

# Bridging Law and Code in Algorithmic Management: Empowering Worker Rights Through Transparency and Portability

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## Abstract

The growing use of algorithmic systems by digital labor platforms has transformed employment relations, introducing opaque and automated decision-making in areas such as task allocation, pay, and termination. In response, legal frameworks—particularly in the European Union—have begun to address these challenges through rights to algorithmic transparency and data portability. This paper argues that these two legal instruments, while often treated separately, can function as complementary and mutually reinforcing tools to reduce algorithmic harms in platform-based work. Drawing on the EU Platform Work Directive, the GDPR, the Data Act, and emerging practices such as algorithmic audits and worker data cooperatives, the paper develops a regulatory-technological framework for operationalizing these rights. It shows how the deliberate interplay of legal mandates and technical implementations can enhance accountability, enable collective action, and reduce power asymmetries between workers and platforms. The paper concludes with policy recommendations to strengthen enforcement, standardization, and worker participation in algorithmic governance.

## Keywords

algorithmic management, transparency, data portability, platform work, GDPR, AI regulation, gig economy, worker rights, law and technology

## 1. Introduction

Digital platforms have transformed contemporary labor markets by extensively adopting algorithmic management to control, coordinate, and monitor workers [1] [2]. Algorithmic management refers to automated systems that assign tasks, evaluate worker performance, determine wages, and even make critical employment-related decisions such as suspensions and terminations with minimal human oversight [3]. Prominent examples include ride-hailing services like Uber, food delivery platforms such as Deliveroo, and e-commerce warehouses operated by Amazon, each characterized by intensive use of algorithms for workforce supervision [4].

Despite potential benefits in operational efficiency and scalability, these technological practices have significant implications for workers, who often experience increased precarity, stress, and opacity in their employment conditions [5]. Platform workers frequently confront unclear or inaccessible criteria for crucial decisions such as task allocation, rating, or even sudden dismissal, exacerbating power imbalances and undermining fair labor practices [6]. The lack of transparency inherent in these algorithms creates a scenario often described as a "black box," leaving workers vulnerable to unfair treatment without adequate recourse [7][8].

Recognizing these harms, recent legal frameworks across jurisdictions have increasingly focused on transparency and accountability obligations, mandating that platform providers disclose meaningful information regarding their automated systems [9] [10] [11]. These regulations rest on a foundational assumption: that making the algorithmic decision-making process transparent—by clearly communicating the logic, parameters, and consequences of these systems—can effectively empower workers to challenge unfair practices and reduce associated harms [12].

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In parallel, data portability rights have emerged as complementary regulatory tools. The EU General Data Protection Regulation (GDPR, Article 20) and the Platform Work Directive (2024) offer workers the right to access, export, and reuse personal and employment-related data. Data portability provides not only an individual remedy but also collective empowerment opportunities through the potential establishment of data cooperatives, enabling workers and their representatives to audit platform algorithms and hold companies accountable [13].

Yet, while legal provisions for algorithmic transparency and data portability are increasingly clear, their effectiveness depends fundamentally on technological implementation. Bridging the gap between these legal rights and the technical realities of algorithmic systems remains a core challenge. In this context, this paper examines how the interplay of algorithmic transparency and data portability rights might practically mitigate the negative impacts of algorithmic management through a deliberate synthesis of law and technology.

The central question guiding this analysis is thus twofold: Can algorithmic transparency and data portability effectively address harms stemming from algorithmic management practices, and how can the interplay of legal and technological frameworks practically achieve meaningful protection for platform workers?

The structure of this paper is as follows: Section 2 defines algorithmic management and explores its detrimental effects on workers. Section 3 reviews existing legal frameworks addressing these challenges, emphasizing recent developments in the European Union and selected jurisdictions. Section 4 delves deeper into the complementary roles of transparency and data portability, evaluating their combined strengths and limitations. Section 5 investigates specific mechanisms that integrate legal rules with technological solutions, exploring practical examples and emerging regulatory models. Section 6 critically discusses implementation barriers and ongoing challenges. Section 7 concludes by providing targeted policy recommendations and outlining avenues for future research.

Through this analysis, the paper aims to contribute to scholarly debates at the intersection of comparative law, digital governance, and technology studies, underscoring the importance of an integrated legal-technological approach to mitigate algorithmic harms in the platform economy.

**Methodological Approach.** This paper adopts a *normative-analytical methodology* situated at the intersection of legal scholarship and technology governance. The analysis proceeds through a doctrinal examination of European Union legislation—particularly the GDPR, the Platform Work Directive, the Data Act, and the Data Governance Act—and evaluates how these legal frameworks address algorithmic management. This is complemented by a comparative review of selected regulatory initiatives from the United States (e.g., NYC Local Law 144 and California’s AB 701) and Member State implementations of EU regulations (e.g., France’s Gaia-X initiative, Spain’s Riders Law).

Illustrative case studies (e.g., Worker Info Exchange) are used to ground the legal analysis in practice. The paper further incorporates legal-technical synthesis by examining how emerging regulatory models (e.g., algorithmic audits, policy-as-code, kill-switch APIs) operationalize transparency and portability rights through technological design. This hybrid approach allows the paper to propose integrated governance models informed by both legal theory and engineering practice.

