government issued decrees and press releases to ensure the practical implementation of the Concept. For example, Government Resolution No. 592 of July 24, 2024, approved the Concept for the Development of AI for 2024–2029 and obligated ministries to implement its provisions. A subsequent government press release emphasized practical implementation steps, including pilot projects in healthcare, education, and public administration (Government of the Republic of Kazakhstan, 2024). Media outlets such as Zakon.kz and Tribune.kz also actively engaged in the discussion, presenting AI as both an engine of economic growth and a source of public debate related to data use, privacy, and employment (Zakon.kz, 2025; Tribune.kz, 2025). The timeline illustrates the key milestones: adoption of the AI Development Concept (2024–2029), the Draft Bill on AI (2025), and the Presidential Address (2025), highlighting the institutionalization of AI governance at the national level.

Figure 2. Timeline of AI Policy in Kazakhstan

Year	Milestone
2024	Adoption of the AI Development Concept 2024–2029
2025	Draft Bill on Artificial Intelligence (January 2025)
2025	President's Address: Kazakhstan in the AI Era (September 2025)
2025	Establishment of the Ministry of AI and Digital Development (2025+)

All these sources demonstrate Kazakhstan's commitment to building a comprehensive AI regulatory system that integrates legal norms, political will, and strategic planning. At the same time, they also reveal certain tensions: between the pursuit of digital sovereignty and dependence on global AI technologies, between stimulating innovation and protecting human rights, and between efficiency-focused reforms and maintaining accountability. In this sense, Kazakhstan represents a valuable case study of how a middle power integrates global debates on AI regulation with its own governance challenges.

METHODOLOGY

The study utilizes an interdisciplinary methodology that integrates legal, institutional, and sociotechnical approaches to DSS analysis. It also considers how decision-making systems reflect cultural norms of rationality, authority, and trust that shape governance practices. The goal is not to test a single hypothesis based on primary data, but to synthesize the latest scientific papers, case studies, and regulations to develop normative and political-legal conclusions (Tretter, 2024; Open Government Partnership, 2021; Future of Life Institute, 2024; ArtificialIntelligenceAct.eu, 2025; European Commission, 2025; Mahroof et al., 2025).

Legal and Institutional Analysis. The first part of the methodology includes an examination of legal and regulatory instruments, with a focus on the EU AI Act (Future of Life Institute, 2024; Horowitz and Kahn, 2023; Spatola, 2024; European Parliament, 2025). Its multi-level requirements for intolerable, high, and limited risk

provide a comparative basis for understanding accountability issues. In parallel, the study interprets how cultural expectations of fairness and legitimacy influence legal approaches to AI governance. The analysis also includes debates in the US about algorithmic accountability mechanisms (Horowitz and Kahn, 2023; Spatola, 2024) and governance challenges in developing economies, including issues of digital sovereignty and limited institutional capacity (European Parliament, 2025).

Comparative Case Analysis. The second part draws on empirical examples of DSS applications in the fields of personnel selection, healthcare, financial services, and public administration. The literature on clinical DSS reveals how automated trust bias in medical decisions creates high risks, where errors directly affect human lives (Abdelwanis et al., 2024; Eslami et al., 2025). Cultural attitudes toward expertise and machine authority also emerge as significant factors shaping trust in algorithmic decisions. Personnel selection and credit scoring systems show that DSS simultaneously scale discrimination risks and offer efficiency benefits (The Australian, 2025; Government of the Republic of Kazakhstan, 2024). Investigative journalism and government audits reveal the gap between formal accountability frameworks and their practical implementation (Chee, 2025; Earp et al., 2025; Zakon.kz, 2025).

Sociotechnical and Cognitive Approaches. The third part of the methodology draws on research in human-computer interaction, psychology, and moral philosophy. Research on automation bias and algorithm rejection demonstrates how DSSs affect user trust and vigilance (European Commission, 2025; Mahroof et al., 2025). Research on moral choice shows that AI can alter people's perceptions of responsibility in ethically relevant situations (Mahroof et al., 2025; Eslami et al., 2025). The cultural framing of moral reasoning is also taken into account, as social values mediate how humans interpret algorithmic advice. These findings help formulate recommendations for implementing explainability and designing interfaces that support conscious human control.

