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Algorithmic Management and Employee Withdrawal Intention: The Mediating Roles of Procedural and Interpersonal Justice

Shuqi Wang

UQ Business School, The University of Queensland, Brisbane, Australia
s4927716@uq.edu.au

Abstract. Algorithms are often used to perform the management functions of former human managers, but their impact on staff is still unknown. Based on Organisational Justice Theory, this study examines how algorithmic management affects employees' intention to leave the company and investigates the mediating roles of procedural and interpersonal justice. Survey data were collected from 190 workers in all sectors of society. Reliability analysis, descriptive statistics, correlation analysis, regression analysis, and mediation analysis were employed to investigate the above relationships. Therefore, algorithmic management is associated with a higher likelihood of employee attrition. Mediation studies have also shown that both procedural justice and interpersonal justice significantly moderate this relationship, and the main effect of algorithmic management is still considerable. Such results suggest that the response of workers to algorithmic management is not only determined by the use of the system but also by their assessment of the fairness of organisational procedures and personal care in algorithmically managed environments. Building on previous studies of algorithmic management, this paper adds research on organisational justice to explore why employees are less willing to quit. It also points out the need to maintain an equitable decision-making system and polite behaviour in the face of increased use of algorithms by management.

Keywords: Algorithmic Management, Organisational Justice, Procedural Justice, Interpersonal Justice, Withdrawal Intention

1. Introduction

1.1. The rise of algorithmic management

With the rise of artificial intelligence and large-scale data analysis, corporate governance has been changing. Algorithms have taken over the supervisory functions of former human supervisors in many workplaces, such as monitoring, setting goals, supervising progress, scheduling work, distributing wages, and dismissing employees [1]. Algorithmic administration can thus be viewed as the use of algorithmic frameworks to create or implement decisions that affect staff, with reduced direct human involvement in the management process [1]. Therefore, the algorithm platform can

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guide the worker by suggesting or restricting behaviour, record and grade it through logging, and shape labour results via incentives or personnel changes [2]. Therefore, algorithmic administration refers to a new type of innovation in the application of management supervision at enterprises, rather than just a single new technology [2].

1.2. Algorithmic control and employee fairness

Although the algorithmic framework can help the company improve the efficiency of strategic planning and collective action for corporate development, it still faces many implementation difficulties for the staff [2]. At present, some studies have shown that automated supervision may reduce workers' freedom, increase the power of executives, and create an unfair working environment for employees [1]. Given the increasing application of algorithms in decision-making that directly affect employees' work and career prospects, these problems are becoming more serious. Therefore, to learn about algorithmic governance, this paper should study both the institutional advantages of it and how workers perceive and respond to decisions made by algorithms.

1.3. The role of organisational justice

Worker evaluations of corporate equity are the main focus. Although algorithms are expected to reduce discrimination and promote fairness, the results of these algorithms are not generally considered better than those achieved by human supervisors. Newman and others have found that algorithmic personnel judgments can be viewed as reductionist because the system translates complex human attributes into quantitative indices and fails to integrate qualitative information and situational factors effectively; therefore, the perceived procedural fairness of important employment decisions is reduced, leading to a decrease in institutional commitment [3]. However, it has not been determined whether organisational equity explains the relationship between experiencing algorithmic supervision and the intention to leave. Research the impact of perceived exposure to algorithmic supervision on employees' intention to leave, and determine whether procedural and interpersonal fairness mediate this path. In terms of procedural fairness, according to the theory of organisational justice, there are several types, such as consistency, impartiality, accuracy, openness to feedback, and participation in selection procedures; it is not the same as interpersonal fairness, and both provide a conceptual system for this study [4].

1.4. Study purpose and conceptual framework

Therefore, this paper will investigate the connection between employees' sense of exposure to algorithmic supervision and their intention to leave, as well as the mediating roles of procedural and interpersonal justice. By combining the concepts of organisational justice and algorithmic management, this study aims to uncover the cognitive paths that lead to disengagement behaviour among workers in technology-driven enterprises.

2. Theoretical background and hypotheses

2.1. Algorithmic management: definition and mechanisms

Algorithmic governance grants managerial powers to intelligent machinery for the organisation, evaluation, and supervision of staff in all parts of the company, extending beyond digital markets to

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traditional sectors [1, 5]. This framework is considered a mechanism of corporate governance that distributes various levels of accountability for decisions affecting staff and industrial workflows through algorithms, thus changing but not eliminating human involvement in administration [1]. Such mechanisms perform the functions of supervision, task allocation, result evaluation, roster planning, pay-to-work arrangements, and termination, etc., and differ from traditional regulations in terms of scale, speed, and degree of autonomy; they are supported by accumulated and analysed staff information to either assist or replace executive decisions [1, 2]. Recently, some studies have found that strong algorithmic supervision may be an obstacle to progress and reduce the motivation of workers [6].

