Algorithmic Control in Non-Platform Organizations - Workers' Legitimacy Judgments and the Impact of Individual Character Traits

Research Paper

Felix Hirsch[1]

[1] TU Dresden, Chair of Business Information Systems, esp. Business Engineering, Dresden, Germany
felix.hirsch@tu-dresden.de

Abstract. Algorithmic control (AC) refers to the increasing use of algorithms to steer worker behavior. While AC is well established in the platform economy, it also now gets increasingly adopted by non-platform organizations, raising questions about its legitimacy. Existing research has focused on organizational factors influencing worker judgments of AC, neglecting how individual character traits impact legitimacy judgments. This paper addresses this gap using fuzzy-set Qualitative Comparative Analysis (fsQCA) to identify configurations of the AC forms of Recommending, Restricting, Requiring, Rating and Monitoring leading to positive legitimacy judgments of AC in terms of fairness, autonomy and competence development with examining the impact of the additional variable of competitive character traits. The findings show that for the legitimacy dimensions of fairness, autonomy and competence development, competitive workers judge AC particularly positively, while non-competitive workers in general expressed rather negative judgments towards AC, especially with regards to the dimension of competence development.

Keywords: Algorithmic Control, Legitimacy Judgments, Non-Platform Organizations, fsQCA

1 Introduction

Intelligent algorithms steering and managing workers – while this phenomenon was primarily present in the context of the platform economy for a long time, algorithmic control (AC) is now making its way into conventional, non-platform organizations. AC is commonly defined as the "the managerial use of intelligent algorithms and advanced digital technology as a means to align worker behaviors with organizational objectives" (Wiener et al., 2023, p. 1). In the platform economy, AC allowed organizations like Uber, Lyft or Instacart an unparalleled speed of scaling, compared to organizations relying on conventional forms of organizational control, making AC a key enabler for their success (Benlian et al., 2022).

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While platform organizations share the technology-driven matching of demand and supply as the core of their value creation, non-platform organizations are usually built on linear business models and cover a wider range of industry sectors such as manufacturing, logistics, retail, or professional services. In this organizational context, organizational control regimes are usually built as relations between human managers (controllers) and workers (controlees). With the rise of AC, digital and algorithmic technologies take over more and more control and management tasks previously performed by human managers. While human managers are today oftentimes not replaced entirely, AC goes beyond the role of a support tool for managers and controls workers autonomously in certain tasks. The introduction of AC therefore represents a fundamental change for workers, since an additional agent is added to the control regime workers face in their everyday work, making it more encompassing, instantaneous, interactive and opaque (Kellogg et al., 2020). Against this background, this paper sets forth to address the following key shortcomings of current research on AC.

First, while AC is already established and broadly researched in the platform economy, research on the application of AC in non-platform organizations has not yet been able to keep pace with the developments in practice. This is certainly partly due to the fact that, as previously mentioned, the context of non-platform organizations is much more heterogeneous than the field of platform organizations, however in areas, such as logistics, AC is already being used intensively, for example in Amazon warehouses (Altenried, 2022; Vallas et al., 2022), which is why we choose to collect the sample for this study from this specific context. Some studies already began to analyse the use of AC and the effects on workers in non-platform organizations. The findings indicate that the introduction of AC in fact represents a major change for workers and that they usually have no choice to opt-out of newly introduced AC practices (Schafheitle et al., 2020). Further studies highlighted that changes induced by digital technologies can unsettle workers and cause anxieties and resistance behaviours (Battilana & Casciaro, 2013). On the other hand, the implementation of novel technologies can as well motivate workers and result in a positive impact (Cram et al., 2022). This shows that very different attitudes towards AC prevail in the workforce of non-platform organizations, covering the entire spectrum from positive views to strong rejection.

Second, AC is often either studied with a focus on individual AC forms, such as algorithmic recommendation systems or algorithmic monitoring, or with a focus on AC as a holistic, aggregated concept. However, studies showed, that the configuration of an AC system has a tremendous impact on both a successful application in practice and workers perceptions and judgments (Alizadeh, Hirsch, Jiang, et al., 2023). The configuration of a systems for example includes the specific AC forms present in the system or the technological embedding, that is what devices are used, what data sources are approached etc. (Alizadeh, Hirsch, Jiang, et al., 2023).

Third, research regarding workers' relation to AC illustrated *what* kinds of perceptions and judgments workers expressed and *how* they differ among contexts, but neglected the question of *why* workers perceive and judge AC the way they do and what reasons could explain the variance in observed reactions, sometimes even within the same organization (Hirsch et al., 2024). Research has recently begun to assess the impact of organizational and technological factors on workers' judgments and perceptions

but so far paid little attention to factors grounded within the individual workers themselves such as character traits. The research questions this paper sets forth to answer therefore are:

RQ1: *How do workers in non-platform organizations judge the legitimacy of AC in terms of autonomy, fairness and competence development?*

RQ2: *How does the character trait of 'competitiveness' impact workers' legitimacy judgments?*

With answering these research questions, we aim to address the above mentioned shortcomings on current research on AC in non-platform organizations, by adopting a nuanced, configurational approach towards AC and including a variable addressing workers individual character traits.

