

# Can Algorithm Management Improve Platform Commitment Effectively?——Job Remaking in the Gig Economy

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**Abstract.** With the development of digital technology, gig economy has become a new form of quickly matching work tasks and labor force in digital scenarios. Based on 426 survey data, this paper finds that there is an inverted U-shaped relationship between algorithm management and platform commitment, and the relationship is mediated by advantage job remodeling and interest job remodeling. This study attempts to examine the impact of algorithmic management on platform commitment in the gig economy from a more comprehensive perspective, and to examine the dual mechanism of action in the new scenario of job reshaping theory from a more granular perspective.

**Keywords.** Gig economy, algorithm management, platform commitment, job remodeling

## 1.Introduction

Because of the progress of digital technology and the rapid development of new business forms, the Gig Economy, represented by e-commerce and ride-hailing, has become an important form of labor and production organization in the new business forms.[1]Gig Economy is a new model of high-speed matching between labor supply and demand side under the background of digital economy,[2]a large number of jobs and new occupations have been created, such as net-hailing distributor, net-hailing driver, etc. . And China's gig economy has a distinct" Temporary workers" characteristics[3]The new type of workers have high turnover rate, poor stability and serious problems of lack of labor security rights and interests.[4]July 2021, the Ministry of Human Resources and Social Security of the People's Republic of China and eight other ministries have jointly issued a series of documents, including "Guidance on safeguarding the rights and interests of workers in new forms of employment" and "Guidance on implementing the responsibility of the Internet catering platform to effectively safeguard the rights and interests of food delivery workers", "Strengthen policy propaganda, actively guide public opinion, enhance the sense of occupational honor of workers in new forms of employment, strive to create a good environment, and ensure the implementation of all labor security rights and interests." It is an important problem in the management practice of the gig economy in the new era to increase the stability of the new type of workers and the sense of professional honor and happiness in their work.

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At present, most of the research on algorithm management is qualitative research, and the innovation of platform management based on algorithm management in digital environment has changed the theory of job remolding, and the research on the impact mechanism of platform commitment in gig economy is rare. In view of this, this paper aims to make contributions in the following three aspects: first, through the perspective of empirical research to explore the platform-based algorithm management in the digital economy on the platform to obtain the platform commitment of the “Double-edged sword” role, secondly, based on cognitive interaction theory, the inverted U-shaped relationship between algorithmic management and job remodeling is discussed and verified from the perspective of novel theory and combination, thirdly, by examining the moderating effect of professional reputation, we can further clarify the boundary of the mechanism between job reengineering and platform commitment, it is emphasized to pay attention to the sense of occupational honor of the platform workers in the gig economy, to enhance their sense of work meaning and happiness, and to ensure the healthy and sustainable development of the gig economy.

## **2.Theoretical basis and research hypothesis**

### *2.1.Algorithm management and platform commitment*

Algorithm management can be divided into three aspects: bureaucratic control, market control and customer control. Bureaucratic control refers to the allocation of rules in the platform, the evaluation of performance, and the provision of information support, market control refers to the change of market environment, through the establishment of some rules to affect the remuneration of platform workers, customer control refers to by promoting the exchange of information between platform workers and customers, provide emotional support and companionship, and provide some useful information for the platform.[5]It can avoid the uncertainty risk brought by flexibility effectively.

Baker, Chinese sociologist (1960)[6]The concept of Organizational commitment was first put forward. In his opinion, Organizational commitment refers to the feeling that employees are willing to participate in all kinds of work of the organization with the increase of “Unilateral input” to the organization, after Baker proposed this concept without systematic research and thus failed to attract social attention, the organizational behaviorist Buchanan (1974)[ 7 ]Porter(1976)[ 8 ]Sociology Wiener (1982)[ 9 ]The meaning of organizational commitment has been developed theoretically and empirically.[10]

Therefore, the algorithm management can improve the recognition and dependence of the new employment form workers on the platform, thus increasing the platform commitment, such as the take-out industry to occupy the market, large-scale recruitment of take-out employees, and through the algorithm management in the form of red envelopes, incentives, subsidies and other forms of market competition.[11]On the other hand, the algorithm not only brings a positive effect to the platform, but also brings a negative effect to the platform.[12]By studying the impact of algorithmic management on the preparation, execution and feedback stages of the platform, it is found that the algorithmic management mechanism of the platform conflicts with the so-called flexibility and autonomy, because of work insecurity and other factors, workers work hard to catch up, continue to extend working hours, increase the intensity of labor and the threat to their own physical and mental health, the flexible and

autonomous employment mode of the platform does not bring more autonomy to the workers, who are asymmetrically dependent on the labor control rights held by the platform and voluntarily accept the algorithmic management and control strategy implemented by the platform, it further reduces work autonomy. In this case, the workers on the platform are trapped in a negative cycle of work autonomy paradox, which constantly increases the working hours and intensifies the labor force, the paradox of work autonomy will have a negative impact on workers from psychological level and behavioral level respectively through labor reinforcement, thus has a negative impact on platform commitment (Liu Shanshi, 2021) .[13]The following assumptions are thus made:

H1: algorithm management has an inverted U-shaped effect on platform commitment.

