

Configuration Study on Influencing Factors of Platform Employee Initiative under Algorithmic Program

-- Case Study Based on Drip Platform Driver Interview

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Abstract. Under the overall pressure of the employment situation in China, the number of platform employees is increasing gradually. Under the algorithm program, how to rationally allocate platform employees' work tasks and improve employee motivation are affected by many factors. This paper uses random interviews with drip drivers in Guangdong and Anhui as a first-hand data sample and uses a clear set qualitative comparison method to analyze and study the configuration of factors affecting employee motivation. Emphasizes that the platform should pay attention to the role of multi-factor coupling in improving employee motivation; Increase employee participation in platform strategic decision-making and procedural fairness among platform employees. The main theoretical contributions of this paper are as follows: Firstly, the factors that affect the enthusiasm of the algorithm program are combed; Second, it verifies the path of different factors to improve employee motivation. The results of the study show that different program settings can meet the needs of employees to varying degrees, thus improving the enthusiasm of employees.

Keywords: Platform employees; Enthusiasm; Qualitative comparative analysis.

1. Introduction

Under the overall pressure of the employment situation in China, the number of platform employees is increasing gradually. The new employment model in the new industry promotes labor market innovation. Internet information technology gives workers the right to allocate time and energy independently (Wood et al., 2019) in an on-demand economy. Intuitively, the online labor platform through the Internet connection performance can enhance workers' autonomy in choosing when, where, and at what intensity to work (Barnes et al., 2015). More work arrangement choices are handed over to platform employees themselves. This strengthens the enthusiasm of platform employees. However, the new technology-driven platform management strategy has more control over employees, and the motivation of platform employees is also affected by employees' perceptions and other aspects.

This paper takes 100 first-hand data from random interviews with drip drivers in Guangdong and Anhui as study samples, uses the Clear Set Qualitative Comparison Method (csQCA) to construct a model of factors affecting employee motivation under the algorithm program, and completes the configuration analysis under the coexistence of internal and external factors affecting the influence of the algorithm program on employee motivation. The main theoretical contributions of this paper are as follows: Firstly, the factors that affect the enthusiasm of the algorithm program are combed; Second, it verifies the path of different factors to improve employee motivation. The results of the study show that different program settings can meet the needs of employees to varying degrees, thus improving the enthusiasm of employees.

2. Literature Review

Unlike previous studies, this paper chooses a case-oriented set of theoretical research methods - Qualitative Comparative Analysis (QCA). QCA was first proposed by Ragin (2009), which is essentially a Weber-style thought experiment. The QCA method considers a case to be a whole of cause conditions and therefore pays more attention to the effect of condition combinations on the

outcome. When there are k variables, using QCA can result in 2^k logical combinations containing all the preconditions. This method combines qualitative and quantitative analysis methods, and based on the Boolean algebra principle, finds the membership relationship between sets by comparing a certain number of cases, thus mining the universality of multiple cases. QCA was originally applied to sociology and politics, and now it has also been concerned by managers. QCA mainly includes clear set QCA (crisp-set QCA, short for CS QCA), multi-value QCA (short for MV QCA), and fuzzy set QCA (fuzzy-set, short for FS QCA) (Ragin, 2000). Fiss (2011) uses QCA to examine how different types of strategies, environmental factors, and structures combine to produce high and low performance. Domestic scholars Du Yunzhou and Jia Liangding (2017) made a detailed statement on the basic principles, three methods, application steps of QCA, and its application in the management field, which paved the way for the wide application of QCA in the domestic management field. At present, domestic scholars are also gradually attempting to use this method for research. Wang Fengbin (2014) and others use QCA to analyze the interaction of such factors as group strategy, system reform, and historical track on the selection of the control structure of the central enterprise group, enriching and developing the control theory of large state-owned enterprise groups.

This paper uses the fs QCA analysis method, which converts the values of variables into continuous values between 0-1 through the calibration process to form a true table, which makes the QCA method more general and better avoids information loss during data conversion (Fiss, 2011). First, the QCA method emphasizes that from a holistic point of view, different preconditional configurations of multiple independent variables resulting in the result variable are explored. Due to the complexity of economic management research problems, the factors leading to the emergence of result variables are complex, diverse, and interdependent. A result is often formed by the combination of multiple interrelated variables. No single variable can act independently to produce the desired results. Thus, traditional quantitative studies have great limitations. They only focus on the independent role of significant variables. They observe the effect of an independent variable on dependent variables by controlling the influence of other variables. They do not take into account how variables are combined to produce results (Fiss, 2007). In contrast, the QCA method makes up for this deficiency. It focuses on the significance of the combination of factors. The goal is to find multiple paths that can achieve the desired results and identify the different equivalent configurations that generate work input (Ragin 2009, Peer 2011).