2.2. Competing perspectives and fairness concerns

Algorithmic supervision empowers management to manage the digital operations of a company by monitoring and evaluating personnel at all levels of the organisation, extending to traditional sectors [1, 5]. This model is a structure of corporate governance that assigns particular degrees of responsibility for personnel management and production through algorithms, thus modifying but not eliminating human participation in management [1]. These systems perform functions such as monitoring, task distribution, outcome assessment, shift scheduling, wage-to-work agreements, and dismissals, and the scope, speed, and degree of autonomy of traditional rules vary; they are supported by collected and analysed labour data to either facilitate or replace managerial decisions [1, 2]. Recently, some research has shown that strong algorithmic supervision may impede progress and reduce the efficiency of employees [6].

2.3. Organisational justice theory in algorithmic contexts

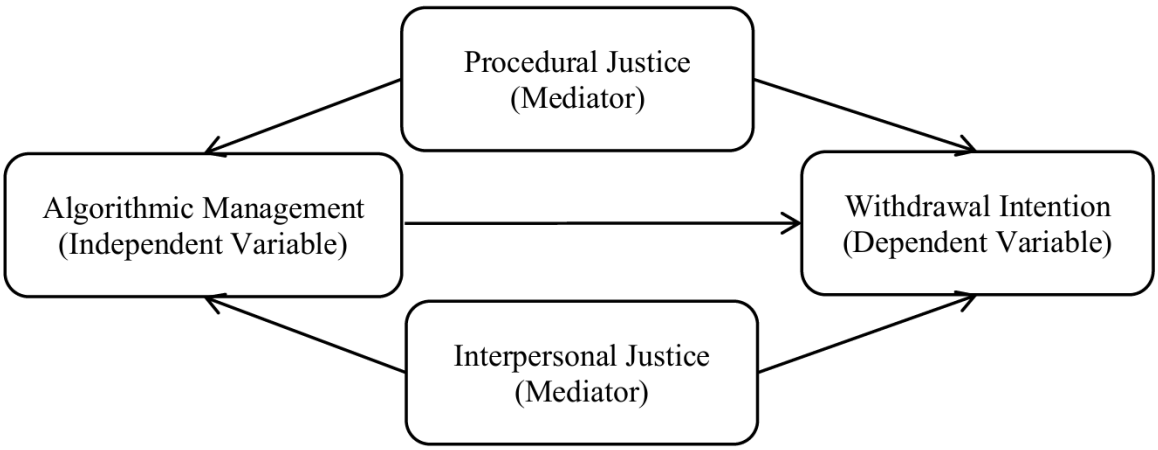


Figure 1. Theoretical research model

According to Organisational Justice Theory, employees' responses to managers' behaviour are affected by their perceptions of fairness [4]. Procedural justice (fairness of decision-making procedures) and interpersonal justice (respectful treatment) are also necessary at the level of algorithms that conduct judgments and exchanges. Distributive and informational justice are still relevant; however, this study focuses on procedural and interpersonal justice as the necessary links between algorithmic governance and workers' sentiment, and explores both structural and relational equity [7]. Procedural justice is violated when algorithms reduce complex data to uniform indicators, restrict the right to object and correct errors, and are also opaque and inflexible [3].

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Interpersonal justice refers to the quality of implementation; reduced human interaction may lower feelings of empathy and respect due to the system's lack of social support. Therefore, Organisational Justice Theory supports the hypothesis that procedural and interpersonal justice mediate the impact of algorithmic management on resignation intention (Figure 1).

2.4. Hypotheses development

2.4.1. The mediating role of procedural justice

Algorithmic governance is now responsible for monitoring, assessing, organising, compensating, and distributing jobs automatically to reduce routine work and minimise direct employee involvement [1, 2]. Thus, the concept of management by rules changes. Organizational Justice Theory refers to procedural justice as the evaluation of organisational methods that are uniform, fair, precise, and participatory [8]. An opaque, rigid automated system in the algorithm world reduces the likelihood of employee learning and challenging decisions. According to the actual research, algorithmically determined employment decisions are considered less procedurally fair than those made by human managers due to their narrow scope; therefore, staff are less satisfied with algorithmic supervision in terms of procedural justice than with manual supervision [3, 7]. Procedural justice predicts corporate attitudes and objectives, and a lack of it is associated with higher turnover intentions [9]. More recently, studies have also shown that procedural justice is associated with a desire to stay [10]. Consequently, diminished procedural justice might intensify departure desire, facilitating the influence of algorithmic governance on employee departure motivation.

Hypothesis 1. Formal Fairness is the mediator of algorithmic supervision and abandonment intention.