## *2.2. The mediating role of job remodeling*

The idea of job crafting can be traced back to the 1980s, when individual employees could redesign their jobs voluntarily and spontaneously, regardless of the involvement of their superiors (Kulik, 1987) .[14]Job reengineering is a process in which employees reconstruct work content, work style and work relationship according to their own needs in order to gain work meaning and identity (Wrzesniewski & Dutton, 2001)[15]Research has shown that job remodeling not only makes employees feel that their work is meaningful and their identity is positive (Wrzesniewski, Lobuglio, Dutton, & Berg, 2013)[16]This reduces job burnout and increases engagement at work (Harju, Hakanen, & Schaufeli, 2016)[17]Increase job satisfaction (De Beer, Tims, & Bakker, 2016)[18]It also brings subjective satisfaction, self-esteem, and happiness, as well as a sense of respect, trust, and appreciation for one's profession, and objective achievement (Linley, Willars, & Biswas-diener, 2010)[19]Job re-engineering not only encourages employees to actively do their jobs better according to their own preferences, abilities, skills and strengths, at the same time, it can also promote the adjustment of work resources and work needs, reduce job burnout, thus bringing positive emotional experience, a sense of belonging.

On the one hand, in fact, the moderate algorithm management can save time and improve work efficiency for the workers on the platform. Under the moderate algorithm control, the employees can have spare time to cultivate their own work advantages, thinking about and leveraging their strengths, and having the opportunity to devote more time to the tasks that they have the greatest advantage over, not only demonstrates the platform's strengths, but also improves the performance of platform workers.[9]On the other hand, as more and more smart devices such as smart voice headphones, smart helmets, indoor positioning base stations are used, the data collected by the platform system will also be more accurate and comprehensive, during this process, the platform also continuously finds loopholes and makes improvements through algorithms, and further strengthens the rider's control through the improvement of these technologies and equipment, riders will think the algorithm is controlling more than they can handle, their autonomy will be greatly reduced, and they will only be able to follow the instructions given by the platform to complete the work in a step-by-step manner, otherwise, it will affect the performance evaluation and even the salary payment, so they are less willing to resist, which is not conducive to the platform workers to reshape their work according to their strengths. The following assumptions are thus made:

H2: algorithm management has an inverted U-shaped effect on superior job reconstruction.

Employees reframe their work to their advantage to enhance their personal image in the organization, to be better accepted by the organization, and to enhance their work identity (Wrzesniewski, 2001) .[16]When employees can adjust the task boundary according to their own advantages and choose the work style that they think is more advantageous, they are more likely to indulge in the work, be loyal to the organization, and improve the organizational commitment and work engagement, reduce turnover intention (Leana, 2009) .[20]Job reinvention can enhance an individual's sense of identity with their work, and they feel competent and energized when they play to their strengths, these positive emotions and energies make them more dependent on their work and put in more effort. Advantage-oriented job reengineering has a positive effect on platform commitment. Employees can improve platform commitment by using advantage-oriented job reengineering to make their work more in line with their own needs and enhance their work efficiency. Therefore, this paper argues that the reengineering of advantageous work has a positive effect on platform commitment. The following assumptions are thus made:

H3: work remodeling positively impacts platform commitment.

H4: work remodeling mediates the inverted U-shaped relationship between algorithm management and platform commitment.

The model is shown in Figure 1.

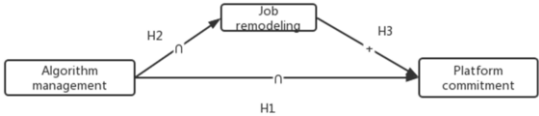


Figure 1. Theoretical model diagram

3.Research Methods, Data Analysis and hypothesis testing

This paper adopts the method of questionnaire survey, and the scale is modified according to the research content by using the mature scale in the past research for reference, the scale has good reliability and validity in different research situations. In order to ensure the accuracy and reliability of the questionnaire, the standard translation-back translation procedure was strictly followed in this study. Likert's five-point scoring method was used to design the questionnaire, which was divided into five levels, ranging from complete disagreement (1 point) to complete agreement (5 points) . The higher the score, the higher the level of agreement.