To examine the research questions, we collected a sample of n=92 non-platform workers from the current prime example of AC application in the non-platform organizational context, logistics warehouses. We applied the method of fsQCA to derive configurations causally connected to positive legitimacy judgments with regard to the dimensions *fairness*, *autonomy* and *competence development*.

2 Conceptual Foundations and Related Work

2.1 Algorithmic Control

The above cited definition of AC approaches control from a behavioral perspective which goes back to the seminal works by Kirsch (2004) and Ouchi (1979). (Digital) technologies were long only the context control was studied in. With the advancements of digital technologies in the past years including sophisticated algorithms, sensors, real-time data processing, cloud computing and artificial intelligence, these technologies now become a central part of the control process itself. For this paper we operationalize AC with the 5RSM framework of Hirsch et al. (2023) which builds on the fundamental work of Kellogg et al. (2020). The 5RSM framework operationalizes AC along seven aggregate dimensions, which are applicable to examine AC application in both platform and non-platform organizations: **AC Recommending** automatically suggests specific behaviors to the worker that takes the form of either explicit recommendations for action or implicit forms (such as nudges). **AC Restricting** withholds information or limits the scope of action for the worker. **AC Requiring** instructs workers to perform specific actions which they cannot reject without negative consequences. **AC Rating** ranks workers or allows third parties to rate work behavior and outcome. **AC Monitoring** enables supervision of the work process by the worker or a third party by collecting, aggregating, and displaying data on working behavior. **AC Rewarding** assigns rewards for work behaviors that align with organizational goals. **AC Sanctioning** issues penalties for work behaviors that do not align with the organizational goals.

In platform organizations oftentimes the full range of AC forms is applied via a single device the workers interact with. They usually work on a freelance basis and human managers play a very limited role in the everyday working lives of the workers. AC

application in platform organizations differs from the application in non-platform organizations. Here, algorithms today take over numerous control and management tasks, previously performed by human managers, such as assigning workers to shifts and tasks, monitoring worker behavior and performance, giving recommendations and instructions to workers on how to perform tasks and even giving rewards or penalties to workers. In some cases the control and management of the algorithms goes far beyond the degree and intensity of the previous human control, forming a novel form algorithmic 'micro-management' or 'micro-control' which emphasizes the already mentioned opaque, interactive and instantaneous nature of AC (Benlian et al., 2022; Brancati et al., 2022; Cameron et al., 2023).

Area examples for AC application in non-platform organizations are retail, call centers, manufacturing, human resources, healthcare or warehousing and logistics (Algorithm Watch, 2023; Rani et al., 2024). The latter of which can be described as one of the current prime examples of AC application in non-platform organizations which is why the sample for the study at hand was collected from this sector.

In logistic centers and warehouses algorithms carry out multiple tasks to control and steer worker behavior. The main tools via which control is exerted are handheld devices like laser scanners and tablets, stationary computers, information screens, light signals, cameras and motion sensors. With that the algorithmic system can monitor close to all actions workers conduct in their everyday work. Based on their configuration and the input data, the algorithms then assign workers to shifts and to work stations within the warehouses, even during a work day, the algorithmic system can move workers between stations. The AC system gives clear instructions to workers what tasks to perform, give recommendations on how to perform tasks or how to improve one's performance. The AC system alerts workers of mistakes and gives instructions and recommendations for correction and improvement and can ultimately as well issue rewards and penalties. While in many warehouses shopfloor supervisors still exists, algorithms now take over a large amount of control tasks leading to workers oftentimes being mainly controlled by the AC systems (Altenried, 2022; Beverungen, 2021; Delfanti, 2021; Vallas et al., 2022 & 2023).

2.2 Microlevel Legitimacy Judgments

When researching novel phenomena in the field of the *future of work* such as AC, it is essential to not only take an organizational lens, but also to adopt the workers perspective, who are affected by the respective novelties. For this paper, we take the concept of microlevel legitimacy judgments to assess the impact of AC on workers. Legitimacy as a broader concept can be defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed systems of norms, values, beliefs" (Suchman, 1995, p. 574). Based on this generic definition, Bitektine and Haack (2015) developed an advanced conceptualization of legitimacy, dividing the concept into a macro- and a microlevel. For this study, we adopt the microlevel perspective of legitimacy to capture the impact of AC on affected workers. Following Bitektine and Haack (2015), microlevel legitimacy consists of a three step process: Perception, judgment, reaction. First workers *perceive*, what

control forms, in our case forms of AC, are applied by the organization to steer the workers behaviour. The worker then *judges* these perceptions with regard to their legitimacy. As a result, the workers then reacts accordingly to their personal judgments. This study focusses on the first two steps of the microlevel legitimacy process. The final step of the microlevel legitimacy process, the question of how workers react to AC is investigated in an isolated, extensive strand of research, with a focus on better understanding why and how workers follow algorithmic control attempts or how they push back against AC, commonly referred to as *algoactivism* (Jiang, 2023).

