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Gig Workers and Psychological Contract Breach: Implications for HRM

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Abstract: The rapid growth of online labour platforms has reshaped management practices, as task allocation, performance tracking, assessment and remuneration are now integrated into algorithmic processes. This paper examines psychological contract violation among gig economy employees through perceived algorithmic control, platform support and procedural justice, while accounting for algorithmic transparency as a limiting factor. The theoretical background comprises Psychological Contract Theory, Social Exchange Theory and Organizational Justice Theory and it provides a basis for the development of an integrated model that confirms the correlation among the above-mentioned variables in a sample of 450 gig workers from India. Methodologically, the use of Partial Least Squares Structural Equation Modelling (PLS-SEM) allowed establishing the relations between the selected variables. The results of the investigation showed that perceived algorithmic control raised the risk of violation of the psychological contract, while the support of the platform by the employees had the opposite impact on this phenomenon and reduced the risk of violation. In addition, findings proved that algorithmic transparency made the link between algorithmic control and psychological contract violation weaker. Hence, the research broadened the existing knowledge about the impact of algorithmic governance.

Keywords: Gig Economy, Psychological Contract Breach, Algorithmic Management, Perceived Algorithmic Control, Platform Support, Procedural Fairness, Algorithmic Transparency, Human Resource Management

INTRODUCTION

Digital labour platforms have transformed the way work is organized by relying on algorithms to allocate tasks, track performance, calculate payouts and shape the future of workers. These systems may allow for improved coordination and speed, but can also shift managerial authority in unique ways compared to traditional employment [1,2]. But the implications of these are not confined to efficiency; they can impact gig workers' sense of autonomy, their sense of fairness and the expectations of what the platform owes them for their work. Algorithmic management is thus not just a technological configuration, but a part of the platform-platformer connection [3]. The relationship can be understood using psychological contract theory. A psychological contract is a person's expectations regarding the mutual commitments of two parties [4]. Psychological contract breach occurs when the employee believes that the other party has not performed an obligation and it can be a subjective perception rather than just an adverse outcome [5,6]. In places like forums, one can have expectations of reliable payment, access to jobs, proper evaluation, help with problems and the consistent enforcement of rules. But these expectations are often driven by algorithmic decisions with little or no basis for understanding or challenge.

For the first time, attention is being paid to psychological contracts in algorithmic management. In five experiments, Tomprou and Lee [7], discovered the meanings of algorithmic rather than human agents to be contingent on the type and the means of the organizing inducements. Qualitative research among ride-hailing workers in Mumbai has also found examples of how the discrepancies between expectations and practices of the platform can manifest as a violation of their psychological contract [8]. Recently, research has found a connection between perceived algorithmic control and psychological contract breach, gig workers' turnover intention [9] and psychological-contract processes and work engagement [10]. These studies show the relevance of the issue and that the psychological contract breach approach has been frequently included in the study of other mechanisms in broader outcome models, but has not been studied together with specific platform-governance conditions. This leaves a theoretical gap. While psychological contract theory is able to explain how it is that workers make judgments on whether or not their obligations have been met, it alone does not offer a definition of how specific

aspects of algorithmically managed work influence those judgments. In the meantime, research on algorithmic management highlights the processes of control, evaluation and contestation, but the literature is still inconsistent in its conceptualization, mechanisms and conditions of use [2,11]. This is addressed in the present study by introducing a dialogue between the psychological contract, social exchange and Organizational justice theories. This integration has taken into account three theoretically different aspects of platform governance: perceived algorithmic control (direction and monitoring), subjective perception of assistance and responsiveness (platform support) and perceived procedural fairness (process of how platform decisions are made) [12-14].

Another gap around the algorithmic control relates to the extent to which control is linked to perceived breach. Different workers might have different understandings of control, depending on the rules and rationale for algorithmic decision-making that they can understand. Transparency of algorithms is thus discussed rather than taken for granted as a panacea. In a recent study of purpose and process transparency, Li *et al*. [15], demonstrate that while purpose transparency might have positive implications, the same cannot be said for process transparency, as there may be negative consequences when it comes to gig workers' disengagement. To test whether transparency impacts the relationship between perceived algorithmic control and psychological contract breach and to examine platform support and procedural fairness as correlates of psychological contract breach separately. The study examines such connections among people who do gig work in India, especially with the food delivery and ride-hailing services they use through apps. It is a novelty because of three related contributions. First, it overcomes the limited scope of algorithmic control as the only immediate precursor of platform-level control and includes the concepts of control, support and procedural fairness. Second, it takes up the question of whether transparency matters and asks when the relationship between control and breach may be lessened. Third, it brings this integrated model to the platform-work context in India and extends the earlier qualitative evidence from India with a model to evaluate the proposed relationships at the same time. The study examines the links between the three constructs of platform governance and psychological contract breach using survey data and partial least squares structural equation modelling and tests the moderating effect of platform transparency. By adopting this approach, it shifts the focus from the operational aspects of digital management to its relational implications, thereby advancing HRM scholarship in this direction. It also provides ground for platform managers to take into account designing algorithms to go together with responsive support and just decision procedures when trying to keep great relationships with gig employees.

Literature Review

Gig Economy and Algorithmic HRM: Many service sectors have experienced a transformation of work allocation, monitoring and remuneration due to digital labour platforms. Relying more and more on algorithms to allocate tasks, assess performance and adjust access to tasks. Duggan *et al*. [1], describe algorithmic management as having the capacity to restructure the nature of employment relations, as it facilitates coordination of work and managerial decision-making. According to Kellogg *et al*. [2], algorithms are tools to guide, measure and punish employees. Algorithmic management is not one-size-fits-all. Platforms employ systems to organize activities, monitor performance and provide rewards [3] and Kadolkar *et al*. [11], found that algorithmic management is used in different ways and connected to different outcomes for workers. It is therefore more precise to consider control, support and procedural fairness as a set of influences that can be examined separately from platform technology to better understand the workers' reactions.

