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**Proceedings of the Weizenbaum Conference 2023:
AI, Big Data, Social Media, and People on the Move**

ALGORITHMIC MANAGEMENT IN THE FOOD DELIVERY SECTOR – A CONTESTED TERRAIN?

**EVIDENCE FROM A FIRM-LEVEL CASE-STUDY ON
ALGORITHMIC MANAGEMENT AND CO-DETERMINATION**

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KEYWORDS

algorithmic management; co-determination; regulation; platform work; food delivery; precarity

ABSTRACT

Forms of algorithmic management (AM) play an essential role in organizing food delivery work by deploying AI-based systems for coordinating driver routes. Given the risks of precarity and threats posed by AM that are typically related to (migrant) platform work, the question arises to what extent structures of co-determination are able to positively shape this type of work and the technologies involved. Based on an intense case-study in a large food delivery company, this paper is guided by three questions: (1) How is algorithm-based management and control used by the company? (2) How is it perceived by the couriers, also in relation to other aspects of their work? (3) What are the works council's priorities, strategies, and achievements regarding co-determination practices? Contrary to the prevalent perception in the literature on the subject of AM, our analysis shows that human agency is still pivotal when algorithm-based systems are used to manage work processes. While data- and AM-related issues do not represent a central area of conflict, we find that co-determination rights in this domain can translate into a powerful bargaining resource of the works council with regard to the companies' digital business model. Our study also shows that algorithmic management poses problems of non-transparency and information asymmetry, which calls for new forms and procedures of co-determination.

1 INTRODUCTION

The term algorithmic management (AM) refers to the use of algorithm-based systems and tools in an organization's management of its work force, labor processes, and work performance (see Meijerink & Bondarouk, 2023; Wood, 2021). Often it is based on artificial intelligence (AI) systems that automate decision-making and technology-based control (Kellogg, Valentine & Christin, 2020). AM plays an essential role in organizing food delivery work. Taking into account customer demand with restaurant and driver availabilities, the sequence of distributions is calculated and assigned to the couriers by an app on their mobile phones in order to optimize their routes. This process entails constant tracking of the couriers along their routes. One stream in the scientific literature and public debate on platform work emphasizes the control potential of algorithm-based management systems, often referring to the food delivery sector as a typical example (Veen, Barratt & Goods, 2020; Woodcock, 2020). In this view, workers are not only exposed to precarious working conditions but also to algorithm-based forms of monitoring and control. Given the risks of precarity and threats that AM systems typically pose in platform work, the question arises to what extent structures of co-determination are able to alter the negative nature of this type of work. Based on an intense case-study in a large food delivery company, this paper is guided by three questions: (1) How is algorithm-based management and control used by the company? (2) How is it perceived by the couriers, also in relation to other aspects of their work? (3) What are the works council's priorities, strategies, and achievements regarding co-determination practices? The paper closes by discussing emerging demands regarding the regulation and co-determination of AM. The study is part of the European research project INCODING funded by the European Commission (<https://incoding-project.eu>). The project conducts firm-level case studies in two sectors in four European countries. It precisely focuses on new challenges for worker representation and regulation in the context of algorithm-based control.

2 BACKGROUND AND RESEARCH QUESTIONS

Work at digital platform companies is a typical field of employment for migrant workers, especially in the area of food delivery. Such platforms are known for precarious working conditions in terms of low-skilled tasks, temporary contracts, low pay and (unreliably) flexible working hours. At the same time, they attract migrant workers (often refugees) due to their easy accessibility through low formal requirements, low language barriers, and short recruitment procedures (van Doorn, Ferrari & Graham, 2022).