Workers' perceptions of AC are represented by the AC forms introduced in the previous section. Workers' legitimacy judgments are the core of the microlevel legitimacy process. Legitimacy judgments as a latent construct can occur in different manifestations. For this study they are operationalized in the forms of *autonomy*, *fairness* and *competence development (Bitektine & Haack, 2015; Walser et al., 2021; Wiener et al., 2023)*. Since microlevel legitimacy judgments have a decisive impact on workers behaviours, they represent a particularly well-suited lens to assess the impact of AC on workers and the general effects of AC application in practice (Hirsch et al., 2024; Kempf et al., 2024; Wiener et al., 2023).

2.3 Workers' Individual Character Traits

Extant research has thoroughly examined *how* AC is applied in practice, *what* impact it has for organizations and as well adopted a managerial perspective towards AC, all primarily in the context of platform organizations. Recent studies also expanded the scope of research towards the worker perspective and novel contexts of AC applications, such as non-platform organizations. Here, research examined *what* impact AC has on workers and *what* reactions and feelings workers express towards AC. Results showed that general, overarching patterns emerged, regarding workers' perceptions and judgments of AC. However, the results also unveiled a significant variance in workers perceptions and judgments (Hirsch et al., 2024). Three main groups of factors can serve as possible explanations for the *why* of workers perceptions and legitimacy judgments and the observed variance in reactions: The configurations of a specific AC system, the organizational embedding of an AC system, or factors routed within the workers themselves such as their character traits.

This study focuses on the latter, since the character traits of workers facing AC in their everyday working life strongly impacts their perceptions and especially their legitimacy judgments of AC. Certain sectors, organizations or job roles, from a general perspective, attract certain types of workers. Workers in sales or distribution positions for example often have rather extroverted character traits. Most large firms and organizations however have a rather heterogenous workforce, where individual workers differ with regard to their character traits. In traditional organizational control, it is part of the responsibilities of human managers to respond to the individual characteristics of workers and give them the necessary consideration. Extant research showed, that this aspect is vitally important for successfully guiding and steering workers with regards to the goals of an organization (Hetland et al., 2008). This again picks up the behavioural perspective on organizational control we fund our research on, the alignment of

individual worker behaviour with the organization's goals. What workers need, to be motivated and steered towards a desired behaviour is highly individual. A mechanism or control attempt which motivates one worker, can have the opposite effect on another worker and vice versa. Taking character traits into account when researching the impact of AC on workers is therefore vitally important. While there is wide range of character traits, we focus on the specific variable of *competitive character traits*, which we included in the fsQCA conducted for the study at hand.

Competition in general plays a dominant role in many western societies across contexts like sports, education, the economy or interpersonal relationships. Looking at individuals, competitive character traits manifest themselves in the fact that a person wants to (a) perform better than other people, connected with (b) a strong desire to constantly improve one's own performance (Menesini et al., 2018). Extant research showed that the question whether a worker has stronger, or weaker competitive character traits can impact their work performance (Pflügner et al., 2021; Wang et al., 2018). In addition, extant research has shown that character traits, including competitiveness, have an influence on how workers want to be led and managed (Hetland et al., 2008; Uusi-Kakkuri & Brandt, 2015). Recent studies examined the impact of competitive character traits on aspects, closely connected to AC. Höllig et al. (2018) for example showed that competitive workers have explicitly positive perceptions and judgments regarding leaderboards in work environments, which can be seen as practical examples of algorithmic rating. Extant research additionally indicates that competitive character traits have a particularly significant impact in areas, where workers perform repetitive tasks that are also easy to measure and monitor. Both apply in particular to the logistics sector, as already mentioned, the current prime example of AC application in non-platform organizations. In addition, the properties of AC, as a particularly opaque, interactive and instantaneous form of organizational control, are of a considerable high relevance here. Against this background, we have included *competitive character traits* as an additional variable in our model for this paper, in order to investigate the influence on workers' legitimacy judgements regarding AC.

3 Research Methodology

The data for this study was collected via the platform *Prolific* in mid 2024. The sample consist of observations from workers from logistics centers and warehouses, the current prime example of AC application in non-platform contexts. At the beginning of the survey the participants were presented with a practical definition of AC (easy to understand definitions of the five AC forms from the 5RSM framework included in the survey) and were asked whether they get in contact with AC during their everyday work, which all invited participants answered positively. The recommended minimum sample size for QCA studies is 2^n with n being the number of included conditions (Pappas and Woodside, 2021). For the study at hand the minimum sample size there is 64. We invited 100 participants for our survey, 8 were excluded for failing attentions check, leading to a final sample size of n=92 observations. All surveyed constructs were measured with established scales. *AC* was measured with the PAC scale (Alizadeh, Hirsch,

Benlian, et al., 2023). *Legitimacy judgments* were measured using scales for *fairness* (Shin et al., 2020), *autonomy* (Morgeson & Humphrey, 2006; van Zoonen et al., 2023) and *competence development* (Deci & Ryan). These scales were already used in previous studies on AC and legitimacy and are founded on an established stream of literature in the specific topic of legitimacy (Bitektine and Haack, 2015; Wiener et al., 2023). The construct of *competitive character traits* was measured with the hyper-competitiveness subscale of the CAS scale (Menesini et al., 2018). All constructs in the study at hand rank above the required thresholds for reliability and validity measures. For the HTMT-ration all constructs rank below the strict threshold of 0.85. For AVE all values rank above the threshold of 0.5, for composite reliability all values rank above 0.7 and for Cronbach's Alpha above 0.8. A complete list of measurement items is available upon request and will be provided by the authors.