Psychological Contract Breach in Platform Work

Psychological contracts relate to beliefs of mutual commitments in a work relationship [4]. Breach is when the worker feels that something has not been done. The idea that discrepancies between the expected and the delivered inducements can generate breach is explained in Morrison and Robinson [5] and Robinson and Morrison [6], differentiate perceived breach from the emotional experience of violation. These principles are not only applicable to gig work but also hold true for regular work. The expectations of the workers may be affected by interactions related to payment, assignment, rating, assistance and penalties. In five experiments, Tomprou and Lee [7], showed that the effects of algorithmic vs. human agents varied with the nature and manner of the Organizational incentives. In Sherman *et al*. workers consider the intentions behind algorithms when forming psychological contracts in app-work.

Perceived Algorithmic Control

Perceived algorithmic control is the degree to which workers feel that algorithms are controlling their activities, monitoring their performance and shaping their behaviour. Control can be exercised through task allocation, ratings, incentive rules and decisions regarding future work. Kellogg *et al*. [2], demonstrate how algorithmic systems develop new forms of managerial control and contestation from workers. Coordinating dispersed workers is a strength of guidance; however, monitoring and restrictions may create concerns regarding autonomy, accountability and opportunities to challenge decisions. According to psychological contract theory, the interpretation of control is related to employees' perceptions of reciprocal obligations. If platform practices are inconsistent with these

expectations, workers may see it as an indication that the platform is not fulfilling its responsibilities [5]. Gig worker studies also emphasise the importance of algorithmic control for psychological-contract processes and engagement [10]. Therefore, the element of perceived control needs to be studied separately as a characteristic of platform governance.

Platform Support and Procedural Fairness

Platform support is the perception of access to support, resources and responsive communication. It is based on what workers think of their organizations' support, that is, whether workers feel that their organizations value their contributions and care about their welfare [12]. Cropanzano & Mitchell [14], pointed out that the social exchange theory suggests that treatment affects people's expectations of reciprocity. In gig work, prompt help and effective complaint mechanisms can be a sign that the platform is aware of workers' concerns. Procedural fairness - the consistency with which decisions are made, applying consistent procedures that are accurate and that can be reviewed. Colquitt [13], put forward the concept of procedural justice as a separate component of Organizational justice. Where algorithms affect worker allocation, ratings, payment tweaks or penalties, it's important when this happens, particularly when workers have fewer opportunities to interact with human decision-makers. An algorithmic HR decision is also found to be relevant to worker attitudes in the context of gig workers, as well as perceived Organizational support. The issue of support is the kind of support that is provided, while the issue of fairness is regarding how decisions are taken.

Algorithmic Transparency

The question of algorithmic transparency relates to the ability of workers to comprehend how algorithmic systems work and why decisions are made. Task allocation, evaluation standards, rewards and penalties might influence the perception of the understandability and legitimacy of control. Transparency can help to mitigate uncertainty, but disclosure does not guarantee fair treatment and living up to perceived obligations. In a study, Li *et al*. [15], provide a distinction between purpose transparency and process transparency and demonstrate how the two impact gig workers' disengagement in different ways. Their results warn that more information isn't necessarily better. The best use of transparency might be in explanations that are consequential and provide information to which workers can respond. It is therefore pertinent both as a feature of the platform as well as a factor that can influence the perception of algorithmic control and interaction with the platform among workers.

Theory-Based Framework

The psychological contract breach is an important dimension of the relationship between workers and Organizations because it concerns individuals' perception that they were not treated in a way that is in accordance with their expectations [4]. This is the case in platform-mediated work, where an understanding of the phenomenon involves taking into account how digital systems shape workers' work activities and how workers understand the responsibilities in relation to the digital system. Algorithmic management is taking over much of the managerial work that was once done by people, such as allocating tasks, tracking performance and managing payroll, thereby changing the nature of managerial control in the gig economy [3]. Although previous studies have contributed to the knowledge of algorithmic control and psychological contracts, the present study connects three separate aspects of platform governance: algorithmic control, platform support and procedural fairness, with regard to the relationship between those dimensions and psychological contract breach. Psychological Contract Theory serves as the general framework for staff relationships, whilst Social Exchange Theory and Perceived Organizational Support help to account for the importance of platform support. Organizational Justice Theory helps to explain the basis for workers' perception of platform processes. These views are supported by algorithmic transparency, which is suggested as one boundary condition of algorithmic control workers' interpretation. In combination, they offer an integrated theory of PCB that takes into account platform control as well as the relational and procedural environment of platform control.

Psychological Contract Theory and Algorithmic Control

Psychological Contract Theory is an explanation of the mental model that people form about mutual expectations or obligations between themselves and a person with whom they have a working relationship. Such beliefs can be rational or irrational, or they can develop from what is said in the contract or from the Organization's communications and previous experiences [4]. Morrison and Robinson [5], also provide a definition of perceived breach as the interpretation by the individual that the Organization has not fulfilled an obligation or obligations. Thus, breach is not an inevitable result of an adverse result from the work, but rather an evaluation of the failure to meet expectations. This is especially relevant to gig work, as there are many non-standard job arrangements, but platforms still have a strong influence over the job process. Platforms can use algorithmic systems to coordinate assignments, track results and decide on rewards or opportunities for future work [3]. These can impact the autonomy, consistent treatment and explanation of decisions regarding work by the worker. Where control experienced by workers seems to be inconsistent with these expectations, members may see the practices of the platform as proof of unfulfilled obligations. Using algorithmic agents instead of human

agents can impact the development and experience of psychological contracts, contingent on the kind of Organizational inducements, according to research by Tomprou and Lee [7]. This indicates that algorithmic management does not have the same relational implications in all situations. Rather, the meaning of control is linked to the link between platform practices and workers' perceived obligations. Rather, the meaning of control is tied to the correspondence between practices on the platform and workers' perceived obligations. Based on these arguments, this study hypothesises that higher perceived algorithmic control will be positively related to psychological contract breach.

- **H1:** Perceived algorithmic control is positively associated with psychological contract breach among gig economy worker

Social Exchange Theory and Platform Support

However, Social Exchange Theory provides a complementary explanation as to why platform support might be related to psychological contract breach. The theory focuses on the reciprocity of relationships, as the way one party treats the other determines how the other party thinks and feels about the proper reactions and future exchanges [14]. POS also clarifies the nature of people's beliefs about an organization's valuing of their contribution and concern for their well-being [12]. Gig workers might not be in a traditional work deal, but there can be an ongoing exchange of labour, time, performance data and access to earnings opportunities between the gig worker and the platform. Platform support in the form of assistance, being responded to and communicating, is a form of recognising workers' contributions and responsibility for them and can communicate this. These signals can help build confidence in the working relationship and expectations of reciprocity. On the other hand, if employees are facing issues and are not getting the support they need, they might feel that the platform isn't giving them what it promises. When workers rely on the platform to coordinate work, but have a limited number of human decision-makers, these perceptions can be especially consequential. Support for the platform is thus seen as a relational resource from a social exchange perspective that elicits lower psychological contract breach.