**Methodological Contributions.** This paper makes three core contributions. First, it proposes a synthesis of EU legal instruments—such as the GDPR, Data Act, and Platform Work Directive—as a framework for algorithmic accountability in the workplace. Second, it interprets data portability not merely as an individual right but as a collective governance tool when implemented via worker cooperatives and data intermediaries. Third, it links legal rights to real-world technical mechanisms—such as APIs, algorithmic audits, and data access tooling—creating a bridge between doctrinal legal theory and engineering practice.

## 2. Algorithmic Management: Defining the Challenge

Algorithmic management broadly refers to the use of automated systems—typically powered by artificial intelligence and big data analytics—to supervise, evaluate, assign tasks to, and control workers with minimal human intervention [14] [15]. While algorithmic management has become prevalent in various sectors, it is particularly dominant within the gig or platform economy, where technology-driven companies manage large, dispersed, and often precarious workforces through mobile apps and digital platforms [3] [4].

The defining features of algorithmic management include continuous real-time monitoring, automated performance assessment, and decision-making based on complex, often opaque criteria. Platforms such as Uber, Lyft, Deliveroo, and Amazon Flex employ sophisticated algorithms to allocate tasks, determine pricing and pay rates, monitor worker performance, and handle disputes or disciplinary issues [5]. These algorithms not only automate routine managerial tasks but also enable unprecedented granular control over workers' daily activities, efficiency, and productivity [16].

Despite efficiency gains from a managerial perspective, these systems introduce substantial challenges for workers. One prominent issue is the opacity or "black box" nature of these algorithms. Workers frequently lack visibility into how their performance is evaluated, how their ratings are determined, or why certain decisions—such as allocation or suspension—are made [7] [17]. Such opacity fosters power asymmetries, where workers find themselves subject to arbitrary or seemingly unfair decisions without clear recourse or understanding of underlying causes [2] [8].

Empirical research increasingly documents the negative psychological and social impacts of algorithmic management practices. Workers subjected to these practices report heightened levels of stress, anxiety, and job insecurity resulting from uncertainty and unpredictability in their working conditions [1]. Algorithmically-managed workers frequently experience intensified competition, surveillance pressures, and diminished autonomy, contributing to elevated risks of burnout and mental health deterioration [3] (Bérastégui, 2021).

Moreover, automated evaluation systems such as rating scores or acceptance rates can exacerbate precarity. Algorithmically determined reputation mechanisms enforce conformity and compliance among workers, as low scores or high rejection rates might result in loss of opportunities or even platform dismissal [18] [19]. Platforms often provide limited or no possibility for appeal, leaving workers vulnerable to bias or systemic errors embedded within these automated systems [5] [8].

The harms associated with algorithmic management are further compounded by structural inequalities, as marginalized groups disproportionately face biases embedded within automated systems. For example, empirical studies have revealed racial, gender, or socio-economic biases within performance and rating algorithms, perpetuating discrimination and exacerbating pre-existing inequalities within the workforce [20] [21]. Thus, algorithmic management not only amplifies individual worker vulnerability but also reinforces broader systemic inequalities.

Given these severe implications, legal and regulatory responses have emerged, aiming to mitigate these algorithmic harms. However, addressing these challenges effectively requires not only clear regulatory frameworks but also technological means to implement and enforce transparency and accountability measures. It is precisely this intersection—the space between law and technology—that demands focused exploration, as will be discussed in the subsequent sections of this paper.

## 3. Legal Approaches to Mitigating Algorithmic Harms

Recognizing the negative implications of algorithmic management, legislators and policymakers globally have begun to establish regulatory frameworks intended to mitigate these harms. These legal approaches primarily revolve around ensuring algorithmic transparency, accountability, human oversight, and the portability of data. While multiple jurisdictions have adopted different approaches, this section focuses primarily on notable developments within the European Union and select examples from the United States.

### 3.1. European Union Regulatory Framework

The European Union has been particularly proactive, developing a multifaceted legal framework designed to provide transparency and accountability within algorithmic management contexts. Central to these developments are three key instruments: the Platform Work Directive, the Digital Services Act, and the GDPR/Data Act regime.

1. Platform Work Directive (2024/2831/EU) The recently adopted EU Platform Work Directive explicitly targets algorithmic transparency and fairness in gig and platform-based employment [9]. Set to enter into force in December 2026, this Directive mandates that digital platforms provide detailed explanations to workers concerning how algorithmic decisions—such as task allocation, performance ratings, remuneration, and potential disciplinary actions—are made. Additionally, the Directive requires platforms to ensure that workers subjected to automated decisions have access to human review mechanisms, particularly when decisions significantly impact their employment conditions.
2. Digital Services Act (DSA, 2022) Though broader in scope, the DSA includes algorithmic transparency obligations for Very Large Online Platforms (VLOPs), such as major gig-work platforms like Uber or Amazon Flex. Under this Act, platforms must disclose to the public and to regulators the main parameters used by recommender algorithms, including those determining task allocation and pricing structures [22]. Crucially, the DSA also requires platforms to enable independent auditing by researchers and regulators, aiming to scrutinize algorithmic impacts systematically.
3. GDPR (2016) and EU Data Act (2023) The GDPR's Article 20, operational since 2018, introduced the data portability right, allowing individuals—including platform workers—to access, export, and reuse personal data provided to and generated by digital platforms. The EU Data Act (2023) significantly expands this right by including non-personal, operational data generated during interactions with digital services, further empowering collective audits and data cooperatives that could systematically investigate platform algorithms for bias or unfair treatment [13].