To now move from data collection to data analysis, we will now explain the method we used for the paper at hand, fuzzy-set Qualitative Comparative Analysis (fsQCA). QCAs in general "identifies whether specific conditions are necessary for an outcome to occur" and "whether specific configurations of conditions prove sufficient to evoke an outcome" (Mattke et al., 2022, p. 209). QCA identifies configurations that result in a specific outcome, by determining their sufficiency and necessary conditions (Mattke et al., 2022). Sufficiency refers to the occurrence of a specific outcome, if a particular configuration is present. QCA analyses data by building on set theory and applying Boolean algebra to analyse the relationship between several conditions and an observed outcome (Mattke et al., 2022; Ragin, 2008). In the following, we refer to 'conditions' as independent variables (AC and competitive character traits) and 'outcome' as a dependent variable (legitimacy judgments); similarly, configurations are a set of multiple conditions that lead to a chosen outcome. When applying fsQCA as a specific sub form from the group of QCA, the data is transformed into a fuzzy set ranging from [0-1], which reflects the degree of inclusion into a specific set (Ragin, 1987). The value of [1] represents a *full membership*, the value of [0] represents *no membership* and the value of [0.5] represents the *point of maximum ambiguity*. Table 1 reports all conditions with their respective anchor points (fully in – maximum ambiguity – fully out). We calibrated the data based on the 0.05, 0.5 and 0.95 percentiles of the dataset, for skewed variables the calibration was adjusted accordingly. We added the value of .000001 to all 0.5 values after the initial calibration to prevent excluding relevant configurations resulting from the subsequent analysis (Mattke et al., 2022; Pappas & Woodside, 2021).

Table 1. FsQCA Calibrations Anchor Points

Conditions	*Recommending*	*Restricting*	*Requiring*	*Rating*
	1.388–3.125–6.000	2.025–4.125–6.000	1.000–2.600–5.000	1.000–3.375–6.000
	Monitoring	*Competitive Character Traits*		
	1.000–3.000–5.580	2.061–3.944–5.717		
Outcome	*Autonomy*	*Fairness*	*Competence Development*	
	1.000–2.833–6.000	1.500–2.500–4.500	1.388–3.000–6.000	

After calibrating the data set, we set up a truth table and proceeded with logical minimizations by applying the Quine-McCluskey algorithm. For the minimization process we followed the guidelines of Pappas and Woodside (2021) and Mattke et al. (2022)

and also included the guidelines and recommendations from Dusa (2018) to ensure a robust and methodological sound analysis. For all minimizations we set 0.8 as the minimum for raw consistency and a minimum of 0.75 in PRI scores.

4 Results

Table 2 illustrates the results for the fsQCA studies for the legitimacy judgment dimensions *autonomy*, *fairness* and *competence development*. For overall solution consistency, overall solution coverage and PRI values, we referred to the thresholds suggested by literature (Mattke et al., 2022; Pappas & Woodside, 2021). All fsQCAs reported in the following section adhere to the respective thresholds: Overall solution consistency ≥ 0.75, overall solution coverage ≥ 0.3 and PRI ≥ 0.75.

To answer the research questions for this paper, we first conducted a fsQCA with the AC forms only. In this analysis, the sample is treated as a heterogenous group, so general conclusions can be drawn, about how workers judge AC in terms of its legitimacy. The results are shown in the upper chart of table 2.

In a second stage, we calculated fsQCAs, with the additional variable of *competitive character traits*, the results of which are shown in the lower chart of table 2. By comparing the two stages, we illustrate the impact of competitive character traits on workers legitimacy judgments, by analysing if differences occur for competitive workers (competitive traits present as core condition) or non-competitive workers (competitive traits absent as core condition). If competitive traits did not occur as a core condition, we would expect it to have no impact on workers legitimacy judgments for the respective legitimacy dimension.

Table 2. FsQCA Results

Results AC Only

Outcomes	**Fairness**				**Competence Development**			**Autonomy**
Conditions	F-1	F-2	F-3	F-4	CD-1	CD-2	CD-3	A-1
Recommending	⊗	●	●	⊗	●	●	●	●
Restricting	⊗	⊗	⊗	⊗	⊗	●		⊗
Requiring	⊗	●	⊗	●			●	
Rating	⊗	●	⊗	⊗	●			
Monitoring	●	●	⊗	⊗		⊗	⊗	⊗

