

Platform Algorithm Control: Theoretical Review and Prospect

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ABSTRACT

Accompanied by the rapid development of big data and digital technology, algorithms gradually penetrate into every field of our lives, the use of algorithmic control in online labor platforms has also refreshed our traditional concepts of management, in view of the above background, this paper focuses on the platform algorithmic control of the literature review of existing research, and discusses, and puts forward suggestions for future research, in order to make a contribution.

Keywords: *Algorithm control, Online labor platform, Literature review.*

1. INTRODUCTION

With the continuous development of information technology and digital economy, gig economy, which relies on mobile Internet, has flourished in China [1]. According to the China Flexible Employment Development Report (2021), the proportion of Chinese enterprises adopting flexible employment increased by more than 11 percent year-on-year to 55.68 percent in 2020, and nearly 30 percent of enterprises said that they would stabilize or expand the scale of flexible employment. According to Ali-Research, about 400 million people will participate in the gig economy in China by 2036. As the market size of the gig economy continues to expand, how online labor platforms properly use algorithms to manage gig workers has attracted wide attention in the academic community. Therefore, theoretically analyzing and discussing the impact of platform algorithm control on gig workers has become the focus of academic research in recent years.

2. THE CONCEPT DEFINITION AND RESEARCH PROGRESS OF PLATFORM ALGORITHM CONTROL

2.1 *The Concept Definition of Algorithm Control*

In the past few decades, algorithms, often defined as computer programming programs that convert input data into a desired output, have gained widespread application in the workplace with the development and commercialization of computer and information technology. Rosenblat A and Stark L(2016) defined algorithmic control through their study of Uber drivers as the management and control of drivers through the design and technology system of the application, utilizing dynamic algorithmic pricing and other elements in a way that is unequal in information and power[2]. Subsequently, Duggan J and Stark L(2020) defines algorithmic control as a control system in algorithmic management in which self-learning algorithms are given the responsibility for making and executing decisions that affect labor, thereby limiting human participation and supervision of the labor process[3]. Wood J et al (2019) points out that algorithmic control in the context of the global casual labor economy is refers to the way in which online labor platforms control

and monitor work through algorithm-based management techniques[4].

Kellogg K C et al (2020) pointed out that algorithm-based control is different from bureaucratic control and technical control and is a new form of rational control [5]. He borrowed from Edwards(1979) 's attempts to control workers by guiding, evaluating and discipling them, and defined algorithm-based control as the use of algorithms by employers to guide workers through restrictions and recommendations. To evaluate workers by recording and rating, and to restrain workers by substituting and rewarding, Chen Long et al. (2020) proposed the concept of "digital control" in their study of the labor control system of takeaway riders, and defined it as the use of data, algorithms, and models for the management of the riders, which is different from the "numerical control" of automated production, and the most important feature of digital control is that it collects and analyzes data covertly and uses them for management, which makes the control intelligent and invisible. Unlike "numerical control" in automated production, the most important feature of digital control is that it collects and analyzes data covertly and uses it for management, making the control intelligent and invisible. [6].

Judging from the previous literature, the concept of algorithmic control has not been defined by scholars at present, and most of them are based on the definition of algorithmic control based on online labor platforms. However, how casual workers feel, recognize and evaluate algorithmic control in the process of human-computer interaction will fundamentally affect or shape their attitudes and behaviors[7]. Pei Jia liang et al. (2021) defined algorithm-based control from the

perspective of individual perception as gig workers' comprehensive perception of how the algorithm can conduct real-time dynamic control over the process of providing online labor services through normative guidance, tracking and evaluation and behavioral constraints[7].

2.2 Dimension and Measurement of Algorithmic Control Structure

Pei Jia liang et al. (2021) through semi-structured interviews with the two most active groups in the gig economy, namely e-hailing drivers and delivery riders, identified three dimensions of gig workers' perception of algorithm-based control: normative guidance, tracking evaluation and behavioral constraints. Normative guidance is the basis for gig workers to make decisions on service behavior. The algorithm provides relevant behavioral requirements expected by the service role, and guides or supports them to complete or exceed the tasks expected by the service role in accordance with the established norms of the platform, making the algorithm system a technical partner for auxiliary gig workers. Tracking evaluation is the basis for monitoring the process of gig workers' labor service. Big data-driven algorithms can track and record the information related to gig workers' service performance in real time, and give feedback and evaluate their service quality in a timely manner in the process of interacting with workers. Behavioral constraint is to motivate gig workers through reward or punishment mechanism, so that they can achieve the set goals and regulate their own behavior. The measurement scale is shown in "Table 1".