- **H2:** Platform support is negatively associated with psychological contract breach among gig workers

Organizational Justice Theory and Procedural Fairness

The theory of Organizational Justice serves as the theoretical foundation to understand the link between the fairness of platform decision-making procedures and psychological contract breach. Procedural justice is about the fairness of the processes through which decisions are made rather than the outcome of such a process and is separate from whether the outcome is favourable to those involved [13]. Rosen *et al*. [24], also conclude that the terms of procedural justice and Organizational context are also important in employees' feelings of psychological contract violation. Platform processes are used to make decisions about how to allocate tasks, how to measure performance, how to reward and penalise performance and how to respond to complaints in the gig economy. Workers can evaluate these procedures according to their consistency, impartiality, accuracy and opportunities for challenging decisions. If procedures are seen as fair, workers might have more justification to see the decisions made on platforms as valid procedures, even if they are not always beneficial to them personally. On the other hand, poor or inconclusive decisions could raise questions regarding the platform's mission. Where algorithmic systems are used to make decisions without giving workers direct explanations or meaningful opportunities to review those decisions, this is important. It may then be possible to maintain a more credible platform-worker relationship by ensuring the fairness of the decision-making process is consistent with the platform workers' perceptions of fairness. The study thus predicts that perceived procedural fairness and psychological contract breach are negatively associated.

- **H3:** Perceived procedural fairness is negatively associated with psychological contract breach among gig economy workers

Algorithmic Transparency as a Boundary Condition

The framework is extended by algorithmic transparency, which aims to clarify the possible different relationships between perceived algorithmic control and psychological contract breach that can be found among workers. Transparency refers to the degree of understandability of what algorithmic systems are used for, how they work and how decisions are made. Workers may not be able to explain why tasks are delegated, how they are assessed, or why they may be rewarded or not for their performance if the control is digital. This limited visibility can make it difficult for them to understand the practices on the platform. Increased transparency could offer information that could assist workers in understanding the rationale behind algorithmic decisions. If controls are more comprehensible, then workers may have more opportunities to distinguish between what is a normal part of the work and what they think is not, if it is inconsistent with their sense of responsibility. Therefore, transparency can decrease the positive link between algorithmic control and psychological contract breach. However, transparency does not have to mean fairness or contractual obligation. Li *et al*. [15], show that the consequences of algorithmic transparency depend on its purpose and form,

indicating that disclosure does not necessarily produce uniformly favourable outcomes. In this context, transparency is interpreted as a boundary condition that can change the meaning of control but is not necessarily a means of solving the problem of psychological contract breach (Figure 1).

- **H4:** Algorithmic transparency weakens the positive relationship between perceived algorithmic control and psychological contract breach

Development of the Integrated Theoretical Framework

The proposed framework brings together the concepts of Psychological Contract Theory, Social Exchange Theory and Organizational Justice Theory to address psychological contract breach in algorithmically managed gig work. Each view provides insights into a separate aspect of the model. The psychological contract theory was used to explain the perception of unmet obligations, the social exchange theory was used to explain the importance of platform assistance to the relationship and the Organizational justice theory was used to explain the importance of the fairness of decision-making procedures. Algorithmic transparency introduces a conditional element, suggesting that an algorithmic breach is associated with an algorithmic control that depends on workers' level of transparency. The framework thus extends the definition of psychological contract breach beyond that of a reaction to the lack of adequate Organizational inducements. It situates perceptions of breaches in a platform-governance context where control, support and procedural fairness can be correlated to different aspects of workers' assessments of the platform relationship. Theoretically, it helps to develop an understanding of how different management practices can lead to different types of experiences of the same digital environment and how different information can lead to a different interpretation of these practices. In the next step of the analysis, the proposed relationships are tested with an empirical method and the cross-sectional design does not allow causal interpretations and conclusions about temporal processes.

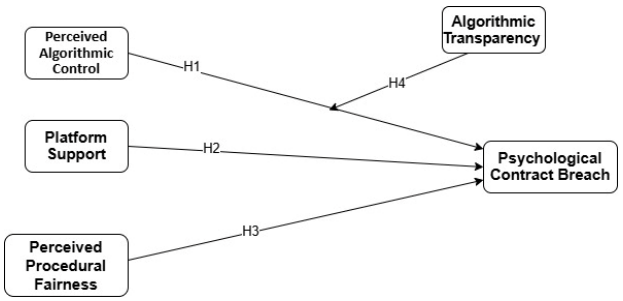


Figure 1: Conceptual Framework
Source: Author's own work

MATERIALS AND METHODS

Research Design

The quantitative cross-sectional research design is used in this study to analyse the psychological contract breach factors of gig economy workers, as well as the boundary-contingent role of algorithmic transparency. The research builds on the assumption that the employment relationship of platform-mediated work is different from the conventional employment relationship, as several traditionally human-centred human resource management functions are increasingly carried out via digital platforms and algorithmic systems. Specifically, algorithmic systems can be used to allocate tasks, track performance, reward workers and determine further chances for work, thereby providing a unique form of HRM control in the gig economy [3]. The empirical framework includes perceived algorithmic control, platform support and perceived procedural fairness as antecedents and algorithmic transparency as a moderating condition of the psychological contract breach. The model thus makes a distinction between the managerial mechanisms by which platforms regulate work and the relational interpretation that workers give to such managerial mechanisms. This is especially important as psychological contracts are workers' perceptions of reciprocal obligations and studies have shown that the psychological violation of the psychological contract is conceptually separate from the emotional reaction of the violation [6]. A survey-based design is used as the platform is a design construct that reflects workers' perceptions and evaluations of their relationship with the platform. Partial Least Squares Structural Equation Modelling (PLS-SEM) is used to evaluate the measurement and structural models. PLS-SEM can be used when the goal is to explore theoretically based relationships between multiple latent variables and to consider predictive evaluation and interaction effects, as discussed by Hair *et al*. [16]. The study uses PLS-SEM as the technique for the proposed research model, which has several latent variables and a moderation relationship. The approach not only allows for the measurement model to be evaluated for reliability and validity, but it also enables the simultaneous estimation of hypothesised structural relationships. The traditional "10-times rule" was not applied for determining the adequacy of the sample; instead, the contemporary PLS-SEM sample-size procedures were considered. Kock and Hadaya [17], prove that both the inverse-square-root and the gamma exponential methods are more defensible alternatives for the minimum number of samples required in PLS-SEM.