Results AC + Competitive Character Traits

Outcomes	**Fairness**				**Competence Development**			**Autonomy**	
Conditions	F-5	F-6	F-7	F-8	CD-4	CD-5	CD-6	A-2	A-3
Recommending	⊗	⊗		●	●	●	⊗	●	●
Restricting	⊗	⊗	⊗	⊗		⊗	⊗	⊗	⊗
Requiring	⊗		⊗	●	●	●	⊗		⊗
Rating	⊗	⊗	⊗	●	●	●	⊗	●	⊗
Monitoring		⊗	⊗	●	●	⊗	⊗	⊗	⊗
Competitive Character Traits	⊗	⊗	⊗	●	●	⊗	⊗	⊗	●

However it did occur as a core condition for all three legitimacy dimensions assessed for the paper at hand. The findings from the second stage fsQCAs, which included the additional variable could either explain ambiguities and/or variances in the initial

fsQCAs, add additional information, or challenge the findings derived in the initial fsQCAs. The result tables are read in the way that workers judge the respective legitimacy judgments in a positive manner. That is, they judge the AC system in place at their workplace, or the AC components of the broader regime of organizational control at their workplace positively with regards to their feeling of autonomy, fairness and competence development. Bold dots and bold circled x'es in the result tables indicate core conditions of the respective configurations, indicating a strong explanatory value for the respective outcome variable, in this case the legitimacy dimensions. Regular, non-bold dots and circled x'es indicate peripheral conditions, which deliver additional explanatory value for the outcome variables (Fiss, 2011). To improve the interpretability of our results, configurations A2; F3; F4; CD3 and CD5 are not discussed in detail, since they only contain peripheral conditions.

In F1 and F2 workers in general require the presence of monitoring and the absence of restricting for a positive fairness judgment. F5 to F7 illustrate that non-competitive workers require the majority of AC forms as absent for a positive fairness judgment with a specific emphasis on rating. Competitive workers on the contrary value presence of rating for a positive fairness judgment, along with the absence of restricting and the presence of all further AC forms, them however just as peripheral conditions as seen in F8. This illustrates a clear distinction between competitive and non-competitive workers.

For CD1 recommending and rating need to be present with restricting being absent for a positive competence development judgment, in CD2 recommending and restricting need to be present, while monitoring needs to be absent. CD4 shows that for competitive workers especially recommending needs to be present for them to judge AC as positive for their competence development, requiring, rating and monitoring need to be present as well as peripheral conditions. CD6 on the contrary shows that non-competitive workers do not value AC for their competence development at all, with all AC forms needing to be absent, with recommending, requiring, and monitoring as core conditions. Again a clear distinction between competitive and non-competitive workers can be drawn for this legitimacy dimension.

For A1 recommending needs to be present as a core condition for a positive autonomy judgment along with the absence of restricting and monitoring. For competitive workers a clear picture emerges in A3 with only recommending needing to be present for a positive autonomy judgment and all further AC forms needing to be absent, restricting and requiring as core conditions. A similar configuration emerges for non-competitive workers in A2, however here no core conditions emerged, limiting its predictive power for a positive autonomy judgment. Notably non-competitive workers as well value recommending for their autonomy.

5 Discussion

5.1 Research Contributions and Practical Implications

Our study provides several contributions to the research on AC, worker legitimacy judgments and individual character traits. While a broad body of literature assessed AC in the context of platform organizations (Cram et al., 2022; Möhlmann et al., 2021; Zheng & Wu, 2022), less attention has been paid to researching AC in the context of non-platform organizations, even though AC application in both quantity and intensity is rapidly increasing here (Jarrahi et al., 2021; Nyman et al., 2023). Also, the question why workers facing the same AC regime judge it differently with regards to its legitimacy, was largely neglected by extant research.

Our results show that personal character traits of workers significantly impact their judgments of AC practices, in this study illustrated at the example of *competitive character traits*. For a positive autonomy judgment, competitive workers require the presence of algorithmic recommendations, along with the absence of requiring and restricting which defines an organizational control system leaving a maximum of decision space for workers to unfold, while on the other hand not giving the organizations many opportunities left for tighter forms of control. For the legitimacy dimension of fairness our results illustrate that the question if workers have strong competitive character traits or not, decisively impacts their judgments regarding AC and as a consequence ultimately as well their reactions and their behaviour in the workplace. Non-competitive workers reject the majority of AC forms when it comes to fairness judgments. Not a single AC form appears as a present condition in the respective fsQCA study. Notably the AC form of rating needs to be absent as a core condition. AC rating can be labelled as the AC form most directly connected to competitive character traits. For competitive workers, it needs to be present as a core condition in order for workers to judge the fairness of AC positively. It therefore can be stated that competitive workers judge AC, especially algorithmic rating as fair, while non-competitive workers judge AC as unfair, especially algorithmic rating. This finding is in line with extant research, for example on the connection of competitive character traits and leader boards, which can be seen as a practical example of AC rating. Here, previous studies showed that competitive workers judge such systems significantly better, than non-competitive workers (Elliott & Long, 2016). For the legitimacy dimension of competence development our results highlight that competitive workers judge all AC forms but restricting as positive, especially algorithmic recommendations. The completely opposite picture emerges when looking at non-competitive workers, who reject all forms of AC in regard to whether it helps them with their competence development, in particular recommending, requiring and monitoring. Seeing such a clear picture in a category as forward-looking as competence development, is likely to have a significant impact on how workers in the respective organization will develop under algorithmic organizational control. Workers, especially when permanently employed in a non-platform organization, generally do not have the option to opt-out of AC practices (Schafheitle et al., 2020). It can therefore be assumed that competitive workers will develop significantly better and faster under

