

Gig Economy in China? A Scoping Review

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Abstract: *This paper presents a comprehensive scoping review of the gig economy in China, shedding light on the multi-dimensional experiences and challenges faced by gig workers. The review encompasses key themes such as work experience and well-being, algorithmic management, labor control, worker solidarity, labor protection, policy development, and gender disparities. It uncovers that Chinese gig workers are often subjected to job insecurity, income instability, and variable working conditions. Furthermore, it reveals how algorithmic management and labor control can influence worker solidarity and labor activism, while highlighting the importance of clearly defined employment statuses and legal protection. Notably, the paper identifies gender disparities as a significant concern within the gig economy, requiring further intervention. Future research directions are also suggested, focusing on the ever-evolving gig work landscape and the effectiveness of proposed interventions and policy responses.*

Keywords: Gig economy; Digitization; Social Security; China.

1. INTRODUCTION

The gig economy, with its flexible, temporary, and on-demand work arrangements, constitutes a major global trend. Tran and Sokas (2017) suggest that gig work encompasses online labor ranging from microwork to online freelancing, incorporating tasks ordered and completed independently or entirely online. Gig work, as Stanford (2017) defines, typically involves performing fixed-term tasks, lacks formal employment relationships, and relies on an intermediary platform firm. Meijerink and Keegan (2019) underline the primary economic exchange in the gig economy as platform-enabled gig work. Gig workers, therefore, work independently and receive assignments through intermediary platforms such as Upwork, Uber, DIDI, and Deliveroo. The International Labour Organization report indicates the gig economy's global expansion, with more workers adopting short-term, flexible work arrangements (Kuhn et al., 2018). China, a rapidly growing gig economy nation in the Asia-Pacific region, exemplifies large-scale, digitally advanced, entrepreneurial, and potentially migrant-worker-inclusive characteristics (Chang & Huang, 2023). In 2020, China's total labor force stood at 880 million, with approximately 200 million gig workers, 40% of whom earned income through online platforms (Renmin University of China, 2022). A nearly 3% YoY increase put the size of China's sharing economy at roughly 3.4 trillion yuan in 2020. This figure should continue to rise, potentially accounting for up to 40% of China's total employment by 2025 (Ali Research Center, 2021).

China's burgeoning gig economy confronts notable challenges. Rapid expansion and investor pressures significantly curtail gig workers' pay. Didi Chuxing, for instance, deducts up to 30% of the ride fare from drivers' earnings, and Meituan, a food delivery app, employs stringent algorithms to restrict couriers' bonus prospects (Xu, 2022). Top players monopolize e-commerce, food delivery, and ride-hailing markets, commanding over an 80% market share, drawing national antitrust regulatory authorities' scrutiny (Li et al., 2022). Escalating dissatisfaction among gig workers has spurred authorities to press online platforms to elevate conditions for food delivery, logistics, and transport personnel by raising wages and boosting safety measures. The gig economy's opportunities and challenges have garnered increasing attention, leading to the swift evolution of academic literature on the topic. However, over the past decade, studies specifically investigating China's gig economy remain sparse. Hence, this study aims to bolster comprehension of China's gig economy's current research status and future growth trajectory. An in-depth understanding of the "Chinese gig economy" may yield insights into its principal themes and challenges. It could guide government bodies, gig economy platforms, and practitioners in more effectively tackling challenges amid intense market competition.

2. RESEARCH METHODOLOGY

In this study, we implement the scoping review method, following the framework and principles suggested by Arksey and O'Malley, with additional recommendations provided by Levac et al (Arksey & O'Malley, 2005; Levac et al., 2010). Initially, our literature search timeline started in 2014, marking the publication year of the earliest gig economy research papers (Friedman, 2014). However, during the screening process, we identified that the first paper on China's gig economy appeared in 2017 (Zou, 2017). Thus, we refined our review timeline to span from

2017 to 2023. We performed this search in April 2023.

To collate research papers for our review, we initially scrutinized titles, abstracts, and keywords of papers published in the Web-Of-Science, yielding 359 papers. Our search strings formulated from keywords included "Gig economy + China," "platform economy + China," "gig worker + China," "DIDI +China," "MEITUAN + China," "Uber + China," "Eleme + China". We then narrowed down the search timeline to the period 2017-2023, resulting in 304 papers. We subsequently excluded conference proceedings, editorial material, and book chapters, finally retaining 258 papers for review. We visually depict this transparent process using the PRISMA flow chart (refer to Figure 1).