3.4 Synthesis and Normative Orientation. Bringing together all strands, the study adopts a normative orientation: DSS should be regulated in a way that enhances human agency rather than undermines it. This requires legal frameworks that mandate transparency, organizational practices that encourage critical engagement, and DSS design that minimizes automation biases (Abdelwanis et al., 2024; European Commission, 2025; Mahroof et al., 2025; Salatino et al., 2025). Thus, the methodology provides a holistic assessment of DSS, linking technical design, institutional structures, and cognitive dynamics into a unified concept of responsible governance.

RESULT & DISCUSSION

Transformation of Management Decisions. DSS have already transformed decision-making processes in areas such as human resources, healthcare, finance, and public administration. For example, Minister of Digital Development Zh. Madiyev noted that Kazakhstan is placing a premium on AI as a strategic technology (Zakon.kz, 2025). This reinforces the importance of DSS in public administration, where automated recommendations must be combined with human autonomy and transparency. In recruiting, algorithmic tools filter and rank thousands of resumes in seconds, determining who will even be considered by recruiters (Eslami et al., 2025; Tribune.kz, 2025). In finance, DSSs assess creditworthiness using behavioral data, creating risk scores that directly impact access to credit and insurance (Eslami et al., 2025). In healthcare, clinical DSSs provide diagnostic recommendations, sometimes outperforming physicians in specific tasks, but creating new risks of automated trust bias when errors go undetected (Abdelwanis et al., 2024; Beck et al., 2025).

As shown in Table 2, the strategic priorities outlined in Kazakhstan's AI policy framework are closely linked to the functions of DSS in governance and public administration.

Table 1: Priority Areas of AI in Kazakhstan and the Role of DSS

Priority Area	AI Applications	Role of DSS
Public Administration	Smart government services, predictive analytics, digital platforms	Support decision-making for policy and service delivery
Healthcare	Medical diagnostics, personalized treatment, hospital management systems	Assist doctors with diagnostics and treatment recommendations
Education	Adaptive learning systems, AI-driven curricula, e-learning platforms	Help educators personalize learning strategies
Agriculture	Precision farming, monitoring of crops and livestock, forecasting yields	Guide farmers with data-driven agricultural practices

Energy & Environment	Energy optimization, smart grids, climate monitoring	Provide recommendations for energy efficiency and sustainability
Transport & Logistics	Traffic management, autonomous transport, supply chain optimization	Optimize logistics planning and ensure safety in transport systems

The table illustrates the connection between AI priorities and DSS, setting the stage for a deeper discussion of their role in governance.

The main effect of DSS lies not only in speeding up processes but also in restructuring the procedures themselves. Instead of a comprehensive analysis of evidence, decision makers often receive probabilistic estimates or ranked results. Thus, the human role shifts from active analysis to passive validation, as noted in numerous case studies (Romeo and Conti, 2025; Zeiser, 2024; Horowitz and Kahn, 2023). While this increases efficiency, it also reduces the meaningful role of human judgment. From a public administration perspective, DSSs function not as neutral instruments but as sociotechnical actors (Open Government Partnership, 2021; Mahroof et al., 2025). By shaping how information is presented, they shape the framework for acceptable decisions. For example, a DSS in a social security system that labels an applicant as "high-risk" pre-emptively shapes the social worker's perception of the client (Eslami et al., 2025). Even if the decision formally remains with the individual, the system's influence on perceptions of the situation is significant (Beck et al., 2025; Tribune.kz, 2025). Thus, DSSs do not simply accelerate processes; they change the architecture of management decisions, which creates a dilemma: increased efficiency is accompanied by a shift in human agency.

Human Agency and Autonomy. Human agency in DSS-mediated control is undermined by several mechanisms. First, automated trust bias leads people to accept algorithmic recommendations without proper verification (Abdelwanis et al., 2024; Romeo and Conti, 2025; Horowitz and Kahn, 2023). This tendency is exacerbated by time pressure, cognitive overload, or when users lack sufficient competence to interpret probabilistic inferences (Romeo and Conti, 2025). In practice, the "human in the loop" often becomes a mere rubber-stamp, formally confirming DSS decisions without subjecting them to critical analysis (Zeiser, 2024; Earp et al., 2025). Cultural attitudes toward expertise and technological authority further shape how individuals trust or challenge algorithmic outcomes. Second, DSS results are probabilistic, not deterministic. They are expressed as probabilities or confidence coefficients, requiring statistical literacy for correct interpretation (Romeo and Conti, 2025). Many officials and professionals lack such training, leading to either overreliance on the system or misinterpretation of its findings (Horowitz and Kahn, 2023). This limits autonomy, as the ability to make independent decisions is reduced. Third, sociotechnical research shows that DSSs affect not only cognitive load but also moral judgment. A. Salatino et al. demonstrate that AI recommendations can bias people's perceptions of responsibility in ethically relevant situations, effectively prompting a change in moral agency. Other experiments show that people evaluate AI proposals differently depending on their framing, increasing the risk of bias (Beck et al., 2025). Cultural norms of moral responsibility also influence how decision-makers internalize or transfer accountability to algorithms. Thus, autonomy in DSS settings is determined not only by legal or institutional frameworks but also by psychological factors. Unless DSS are specifically designed to support critical reflection, human agency risks becoming a legal fiction that exists only formally (Open Government Partnership, 2021; Salatino et al., 2025).