While many articles deal with platform work in terms of precarious and migrant work, others have focused primarily on the functioning and impact of AM in their firm-level case studies. Besides (location-based forms of) platform work, such as food delivery or other driving services (see the overview by Lücking, 2019), prominent fields of research regarding AM are logistics (Butollo et al., 2018; Staab & Geschke, 2019), manufacturing (Evers, Krzywdzinski & Pfeiffer, 2019), and HR work (Spielkamp & Gießler, 2020). In the German food delivery sector, AM occurs in the form of “app-based management” (Ivanova et al., 2018) and is often discussed as an example of high external performance control in the sense of Kellogg, Valentine & Christin (2020). The smartphone is the focal point of algorithmic management in location-based platform work. It not only ensures the mobility of platform workers but also enables the extensive collection of data that can be evaluated – in particular positional data via GPS.

The study by Ivanova et al. (2018) on the management of food delivery platform work via smart phone applications provided evidence that tracking movement generates an enormous amount of data, which enables comprehensive control of work processes. Automatically evaluating this data serves to optimize the processes and to monitor the work performance of the “riders,” as couriers are called internally. The assignment of work orders is based on data evaluation. Automated decision-making occurs through algorithms, which often creates the impression of technical rationality and objectivity. The app can also be used to generate additional incentives for motivation and performance improvement through push messages. By offering minor choices, the app can foster the impression of autonomy and set incentives to increase individual productivity gains (“digital nudging”) (Lücking, 2019).

Data on work performance is sometimes used to initiate competition among workers, but it is also used for hierarchical purposes by dividing couriers into different groups. Lucrative shifts or orders are only displayed to “best performers.” A central element of the algorithmic control by the app is information asymmetry: The couriers remain unaware of the exact extent and purpose of the service. They know neither how the summary metrics used to monitor their performance are calculated nor how the metrics enter into decisions on the shifts or orders offered to them (Schreyer & Schrape, 2018).

According to given data protection regulations in Germany, employees must agree to the processing of their personal data individually and voluntarily unless such processing is legitimized by relevant company agreements under data protection law (Wedde, 2020). Problems arise when there exists neither individual consent nor works councils willing and capable of negotiating appropriate company agreements. Consequently, it can be expected that companies using these systems operate in a legal gray area. Often the use of these systems is indeed illegal.

In spring 2021, the data protection officer of the state of Baden-Württemberg raised some concerns regarding the “Scoober” app, an algorithm-based app used by a large food-delivery platform (see Tagesschau from May 21st, 2021): The data that the app collects and stores about couriers is documented in several data reports, showing that it is possible to track down with high precision when a driver is assigned an order, picks it up, and delivers it. The data protection officer concluded that this “is a very close-meshed monitoring of the employment relationship.” The exact location of the couriers is passed on at intervals of 15 to 20 seconds. According to the data protection officer, this leads to so-called tracking, i.e., “constant monitoring of work performance,” which he believes is “clearly illegal.” The app also sends personal data to third parties, such as Google. The food delivery company denied the allegation and argued that the courier app complied with the applicable data protection regulations since time and location data are essential for the delivery service to function properly. The company also stated that the data collected was not used for unauthorized performance or behavior control and that the couriers were informed on how and for what purpose the data is used. The lawsuit is still ongoing. It demonstrates the difficulties and possible limitations when legal regulations regarding data protection are applied.

While the food delivery sector is often regarded as an example of strong algorithm-based control and standardization of low-skilled work, case-studies in the manufacturing or logistics sector draw a more ambiguous picture. On the one hand, algorithm-based work governance at industrial workplaces is also criticized for its potential to gather data on worker productivity and hence the ability to closely monitor activities (Falkenberg, 2018). Particularly, in assembly work and logistics, algorithm-based assistance systems are applied to guide workers through the assembly process or in the selection of parts. On the other hand, studies show that these systems can indeed be deployed with very different

concepts of work: Algorithm-based assistance systems can provide flexible, situational information to employees, or they can be used to improve the transparency of work processes, optimize individual work performance and work organization, and increase the quality of tasks and enhance skills (Klippert, 2020).