AC than those who do not possess these traits and that the medium and long-term retention of non-competitive workers in the respective organization may even have to be called into question. This effect could be reinforced by the fact that extant research has found that a competitive environment further reinforces competitive traits (Wang et al., 2018). Therefore, if AC as an opaque, instantaneous and interactive technology meets repetitive, easy to measure tasks, as in the logistics sector and competitive workers in particular value AC for their personal development, while non-competitive workers do not, a self-reinforcing effect could arise to the detriment of non-competitive workers.

In summary our results show that competitive workers judge AC more positively with regard to the dimensions of fairness, autonomy and competence development compared to non-competitive workers. The former seem to favour AC configurations which help them to reach a maximum level of performance and comparison to other workers, while AC forms which would allow an organization to exert tighter forms of control on workers such as restricting or requiring a largely rejected. Non-competitive workers showed avers attitudes towards AC, generally requiring the absence of the majority of AC forms for positive fairness, autonomy, privacy and competence development judgments. Not a single AC form was found as a present core condition for non-competitive workers. As a conclusion, competitive workers are therefore more likely to follow algorithmic organizational control attempts, while non-competitive workers are more likely to engage in algoactivism and to push back against AC practices, which can ultimately result in negative outcomes for the respective organization (Wang, 2023). With this clear distinction of attitudes towards AC of competitive and non-competitive workers, our study highlights the importance of competitive character traits when researching the impact of AC and related constructs on workers, their judgments and ultimately their reactions and behaviours.

Regarding the practical implications, our study highlights that it is important to look at AC systems from a configurational perspective, rather than at an aggregated, overall system level, or on the basis of individual, isolated control forms. Individual components of control regimes can have completely different effects depending on how they interact with other components and thus ultimately have a different impact on the success of an organization, which confirms findings from extant research (Alizadeh, Hirsch, Jiang, et al., 2023). As a second practical implication our study reveals that there is no ‘one fits all’ solution when it comes to AC systems in practice. When AC systems, either as stand-alone organizational control systems or as part of hybrid control regimes, are applied to a diverse workforce, different types of workers need to be taken into consideration. What motivates one worker, can have the opposite effect on another worker (Breu & Yasseri, 2023). While human managers were responsible for meeting the individual needs of workers in pre-AC times, AC system now need to be designed and enabled to do the same. Non-platform organizations introducing AC to their control regime therefore need to carefully consider this aspect by either designing the AC components to be able to cater to individual workers needs, or to need to sensitize their human supervisors to this aspect.

5.2 Limitations and Future Research

When interpreting the results of our study, some limitations should be taken into account. First, we conducted this study with a focus on the logistics and warehousing sector. Expanding research to further sectors will add additional insights into workers judgments of AC practices in general and the impact of character traits in particular. Second, while we illustrate the impact of competitive character traits, further variables might additionally impact workers legitimacy judgments of AC and with that as well their reactions to AC practices. Third, we collected our sample via the panel provider *Prolific* and therefore have a sample spread over several different organizations. Future research could assess specific structures and mechanisms within one specific organization.

The construct of microlevel legitimacy is a well-established lens to capture the impact of technological artefacts on users (workers), along with the specific dimensions used for the study at hand: fairness, autonomy and competence development. Our results show that while the presence of a specific AC form can in one case be necessary for a positive legitimacy judgment, while for the positive outcome of another judgment it needs to be absent. As already illustrated in the beginning of this paper, AC or hybrid control regimes are configurated quite differently in practice, which impacts workers perceptions, judgments and ultimately their reactions. To better understand and assess how workers perceive, judge and react to being exposed to AC, future research could also take the relative importance into account the individual legitimacy dimensions have for individual workers. While some workers might pay special attention to their no being invaded in their workplace, others might focus on maintain their autonomy as their main goal.

5.3 Conclusion

This study examined workers' legitimacy judgments of AC in the context of non-platform organizations and assessed the impact of character traits on workers' legitimacy judgments. We applied the method of fsQCA to derive configurations which lead to positive worker legitimacy judgments. Our findings show that competitive character traits impact how workers judge AC, for this paper in the specific context of non-platform organizations. With regards to the legitimacy dimension of competence development for example our findings illustrate, that workers with competitive character traits judge AC significantly positively in contrast to workers with low competitive character traits, which reject AC with regards to the dimension of competence development. Overall, our study contributes to a more nuanced understanding of the impact AC has on non-platform workers. Our study highlights that it is important to consider individual characteristics of workers, both in the research of AC and in its practical application, as these significantly influence the judgments of AC and thus ultimately the success of AC when applied by organizations in practice. Our study further emphasizes the importance of researching AC from a configurational perspective.