Algorithms are computational formulas that make decisions autonomously based on statistical models or decision rules without explicit manual intervention (Eurofound, 2018); It is also a combination of instructions that tell computers how to precisely follow steps and rules to accomplish a task, enabling organizations to use artificial intelligence to solve problems in complex areas such as innovative products and self-managing business processes (Mann and O'Neil, 2016). Algorithmic technology is changing the way organizations manage their work. The management practices in online labor platform work arrangements refer to the way digital media platforms such as Facebook and Netflix manage and affect their users (Duggan et al., 2020), manage their work through workflow design, and use a series of algorithmic instruction codes based on data servers to control workers distributed around the world (Aneesh, 2009).

"On-demand service" of platform employment mode mainly focuses on completing structured tasks. Structured, fragmented, and instant labor service needs provide the platform with the opportunity to manage labor as data storage assets based on digital algorithm technology (Rosenblat and Stark, 2016; van Doorn, 2017). Thomas (2018) also found that workers can freely schedule work hours and choose the type of work they want to do based on an application-designed business operation architecture and customer information resources, without employer control and constraints. These parts-work economic platforms attracted a large number of laborers flexibly and flexibly working. They had significant advantages over traditional enterprises with less flexible schedules (Swarns, 2014). From the point of view of the characteristics of part-time work, the part-time economy platform provides employees with unprecedented flexibility. Service providers on the platform can not only freely decide their schedule, but also their working hours and even their work

intentions (Hall & Krueger, 2018). They take part in part-time work because platform-specific flexibility allows them to control their schedule and provide opportunities for social contact (Rosenblat & Hwang, 2016; Rockmann & Ballinger, 2017).

For the literature review, the existing research mainly focuses on the operation and fairness of platform algorithm programs, as well as the autonomy of platform employees, but there is a lack of some perceptive exploration of the enthusiasm of platform employees. Therefore, this paper mainly on two aspects of company and platform employees exploring the factors that affect the enthusiasm of employees and exploring the promotion effect of multi-dimensional influence on the enthusiasm of platform employees.

3. Research methods and variable determination

(1) Selection of methods and data collection statistics

To achieve the research objectives, this paper chooses QCA qualitative comparative analysis for the following reasons: First, this method breaks through the limitations and requirements of the traditional empirical methods on the number of samples, and can use small samples for research; Secondly, changing the traditional method can only verify the relationship between a single variable and a dependent variable, the situation that the interaction between multiple variables is difficult to achieve can achieve multiple interaction studies under complex scenarios (Guo Yuanyuan, 2019). Finally, the qualitative comparison method can achieve the non-linear causal analysis between the conditional variable and the result variable. This paper will further explore the platform employee motivation under the algorithm program by identifying and analyzing the sufficient conditions and necessary conditions configuration that affects the result variable. This paper takes a combination of questionnaires and interviews to collect the research data. First, 100 interviews and questionnaires of drip drivers in Guangdong and Anhui were collected. Starting from July 2012, project team members sent questionnaires and collected data to related enterprises by interview and direct mail. By the end of September 2019, 91 valid feedback questionnaires were received, which were incomplete and tended to be answered regularly. The proportion of male car owners is 77.8%, which is higher than that of female car owners. Age ranged from 30 to 50 years. Full-time drivers account for 89%; Samples are mostly concentrated in central cities.

(2) Construction of research index system

Based on the literature review and research, this paper constructs the factors that affect the motivation of platform employees from the two dimensions of "platform" and "driver individual".

1. Platform Aspects

The related factors of the platform side select two aspects: system dispatch order, start price differentiation, and co-creation. From the point of view of the characteristics of part-time work, the part-time economy platform provides platform employees with unprecedented flexibility. Service providers on the platform can not only freely decide their schedule, but also their working hours and even their work intentions (Hall & Krueger, 2018). In a digitized organizational environment, drip industry platforms make scientific decisions using large data-driven AI algorithms. Objectively, AI algorithms can better understand and interpret the decision-making process than human beings. Large data resources provide several models and architectures for the algorithm to improve decision-making efficiency (Schildt, 2017). Drip driver's dispatch system is based on an AI algorithm to arrange the most suitable driver for passengers according to some comprehensive elements such as distance and road conditions, to complete the dispatched task. However, according to most drivers' feedback, the platform prevents drivers from brushing their bills. Some restrictions have been added, sometimes dispatching orders is not optimal. Because of different periods and different levels of economic development in the city, the starting price of taxis varies.