### 3.2. Select Regulatory Examples from the United States

Parallel developments in the United States highlight similar concerns but approach regulation primarily at the municipal and state levels, reflecting the fragmented federal stance.

1. New York City Local Law 144 (2023) In a notable municipal effort, New York City has implemented Local Law 144, mandating annual external audits of algorithmic tools used in employment contexts. This legislation, effective as of 2024, requires algorithmic employment systems—such as those used in recruitment or performance evaluation—to undergo third-party audits for potential race and gender biases, with results publicly reported to ensure transparency and accountability [23].
2. California Assembly Bill 701 (AB 701) Addressing worker protection in warehouses extensively employing algorithmic performance monitoring, California's AB 701 mandates disclosure of productivity quotas, algorithms underlying performance targets, and explicitly prohibits quotas that prevent workers from taking legally mandated breaks or violating safety standards. This regulatory approach underscores transparency and enforces practical limitations on algorithmic management tools to protect worker rights and safety [24].

### 3.3. Comparative Observations and Limitations

These emerging legal frameworks represent significant steps toward protecting platform workers through algorithmic transparency, data portability, and accountability. Nevertheless, several limitations remain:

1. Vagueness of Standards: Regulations often specify requirements for disclosure broadly (e.g., "main parameters"), leaving interpretative flexibility that can limit transparency in practice [12] [25].
2. Enforcement Challenges: Effective implementation relies heavily on technical standards, interoperability of data formats, and the willingness of platforms to cooperate—conditions that remain uncertain [12][2].

3. Individual versus Collective Rights: While transparency and portability rights typically focus on individual empowerment, collective approaches—such as union-led data audits—remain underdeveloped legally and practically, despite their potential impact [13].

Thus, to realize the full potential of algorithmic transparency and portability rights, legal norms must be closely integrated with concrete technological standards and robust enforcement mechanisms. The subsequent section will analyze precisely this intersection, exploring how combined legal-technological frameworks might address the challenges outlined here.

### 3.4. The Role of the Data Governance Act (DGA) in Supporting Data Cooperatives and Intermediaries

The *Data Governance Act* (DGA) (Regulation (EU) 2022/868) is a foundational element of the European Union's emerging data governance framework. Although not focused specifically on employment or labor regulation, it provides an institutional and legal foundation for the creation of *data intermediaries*, including data cooperatives and data altruism organizations, that may directly impact collective worker rights in platform environments.

**Legal Recognition of Data Intermediaries.** The DGA establishes a supervisory regime for *data intermediation services*, which are defined as neutral entities that facilitate data sharing between data holders and users without engaging in the monetization of data themselves. These entities are required to register with designated authorities and comply with transparency and fiduciary standards. This regulatory structure is especially significant for the gig economy, where unions, worker associations, and non-profits can act as intermediaries—legally recognized under the DGA—to facilitate collective data pooling and algorithmic auditing on behalf of platform workers.

**Complementarity with GDPR and Platform Work Directive.** The DGA operates in complement to other EU data laws. Whereas Article 20 of the GDPR enables individual workers to export their personal data, and the Platform Work Directive establishes transparency rights in algorithmic management, the DGA enables the structured, voluntary sharing of this data through intermediaries. By facilitating standardized *data altruism consent forms* and trusted sharing mechanisms, the DGA opens the door to worker-led algorithmic audits that rely on pooled, cross-platform datasets.

**Implementation and Challenges.** Implementation across Member States is ongoing, with some jurisdictions—such as France and Germany—moving forward in establishing national authorities and regulatory infrastructure. Nonetheless, several challenges remain:

- **Ambiguity of scope:** The DGA does not specifically address employment contexts, creating uncertainty about its applicability to platform work.
- **GDPR tensions:** Potential conflicts arise with GDPR provisions on data minimization and purpose limitation, especially in the context of collective data use.
- **Technical readiness:** Worker cooperatives and unions often lack the infrastructure or interoperability tools to comply with DGA standards.

**Implications for Platform Work.** Despite these hurdles, the DGA provides a strategic opportunity to enhance *collective data rights*. With proper regulatory guidance, technical standardization, and institutional support, worker-led cooperatives can leverage the DGA framework to become trusted platforms for monitoring algorithmic management. In doing so, they can bridge the gap between *individual portability rights* and *collective algorithmic accountability*.

For example, if a cooperative of food delivery workers registers under the DGA and pools data acquired via GDPR portability requests, it could conduct statistically robust audits of wage algorithms or dispatch rules. This would provide the evidentiary basis for claims of algorithmic bias or lack of transparency, reinforcing workers' ability to challenge unfair platform practices.



**Case Studies and Emerging National Practices.** Although full implementation of the DGA remains in progress across the EU, several Member States have initiated pilot programs or policy experiments that illustrate how the regulation may be leveraged to support data cooperatives and labor-focused intermediaries.

**France** has been one of the early adopters in operationalizing trusted data intermediaries. Through the *France Numérique* and *Gaia-X France Hub* initiatives, the country has promoted sector-specific data spaces, including exploratory frameworks for *social and labor data sharing*. For example, *LaborIA*, a government-sponsored research program, has explored the intersection of AI, labor, and data trustworthiness. While not a fully fledged data cooperative for platform workers, these programs show institutional willingness to pilot interoperability standards and ethical governance models that align with DGA objectives.