The literature on AM also highlights that structures of co-determination can be a crucial factor in this ambiguous field. Several studies show the importance of co-determination regarding both the introduction of new (digital) technology and issues of performance regulation to recognize aspects of a human-oriented design of assistance systems (Albrecht & Görlitz, 2021; Evers, Krzywdzinski & Pfeiffer, 2019; Krzywdzinski, Gerst & Butollo, 2023). A notable result is the relatively high acceptance of digital assistance systems, even in highly standardized processes. There are few conflicts, also due to the strong role of works councils in securing data protection criteria and preventing performance monitoring and behavioral control. Moreover, there is evidence that the acceptance of algorithm-based assistance systems (such as smart wearables) by workers relates to issues of transparency and co-determination. Employees tend to accept such systems if they retain control over the data and data usage and if this has a clear benefit for their work – especially in terms of reducing workload (Evers, Krzywdzinski & Pfeiffer, 2019).

Given the outlined risks of algorithm-based control in the food delivery sector, which is characterized by both a lack of co-determination and a high level of precarious labor conditions, the question arises to what extent algorithmic control is exercised and how structures of co-determination can make a difference here.

3 EVIDENCE FROM THE CASE STUDY

The following results are based on an intense firm-level case study from 2022 in a large food delivery company. In contrast to other parts of the platform economy, the company issues fixed-term and permanent contracts to their couriers. After long periods of labor disputes, structures of co-determination have been introduced. This specific organizational setting gives us the opportunity to study the role of co-determination in the food delivery sector, which has not been covered in academic literature before. We have conducted interviews with managers, members of the work council, couriers, and external experts. In this section we outline the main results with regard to (1) the company's aims and use of algorithmic management, (2) the experience and evaluation of AM practices by the couriers and the works council, and (3) the works council's priorities, strategies and achievements regarding co-determination practices.

3.1 Management objectives regarding the use of AM

In the observed company, algorithm-based management takes place via an app that couriers need to install on their cell phones. It assigns jobs to couriers, navigates them to the destination and transmits information about pickup and arrival times to customers. This means the company continually tracks the location, speed, response time, delivery time, and route of the couriers. But, according to the company officials and couriers we interviewed, this information is not used to discipline couriers and achieve performance gains, at least not in an automated way. The management emphasized that individual performance characteristics are neither generated nor used for individual performance control. The works council is skeptical in this respect and fears that such information might be used for regular performance reviews.

Overall, our study provides evidence that AM is mainly used by the company for functional reasons, i.e., for optimizing the sequence and allocation of orders. Humans could clearly not oversee and efficiently manage such large numbers of couriers and orders in the delivery area. According to a typology by Nies (2021), this type of technology use represents “process-oriented rationalization,” in contrast to rationalization strategies focusing on individual performance control. This orientation fulfills the function of maximizing efficiency by processing data fast, keeping routes short, and enlarging the geographical scope of deliveries. Nevertheless, it does not mainly aim at individual work performance since couriers are not expected to finish more than around two deliveries per hour and the maximum distance of orders cannot exceed a given number of kilometers.

How does algorithmic management relate to control issues in our case study? It is evident that couriers are instructed and directed and that their performance is recorded (e.g., start of work, speed, distance, and number of orders). The number of orders also feeds into a bonus system, which rewards couriers when achieving certain numbers of orders per month. But no direct disciplining occurs if couriers are too slow. The technically possible control potential is clearly not exhausted here. We do not find evidence for automated forms of performance control, trying to push couriers or punishing them if late on arrival. The app does indicate couriers who get behind schedule by highlighting the arrival time in red, but it does not execute any automated forms of sanctions. The main variable for the company’s productivity, regarding the delivery process, is the efficient coordination of tasks – not the individual work performance.

3.2 Experience and evaluation of AM practices by couriers

Tracking and performance recording are widely accepted by the couriers we interviewed, who consider it as “part of the job.” We also find evidence that some couriers even prefer to work with the app over constantly being monitored by a human superior. The app is partly experienced as a liberation from direct, personal management control. Interaction with private apps or tracking of private information are more likely to be discussed as hazards. Hence, there is often the desire for a company cell phone. At the same time, the works council and some riders with a critical stance have strong concerns regarding data protection issues. They emphasize the risk that the company might collect and process information that is not obligatory for the mere execution of the work process. Issues of algorithmic control and data acquisition are seen as a crucial point for negotiations between the works council and the management. Interestingly, the works council applies a kind of double-edged strategy here. On the one hand, it strives for more transparency and co-determination regarding the development and functioning of the app. On the other hand, they can use their information and approval rights (granted by the Works Council Constitution Act) to enforce non-AM related claims. In this respect, blocking and delaying software adaptations by not consenting to its implementation represents a strong means to pressure companies that apply digital business models.