Table 1. Algorithm control measurement scale

Dimensions	Entries
Specification Guidance	The algorithm intelligently assigns my work tasks
	The algorithm gave me specifications for my work according to platform standards
	The algorithm provides me with a large amount of information relevant to the completion of the work task
Tracking Evaluations	The algorithm gives me dynamic feedback about my performance in real time
	Algorithms track my geolocation in real time
	The algorithms constantly track my attitude at work
	The algorithm monitors my work attitude in real time
	The algorithm automatically rates the quality of my work done

	The algorithm ranks and ranks me within the platform based on my job performance
Behavioral constraints	The algorithm incentivizes me to work hard by offering cash rewards for specific periods or periods of time
	When my work fails to meet the platform's requirements, the algorithm fines me

2.3 Research on Algorithm Control

At present, researches on algorithm control mainly focus on its impact on the autonomy of gig workers. Rosenblat A and Stark L (2016) through the investigation of Uber drivers, showed that Uber utilizes digital technology and algorithm. To influence drivers' working conditions, emotional labor and gamified work participation mode with asymmetry of information and power, thus limiting drivers' work autonomy to a certain extent[2]. Wood J et al (2019) noted that while algorithmic control gives workers enough autonomy and flexibility, it also forces them to work harder to some extent[4].

The research of Wu Qingjun and Li Zhen (2018) found that customers can evaluate the work behavior of platform workers online, and customer evaluation is often a standard for algorithms to determine the working time and working style of workers, etc. At the same time, customer evaluation also becomes a standard to measure the performance of platform workers. If a customer suffers from an unsatisfactory behavior, Platform workers will receive negative comments, and the algorithm will control the working mode and working time of platform workers after receiving the negative comments, which will also negatively affect the work autonomy of platform workers to a certain extent [8]. Liu Shan shi (2021) also points out that although the flexible and autonomous platform employment model has conceded more work autonomy to platform workers, platform workers are asymmetrically dependent on the platform's power to allocate resources and control the labor process, and have to autonomously accept the algorithmic control mechanisms implemented by the platform, which in turn reduces their work autonomy and puts them in a negative cycle of the work autonomy paradox[9].

In addition, some scholars have also focused on the impact of algorithmic control on the work attitudes and behaviors of platform workers. Cram's study found that Uber drivers feel technological stress when facing algorithmic control, which is mainly manifested in the form of concerns about job uncertainty, dissatisfaction with algorithmic

decision-making, and a sense of limitation of work autonomy. In addition algorithmic control can also cause Uber drivers to feel a lack of control and autonomy, increase job stress and anxiety, and negatively affect their job satisfaction and performance [10].

Based on the motivation perspective of self-determination theory, Pei Jia liang et al. (2022) pointed out that algorithmic control can stimulate both proactive and controlling motives of zero-worker workers, thus producing a double-edged sword effect on the proactive service behavior of zero-worker workers [11]. The study of Cram W A et al (2020) finds that algorithmic control will increase the work flexibility of gig workers and provide more job opportunities, but it will also lead to job instability, income uncertainty and other problems [12]. Based on social information processing theory, Liu Shan shi (2023) found that platform algorithmic control has a double-edged sword effect on the online labor hours of zero-workers, on the one hand, platform algorithmic control induces the negative emotions of zero-workers to inhibit their online labor hours, and on the other hand, platform algorithmic control enhances their self-efficacy to promote their online labor hours [13]. Based on 279 questionnaire survey data from gig workers, meanwhile, Sun Rui et al. (2023), based on social information processing theory, found that zero-worker workers perceive that algorithmic control affects their legitimacy judgments thus having a double-edged sword effect influence on emotional exhaustion from the perception-judgment-attitude path [14].

3. RESEARCH PROSPECT OF PLATFORM ALGORITHM CONTROL

With the continuous development of digital technology and its application in the workplace, online labor platform algorithmic management as a management practice innovation in the era of digital economy[1], under the premise of the rapid development of artificial intelligence in recent years by the theoretical community has been widely concerned about the future of the platform

algorithmic control of the research field is also worthy of in-depth excavation, for this paper will be put forward to the future platform algorithmic control of the study of the outlook as follows. In this paper, we will put forward the following prospects for future research on platform algorithmic control:

First, most of the current research on algorithmic control is qualitative research and theoretical discussion, and there is a relative lack of quantitative research on the effect of algorithmic control on zero-worker workers, and most of the existing quantitative research focuses on the positive or negative effect of algorithms on zero-worker workers in a single aspect of the research, future research can start from the double-edged sword effect of the platform algorithmic control to enrich the platform algorithmic control, and quantitative research in the field of platform algorithmic control.

Second, to enrich the contextual influencing factors of platform algorithmic control, most of the previous studies on algorithmic control selected algorithmic transparency as well as individual traits as moderating variables, and in the future, we can start from the aspects of leadership styles, human resource management practices, etc., to explore their roles in the influencing effects of algorithmic control.

Third, in the context of the intelligent era of human-computer interaction and collaboration, it is worth exploring whether platform workers, and under the premise of being controlled by algorithms, it can also utilize algorithms to improve their own personal performance and gain a more positive emotional experience in the future.

4. CONCLUSION

Platform algorithmic control has become a hot topic in the field of management in recent years, and the number of literature on algorithmic control has been growing year by year. This paper summarizes and outlines the concept of algorithmic control on the basis of existing literature, and combs through the impact of platform algorithmic control on the work autonomy, work attitude and work behavior of gig workers, which has been the main focus of the research in recent years, and finally puts forward suggestions for the future direction of platform algorithmic control research.

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