**Germany** has also advanced preliminary steps by integrating DGA principles into its national digital strategy. The German government has recognized *data trustees* and promoted public-private collaboration for sharing industrial and social data. Although employment data is not yet a focal point, emerging prototypes under the *Mobility Data Space* and *Health Data Hub* may provide templates for future gig economy-specific cooperatives.

**Spain**, while not explicitly invoking the DGA, has aligned with its principles through the implementation of the *Riders Law (Ley 12/2021)*. This law requires platforms to disclose algorithmic management parameters to worker representatives, and trade unions have begun experimenting with collective data audits using voluntarily pooled data. These efforts exemplify grassroots legal-technological innovation that could be supported and scaled under the DGA framework.

While these examples remain nascent, they underscore the DGA's potential to catalyze institutional innovation and technical capacity-building for worker-centric data governance. Comparative monitoring of Member State initiatives will be essential for refining the role of data intermediaries in labor regulation and ensuring equitable algorithmic accountability across the EU.

## 4. The Interplay of Algorithmic Transparency and Data Portability

Algorithmic transparency and data portability, when effectively combined, offer robust and complementary mechanisms to mitigate the adverse impacts of algorithmic management practices. Individually, these rights each provide critical, yet incomplete, legal tools. Together, however, they create a more substantial framework capable of empowering workers, increasing platform accountability, and fostering fairer employment conditions.

### 4.1. Algorithmic Transparency: Illuminating the Black Box

Transparency obligations aim fundamentally to reduce opacity by mandating platform companies to disclose how automated decisions impacting workers are made. According to the EU Platform Work Directive and the Digital Services Act (DSA), transparency means platforms must explicitly clarify the logic, parameters, and expected outcomes of algorithmic decisions, particularly regarding performance evaluation, pay rates, and disciplinary actions [22] [9].

Effective transparency enables workers to understand the underlying criteria that shape their work environment, potentially increasing their trust in platform systems and allowing them to identify unfair or arbitrary treatment. For instance, following the adoption of Spain's Riders Law (Law 12/2021), food-delivery platforms must disclose their algorithms' operational rules to worker representatives, significantly enhancing collective bargaining potential [26].

However, transparency obligations alone exhibit limitations. Platforms can fulfill transparency requirements superficially, providing general, vague disclosures insufficient for meaningful scrutiny or enforcement [25]. Furthermore, even detailed transparency disclosures may remain inaccessible or incomprehensible for individual workers lacking the necessary technical or legal expertise [7] [12]. Thus, transparency is a necessary but insufficient tool, requiring supplementary mechanisms to operationalize its potential fully.

## **4.2. Data Portability: Empowering Individual and Collective Action**

Data portability complements transparency by granting platform workers direct control over their data. Under GDPR Article 20 and the Platform Work Directive Article 9(6), workers can export personal and operational data from one platform, reuse it elsewhere, or collectively pool it to facilitate auditing or advocacy activities [13]. Crucially, portability enables workers to escape "reputation lock-in," preserving their ratings and performance metrics when switching platforms, thereby enhancing labor mobility and bargaining power [8].

Practically, data portability has already shown its promise. Organizations like Worker Info Exchange have effectively used portability rights to pool data from hundreds of Uber drivers, revealing systemic problems like algorithmic bias, wage discrepancies, and arbitrary dismissals [13]. This demonstrates how portability rights enable not only individual mobility but collective empowerment through systematic, evidence-based advocacy.

Nevertheless, data portability alone also exhibits critical shortcomings. Many essential data points influencing algorithmic management—such as internal metrics, predictive scores, or derived analytical insights—often fall outside the scope of portability rights under current interpretations of the GDPR [27]. Additionally, portability depends on the technological standardization and interoperability of data formats across platforms, a condition currently lacking [28]. Without consistent technical standards, data portability's potential remains severely limited.

## **4.3. Synergizing Transparency and Portability: A Combined Approach**

The full potential of these rights becomes clear when transparency and portability are integrated into a cohesive regulatory-technological framework. Transparent disclosures can inform workers precisely which data points and algorithmic parameters matter most, thereby guiding the targeted use of portability rights to access and analyze relevant data [8]. Conversely, portability enhances transparency by empowering workers, unions, and civil society groups to verify platforms' transparency claims independently.

For example, under such a combined framework, platforms would disclose details about their rating systems or assignment algorithms (transparency), and workers could subsequently export their raw personal and operational data (portability). This data could then be collectively analyzed by worker co-operatives or independent auditors to identify inconsistencies, biases, or hidden algorithmic parameters not adequately disclosed initially [13].

However, operationalizing this synergy requires intentional policy design. Regulators must clearly define mandatory minimum standards for algorithmic disclosures, standardize interoperable data formats for portability, and establish enforcement mechanisms enabling workers or third parties to conduct meaningful algorithmic audits [28] [2].

The following section further expands this argument by examining concrete examples and emerging regulatory models, illustrating how these legal rights can be effectively implemented through integrated technological mechanisms.

## **5. Bridging Code and Law: Emerging Regulatory Models and Technical Tools**

Effectively addressing the challenges of algorithmic management requires more than abstract legal rights: it demands tangible integration between legal frameworks and technological implementation. Recently emerging regulatory models demonstrate innovative approaches, concretely bridging legal mandates and technical solutions. This section analyzes specific examples of these approaches, illustrating how integrated law-tech solutions could operationalize algorithmic transparency and data portability for protecting platform workers.