Surprisingly, basic flaws of the app are a major topic amongst couriers. Bad navigation and poorly calculated arrival times are seen as an obstacle to good work performance. Moreover, the lack of transparency of the app was seen as a major shortcoming. Couriers are unsure what information is tracked and who might possibly see it and use it for performance assessments. As stated above, our research does not provide evidence of such malpractice at the company surveyed. Still, the insecurity about whether this is done does unsettle couriers and thus results in indirect disciplining. As one rider comments:

So, there's this fear that it'll kind of backfire on me. That there is something like a digital profile of me. And if I somehow make mistakes or become rebellious, then I only get very thankless orders, so to speak. I already had the feeling that a few colleagues were very reserved when it came to criticism or confrontation. (Courier)

Feelings of insecurity in this regard may be even more significant amongst vulnerable groups like migrant workers, who represent a large proportion of the workforce.

In line with the existing literature emphasizing information asymmetries due to the black-box character of algorithmic systems, it is difficult for the works council to understand and evaluate the functions of the app regarding their effects on couriers. The works council criticizes that the management only reluctantly provides insights on these matters. As a consequence, the works council and individual couriers have developed reverse engineering strategies to grasp the functioning of the app, i.e., using their own Python programming skills and documentation to assess the algorithm of the app.

3.3 Works council priorities, strategies, and achievements

Regarding the labor policy background, the company is characterized by a very active, dedicated general works council, which uses all options to improve the couriers' working conditions (including appealing to the labor court). However, the focus is not mainly on control questions relating to the algorithm, but on other topics. This includes the definition of the delivery area (which the company wants to be as large as possible) or the destination of the last delivery (as close to the riders' home as possible). Work cell phones, work equipment (first of all, the bikes), pay and working time issues, as well as a fair distribution of shifts, are major issues forming the companies' main contested terrain. The works council has been successfully engaged in all these issues. The app and related control issues, in contrast, rather remain secondary. The works council is primarily concerned with access to the functional parameters, understanding how the app is processing this information and how it affects the work of the couriers. The works council recognizes the need to engage with the app, but reports difficulties in doing so:

I have an idea of what I do as a works council member – co-determination rights. But the problem is when it comes to the question of what I should deal with precisely. I'm poking around in the dark. (Works council member)

Therefore, the works council can only assess the consequences of AM to a limited extent. Thus, the scope for co-determination is restricted, and there remain uncertainties about the effects of possible changes in the AM-system. This is illustrated by the attempts to co-determine the length of tracking intervals:

The thing is, we have no idea about what the impact of, for example, extending the tracking intervals will be. That's always the problem. And we are not told that either. If I have a minute now [...], could it be that the orders will become totally stupid for the couriers? Because they aren't tracked as often anymore. And then they get worse jobs? Maybe they'll get better as a result, but those are the scenarios that we can't answer. (Works council member)

4 CONCLUSIONS AND DISCUSSION – LESSONS LEARNED FOR THE REGULATION AND CO-DETERMINATION OF AM

Regarding the regulation of AM, Germany is, on the one hand, characterized by an overall lack of formalized regulations with an explicit focus on AM issues. On the other hand, a relatively large number of established legal regulations, sectoral and company agreements, and union and works council activities are already indirectly governing the field of AI and AM application. They address issues of data protection, platform work, co-determination, or discrimination. However, in many respects, the existing national regulations do not cover specific issues that arise in the course of AM, as shown by our case study (see also Krzywdzinski, Gerst & Butollo, 2023; Molina et al., 2023).