Accountability and Legal Risks. Accountability is one of the most pressing challenges associated with the use of DSS. Traditional legal and administrative systems assume a direct line of responsibility between a decision and the person who made it. DSS blur this connection. When an error occurs, it remains unclear who is responsible: the programmer, the implementing organization, or the person who formally approved the result (Zeiser, 2024; Earp et al., 2025). This is what Zeiser (2024) defines as the "attribution gap." Accountability is one of the most pressing challenges associated with the use of DSS. An "attribution gap" arises when the distribution of responsibility between developers, organizations, and users becomes blurred (Open Government Partnership, 2021; Zeiser, 2024).

For a comparison of the challenges of DSS and the solutions proposed in the draft Bill of the Republic of Kazakhstan "On artificial intelligence" (2025), see Table 2.

Table 2: Comparative Analysis: DSS and the Draft Bill the Republic of Kazakhstan on AI (2025)

Challenges of DSS (literature)	**Solutions in the Draft Bill on AI (2025)**
Attribution gap – it is difficult to determine who bears responsibility for DSS errors: developer, operator, or user [7], [17].	The Bill establishes distributed responsibility at all stages of the system's life cycle (development, deployment, operation). Developers, owners, and users bear responsibility within their role.

Automation bias – the risk that humans accept DSS outputs uncritically [5], [6], [8].	Art. 9: priority of human autonomy and free will. Systems must not replace human decision-making, and users have the right to refuse.
Opacity problem ('black box') – DSS algorithms are often inexplicable [3], [11].	Art. 7: users have the right to know the principles of system operation and to receive explanations of decisions. Transparency and explainability are mandatory.
Lack of traceable accountability – impossibility of auditing DSS decisions [9], [14].	Obligation to maintain documentation depending on the risk level and system impact. This ensures verifiability and auditability of DSS.
Risk of human manipulation – DSS may use behavioral and emotional data [1], [22].	Ban on the use of subconscious manipulation methods, emotion recognition without consent, and real-time remote biometric identification.
Discrimination and social inequality – DSS may reproduce biases in data [21], [25], [26].	Principle of fairness and equality introduced. Systems that classify people by personal characteristics (e.g., 'social scoring') are prohibited.
Dependence of DSS on data quality – errors and bias in input data lead to distorted outcomes [21], [23].	Creation of a National AI platform and data libraries accessible to DSS. Standards for data quality and control are established.
Lack of user rights – citizens cannot appeal algorithm-based decisions [10], [11], [12].	Users are granted the right to appeal AI-based decisions and to demand explanations. This strengthens procedural safeguards.

Thus, DSSs can become tools for fairer and more effective governance if their integration is based on principles of fairness, accountability, and respect for human agency.

The situation is exacerbated by the opacity of DSSs. Many systems operate as "black boxes" – either due to the complexity of their machine-learning algorithms or due to commercial secrecy (ArtificialIntelligenceAct.eu, 2025; European Commission, 2025). This opacity makes it impossible to provide victims with clear reasons for decisions, undermining their right to appeal. Legal frameworks are only beginning to respond to these challenges. The EU AI Act introduces requirements for transparency, documentation, and certification of high-risk systems (ArtificialIntelligenceAct.eu, 2025; European Commission, 2025; European Parliament, 2025). However, as audits and investigative journalism show, gaps remain: government agencies often fail to maintain mandatory registers of AI systems, and oversight bodies lack sufficient resources to ensure compliance. Evidentiary difficulties also arise in court. Unlike a human expert, a DSS cannot be cross-examined. If an algorithm labels a social security applicant as "high-risk" without explanation, the citizen has virtually no recourse to defend their rights (ArtificialIntelligenceAct.eu, 2025). This undermines procedural fairness and reduces trust in institutions. Accountability under DSS is thus dispersed across multiple actors, with no single actor fully accountable. Without stronger mechanisms for traceable accountability, DSS have the potential to erode the foundations of democratic governance (Spatola, 2024; Parazzoli, 2024; Mahroof et al., 2025).