References

Algorithm Watch (2023). https://algorithmwatch.org/en/wp-content/uploads/2023/02/2023_AlgorithmWatch_ITUC_Report.pdf

Alizadeh, A., Hirsch, F., Benlian, A., Wiener, M., & Cram, W. A. (2023). Perceived Algorithmic Control: Conceptualization and Scale Development. ECIS Proceedings, 1-16.

Alizadeh, A., Hirsch, F., Jiang, J., Wiener, M., & Benlian, A. (2023). A Taxonomy of Algorithmic Control Systems. ICIS Proceedings, 1-17.

Altenried, M. (2022). The Digital Factory. University of Chicago Press.

Battilana, J., & Casciaro, T. (2013). Overcoming Resistance to Organizational Change: Strong Ties and Affective Cooptation. Management Science, 59(4), 819-836.

Benlian, A., Wiener, M., Cram, A. W., Krasnova, H., Maedche, A., Möhlmann, M., Recker, J., & Remus, U. (2022). Algorithmic Management. Business & Information Systems Engineering, 64, 825.

Beverungen, A. (2021). "The Invisualities of Capture in Amazon's Logistical Operations," Digital Culture & Society 7 (2), 185-202.

Bitektine, A., & Haack, P. (2015). The "Macro" and the "Micro" of Legitimacy: Toward a Multilevel Theory of the Legitimacy Process. Academy of Management Review, 40(1), 49-75.

Breu, A., & Yasseri, T. (2023). What drives passion? An empirical examination on the impact of personality trait interactions and job environments on work passion. *Current Psychology*, *42*(17), 14350-14367.

Byrne, D., & Ragin, C. (2009). Using Cluster Analysis, Qualitative Comparative Analysis and NVivo in Relation to the Establishment of Causal Configurations with Pre-existing Large N Datasets: Machining Hermeneutics. In D. Byrne & C. Ragin (Eds.), The SAGE Handbook of Case-based Methods (pp. 260-268). Sage Publications.

Cameron, L., Lamers, L., Leicht-Deobald, U., Lutz, C., Meijerink, J., & Möhlmann, M. (2023). Algorithmic Management: Its Implications for Information Systems Research. Communications of the Association for Information Systems, 52(1), 518-537.

Cram, A. W., Wiener, M., Tarafdar, M., & Benlian, A. (2022). Examining the Impact of Algorithmic Control on Uber Drivers' Technostress. Journal of management information systems, 39(2), 426-453.

Deci, E. L., & Ryan, R. M. Perceived Competence Scales. Center for Self-Determination Theory.

Delfanti, A. (2021). The Warehouse: Workers and Robots at Amazon. Pluto Press.

Dusa, D. (2018). QCA with R. Springer.

Elliott, C. S., & Long, G. (2016). Manufacturing rate busters: computer control and social relations in the labour process. Work, Employment and Society, 30(1), 135-151.

Fiss, P. C., (2011). Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research. The Academy of Management Journal, 54(2), 393-420.

Hetland, H., Sandal, G. M., & Johnsen, T. B. (2008). Followers' Personality and Leadership. Journal of Leadership & Organizational Studies, 14(4), 322-331.

Hirsch, F., Alizadeh, A., Wiener, M., & Benlian, A. (2024). The Uberization of Work: Non-Platform Workers' Perceptions and Legitimacy Judgments of Algorithmic Control in Hybrid Control Regimes. ICIS Proceedings, 1-17.

Hirsch, F., Alizadeh, A., Wiener, M., & Cram, A. W. (2023). Algorithmic Control in Platform and Traditional Work Settings: An Updated Conceptual Framework. ECIS Proceedings, 1-16.

Höllig, C. E., Tumasjan, A., & Welpe, I. M. (2018). The Interaction of Trait Competitiveness and Leaderboard Design-an Experimental Analysis of Effects on Perceptions and Usage Intention. HICSS, 1-10.

Jarrahi, M. H., Newlands, G., Lee, M. K., Wolf, C. T., Kinder, E., & Sutherland, W. (2021). Algorithmic management in a work context. Big Data & Society, 8(2), 1-14.

Jarrahi, M. H., Möhlmann, M., & Lee, M. K. (2023). Algorithmic Management: The Role of AI in Managing Workforces. MIT Sloan Management Review, 64(3), 1-5.

Jiang, J. (2023). Covert Resistance Against Algorithmic Control on Online Labor Platforms - A Systematic Literature Review. ECIS Proceedings 1-17.

Kellogg, K. C., Valentine, M. A., & Christin, A. (2020). Algorithms at Work: The New Contested Terrain of Control. Academy of Management Annals, 14(1), 366-410.

Kempf, Maximilian; Simić, Filip; Alizadeh, Armin; and Benlian, Alexander, "Transparency of Algorithmic Control Systems and Worker Judgments" (2024). Wirtschaftsinformatik 2024 Proceedings. 5.

Kirsch, L. J. (2004). Deploying Common Systems Globally: The Dynamics of Control. Information Systems Research, 15(4), 374-395.

Lee, M. K., Kusbit, D., Metsky, E., & Dabbish, L. (2015). Working with machines: The impact of algorithmic and data-driven management on human workers. Proceedings of the 33rd annual ACM conference on human factors in computing systems, 1603-1612.