2. Driver Aspect

The related factors of the driver side select three aspects: democratic forms such as participating in co-creation meetings, driver's service score, and effective online feedback. In April 2012, drip-drip

set up the Ecological Development Committee for drip-drip drivers, which will explore the protection of the rights and interests of drip-drip drivers, the stability and transparency of drivers' income, and the fairness and rationality of platform rules. Drip driver platform participates in the joint venture, and from the perspective of safeguarding their rights and interests, puts forward relevant suggestions, effectively enhancing the driver's recognition of the platform; Drip Travel Services score is initially 80 points, followed by service score based on the number of orders received, duration, quality, complaints, cancellations and other conditions, less than 10 points will stop dispatching orders, effectively link drivers with passengers, the higher the service score, the higher the optimal dispatching rights, thus motivating the driver's dispatching behavior; Because the driver's travel score and word-of-mouth value are related to the passenger's score, which is subjective, platform drivers can submit relevant certificates to appeal and ensure the driver's rights and interests.

Table 1. Variable encoding and judgment description

Factor	Variable Name	Measurement standard	assignment		
Platform Aspects	Start price	Start price exceeds ¥9	1		
		Starting price is less than ¥9	0		
	System dispatch	Passengers assigned by the algorithm on the driver's day do not match the driver optimally more than 5 singles	1		
		Less than 5 singletons of passengers and drivers not optimally matched by the algorithm assigned by the driver on the same day	0		
		Driver Aspect	Experience in co-creation	Experience in a co-founding meeting	1
				Did not attend Drop Co-Creation	0
Travel Service Points	The average score for a service given by passengers is greater than 3		1		
	The average score for a service given by passengers does not exceed 3		0		
Effective appeal	Successful problem solving was achieved more than 3 times with the appeal system		1		
	No more than 3 successful problems solving by the appeal system		0		
Activity		For longer than 11 h / day at the active phase of the platform	1		
		At the active time of the platform was below 11 h / day	0		

4. Analysis and discussion

(1) Combined condition analysis

First, after the selection and assignment of variables, according to the analysis method and steps of a clear set of csQCA, the coding summary work is completed for all cases, and the binary data table of case samples is obtained, then QCA3 is used. 0 software's true table algorithm function and gets a true table without contradictory configuration with result variable "1" (limited in length).

Table 2. Univariate Necessity Analysis

Variable	Uniformity	Coverage
Start price	0.40000	0.40000
~ Start price	0.60000	0.70000
System dispatch	0.40000	0.87500
~System dispatch	0.60000	0.50000
Experience in co-creation	1.0000	1.00000
~ Experience in co-creation	0.0000	0.0000
Travel Service Points	0.20000	0.35714
~ Travel Service Points	0.80000	0.81250
Effective appeal	0.53333	0.76471
~ Effective appeal	0.46667	0.38462

(2) Multivariate Configuration Sufficiency Analysis

This analysis is based on the need analysis of a single variable and aims to identify all feasible conditional configurations. The configuration of intermediate solution results shown in Table 5 is formed according to the calculation logic of QCA. The intermediate solution not only integrates individual different configurations but also contains the core conditions of the final solution. The configuration expression is:

Configuration1: System dispatch*Experience in co-creation*Effective appeal

Configuration2: System dispatch*~ Experience in co-creation*Travel Service Point*Effective appeal

Configuration3: Start price*System dispatch* Effective appeal

Configuration4: System dispatch*~Travel Service Points*~Effective appeal

Table 3. Platform employee motivation configuration

Condition-al Variables	Configuration 1	Configuration 2	Configuration 3	Configuration 4	Overall consistency	Overall coverage
Start price			●			
System dispatch	●	●	●	●		
Experience in co-creation	●	⊗				
Travel Service Points		●		⊗	1	1
Effective appeal	●	●	⊗	⊗		
Uniformity	1	1	1	1		
Coverage	0.61111	0.33333	0.16667	0.11111		
Net Coverage	0.44444	0.16667	0.11111	0.55556		

From Table 3, four configurations can be found that affect the motivation of platform drivers.

Configuration1: System dispatch*Experience in co-creation*Effective appeal. The original coverage of the explanatory path was 0.61, indicating that the causal path can account for about 61% of successful cases that affect the motivation of platform employees. In an uncertain and dynamic spatial structure, the perceptual dispatch list of platform drivers is best matched by the systematic dispatch list through the algorithm. And platform drivers participating in Drop Co-Creation can better express their demands, perceive the process of their rights and interests being protected, and enhance trust in the organization. The more effectively platform drivers' complaints are resolved, the better they can perceive the fairness of the platform and protect the driver's rights, thus increasing the driver's motivation.