Measurement Instrument and Data Collection

The questionnaire was designed based on existing measurement instruments and wording was adjusted as needed to capture platform-based gig work. It included two parts: the demographic information (age, gender, education, platform type, platform tenure, work arrangement and weekly hours) and measures of the five constructs, each measured on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Perceived Algorithmic Control was based

on the gig-worker measure of Pei *et al*., which included standardised guidance, tracking and evaluation and behavioural constraints. It reflects algorithmic direction, monitoring and behavioural restrictions, which are representative of algorithmic HRM control [3]. Platform Support is the perception of the availability of platform support, resources and responsiveness. It is based on perceived Organizational support, which is related to feeling valued and supported [12]. Contextualisation of items to the platform relationship. Perceived Procedural Fairness refers to the fair and uniform nature of the decision-making procedures of platforms. Items were adapted from Colquitt's [13], Organizational justice instrument and its measurement was informed by the task allocation, performance assessment, reward, penalty and complaint procedures items. Algorithmic Transparency includes workers' awareness that the platform provides an understanding of how algorithmic decisions are made. Evidence of complex effects of transparency in gig work has led to its inclusion as a boundary condition. Psychological Contract Breach is identified as the failure to deliver on the obligations and commitments [6]. The items were modified from the traditional employment to a platform-worker relationship. The clarity and relevance of the questions and the time needed to complete the questions, should be tested by experts before final administration and by platform workers.

Sampling and Respondent Profile

This study aims to identify and analyze the target population of gig economy workers who work through app-based platforms in India, specifically those involved in food delivery and ride-sharing services. Eligible participants are those who are 18 years and above, currently work on a digital platform and have accumulated 3 months of work experience on the platform. These criteria are designed to provide good exposure to algorithmic management and platform-worker relationships. The proposed empirical study requires the use of purposive sampling, as a complete sampling frame of gig workers in India on platforms might be hard to come by. The recruitment process can use worker networks, online communities and contacts in the field and can include questions in the screening process that check eligibility. The proposed number of valid responses is 450 and based on an a priori statistical power analysis, the final number is warranted. In Table 1, the demographic and work characteristics of the data set are summarized. The age group 26–35 years old makes up the largest age group (42.7%), with 18–25 years making up 27.3%. There are 75.6% of records for males and 20.4% for females. As far as education is concerned, the group with a higher secondary degree is the largest group (32.0%), followed by the group with a bachelor's degree (29.1%). 52.4% of the records are for food delivery workers, while 37.6% are for ride-hailing workers and 10.0% are for other app-based workers. Almost half of the records (47.6%) list platform duration as 1-3 years. People usually work full-time (64.0%) and 46.0% of the records are in the 40-59 hours category. When aggregated, the distributions will show an overall trend towards relatively young, male, food delivery and full-time platform workers.

Table 1. Demographic and Work-Related Profile

Characteristic	Category	Frequency (n)	(%)
Age	18–25 years	123	27.3
	26–35 years	192	42.7
	36–45 years	93	20.7
	46 years and above	42	9.3
Gender	Man	340	75.6
	Woman	92	20.4
	Non-binary/another identity	10	2.2
	Prefer not to say	8	1.8
Education	Up to secondary	70	15.6
	Higher secondary	144	32.0
	Diploma/ITI	57	12.7
	Bachelor's degree	131	29.1
	Postgraduate or above	48	10.7
Platform type	Food delivery	236	52.4
	Ride-hailing	169	37.6
	Other eligible app-based services	45	10.0
Platform tenure	3–6 months	89	19.8
	7–12 months	101	22.4
	1–3 years	214	47.6
	Over 3 years	46	10.2
Work arrangement	Full-time	288	64.0
	Part-time	132	29.3
	Occasional	30	6.7
Weekly working hours	Under 20 hours	26	5.8
	20–39 hours	120	26.7
	40–59 hours	207	46.0
	60 hours or more	97	21.6
Total		450	100.0

Source: Authors' calculations from the survey data

RESULTS

The data analysis was carried out systematically based on the existing procedure in conducting PLS-SEM. The data set was first reviewed for missing data, gaps in data, outliers and possible data quality problems. IBM SPSS Statistics 26 was used to analyze descriptive statistics and the respondent demographic profile. The model to be tested was then evaluated by the software Smart PLS. Indicator reliability, internal consistency reliability, convergent validity, discriminant validity and collinearity were used in the evaluation of the measurement model. To evaluate discriminant validity, the Heterotrait-Monotrait Ratio (HTMT), as recommended by Henseler *et al*. [18], was used. Path coefficients, the coefficients of determination (R^2) and bootstrapping were used to analyze the structural model and determine the significance of the hypothesized relationships [19,20]. Specifically, the direct effects of perceived algorithmic control, platform support and perceived procedural fairness on psychological contract breach were examined. The moderating effect of algorithmic transparency was tested by adding the relevant interaction terms and testing the significance of these bootstrapped interaction terms. The full-collinearity variance inflation factors [21], were also checked for potential common method bias. In those cases where it was appropriate, the predictive performance was evaluated using Smart PLS [22]. The analysis aimed at assessing the explanatory power of the proposed model as well as the extent to which algorithmic transparency can contribute to the perceptions of the psychological contract breach among gig workers.