2.4.2. The mediating role of interpersonal justice

Technology has reduced the need for human intervention and changed the nature of work, thus altering the relationship between employees and managers [1, 2]. Workers judge algorithmic governance based on both the results of performance and how well courteous human interactions are maintained in digitalised procedures. Social equity is to treat people with dignity, civility, and respect during the operation of a system, as well as to allow for human-centred care [4, 11]. Moritz and Wehner believe that social equity is an essential component of employees' perceptions of algorithmic management, and computational systems are often associated with negative equity outcomes [7]. Reduced social equity is also associated with an increased desire to leave; thus, the erosion of social equity under algorithmic supervision may promote desertion [9]. Consequently, social equity mediates the impact of algorithmic management on departure inclination.

Hypothesis 2. Interpersonal justice mediates the relationship between algorithmic management and withdrawal intention.

3. Methodology

3.1. Sample and data collection

A cross-sectional study was conducted to examine whether a sense of being subject to algorithmic management is related to the intention of employees leaving the company, and whether this relationship is moderated by procedural and interpersonal justice. Wenjuanxing, a Chinese digital

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questionnaire platform, was used to collect information by inviting staff from all departments of the company through corporate WeChat groups and online platforms.

Convenience sampling was used to select 195 staff members, and 191 responded; the response rate was 97.9%. Excluding the one incomplete form, the total number of complete pools was 190 (97.4% valid response rate). The four areas are presented in the cohorts above. Demographic characteristics such as gender, age, education, employment stability, years of service, position in the company (management or technical), etc., were added as control variables.

3.2. Measures and instruments

All the indicators were collected through questionnaires based on previous studies. A 7-point Likert scale was used to evaluate, with "strongly disagree" being 1 and "strongly agree" being 7.

According to the six indicators proposed by Parent-Rocheleau and Parker, the degree to which staff members felt under the control of algorithmic management in areas such as surveillance, workload distribution, scheduling, evaluation, reward, and dismissal processes was measured [1].

Procedural equity (7 indicators) is the perception of fairness in corporate outcome-making routines [4].

The four factors of interpersonal equity refer to how respected and valued employees feel by their managers [4].

Withdrawal intention (3 indicators) refers to staff members' wish to leave their current organisation [12].

3.3. Data procedure

First, IBM SPSS Statistics 27 was used to conduct initial analysis of frequency distribution, validity tests (Cronbach's alpha), and Pearson correlation analysis of the items and homogeneity reliability.

To explore the mediating effects of procedural and interpersonal justice, PROCESS Macro (Model 4) was used, and 5,000 bootstrap simulations were conducted to obtain 95% bias-corrected confidence intervals [13]. Indirect effects were taken to be significant if their confidence intervals contained zero.

4. Results

4.1. Descriptive statistics and correlation

The reliability analysis indicated satisfactory internal consistency across all measures, with Cronbach's alpha coefficients ranging from .883 to .958. Descriptive statistics, reliability coefficients, and correlations among the study variables are presented in Table 1.

Table 1. Descriptive statistics, reliability coefficients, and correlations among study variables

Variables	M	SD	α	1	2	3	4
1. Perceived Exposure to Algorithmic Management	4.96	1.10	.939	—			
2. Procedural Justice	3.97	1.15	.958	.598**	—		
3. Interpersonal Justice	3.96	1.23	.911	.670**	.707**	—	
4. Withdrawal Intention	4.06	1.16	.883	.664**	.600**	.674**	—

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Descriptive statistics show that the mean of perceived exposure to algorithmic management (M = 4.96, SD = 1.10) was the highest, followed by withdrawal desire (M = 4.06, SD = 1.16); procedural justice (M = 3.97, SD = 1.15) and interpersonal justice (M = 3.96, SD = 1.23) were relatively low.

Pearson correlation investigations revealed that perceived exposure to algorithmic oversight was significantly linked with withdrawal motivation (r = .664, < .001), alongside procedural justice (r = .598, < .001), plus interpersonal justice (r = .670, < .001). Procedural justice and interpersonal justice were also positively correlated with withdrawal motivation (r = .600 and r = .674, respectively, both < .001). The above strong connections provided the first support for the intended mediation paths in the following studies.

4.2. Direct effect of algorithmic management

Initially, it was thought that higher perceived interaction with algorithmic supervision would be associated with increased withdrawal motivation. A single linear regression model was employed to investigate the above phenomenon. As shown in Table 2, perceived interaction with algorithmic oversight positively and significantly predicted withdrawal motivation (β = .057, t = 12.160, ρ < .001, 95% CI [.584, .811]). The total regression model was still statistically significant (F(1, 188) = 147.864, ρ < .001) and explained 44.0% of the variation in withdrawal motivation (R^2 = .440). Consequently, this hypothesis was validated.