### **5.1. Pre-market Licensing and Algorithmic Impact Assessments (AIAs)**

The EU AI Act (2024), identifying employment-related AI systems as "high-risk," introduces a mandatory conformity assessment and licensing scheme before such systems enter the market [29]. Similarly, Canada's Directive on Automated Decision-Making (2024) mandates pre-deployment AI risk assessments in government employment contexts [30].

From a technological perspective, these obligations translate into concrete artefacts, such as "model cards" or structured safety documentation in machine-readable formats (e.g., JSON or XML). These artefacts allow regulatory authorities to automatically verify whether algorithms meet established fairness, safety, and transparency benchmarks. Such a structured regulatory-tech approach moves beyond abstract guidelines, enabling clear and automated compliance checks and enhancing public accountability.

### **5.2. Mandatory Algorithmic Audits and Public Scorecards**

New York City Local Law 144 (effective from 2024) illustrates the potential of mandatory external audits for employment-related algorithms, explicitly targeting racial and gender bias. Platforms must conduct annual audits by independent third-party auditors and publicly disclose audit outcomes [23].

From a technical implementation perspective, platforms would provide auditors with secure API-based access to fairness and performance metrics, ensuring consistent audit methodologies and comparability of results over time. The publication of algorithmic fairness metrics through standardized APIs or dashboards offers transparency not only for regulatory oversight but also for informed advocacy by workers and civil society organizations.

### **5.3. Algorithmic Co-determination and Worker Representation**

Spain's Riders Law (Law 12/2021) and Germany's Works Constitution Act (§87) have introduced explicit rights for worker representatives to participate in decisions regarding the deployment and modification of automated management systems [26]. Under these frameworks, worker representatives have rights to receive detailed disclosures and can negotiate or even veto algorithmic implementations directly affecting employees.

Technologically, these laws suggest a practical model where worker representatives could access or even co-manage a controlled Git-based repository or version-controlled platform containing transparent algorithmic rulesets. Any proposed changes to the system—such as adjustments to scoring parameters or scheduling rules—would generate structured notifications or "pull requests," facilitating informed worker feedback before implementation.

### **5.4. Real-time Portability and Worker Data Cooperatives**

GDPR Article 20 and the Platform Work Directive Article 9(6) facilitate real-time data portability, enabling workers to export both personal and non-personal operational data. A promising practical manifestation of these rights involves real-time API integrations or webhook-based mechanisms that automatically transfer data between platforms and trusted third-party data cooperatives or unions.

Worker data cooperatives—already exemplified by organizations such as Worker Info Exchange—utilize this portability to aggregate data for collective audits, identifying systemic algorithmic biases, wage inconsistencies, or problematic scheduling practices [13]. Such cooperatives rely heavily on the technological infrastructure of interoperable data standards, highlighting the crucial interplay between regulation and technology standardization.

### **5.5. Policy-as-Code and Compliance Automation**

Inspired by the "policy-as-code" paradigm popular in software development, regulatory compliance regarding employment standards (e.g., maximum consecutive work hours, fairness constraints) could



be encoded directly into algorithmic management systems using standardized policy languages (e.g., Open Policy Agent or similar tools).

These "compliance-by-design" mechanisms ensure automatic enforcement of labor protections within the algorithm itself. If a scheduling algorithm attempts to allocate tasks that violate legal rest periods or performance metrics thresholds, the policy-as-code mechanism automatically rejects the decision or raises compliance alerts. Such automated compliance reduces reliance on post-hoc enforcement, providing stronger, proactive worker protections.

## **5.6. Digital Enforcement Mechanisms: Tamper-proof Logs and Algorithmic Insurance**

Enforcement mechanisms also play a crucial role in bridging the gap between legal rights and technological implementation. The EU AI Act requires event logs for high-risk algorithms, creating accountability through tamper-proof, hash-chained logging technology. Such logs would allow regulators or workers to reliably track, audit, and challenge unfair or discriminatory algorithmic decisions.

Complementarily, "algorithmic insurance" or "performance bonds"—insurance policies triggered automatically upon algorithmic non-compliance—offer innovative enforcement options. Algorithms emitting data indicative of unfair practices or exceeding regulatory thresholds could automatically activate increased insurance premiums, financially incentivizing platforms toward proactive compliance.

## **5.7. Digital "Kill-switches" and Algorithmic Recalls**

Finally, the EU AI Act (Article 10) envisions regulator-mandated withdrawals or suspensions ("recalls") of non-compliant AI systems, analogous to traditional product recalls. Operationalizing such rights technologically would entail mandated deployment of secure "kill-switch" APIs registered with regulatory authorities, enabling immediate suspension of problematic algorithms until compliance is restored. Such mechanisms represent a significant step forward in concrete regulatory enforcement capacities.

## **5.8. Summary of Technological-legal Integration**

These examples collectively illustrate a coherent vision where technology and law form an integrated governance infrastructure, concretely operationalizing transparency, accountability, and worker empowerment. However, successfully implementing these mechanisms faces substantial practical and legal challenges, as addressed in the following section.