Descriptive Statistics of the Research Constructs

The descriptive statistics for the five constructs in the proposed research model are given in Table 2. The construct range was 3.143 to 3.191 (on a 5-point Likert scale), which is just above the midpoint of the scale. Perceived Algorithmic Control recorded the highest mean (M = 3.191, SD = 1.012), followed by Perceived Procedural Fairness (M = 3.179, SD = 1.014), Algorithmic Transparency (M = 3.166, SD = 1.011), Psychological Contract Breach (M = 3.159, SD = 0.993) and Platform Support (M = 3.143, SD = 0.997). The standard deviations (0.993 to 1.014) suggest that the replies varied by a similar amount across the constructs. The skewness coefficients were between −0.217 and −0.068 and the kurtosis values were between −0.752 and −0.569. The relatively low coefficients suggest low univariate asymmetry and no strong kurtosis in the construct scores. However, multivariate normality cannot be ensured based on descriptive skewness and kurtosis statistics.

Table 2: Descriptive Statistics of the Research Constructs

Construct	N	Mean	SD	Skewness	Kurtosis
Perceived Algorithmic Control (PAC)	450	3.191	1.012	−0.165	−0.680
Platform Support (PS)	450	3.143	0.997	−0.107	−0.569
Perceived Procedural Fairness (PPF)	450	3.179	1.014	−0.217	−0.614
Algorithmic Transparency (AT)	450	3.166	1.011	−0.099	−0.752
Psychological Contract Breach (PCB)	450	3.159	0.993	−0.068	−0.676

N = 450, SD = standard deviation.
Source: Authors' calculations based on the survey data.

Table 3: Measurement Quality: Indicator Reliability, Internal Consistency and Convergent Validity

Construct	Indicator	Outer loading	Cronbach's α	rho_A	CR	AVE
Algorithmic Transparency (AT)	AT1	0.866	0.884	0.885	0.920	0.741
	AT2	0.864				
	AT3	0.831				
	AT4	0.882				
Perceived Algorithmic Control (PAC)	PAC1	0.850	0.886	0.889	0.921	0.745
	PAC2	0.862				
	PAC3	0.853				
	PAC4	0.888				
Psychological Contract Breach (PCB)	PCB1	0.848	0.879	0.879	0.917	0.734
	PCB2	0.856				
	PCB3	0.861				
	PCB4	0.861				
Perceived Procedural Fairness (PPF)	PPF1	0.860	0.878	0.884	0.916	0.732
	PPF2	0.859				
	PPF3	0.826				
	PPF4	0.876				
Platform Support (PS)	PS1	0.865	0.885	0.890	0.920	0.743
	PS2	0.852				
	PS3	0.873				
	PS4	0.858				

CR: Composite Reliability, AVE: Average Variance Extracted, rho_A = Dijkstra–Henseler Reliability Coefficient. Dashes indicate that construct-level statistics are reported only alongside the first indicator of each construct.
Source: Authors' calculations based on Smart PLS output

Furthermore, PLS-SEM does not assume normally distributed data like traditional parametric methods, but the data may not be normal to a great degree, which will impact the standard errors obtained in bootstrapping and should be taken into account when interpreting the results [19,20]. Hence, descriptive results serve as a preliminary evaluation prior to the measurement-model and structural-model evaluation.

Measurement Model Evaluation

The measurement model was evaluated for reliability and convergent validity of the indicators and for their adequacy to the construct they measure. The assessment was conducted according to the model assessment guidelines in PLS-SEM which include outer loadings, internal consistency reliability and average variance extracted (AVE) [19,20]. The outer loadings of the 20 indicators were standardised and showed values between 0.826 and 0.888, which are higher than the threshold of 0.70 which is often recommended. The results show that the indicators have acceptable reliability at an individual level. Cronbach's alpha, rho_A and composite reliability (CR) were used to examine internal consistency. Cronbach's alpha values ranged from 0.878 to 0.886, rho_A values ranged from 0.879 to 0.890 and CR values ranged from 0.916 to 0.921. The internal consistency of the five constructs was supported by all coefficients being greater than the recommended minimum value of 0.70 [19,20]. Convergent validity was checked by the AVE, which represents the percentage of variance explained by the indicators of the constructs. AVE values ranged from 0.732 to 0.745, which was far above the minimum acceptable value of 0.50 [23]. Specifically, the highest AVE was found for Perceived Algorithmic Control (0.745) and the lowest was found for Perceived Procedural Fairness (0.732), both of which are satisfactory in terms of convergent validity. The results taken together indicate the reliability and convergent validity of the measurement model. It is important to also assess the validity of the construct with the HTMT criterion, as it is not included in the output of this discriminant validity test [18].

Henseler reliability coefficient. Dashes indicate that construct-level statistics are reported only alongside the first indicator of each construct (Figure 2).

Discriminant Validity

In an effort to determine if the five constructs represent different constructs, discriminant validity was tested. In this regard, two complementary criteria were used: the Fornell-Larcker criterion and the HTMT ratio. The use of both criteria allows for a more precise evaluation of the distinctiveness of constructs compared to using a single criterion [18,23].

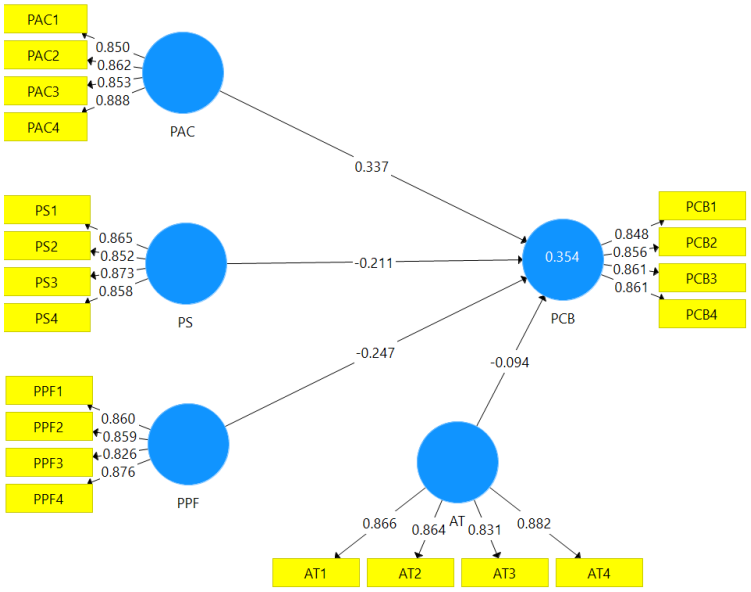


Figure 2: Structural Model Estimates from the PLS-SEM Analysis
Source: Authors' calculations based on SmartPLS output