Algorithm: the measurement of the algorithm comes from Peter[17](2021) developed a nine-item scale to measure the platform's supervisory and motivational impact on employees, representative items such as “The platform will monitor my behavior through the algorithm”, “The platform will evaluate my work performance through the algorithm, and affect my task allocation and ranking”, “I put in a lot of time to improve my performance by studying the rules of the platform's algorithm management”, and so on.

Job remodeling: the measurement of job remodeling is derived from Slemph[21](2013) developed a 15-item scale to measure employees' willingness to

reshape their jobs in terms of their multiple strengths and interests, typical items such as “I am very willing to improve my work according to my advantages”.

Organizational commitment: the measurement of organizational commitment comes from Meyer[22](1993) developed an 18-item scale to measure employees' identification and participation in the organization from three aspects: affective commitment, continuous commitment and normative commitment, typical items such as “I feel like a member of the platform family” and “I have a strong sense of belonging to the platform”.

Control variables: with reference to general variable characteristics, statistical characteristic variables are used as control variables in this paper, it includes the employee's sex, age, education level, working style (full-time, part-time) , working years, daily working hours, income, etc. .

In this study, we used STATA15.0 and SPSS 25.0 to perform confirmatory factor analysis, common method bias test, descriptive statistics, correlation analysis and hypothesis test.

3.1. Correlation Analysis and reliability and validity test

In this study, we used the maturity scale from the authoritative research and followed the standard translation-back translation procedure strictly. The scale has good reliability and validity in different research situations. In the Table 1, the Cronbach's  $\alpha$  of all construal is greater than the critical value 0.7, which has good reliability. The correlation coefficients among the variables showed that there was a significant positive correlation between algorithm management and job reengineering, between algorithm management and platform commitment, and between job reengineering and platform commitment, the relationship between the variables is in accordance with the basic theoretical expectation, which provides the basic evidence for the next hypothesis test.

Table 1. correlation coefficient and reliability and validity test of variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	14
Sex	1383	0487	-											
Age	3516	1016	0056	-										
Education level	2528	0767	-0045	-0143 <sup>*</sup>	-									
Platform type	1663	0477	0148 <sup>***</sup>	0148 <sup>***</sup>	-0005	-								
Form of work	1531	0500	-0005	-0045	-0002	-0104 <sup>*</sup>	-							
Monthly income	2232	0782	-0036	0026	0085	0078	-0394 <sup>***</sup>	-						
Years of service	2366	0959	0032	0339 <sup>***</sup>	0034	0186 <sup>***</sup>	-0387 <sup>***</sup>	0303 <sup>***</sup>	-					
The reason for the choice	2890	0834	0023	-0091	0040	0081	0293 <sup>***</sup>	-0119 <sup>*</sup>	-0135 <sup>***</sup>	-				
Working Hours	2770	1021	-0073	-0008	0011	0005	-00761 <sup>***</sup>	0367 <sup>***</sup>	0360 <sup>***</sup>	-0306 <sup>***</sup>	-			
Algorithm management	4034	0595	-0069	-0051	-0045	-0031	-0085	0019	-0014	-0088	0116 <sup>*</sup>	(0731)		
Job remodeling	3958	0666	0145 <sup>***</sup>	0107 <sup>*</sup>	-0036	-0001	-0147 <sup>***</sup>	0098 <sup>*</sup>	0231 <sup>***</sup>	-0064	0161 <sup>***</sup>	0315 <sup>***</sup>	(0722)	
Platform Commitment	3552	0767	0100 <sup>*</sup>	0135 <sup>***</sup>	-0092	0012	-0264 <sup>***</sup>	0113 <sup>*</sup>	0197 <sup>***</sup>	-0153 <sup>***</sup>	0245 <sup>***</sup>	0268 <sup>***</sup>	0682 <sup>***</sup>	(0829)

Note: \*  $p < 0.05$ , \* \*  $p < 0.01$  Cronbach's of variables in brackets  $\alpha$  Value.