# **6. Challenges and Roadblocks to Effective Implementation**

Despite the promising regulatory approaches and technical tools discussed above, several significant challenges and roadblocks complicate the practical implementation of algorithmic transparency and data portability mechanisms. These challenges can be broadly grouped into technical, legal, and socio-economic dimensions.

## **6.1. Technical Challenges: Standardization and Interoperability**

A primary obstacle to effectively implementing transparency and data portability is the lack of uniform technical standards and interoperability between different platform systems. Transparency obligations require algorithms' logic and metrics to be disclosed meaningfully, yet current regulations provide limited guidance on standardized formats or specific technical documentation [12]. Without clearly defined technical specifications (e.g., standardized model cards, uniform API schemas), disclosures may remain fragmented, superficial, or difficult for workers and auditors to interpret effectively.

Similarly, data portability relies fundamentally on interoperable data formats and protocols enabling seamless data transfers between platforms and third-party cooperatives or worker representatives [28]. Currently, each platform maintains proprietary data formats, complicating data exchange and limiting

**Table 1**

Summary of Legal Instruments, Technological Mechanisms, and Worker Impact

Legal Instrument	Key Rights and Provisions	Technological Mechanisms	Impact on Workers
<b>GDPR (2016)</b>	Data portability (Art. 20), transparency obligations	Personal data export tools, access request portals	Enables individual control, supports mobility across platforms
<b>Data Act (2023)</b>	Access to non-personal and co-generated data	Interoperable APIs, standardized machine-readable formats	Facilitates collective audits and algorithmic accountability
<b>Data Governance Act (2022)</b>	Legal basis for trusted data intermediaries and cooperatives	Data altruism consent forms, registration frameworks for intermediaries	Supports the formation of worker data cooperatives
<b>Platform Work Directive (2024)</b>	Algorithmic transparency, right to human review, data rights	Mandatory algorithmic disclosures, human oversight channels	Enhances transparency and fairness in platform management
<b>EU AI Act (2024)</b>	Pre-market assessment of high-risk AI systems	Model cards, algorithmic impact assessments, kill-switches	Prevents deployment of non-compliant systems, ensures accountability
<b>Spain's Riders Law (2021)</b>	Algorithmic co-determination rights	Representative access to algorithm rulesets	Enables worker negotiation and oversight
<b>NYC Local Law 144 (2023)</b>	Mandatory algorithmic audits for employment tools	Public scorecards, independent audits	Exposes bias, enables public scrutiny

the practical effectiveness of portability rights. The absence of common schemas significantly increases compliance costs and undermines portability's promise as a collective empowerment tool.

## 6.2. Legal and Regulatory Challenges: Vague Standards and Enforcement Gaps

Legal frameworks surrounding transparency and portability are often deliberately general, leaving critical details—such as the extent of disclosure, exact data categories subject to portability, or minimum auditing requirements—open-ended or subject to broad interpretation [25]. Regulatory vagueness can result in inconsistent implementation across platforms and jurisdictions, potentially undermining transparency and accountability goals.

Furthermore, enforcement remains a major regulatory challenge. Platforms frequently demonstrate significant resistance, contesting regulatory interpretations or delaying compliance through legal challenges. Regulators may also lack adequate resources, technical expertise, or enforcement authority necessary for rigorous oversight and accountability, creating a risk that transparency and portability obligations could devolve into mere paper rights rather than meaningful protections [12][2].

**Legal-Technical Constraints on Data Cooperatives under the GDPR.** While data cooperatives hold promise for empowering workers through collective data access and audit capabilities, the *General Data Protection Regulation* (GDPR) presents several obstacles that hinder their practical effectiveness.

First, the **purpose limitation principle** (Article 5(1)(b)) restricts the reuse of personal data for purposes not explicitly defined at the point of collection. This creates a challenge for data cooperatives that aim to aggregate data from multiple workers to conduct algorithmic audits, as the original data was typically collected for employment-related tasks—not for collective transparency initiatives.

Second, the **data minimization and necessity principles** (Article 5(1)(c)) complicate the creation of large-scale, rich datasets required for statistical analysis or detecting systemic bias. Data controllers (platforms) may resist sharing detailed datasets by arguing that broad data disclosure is not “necessary” for exercising data subject rights.

Third, the issue of **joint controllership** (Article 26) arises when cooperatives process data on behalf

of multiple data subjects. Legal ambiguity exists regarding whether the cooperative becomes a controller, a joint controller, or merely a processor—and what legal responsibilities and liabilities this entails. This uncertainty increases compliance burdens and may discourage grassroots initiatives from pursuing collective data governance models.

Finally, the GDPR's reliance on **individual rights enforcement** mechanisms (e.g., individual subject access requests or portability claims) poses structural limitations for cooperatives. Without explicit recognition of collective data rights or data trust entities within the GDPR, cooperatives must rely on consent from each individual worker—creating logistical overhead and undermining scalability.

Addressing these legal-technical constraints will require future regulatory clarification or reform, potentially through delegated acts under the GDPR or alignment with instruments like the Data Governance Act, which provide a clearer legal identity for data intermediaries acting in the collective interest.

### **6.3. Socio-economic Obstacles: Worker Capacity and Collective Action**

From the worker perspective, both transparency and portability rights presuppose a substantial degree of data literacy, technical capability, and legal expertise to effectively interpret disclosures, utilize portability mechanisms, and challenge algorithmic decisions [8]. Yet, many gig workers—particularly those in precarious employment conditions—may lack sufficient resources or knowledge to meaningfully exercise these rights individually.