Social and Political Consequences. Integrating DSS into public administration processes has far-reaching social and political implications. On the one hand, they promise efficiency, consistency, and predictive accuracy. On the other, they pose risks of undermining legitimacy and fairness. First, DSS can perpetuate or reinforce existing social biases. Credit scoring, recruitment, and predictive policing systems have already been shown to often disproportionately disadvantage vulnerable groups (Eslami et al., 2025; Tribune.kz, 2025). Algorithmic discrimination undermines public trust and exacerbates social inequality (Zakon.kz, 2025). Cultural perceptions of justice and inclusion also influence how societies interpret algorithmic fairness and its social acceptability. Second, public perceptions of DSS remain controversial. Some citizens perceive algorithmic decisions as more objective than human ones, especially in contexts where corruption or favoritism are widespread (Tribune.kz, 2025). However, others view DSS as impersonal, opaque, and unaccountable (Mahroof et al., 2025). This ambivalence means that DSS can either strengthen or weaken institutional legitimacy, depending on their design, context, and level of transparency. Cultural narratives about technology and trust further shape public acceptance or resistance to AI-driven governance. Third, DSS expand the state's ability to monitor and regulate the population. Governments can use AI to track online activity, distribute social benefits, or enforce legislation (Future of Life Institute, 2024; European Parliament, 2025). While this enhances administrative capacity, it also raises concerns about surveillance, concentration of power, and potential abuse (The Guardian, 2024; Mahroof et al., 2025). The risk stems not only from technical failures but also from a potential authoritarian bias, where arguments about efficiency serve to justify excessive control.

Finally, DSSs alter power relations within governance structures. K. Mahroof et al. demonstrate that AI integration redistributes authority across departments, sometimes strengthening the influence of technocratic actors at the expense of democratic deliberation (Mahroof et al., 2025). This can weaken pluralism in the political

process and shift decision-making toward less transparent mechanisms. As a result, DSSs act as ambivalent instruments: they provide benefits in the form of efficiency and predictability, but without proper regulation, they can undermine fairness, accountability, and democratic legitimacy (Open Government Partnership, 2021; Spatola, 2024; Parazzoli, 2024; Mahroof et al., 2025). At the same time, public perceptions of the technologies remain ambivalent. The media note both high expectations for AI implementation and concerns regarding data protection and trust in algorithms.

CONCLUSION

Thus, DSSs embody the dual nature of artificial intelligence: on the one hand, they can enhance human capabilities by increasing efficiency, forecast accuracy, and decision consistency; on the other, they carry the risk of undermining autonomy, accountability, and democratic legitimacy. They also reshape cultural meanings of authority, trust, and responsibility that underlie governance in digital societies. Kazakhstan's AI strategy balances ambitious digital transformation goals with the challenges of social trust and the need to ensure human agency.

The analysis revealed that DSSs are transforming governance in four key ways. The restructuring of decision-making processes shifts the human role from active analysis to passive validation of algorithmic results. Challenges to human agency – automated trust bias, the probabilistic nature of conclusions, and the cognitive impact of DSSs – reduce the potential for meaningful autonomy. Accountability issues – an "attribution gap" arises when the distribution of responsibility between developers, organizations, and users becomes blurred. Social and political consequences – DSS can increase discrimination, alter public perceptions of fairness, and expand state control mechanisms, which simultaneously strengthens and weakens institutional legitimacy. These sociotechnical shifts also reflect broader cultural transformations in how societies negotiate the boundaries between human judgment and machine reasoning.

The study's findings confirm that DSS are not neutral tools, but sociotechnical actors that redistribute agency and power within governance systems. To overcome these challenges, three strategies are needed: a) Preserving human agency – humans must remain critical evaluators of decisions, not their formal "validators"; b) Transparency and explainability – algorithmic conclusions must be understandable and contestable for affected individuals; c) Mechanisms for traceable accountability – responsibility must be shared between developers, implementing organizations, and end users.

Thus, DSS can become tools for more just and effective governance if their integration is based on principles of fairness, accountability, and respect for human agency. The challenge for policymakers, technologists, and institutions is not to resist DSS, but to guide their development in ways that strengthen, rather than undermine, democratic governance.

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