To determine whether the association remained after controlling for differences in age, gender, education level, occupation, length of service at the company, job title, and reliance on digital systems, a second regression model was constructed. The total model was still statistically significant, F(8, 181) = 19.109, < .001, and explained 45.8% of the variation in withdrawal desire (R^2 = .458). Subjective exposure to algorithmic oversight continued to be a significant positive predictor of withdrawal intention (β = 0.696, SE = 0.058, t = 11.940, p < 0.001), and none of the control variables were statistically significant. Therefore, the positive association between perceived exposure to algorithmic supervision and a lack of desire to leave was still present after adding control variables.

4.3. Mediation analysis

Hayes' PROCESS Macro (Model 4) was employed to perform mediation analysis, 5,000 bootstrap iterations, and a 95% bias-corrected confidence interval. Procedural justice was associated with a decrease in the intention to leave (β = .698, p < .001), and both procedural justice and the intention to leave were positively correlated (β = .633, p < .001); additionally, procedural justice independently predicted a reduction in the intention to leave (β = .392, p < .001). The total model explained 53.6% of the variance (R^2 = .536, F(2, 187) = 107.955, p < .001). The indirect effect through procedural justice was relatively large (effect = .201, BootSE = .049, 95% CI [.113, .308]), and Hypothesis 1 was supported. Interpersonal justice was positively associated with withdrawal intention (β = .319, p < .001), and exposure to algorithmic management significantly increased both interpersonal justice (β = .756, p < .001) and withdrawal intention (β = .698, p < .001). Together, these two factors accounted for 50.5% of the variance in withdrawal intention (R^2 = .505, F(2, 187) = 95.335, p < .001). The indirect effect through interpersonal justice was also relatively large (effect = .298, BootSE = .057, 95% CI [.188, .417]) and supported Hypothesis 2.

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Table 2. Regression results for the direct and mediated effects of algorithmic management on withdrawal intention

Variables	Model 1	Model 2	Model 3
	B (SE)	B (SE)	B (SE)
Perceived exposure to algorithmic management	.698(.057)***	.404(.071)***	.498(.067)***
Procedural justice	—	.392 (.063)***	—
Interpersonal justice	—	—	.319 (.065)***
F	147.864***	107.955***	95.335***
R^2	.440	.536	.505
Adjusted R^2	—	.531	.500

5. Discussion

Determine whether procedural and interpersonal justice mediate the effect of exposure to algorithmic management on employees' intention to leave. Both hypotheses were supported: both dimensions of justice partially mediated this path, and a strong direct effect still existed; thus, fairness perception serves as an important pathway for algorithmic management to affect withdrawal intention. Procedural justice partially explains this relationship; at times, algorithmic standardisation has not increased the feeling of fairness, and opaque, distant procedures have lowered both transparency and situational evaluation, thus weakening procedural justice [3]. Expand the framework of organisational justice by showing that procedural fairness in management under new-age technology is still important [4]. Interpersonal justice also partially mediated this link; algorithms cannot fully replace the empathy, honour and social support provided by human contact, thus reducing the perception of interpersonal justice in mechanised management systems [11]. Extend organisational justice theory to technology-mediated environments and maintain the value of courteous human interaction. The practical applications are to enhance the transparency and procedural legitimacy by disclosing specific details of algorithm standards and correction mechanisms; to protect the right to participation of the people and add empathy and explanation; and to balance algorithmic efficiency with human autonomy in judgment.

Constraints are temporary systems that limit causal analysis; individual-report assessments may lead to shared-method problems; and a population of Chinese workers may affect generalizability, so subsequent research needs to use a longitudinal or empirical model and diverse-source information from multiple continents.

6. Conclusion

Determine whether procedural and interpersonal fairness moderate the effect of algorithmic oversight on staff turnover motivation in this study. Both parts partially mediated this association, and it was found that the staff's response was not solely due to the technical system but also to the fairness of management and social participation. Ambiguous and remote procedures may violate procedural justice, and a lack of personal contact reduces interpersonal fairness.

Extend the concept of organisational justice to algorithmically managed environments and investigate the connection between procedural and interpersonal justice and the intention to leave. Therefore, the company should improve the transparency of algorithmic decision-making, provide a path for employees to appeal such decisions, and maintain the supervisory function to offer

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explanations and emotional support. The above measures can help meet the demand for computational efficiency and fairness.

Cross-sectional data cannot determine the cause-and-effect relationship, and self-reported data are subject to common-method bias. Subsequent research may use longitudinal and multi-source data. As this group was composed of Chinese workers, cross-cultural research could also be carried out to explore whether culture and institutions affect employees' responses to algorithmic leadership.

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