3.2. Hypothesis testing

(1) main effect test

For the curve effect between algorithm management and platform commitment, Edwards and Lambert are used in this paper[23](2007) proposed a “Subgroup approach” to hypothesis testing. In table 2, Model 2 and Model 3 show that there is a significant positive correlation between algorithm management and platform commitment ( $\beta = 0.327, p < 0.01$ ) . After the square term of algorithm management is put into the model, the correlation coefficient between algorithm management and platform commitment decreases, however, there was a significant negative correlation between the algorithm management square and platform commitment ( $\beta = -0.042, p < 0.01$ ) , and the fitting index was significantly increased ( $\Delta R^2 = 0.159$ ) , which indicated that there was an inverted U-shaped effect between the algorithm management and platform commitment. Hypothesis H1 was verified.

(2) test of mediating effect

According to Model 7 and Model 8 in Table 2, there was a significant positive correlation between algorithm management and job remodeling ( $\beta = 0.362, p < 0.01$ ) . After adding the square term of algorithm management to the model, the correlation coefficient between algorithm management and job remodeling decreased, the square term was negatively correlated with the promotion of focus ( $\beta = -0.057, p < 0.01$ ) , and the fitting index was improved ( $\Delta R^2 = 0.173, p < 0.05$ ) , which indicated that there was an inverse U-shaped relationship between the algorithm management and job remodeling. Hypothesis H2 was verified.

According to model 5 in Table 2, after job remodeling was put into the model, there was a significant positive correlation between job remodeling and platform commitment ( $\beta = 0.734, p < 0.01$ ) . Hypothesis H3 was verified. From the Model 5 in

**Table 2.** Test of main effect and intermediate effect of relationship between algorithm management and platform commitment curve

Variable	Platform Commitment				Advantage job remodel			
	Models1	Models2	Models3	Model 4	Model 5	Model 6	Model 7	Model 8
Sex	0.164*	0.188**	0.186**	0.005	0.014	0.211**	0.237**	0.235**
Age	0.067	0.076*	0.077*	0.046	0.048	0.028	0.037	0.038
Education level	-0.076	-0.064	-0.064	-0.055	-0.053	-0.028	-0.014	-0.015
Platform type	-0.066	-0.065	-0.064	0.003	0.001	-0.092	-0.090	-0.089
The Way It Works	-0.212	-0.207	-0.207	-0.220*	-0.219*	0.011	0.016	0.016
Monthly income	0.001	0.005	0.004	-0.010	-0.009	0.015	0.020	0.018
Working Hours	0.079	0.059	0.058	0.026	0.024	0.070	0.048	0.046
Years of service	0.059	0.067	0.066	-0.037	-0.033	0.128**	0.137**	0.135**
The reason for the choice	-0.053	-0.039	-0.042	-0.053	-0.051	-0.000	0.015	0.012
Algorithm management		0.327**	0.026		0.063**		0.362**	-0.051
Algorithm management <sup>2</sup>			-0.042**		-0.000**			-0.057**
Job remodeling				0.753**	0.734**			
F	5.990	8.942	8.194	42.267	35.326	4.494	9.750	9.060
R <sup>2</sup>	0.115	0.177	0.179	0.505	0.507	0.089	0.190	0.194
$\Delta R^2$		0.157	0.159	0.493	0.492		0.171	0.173

table 2, the correlation coefficients between algorithm management and platform commitment ( $\beta = 0.063$ ,  $p < 0.01$ ), the square term of algorithm management and platform commitment ( $\beta = -0.000$ ,  $p < 0.01$ ) were decreased, but still significant, it is shown that work remodeling plays a part of mediating role in the inverted u relationship between algorithm management and platform commitment, and hypothesis H4 is verified.

#### 4. Conclusion and discussion

The rapid development of digital economy has given birth to the gig economy, which is a new organizational mode of productive forces and a new motive force for economic development, it has played a positive role in innovation, serving People's livelihood and expanding employment channels. Platform based on digital technology and algorithms, explore the degree of control of algorithm management and role, it is of great theoretical and practical significance to promote the mediating effect of research platform commitment, job remodeling and the moderating effect of professional prestige. The conclusions of this paper are as follows: first, platform-based algorithm management may form a "Double-edged sword effect" on platform commitment. Cognitive interaction theory and work remodeling theory enrich the relationship between variables and reveal the internal dual trigger mechanism of platform-based algorithm management affecting platform commitment, work reengineering mediates between algorithm management and platform commitment, and it mediates the inverted U-shaped relationship between algorithm management and platform commitment.

The platform is based on digital technology and algorithms, which can prove the degree of control and role of algorithm management, and has important theoretical and practical significance in promoting the intermediary role of research platform commitment, job remodeling and the regulatory role of professional reputation.