Moreover, current regulatory frameworks largely prioritize individual-level rights and mechanisms, providing limited formal support for collective actions like data cooperatives or union-driven auditing initiatives. Given the structural power imbalances inherent in platform employment, effective protection likely necessitates explicit regulatory provisions supporting collective data access, cooperative audits, and representation in algorithmic governance processes [13].

### **6.4. Platform Resistance and Regulatory Arbitrage**

Platforms themselves frequently pose significant barriers to the effective realization of transparency and portability rights. Given the competitive and proprietary nature of algorithmic management systems, platforms may actively resist detailed disclosure or meaningful portability standards, citing trade secrets, competitive concerns, or operational burdens [12].

Additionally, given the international scope of platform companies, regulatory arbitrage presents a real risk, whereby platforms strategically choose jurisdictions with less stringent transparency or portability regulations to minimize compliance costs and exposure to scrutiny. Without robust international coordination or aligned regulatory standards, platforms may exploit these disparities, undermining efforts to provide consistent protections across jurisdictions [28].

### **6.5. Addressing Implementation Challenges: Toward Integrated Governance**

Addressing these challenges will require a concerted approach combining clearer regulatory definitions, technical standardization, enhanced regulatory capacities, and explicit support for collective worker actions. Policymakers must proactively establish detailed, interoperable technical standards alongside regulatory obligations, develop clear enforcement mechanisms with adequate resources, and explicitly recognize and facilitate collective data rights and representation mechanisms [2].

The next section provides concrete policy recommendations and outlines potential avenues for further research to overcome these challenges and effectively operationalize the integration of transparency and portability rights into algorithmic management governance frameworks.

## **7. Policy Recommendations and Future Research**

Given the complexity of implementing effective algorithmic transparency and data portability within platform work, policymakers, scholars, and stakeholders should prioritize integrated regulatory frame-

works and technological solutions. Below, concrete policy recommendations are presented, followed by suggestions for future research.

## **7.1. Policy Recommendations**

### **7.1.1. Establishing Clear and Interoperable Technical Standards**

To translate transparency and portability rights into effective regulatory practice, policymakers should mandate clear, interoperable technical standards. Standardized data schemas (e.g., JSON or XML-based schemas for worker data) should be developed at the EU or international levels, through collaboration between regulatory agencies, standard-setting organizations (such as ISO, ETSI, or CEN), worker representatives, and platform companies. Such standards would facilitate consistency across platforms, enabling more efficient enforcement, streamlined compliance, and meaningful data interoperability.

### **7.1.2. Strengthening Regulatory Enforcement Mechanisms**

Regulators should be equipped with sufficient resources, including technical expertise, funding, and enforcement capabilities, to monitor, audit, and enforce compliance actively. Developing centralized or distributed compliance monitoring systems—potentially leveraging blockchain or tamper-proof logging technologies—could enhance accountability, transparency, and regulatory responsiveness. Furthermore, regulators should establish clear, legally binding compliance deadlines and implement meaningful financial penalties for non-compliance, deterring regulatory avoidance.

### **7.1.3. Encouraging and Facilitating Collective Worker Actions**

Explicitly incorporating collective mechanisms within legal frameworks is crucial for meaningful worker empowerment. Policymakers should formalize the rights of worker cooperatives, trade unions, and representative bodies to access and aggregate data collectively for auditing, research, or advocacy. Financial and institutional support for organizations performing collective audits, such as data cooperatives, should be provided, ensuring workers can effectively leverage transparency and portability rights collectively.

### **7.1.4. Implementing Algorithmic Co-determination Rights**

Platform workers should be granted explicit algorithmic co-determination rights, including mandatory consultation, negotiation, or even veto rights through worker representatives regarding significant algorithmic decisions (as exemplified by Spain's Riders Law and Germany's Works Constitution Act). Legal frameworks should mandate technological mechanisms (e.g., shared repositories, algorithmic rule disclosures) facilitating meaningful worker participation and influence over algorithmic governance.

### **7.1.5. Fostering International Regulatory Coordination**

To prevent regulatory arbitrage and achieve consistent worker protections globally, international regulatory coordination is essential. International bodies like the OECD, ILO, or European institutions should facilitate dialogues among regulators, platforms, worker representatives, and civil society organizations to align minimum transparency, accountability, and portability standards internationally. Such coordination can significantly reduce compliance complexity for multinational platforms and increase the overall efficacy of regulatory interventions.

## **7.2. Directions for Future Research**

### **7.2.1. Longitudinal Analysis of Transparency and Portability Impacts**

Future research should systematically investigate the long-term impacts of transparency and portability rights on workers' experiences, employment stability, income levels, and bargaining power within the gig economy. Empirical, longitudinal studies comparing jurisdictions with varying regulatory

frameworks would provide valuable insights into the actual effectiveness and limitations of these legal instruments.

### 7.2.2. Development of Technical Standards and Interoperability Schemas

Scholars and technologists should collaboratively research and develop detailed proposals for interoperable data schemas, standardized algorithmic disclosures, and compliance APIs. This work could inform policymakers, standard-setting bodies, and regulatory agencies, ensuring practical feasibility, stakeholder acceptance, and broad applicability across different platforms and jurisdictions.