Table 4: Fornell–Larcker Criterion

Construct	AT	PAC	PCB	PPF	PS
Algorithmic Transparency (AT)	0.861				
Perceived Algorithmic Control (PAC)	−0.236	0.863			
Psychological Contract Breach (PCB)	−0.301	0.441	0.856		
Perceived Procedural Fairness (PPF)	0.345	−0.196	−0.410	0.856	
Platform Support (PS)	0.196	−0.156	−0.357	0.304	0.862

Diagonal values in bold represent the square roots of AVE; off-diagonal values represent interconstruct correlations. The absolute correlations are lower than the corresponding diagonal values

Table 5. Heterotrait–Monotrait (HTMT) Ratios

Construct	AT	PAC	PCB	PPF	PS
Algorithmic Transparency (AT)	—				
Perceived Algorithmic Control (PAC)	0.267	—			
Psychological Contract Breach (PCB)	0.341	0.498	—		
Perceived Procedural Fairness (PPF)	0.391	0.222	0.463	—	
Platform Support (PS)	0.224	0.175	0.402	0.349	—

All HTMT values are below 0.85, supporting discriminant validity
Source for Tables 4 and 5: Authors' calculations based on SmartPLS output

According to the Fornell-Larcker results, the roots of the AVE are shown on the diagonal of Table 4 and the obtained values are between 0.856 and 0.863. Moreover, all the diagonal figures surpass all absolute correlations between this construct and all other constructs in the study. The results obtained correspond to the Fornell-Larcker criterion, which indicates that every construct has more variance with its own indicators than with the other latent constructs. Finally, the HTMT results contribute to the findings of discriminant validity. In this context, in Table 5, the HTMT values vary from 0.175 to 0.498, which is much less than the cut-off value of 0.85 suggested by Henseler *et al*. [18]. The highest value was obtained for the pair of terms Perceived Algorithmic Control and Psychological Contract Breach (HTMT = 0.498). Therefore, none of the pairs approaches the cut-off point. To summarise the findings of both HTMT and Fornell-Larcker, it was demonstrated that Perceived Algorithmic Control, Platform Support, Perceived Procedural Fairness, Algorithmic Transparency and Psychological Contract Breach have acceptable discriminant validity. Thus, the measurement model meets the established criteria for construct distinctiveness and the evaluation of the structural model can be carried out.

Structural Model Assessment and Hypothesis Testing

The structural model was scrutinized through bootstrapping in order to ascertain the direction, magnitude and statistical significance of the assumed connections between the variables in the model. The study set out to investigate the direct impacts of perceived algorithmic control, platform support and perceived procedural fairness on psychological contract breach, as well as the moderating influence of algorithmic transparency. Bootstrapping also serves as a technique for estimating the significance of PLS-SEM path coefficients without the need to presume that their sampling distributions are normal [19,20]. The findings show that there is a positive and statistically significant relation between perceived algorithmic control and psychological contract breach ($\beta = 0.343$, $t = 9.320$, $p<0.001$), hence supporting H1, which means that higher values of perceived algorithmic control are associated with bigger values of perceived breach. H2 is also verified because platform support has been found to have a significant negative effect on psychological contract breach ($\beta = -0.205$, $t = 5.268$, $p<0.001$). This signifies that the more support is experienced by individuals from the platform, the lesser psychological contract breach they report. Perceived procedural fairness has a significant negative impact on psychological contract breach ($\beta = -0.247$, $t = 5.941$, $p<0.001$), which confirms H3. Among three proposed direct effects, perceived algorithmic control has the largest absolute path coefficient and is followed by perceived procedural fairness and platform support. The moderation analysis also indicated the presence of a negative and statistically significant interaction between perceived algorithmic control and algorithmic transparency ($\beta = -0.163$, $t = 4.531$, $p<0.001$) which proves H4 and is in line with the assumption that algorithmic transparency reduces the positive effect that perceived algorithmic control has on psychological contract breach. However, the conditional effects or simple slopes analysis should be conducted in order to see how the interaction varies at lower and higher values of algorithmic transparency. The estimated direct impact of algorithmic transparency on psychological contract breach has a negative value but it is statistically not significant ($\beta = -0.076$, $t = 1.753$, $p = 0.080$). It does not appear to be significant at the 5% significance level. Nevertheless, the insignificant direct effect does not deny the presence of a significant interaction, as a moderator can have a significant effect on the strength of the relationship without having a significant direct impact on the dependent variable. Overall, the outcomes support the propositions of all four hypotheses since the tests yield the relevant bootstrapping statistics. The discoveries highlight the importance of the terms algorithmic control, platform support and procedural fairness in regard to the issue of psychological contract breach and show that algorithmic transparency may serve as a boundary condition for the relationship between algorithmic control and perceived breach (Table 6).

Simple Slope Analysis

To examine the moderating impact of Algorithmic Transparency (AT) on the relation between Perceived Algorithmic Control (PAC) and Psychological Contract Breach (PCB), simple-slope analysis was performed. The findings represented in Figure 3 shows that the PAC–PCB relation varies depending on the level of AT. As indicated in the graphical representation, the slope is steepest when AT is low (−1 SD), flattens to the average AT level and finally becomes the flattest at a high AT level (+1 SD). This means that as AT increases, the positive influence of felt

algorithmic control on PCB weakens. This aligns with the negative and significant interaction effect established in the structural model (β = −0.163, t = 4.531, p<0.001), lending support to H4 as well. More specifically, this plot implies that the relationship is the strongest among those employees experiencing low transparency and the relationship grows weaker as transparency increases. An explanation for this may be that greater AT helps employees understand better the reasoning behind algorithmic decisions, decreasing the uncertainty around platform's control. However, it should be noted that transparency may not necessarily mean decreased perceptions of breach since it all depends on how the information on algorithmic systems is conveyed and perceived by the workforce [15]. Finally, the simple slope pattern established complies with the moderating hypothesis proposed earlier: algorithmic transparency neutralizes the positive effect of perceived algorithmic control on breach perception. However, it should be noted that the plotted slopes show the conditional nature of the discovered relation and do not show the significant nature of every single slope. For this purpose, it is necessary to perform bootstrapped conditional effect estimates and calculate the confidence intervals.