#### References

- [1] Chen L. Labor Order under Digital Control--Study on Labor Control of Delivery Rider[J]. *Sociological Research*, 2020, 35 (06):113-135+244.
- [2] Horney, N.. The Gig Economy: A Disruptor Requiring HR Agility[J]. *People and Strategy*, 2016, 39(3): 20-27.
- [3] Xie FS, Wu Y, Wang Shengsheng. Political Economy Analysis of Platform Economy Globalization[J]. *China Social Sciences*, 2019(12):62-81, 200.
- [4] Let It Go. Digital economy, new forms of employment and labour market transformation[J]. *Learn and practice*, 2021, 452(10):71-77.
- [5] Peter, N., Nenad, J., Arup, V., Svetlozar, N.. The effects of technological supervision on gig workers: organizational control and motivation of Uber, taxi, and limousine drivers[J]. *The International Journal of Human Resource Management*, 2021(4):1-25.
- [6] Becker H S . Notes on the Concept of Commitment[J]. *American Journal of Sociology*, 1960, 66(1):32-40.
- [7] Bruce, Buchanan. To walk an extra mile The whats, whens, and whys of organizational commitment[J]. *Organizational Dynamics*, 1975.
- [8] Porter L W , Crampon W J , Smith F J . Organizational commitment and managerial turnover: A longitudinal study[J]. *Organizational Behavior and Human Performance*, 1976, 15(1):87-98.
- [9] Wiener, Y. Commitment in Organizations: A Normative View[J]. *Academy of Management Review*, 1982.
- [10] Xi J. The Comparison of Organizational Identity and Organizational Commitment and Its Implications for Management Practice[J]. *leading edge*, 2009(11):162-165.

- [11] Sun P. Digital labor in "Algorithmic Logic": A Study of food delivery workers in a platform economy[J]. *The ideological front*, 2019, 45(06): 50-57.
- [12] Mazmanian, M., Orlikowski, W. J., Yates, J. A.. The autonomy paradox: The implications of mobile email devices for knowledge professionals[J]. *Organization Science*, 2013, 24(5): 1337-1357.
- [13] Liu SS, Pei JL, Zhong CY. Does the platform work autonomously? The influence of online labor platform algorithm management on work autonomy[J]. *Foreign Economy and management*, 2021, 43(02): 51-67.
- [14] Kulik, C. T., Oldham, G. R., Hackman, J. R.. Work Design as an Approach to Person—Environment Fit[J]. *Journal of Vocational Behavior*, 1987, 31(3): 278-296.
- [15] Wrzesniewski, A., Dutton, J. E.. Crafting a job: revisioning employees as active crafters of their work[J]. *Academy of Management Review*. 2001, 26(26): 179- 201.
- [16] Wrzesniewski A , Lobuglio N , Dutton J E , et al. *Job Crafting and Cultivating Positive Meaning and Identity in Work*[M]. Emerald Group Publishing Limited, 2013.
- [17] Harju L K , Hakanen J J , Schaufeli W B . Can job crafting reduce job boredom and increase work engagement? A three-year cross-lagged panel study[J]. *Journal of Vocational Behavior*, 2016, 95-96(AUG.-OCT.): 11-20.
- [18] De B L T , Maria T , Bakker A B . Job crafting and its impact on work engagement and job satisfaction in mining and manufacturing[J]. *South African Journal of Economic and Management Sciences (SAJEMS)*, 2016, 19(3): 400-412.
- [19] Linley, P. A., Nielsen, K. M., Gillett, R., Biswas-Diener, R.. Using signature strengths in pursuit of goals: Effects on goal progress, need satisfaction, and well-being, and implications for coaching psychologists[J]. *International Coaching Psychology Review*, 2010, 5: 6-15.
- [20] Leana, C., Appelbaum, E., Shevchuk, I.. Work process and quality of care in early childhood education: the role of job crafting[J]. *Academy of Management Journal*. 2009, 52(6): 1169-1192.
- [21] Slemp, G. R., Vella—Brodrick, D. A.. The job crafting questionnaire: A new scale to measure the extent to which employees engage in job crafting[J]. *International Journal of Wellbeing*, 2013, 3(2): 126-146.
- [22] Meyer John, P., Allen Natalie, J., Smith Catherine, A.. Commitment to organizations and occupations: Extension and test of a three-component conceptualization[J]. *Journal of Applied Psychology*, 1993, 78(4): 538-551.
- [23] Edwards, J. R., Lambert, L. S.. Methods for Integrating Moderation and Mediation: A General Analytical Framework Using Moderated Path Analysis[J]. *Psychological Methods*, 2007, 12(1): 1-22.