### 7.2.3. Algorithmic Co-determination and Worker Representation

Further investigation is required into the effectiveness, challenges, and best practices associated with algorithmic co-determination models. Comparative studies examining co-determination in different jurisdictions or sectors could help identify critical success factors, barriers, and transferable lessons for broader implementation in the platform economy.

### 7.2.4. Socio-technical Approaches to Collective Data Rights

Research exploring socio-technical frameworks facilitating collective data rights, such as data trusts, cooperatives, or decentralized autonomous organizations (DAOs), could provide insights into the viability, governance, and potential risks of collective worker data management. Such research would help establish practical mechanisms through which workers could effectively aggregate and utilize portability rights.

### 7.2.5. Regulatory Enforcement and Compliance Monitoring Technologies

Finally, research into emerging technologies supporting automated compliance monitoring, such as tamper-proof logging, blockchain-based audits, or "policy-as-code" mechanisms, should be pursued. Such studies would offer practical insights into operationalizing automated compliance checks and enforcement mechanisms, thereby enhancing regulatory effectiveness and platform accountability.

By addressing these policy recommendations and research directions, stakeholders can move toward a more robust and practically enforceable framework, effectively bridging law and technology to mitigate algorithmic harms and significantly enhancing platform worker protection.

Instrument	Key Rights	Scope	Enforcement	Cooperatives
GDPR (2016)	Data portability Transparency rights	Personal data	Data Protection Authorities (DPAs)	Partially
Data Act (2023)	Access to non-personal data Enhanced reuse obligations	Operational / usage data	National authorities	Yes
DGA (2022)	Neutrality of intermediaries Registration and trust mechanisms	Voluntary data sharing	Coordinated EU bodies	Yes
Platform Work Directive	Algorithmic transparency Right to human review	Platform workers	Labor inspectorates	Yes

**Table 2**

Comparison of EU Legal Instruments Supporting Worker Data Rights



### 7.3. A Named Governance Model: The Collective Data Portability Governance Framework (CDPGF)

To unify the findings and examples presented, this paper proposes the **Collective Data Portability Governance Framework (CDPGF)**. This model includes:

- **Legal Base:** Grounded in GDPR Art. 20, the Data Act, and the DGA.
- **Technical Tools:** APIs, standardized export formats, audit logs.
- **Actors:** Worker cooperatives, trade unions, trusted intermediaries.
- **Process:** Voluntary pooling of personal data, algorithmic review, rights assertion.

CDPGF bridges individual rights and collective accountability, offering a scalable template for rights enforcement in platform work environments.

## 8. Conclusion

This paper explored the potential of algorithmic transparency and data portability rights as complementary tools bridging law and technology to mitigate harms arising from algorithmic management practices in the platform economy. Algorithmic management—characterized by automated task assignment, continuous performance evaluation, and algorithmic disciplinary actions—has significantly reshaped work relations, introducing notable challenges, including opacity, increased precarity, and exacerbation of structural inequalities.

The legal frameworks examined, particularly in the European Union and select jurisdictions in the United States, demonstrate promising efforts to enhance transparency, accountability, and worker empowerment through algorithmic transparency obligations and robust data portability rights. However, regulatory measures alone remain insufficient, facing practical limitations such as technical interoperability challenges, enforcement gaps, and socio-economic barriers to effective worker utilization.

A deeper, deliberate integration of law and technology is essential. Emerging regulatory-technical approaches, including algorithmic licensing schemes, mandatory audits, worker-driven algorithmic co-determination, real-time data portability, and automated compliance systems (policy-as-code), represent viable pathways toward achieving effective algorithmic governance. Yet, realizing these innovations' full potential will require addressing significant technical, legal, and socio-economic obstacles, including standardization of technical protocols, strengthened regulatory capacity, explicit support for collective worker actions, and enhanced international cooperation.

Future policy interventions should explicitly integrate clear technical standards, reinforce enforcement mechanisms, and recognize and facilitate collective worker representation. Concurrently, scholarly research must continue exploring long-term impacts, technical standardization efforts, algorithmic co-determination models, collective data rights mechanisms, and advanced compliance monitoring technologies.

Ultimately, bridging the gap between legal frameworks and technological implementation is not merely desirable—it is necessary. Achieving meaningful transparency, accountability, and worker empowerment in the age of algorithmic management depends fundamentally on a sustained, integrated collaboration between policymakers, technologists, researchers, and, most critically, the workers themselves.

## Future Research Directions

This paper opens several lines of inquiry for future work. How can algorithmic co-determination evolve as a statutory right? What governance models can balance automation and human oversight at scale? How can regulatory bodies operationalize collective enforcement of portability rights using technical infrastructures?

## Policy Recommendations

- Standardize algorithmic audit formats across EU Member States.
- Clarify the legal status of data cooperatives under GDPR.
- Fund technical capacity-building for worker data intermediaries.
- Mandate cross-platform data portability through interoperable APIs.
- Encourage national DPAs to support collective data rights enforcement.

**Limitations.** This analysis is legal-normative and does not include empirical data from worker experiences or platform implementations. It focuses primarily on EU law, with limited cross-jurisdictional depth. Future work could include interviews, prototype evaluations, or audit deployments to substantiate the proposed framework.

## Declaration on Generative AI

During the preparation of this work, the author used ChatGPT in order to: Grammar and spelling check, Paraphrase and reword. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the publication's content.

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