Explanatory Power of the Structural Model

The explanatory capacity of the structural model was evaluated using the coefficient of determination (R^2) and adjusted R^2. These metrics measure the explanatory power of the model, which describes the proportion of fluctuations in the predetermined variable which can be accounted for by its independent variables, while adjusted R^2 shows what percentage of changes in the endogenous construct is justified by its predictors after correcting for the model's independent variables [16]. As can be seen in Table 8, the R^2 coefficient of Psychological Contract Breach (PCB) is equal to 0.382, meaning that the influence of Perceived Algorithmic Control, Platform Support, Perceived Procedural Fairness, Algorithmic Transparency and the interactivity term makes for 38.2% of the fluctuations in psychological contract breach. The adjusted R^2 coefficient of 0.375 shows that the model can explain 37.5% of fluctuations in psychological contract breach considering the following corrector for the number of independent variables.

Table 6: Structural Path Results and Hypothesis Testing

Hypothesis	Predictor	Outcome	Beta coefficient	Standard Error	t-statistic	p-value	Decision
H1	Perceived Algorithmic Control (PAC)	Psychological Contract Breach (PCB)	0.343	0.037	9.320	<0.001	Supported
H2	Platform Support (PS)	Psychological Contract Breach (PCB)	−0.205	0.039	5.268	<0.001	Supported
H3	Perceived Procedural Fairness (PPF)	Psychological Contract Breach (PCB)	−0.247	0.042	5.941	<0.001	Supported
H4	PAC × Algorithmic Transparency (AT)	Psychological Contract Breach (PCB)	−0.163	0.036	4.531	<0.001	Supported (Negative Moderation)

β = Original-Sample Path Coefficient; SE = Standard Deviation of the bootstrapped estimates; t = Bootstrapped t-statistic; p = Significance Level. Hypothesis decisions are based on a 5% significance threshold.
Source: Authors' calculations based on SmartPLS bootstrapping output

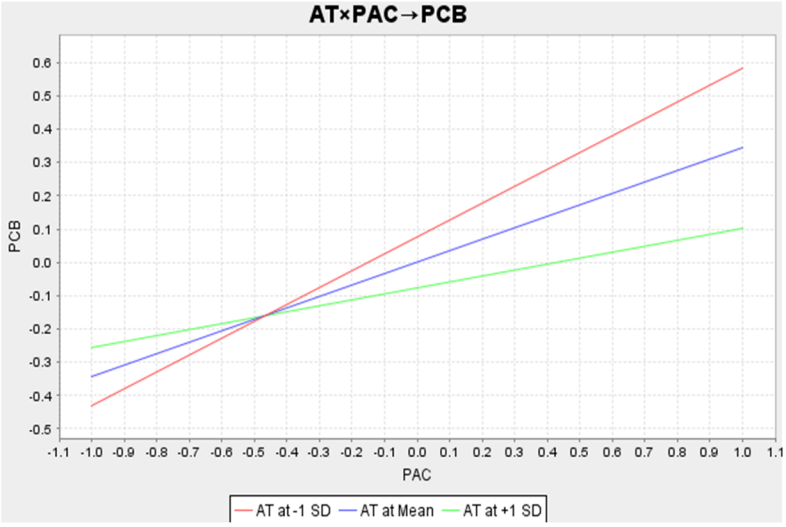


Figure 3: Simple-Slope Analysis of the Moderating Effect of Algorithmic Transparency
The red, blue and green lines represent low algorithmic transparency (−1 SD), mean algorithmic transparency and high algorithmic transparency (+1 SD), respectively.
Source: Authors' calculations based on SmartPLS output

The minor dissimilarity between these values indicates that the estimated explanatory coefficient is stable after the correction. Following widely adopted PLS-SEM guidelines, the model is perceived as having the level of explanatory power that is recognized between the weak and moderate levels, although the exact meaning of R^2 depends on the context of research and the variable being studied [16]. In summary, it can be stated that the presented model explains a significant portion of the variance in psychological contract breach, although the variations not explained by it can arise due to some additional factors which have not been taken into consideration in the current study (Figure 3).

DISCUSSION

This study proposes a theoretical lens of perceived algorithmic control, platform support, procedural fairness and algorithmic transparency for understanding what constitutes psychological contract breach among gig economy employees. The results suggest that perceived contractual violations are linked not only to the degree of platform control but also to the support and fairness that come with platform control. Algorithmic transparency conditions the (significant) interaction between control and breach. These results complement the algorithmic conversation about HRM by bringing to light the relational aspects of platform governance. The strongest positive relationship was found to be between perceived algorithmic control and psychological contract breach (β = 0.343) (p<0.001). This finding implies that there is a positive relationship between perceived better algorithmic direction and perceived lower success rate in fulfilling the algorithm's obligations, as well as perceived stronger algorithmic monitoring and perceived lower success rate in fulfilling the algorithm's obligations. Duggan *et al*. [3], define algorithmic HRM control as a process that relies on platforms to organize work, assess performance, manage rewards and shape worker behaviour. These mechanisms also allow for operational coordination, but can also influence workers' expectations for autonomy, equitable treatment and reciprocity. The psychological contract view is not just whether the employee is displeased with a certain management decision but also when they feel that the obligations they thought they were owed have not been met [6]. Thus, the present finding implies a broad range of implications for algorithmic control which reach not only into the realm of work coordination, but also into the realm of the perceived quality of the platform-worker relationship. It also adds to the findings from Zhang *et al*. [10], who found that the psychological contract and engagement of gig workers can be varied as a result of different aspects of algorithmic control. Support on the platform was negatively correlated with psychological contract breach (β = -0.205) (p<0.001). This is in line with the perceived organizational support theory which focuses on employees' confidence in the importance that their Organization places on their contributions and values their well-being [12]. Assistance is available, response is quick and effective mechanisms to resolve complaints can convey to workers that they are being listened to in platform-mediated work. These practices can help to strengthen expectations for reciprocity and minimize the perceived burden of responsibility on workers without any corresponding support. The discovery underscores the need for relational support, even in the case of work that is coordinated digitally. However, the cross-sectional evidence is only suggestive of an association, not proof that a difference in perceived breach was caused by the difference in platform support. Psychological contract breach was also strongly negatively related with perceived procedural fairness (β = -0.247) (p<0.001). The value of its correlation coefficient in absolute value was larger than that of the platform support but no statistical test comparing these coefficients was reported. The finding agrees with that of Colquitt [13], who defines procedural justice as a separate form of justice to recognise as a dimension of justice in an organization. The predictability of task distribution, evaluation, penalties and grievance mechanisms can affect users' sense of a platform's legitimacy for gig workers. Predictability of task allocation, assessment, penalties and appeal mechanisms may matter to users' sense of legitimacy for platform decisions for gig workers. Rosen *et al*. [24,25], also found that procedural justice and Organizational context had relevance to the phenomenon of psychological contract breach. Based on the findings of the present study, the conduct of fair decision-making procedures is an important part of the platform governance, especially in platforms with a lower level of traditional managerial interaction. Another contribution relates to the moderating effect of algorithmic transparency. The interaction perceived algorithmic control and transparency was negatively and significantly related to another measure (β = -0.163), (p<0.001). The simple-slope graph shows that the increase in breach is greatest at low transparency and least at high transparency. This pattern is consistent with the suggestion that more transparency would weaken the link between perceived control and breach. An algorithmic procedure explanation can be used to clarify algorithmic procedures, which may be important for workers to understand to interpr*et al*gorithmic decision-making and to decrease uncertainty surrounding platform practices. The direct effect on transparency was not statistically significant, however, (p = .080) (β = -0.076). The notion of transparency should therefore be regarded as a possible boundary condition and not as an independent predictor of a lower breach. This distinction is consistent with that of Li *et al*. [15], who demonstrate that the impact of algorithmic transparency can differ depending on the nature of the algorithm and its application. The moderation results confirmed H4 but would be further strengthened by the inclusion of conditional effect