Mattke, J., Maier, C., Weitzel, T., Gerow, J. E., & Thatcher, J. B. (2022). Qualitative Comparative Analysis (QCA) in Information Systems Research: Status Quo, Guidelines, and Future Directions. Communications of the Association for Information Systems, 50, 208-240.

Menesini, E., Tassi, F., & Nocentini, A. (2018). The Competitive Attitude Scale (CAS): A Multidimensional Measure of Competitiveness in Adolescence. Journal of Psychology & Clinical Psychiatry, 9(3), 240-244.

Misangyi, V. F., Greckhamer, T., Furnari, S., Fiss, P. C., Crilly, D., & Aguilera, R. (2017). Embracing Causal Complexity: The Emergence of a Neo-configurational Perspective. Journal of Management, 43(1), 255-282.

Möhlmann, M., Zalmanson, L., Henfridsson, O., & Gregory, R. W. (2021). "Algorithmic Management of Work on Online Labor Platforms: When Matching Meets Control," MIS Quarterly 45 (4), 1999-2022.

Morgeson, F. P., & Humphrey, S. E. (2006). The Work Design Questionnaire (WDQ): Developing and Validating a Comprehensive Measure for Assessing Job Design and the Nature of Work. Journal of Applied Psychology, 91(6), 1321-1339.

Nyman, S., Bødker, M., & Blegind Jensen, T. (2023). Reforming work patterns or negotiating workloads? Exploring alternative pathways for digital productivity assistants through a problematization lens. Journal of Information Technology, 39(3), 503-520.

Ouchi, W. G. (1979). A Conceptual Framework for the Design of Organizational Control Mechanisms. Management Science, 25(9), 833-848.

Pappas, I. O., & Woodside, A. G. (2021). Fuzzy-set Qualitative Comparative Analysis (fsQCA): Guidelines for Research Practice in Information Systems and Marketing. International Journal of Information Management, 58, 1-23.

Pflügner, K., Maier, C., Mattke, J., & Weitzel, T. (2021). Personality Profiles that Put Users at Risk of Perceiving Technostress: A Qualitative Comparative Analysis with the Big Five Personality Traits. Business & Information Systems Engineering, 63, 389-402.

Ragin, C. (1987). The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies. University of California Press.

Ragin, C. (2008). Redesigning Social Inquiry: Fuzzy Sets and Beyond. University of Chicago Press.

Rani, U., Pesole, A. and Gonzalez Vazquez, I.*, Algorithmic Management practices in regular workplaces: case studies in logistics and healthcare*, Publications Office of the European Union, Luxembourg, 2024.

Schafheitle, S., Weibel, A., Ebert, I., Kasper, G., Schank, C., & Leicht-Deobald, U. (2020). No stone left unturned? Toward a framework for the impact of datafication technologies on organizational control. Academy of Management Discoveries, 6(3), 455–487.

Shin, D., Zhong, B., & Biocca, F. A. (2020). Beyond User Experience: What Constitutes Algorithmic Experiences? International Journal of Information Management, 52, 1-11.

Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. Academy of Management Review, 20(3), 571-610.

Urzì Brancati, M., C., Curtarelli , M., Riso, S., Baiocco, S. How digital technology is reshaping the art of management, European Commission, Seville, 2022, JRC130808.

Uusi-Kakkuri, P., & Brandt, T. (2015). Preferred Leadership Behaviours by Different Personalities. International Journal of Business and Globalisation, 15(4), 461-474.

Vallas, S. P., Johnston, H., & Mommadova, Y. (2022). Prime Suspect: Mechanisms of Labor Control at Amazon's Warehouses. Work and Occupations, 49(4), 421-456.

Vallas, S. P., & Kronberg, A.-K. (2023). Coercion, Consent, and Class Consciousness: How Workers Respond to Amazon's Production Regime. *Socius*, *9*, 1-16.

van Zoonen, W., ter Hoeven, C., & Morgan, R. (2023). Finding Meaning in Crowdwork: An Analysis of Algorithmic Management, Work Characteristics, and Meaningfulness. The Information Society, 39(5), 322-336.

Walser, R., Cram, W. A., Bernroider, E. W. N., & Wiener, M. (2021). Control Choices and Enactments in IS Development Projects: Implications for Legitimacy Perceptions and Compliance Intentions. Information & Management, 58(7), 1-16.

Wang, Q. "The Impact of AI on Organizational Employees: A Literature Review." *J. Educ. Humanit. Soc. Sci* 19 (2023): 45-53.

Wang, H., Wang, L., & Liu, C. (2018). Employee Competitive Attitude and Competitive Behavior promote Job-crafting and Performance: A Two-component Dynamic Model. Frontiers in Psychology, 9, 1-13.

Wiener, M., Cram, A. W., & Benlian, A. (2023). Algorithmic Control and Gig Workers: A Legitimacy Perspective of Uber Drivers. European Journal of Information Systems, 32(3), 485-507.

Zheng, Y., & Wu, P. F. (2022). Producing speed on demand: Reconfiguration of space and time in food delivery platform work. Information Systems Journal, 32(5), 973-1004.