Configuration2: System dispatch*~ Experience in co-creation*Travel Service Point*Effective appeal. The original coverage of the explanatory path is 0.33, indicating that the causal path can explain about 33% of the successful cases that affect the motivation of platform employees. Explain the rationality of system algorithm dispatch under employee perception, reasonable travel service score affected by passenger scoring, and in this case, employee complaints are better resolved, and the enthusiasm of employees on that platform will be improved accordingly.

Configuration3: Start price*System dispatch* Effective appeal. The original coverage of the explanatory path is 0.16, indicating that the causal path can explain about 16% of successful cases that affect employee motivation. This configuration path is mainly affected by the platform. Due to the difference in starting price of drip travel between different provinces and cities, employees' evaluation of fairness will be different and their motivation will be affected. System dispatch is also mainly affected by platform-side algorithm systems, due to platform settings-related restrictions, such as restricting drivers from dispatching the latest single to the same driver frequently, but there are

also biases, which can lead to platform employees' distrust of platform algorithms and reduce motivation.

Configuration4: System dispatch*~Travel Service Points*~Effective appeal. The original coverage of the explanatory path was 0.11, indicating that the causal path can explain about 11% of the successful cases that affect the motivation of platform employees. This configuration path indicates that if the platform only dispatches orders through algorithms, it will not be able to fully and effectively motivate employees.

5. Conclusions and Suggestions

(1) Research Conclusion

This paper combines the qualitative comparison method of the clear set, and analyses the factors that affect the enthusiasm of platform employees and their combination paths from the perspective of both platform parties and employees. The results of the study are by the research hypothesis. Starting price, algorithm system dispatch, employee participation in co-creation, travel score and effective appeal of the problem all have an impact. However, a single factor can not explain the successful cases of increasing employee motivation, and the coupling of multiple factors can achieve the feasible path of increasing employee motivation. At the same time, the results of the study also found that employees' perception of job fairness and employees' participation play a greater role in motivation.

Based on the analysis of the coupling phenomenon of multiple factors that affect the enthusiasm of employees, this paper further studies four explanatory paths to improve the enthusiasm of platform employees, which are "reasonable system dispatch list + platform employees participating in co-creation meeting + effective appeal for problems", "reasonable system dispatch list + high service travel list + effective appeal for problems", "high starting price + reasonable system dispatch list", "reasonable system dispatch list". This paper also finds the strongest paths in the conditional combination path, from high to low are "Route 1, Route 3, Route 2, Route 4", which are the main paths to improve the enthusiasm of platform employees.

(2) Research Recommendations

The conclusions drawn in this paper have important reference significance for analyzing the factors that affect the positivity of platform employees. Based on the research, this paper proposes three suggestions to provide references for improving the positivity of platform employees.

First, pay attention to the role of multi-factor coupling in improving employee motivation. Based on the diversity of explanatory paths that affect the motivation of platform employees, the complexity of influencing factors is indicated. Drip Platform should study the coupling of influencing factors under different conditions in an all-around way and implement flexible policies to attract drivers according to the results. On the one hand, the platform can improve the internal algorithm dispatch system, determine reasonable inter-regional differential pricing, and let drivers perceive the fairness of the platform from an objective level; On the other hand, we should organize Drop Co-Creation Association, improve the appeal system and focus on the emotional needs of drivers, to improve the enthusiasm of employees.

Second, improve employee participation in platform strategic decision-making. Employee participation in enterprise management has become the development trend of each enterprise's production and operation. Employee participation in the management process not only realizes the sublimation of self-value but also ensures the scientific and reliable decision-making methods and results of the enterprise. Based on the results of the study, the platform employees participate in the platform meeting decision-making discussion, reflect on their demands, strive for their rights and interests, and put forward their views on the problems in the development of the platform and the future development, which is conducive to fully mobilize the enthusiasm of employees.

Third, improve the procedural fairness of platform employees. In the process of digitizing transformation and introducing AI to help organizations make decisions, drip platforms need to pay attention to employees' perceptions and views on digitizing technologies such as AI in the process of

human-computer interaction. Managers can try to make the information related to AI algorithm decision-making process public and shared it with employees, to increase employees' preference and even trust in the AI algorithm. At the same time, the uncertainty of the application process and results of the algorithm remind stakeholders to fully understand the possible derivative results and their impacts on the algorithm to avoid ignoring important value considerations in simplifying social complexity. Employees should be encouraged to participate in decision-making, set up appeal channels, and strive to enhance the certainty of the decision-making process to increase their motivation.

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