Previous studies have identified challenges for policy-makers and the regulation of AM in the following three areas of the German workplace, which are confirmed by our findings: (1) Transparency issues: Employers often do not provide sufficient information on the methods used in AI applications. (2) Control issues: According to the existing data protection regulations, employers may collect and process individual data when this information is used to fulfill the specific work purpose. Since this regulation leaves room for interpretation, misuse by companies can occur. (3) Co-determination issues: Processual forms of co-determination gain importance (Krzywdzinski, Gerst & Butollo, 2023), because governance and monitoring of AI and AM are becoming permanent tasks in the context of systems that are frequently updated. Rights of co-determination are less effective as soon as such systems have been introduced, amplifying the importance that employees, works councils, and HR managers possess the appropriate skills and information to draw the right conclusions, anticipating possible long-term effects and unintended consequences.

Our findings complement existing research in this field by shedding light on the role and interplay of management objectives, experiences of couriers, strategies of works councils, and co-determination issues regarding AM. A question of crucial importance is to what extent and in which way AM has become a new contested terrain of labor policies in the food delivery sector. Overall, our findings do not support the idea of strong labor conflicts regarding issues of AM in the German regulatory context. Problems and conflicts rather arise from the couriers' general precarious work and employment conditions.

Our study did not find evidence for algorithm-based performance control at the individual level, as suggested by the respective literature in the field of AM (Kellogg, Valentine & Christin, 2020) and the platform economy (Schreyer & Schrape, 2018). The given potential of a rigid, algorithmically driven control system, as it is provided by the collection of vast amounts of data and technological possibilities (as demonstrated in other cases), has not been realized in practice in this case. Moreover, we find close linkages and interactions between (automated) algorithm-based order assignments and human readjustments by couriers and operators. In this respect, the term algorithmic management might be misleading and should be used more carefully in the scientific debate, since it tends to suggest and emphasize the (AI-based) substitution of management functions.

Concerning the strategies of the works council and couriers, labor policies are first of all concerned with traditional issues in terms of pay, working hours, work equipment, or safety issues. Despite the works council's engagement and (fixed- and long-term) employment contracts, classic elements of precarious employment in the low-wage sector tend to persist, such as low pay, the lack of provision of core work equipment, bad and often dangerous working conditions, and insecure employment prospects due to high market fluctuations. Still, for many workers, especially migrants, who often are

particularly reliant on initial labor market access, this form of work offers low threshold job opportunities.

When trying to tackle issues of AM, the works council faces difficulties to obtain the necessary information on the parameters feeding into the AM system, to understand their functioning and interaction, and to evaluate the effects of possible changes and alternative usages – despite rather rich co-determination rights and recent reforms (Work Council Modernization Act) in the German context. This raises the crucial question to what extent employee representations are able and need to be enabled to co-determine AI- or AM-based systems themselves, as often suggested in the current debate, underlining the need for more processual rights. An alternative approach to co-determination might put more emphasis on regulating the effects of AM-based systems to prevent negative outcomes regarding staffing, work hours, workload, or safety. Such an approach would rely on classical fields and instruments of employee representation.

Eventually, we find evidence that given regulations touching issues of data protection and technology can provide powerful means to works councils to achieve goals in other areas of action. In the digital platform economy, both efficient day-to-day business and quick innovation depend greatly on the collection and processing of data as well as on the fast and continuous development of (globally used) software. Putting pressure on the collection or processing of data can therefore quickly threaten companies' core business interests and amplify their cooperativeness in bargaining processes. In this respect, existing co-determination rights regarding issues of AM can provide a new, powerful bargaining resource to employee representation in AM-based business models. To the best of our knowledge, this fact has not yet received much attention in previous research. It underlines the need to study bargaining processes, power resources, and negotiation strategies in the area of AM more carefully. Future research in this field should take a broader perspective on AM-related policies in organizations, also considering issues and conflicts in other, "traditional" areas of action. Moreover, it seems useful to build on insights from bargaining and power resource theories to extend our understanding of the role AM-related issues and conflicts in organizational labor policies.

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