estimates and confidence intervals in the moderation result. The results of the study have implications for the human resource management practice. Platforms ought to apply transparent principles while making decisions through algorithms and have support systems readily available for its users. Teaching employees about automation systems can be more useful when a transparency program explains how to comprehend the decision or fix the mistake, rather than just giving abstract information about the system. This model accounts for 38.2% of the variance in psychological contract breach ($R^2 = 0.382$), which means that it has some explanatory power, though not exhaustive, suggesting that other factors such as job insecurity, trust, autonomy and worker voice may have an effect. Longitudinal and cross-platform research in the future could explore the interaction between these factors over time. In general, the PSOC is seen in this study as a key relational factor to be addressed in algorithmically managed work, while it is also noted that platform HRM must take into account a mix of technological control and workers' perceptions of reciprocal obligations [26].

Theoretical and Practical Implications

In theory, this study takes psychological contract breach into a study of algorithmically managed gig work in India by combining facets of control, platform support, procedural fairness and transparency. Platform systems not only coordinate tasks; they can also influence workers' understandings of their reciprocal obligations, as there is a positive association between perceived algorithmic control and breach [3,6]. Negative relationships for platform support and procedural fairness are reflected in the differences between relational assistance and fair decision processes and both have an impact on the workers' evaluation of the platform relationship [12,13]. Negative interaction relation repositions algorithmic transparency into a possible boundary condition instead of an actual solution. Corresponding to this are research findings stating that transparency can be either beneficial or detrimental depending on how it is presented and perceived [15]. Since this is a cross-sectional design, these findings are indicative of association, but not a cause-and-effect relationship. Platforms need to make algorithmic governance a Human Resource Management (HRM) issue instead of just a technical issue, in practice. They possess the ability to explain the standards of work distribution, assessment process, alteration of payment and limitations of account features of language workers. Methods for human examination of issues in questioning decisions exist making it possible to support promptly and address problems of workers. There should be no inconsistencies in the application of procedural rules; exceptions should be stated. Transparency efforts should be assessed as to whether they make decisions more transparent; merely providing more information is not enough. It is important for platform managers to track worker perceptions over time and their evaluation of whether changes in control, support and review processes are correlated with changes in perceived breach.

CONCLUSION

The current study investigated possible psychological contract breach among gig economy workers by focusing on four variables: perceived algorithmic control, platform support, procedural fairness and algorithmic transparency. The results of this study suggest that algorithmic control is positively related to breach while platform support and procedural fairness are negatively related to algorithmic control. The negative interaction between control and transparency indicates that transparency undermines the positive control–breach relationship. The findings suggest that workers' perceptions of platform relationships relate not only to digital control but also to the facilitation and decision-making processes around control. The study makes a meaningful contribution to human resource management research on psychological contract theory and social exchange/Organizational justice theories in algorithmically managed work. It treats algorithmic transparency as a boundary condition, not a situation where disclosure automatically reduces breach. In practice, platforms should clarify the consequences of algorithmic decisions, provide support, ensure decisions are applied consistently and allow mechanisms to challenge incorrect algorithmic decisions. The findings should be interpreted in the context of the cross-sectional design that is not used to make causal inferences. Generalising from the sample may be difficult, as it is highly concentrated in food delivery and ride-hailing work. Future longitudinal and cross-platform designs could investigate how these relationships evolve and whether variation in psychological contract breach can be explained by variation in psychological contract worker voice, worker trust, or job insecurity.

Limitations and Future Research

This study was limited in several aspects that would benefit future studies. First, it is a cross-sectional design that limits the ability to identify causal relationships or examine the development of psychological contract breach over time. Longitudinal designs could be used in future research to explore shifts in workers' beliefs over time as policy and algorithmic practices change. Second, the relatively small sample of 450 gig economy workers – which was more representative of food delivery and ride-hailing workers – may restrict the generalizability of the results to other platform-based jobs and geographic settings. Comparative studies would be useful across industries, countries and platform business models to determine if the relationships that are proposed are different across institutional and cultural contexts. Third, although the statistical tools used are appropriate, common method and response biases may have occurred due to using self-reported questionnaire information. In the future, surveys and interviews, platform data, and/or qualitative case studies could be used together to gain a more holistic perspective on workers' experiences.

Finally, other mechanisms (e.g., Organizational trust, worker voice, job insecurity, perceived autonomy) and other moderators can be explored in greater depth. Experimental research might also examine the effect of various transparency types on employees' sense of control and violation of their psychological contract.

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