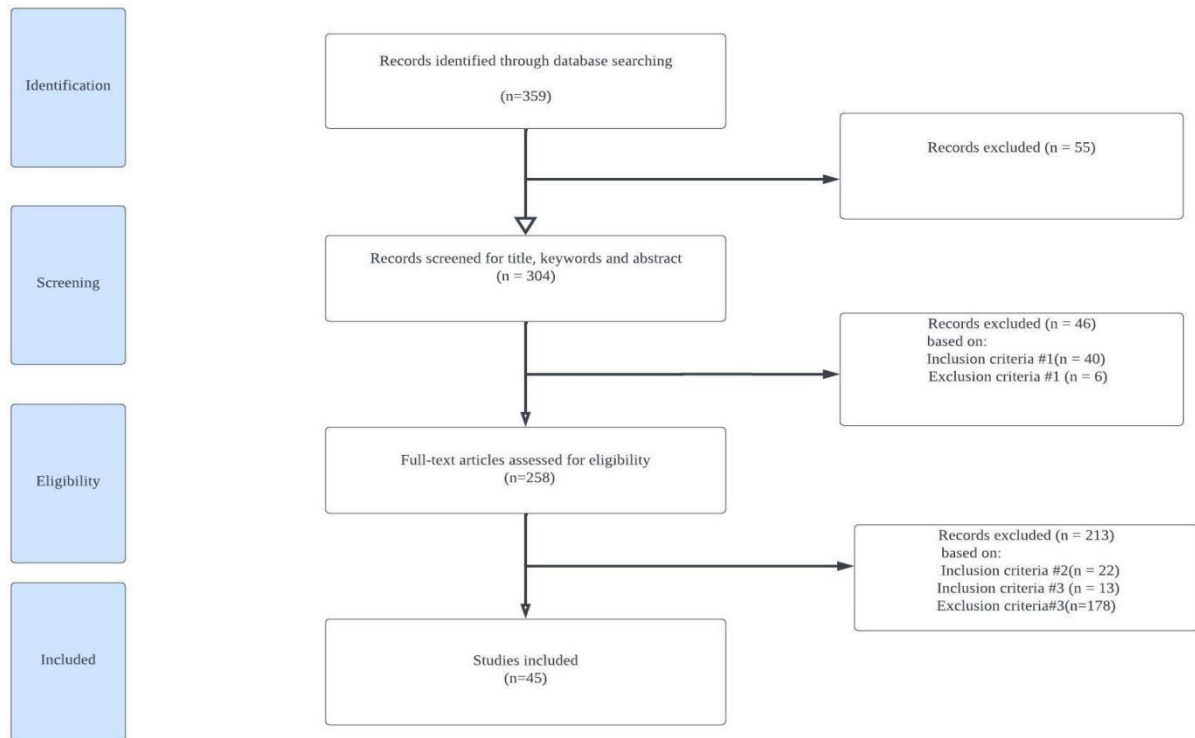


Figure 1: The complete data retrieval process

We established the scope of this study by setting eligibility criteria, which determined the resources to include or exclude. Such guidelines are vital to keep the research focused and valid (Levac et al., 2010). Based on the research objective and question, we explained and defined the inclusion criteria for the research population, concept, context, and types of sources. Hence, we set the following inclusion and exclusion criteria:

Inclusion:

We included articles published between 2014 and 2023.

We included articles providing information related to China's gig economy or platform economy, associated theories, themes, variables, drivers, outcomes.

We included articles with empirical, conceptual, or both types of findings. **Exclusion:**

We excluded conference proceedings and book chapters.

We excluded articles not pertaining to China or the Chinese context.

We excluded articles covering topics distinct from our goals, such as supply chain, enterprise culture, e-commerce platforms, digital platforms, sharing economy, environmental issues, logistics network, energy.

We then evaluated each paper in the data set using the established inclusion criteria sequentially. First, we screened

titles and abstracts of articles for their relevance. Following that, we retrieved and evaluated the full texts of the papers against the inclusion criteria. The PRISMA flow chart (Figure 1) visually represents the screening process, showing the exclusion of 213 papers across both filtering stages due to non-compliance with the criteria. Ultimately, the final data set consisted of 45 papers that met the established inclusion criteria.

3. RESULTS

3.1 Overview

This scoping review incorporated 45 articles. The initial search identified 359 articles, from which we considered 181 based on their titles, keywords, and abstracts. We then selected 304 of these articles as suitable for our study. We independently screened the abstracts of these 304 articles, deeming 258 of them relevant. Following a comprehensive full-text review, we ultimately included 45 articles in this scoping review.

Table 1: Analysis of demographic variables in different dimensions

		AT	SN	PBC	fertility intention
Marital status	unmarried	5.01	5.41	5.08	4.90
	married	5.79	5.67	5.40	5.21
	<i>p</i>	.000**	.002**	.001**	.032**
Fertility status	Not having children	5.25	5.53	5.25	5.19
	Having children	5.89	5.67	5.39	5.09
	<i>p</i>	.000**	.054*	.085	.469
Gender	men	5.53	5.57	5.32	5.11
	women	5.72	5.68	5.34	5.19
	<i>p</i>	.049*	.998	.238	.034*

Table 2: Descriptive statistical analysis

Variable	Obs	Mean	Std	Min	Max
pe	126	1219.68	1203.26	131.28	6811.30
employ	126	53.48	35.20	0.20	180.00
rd	126	27.93	45.87	0.10	265.86
pergdp	126	3.73	2.59	0.92	13.69
trade	126	135.82	205.73	1.78	1323.27
edu	126	827.69	1371.489	119.38	6359.50

3.2 Theme Analysis

The literature on gig economy workers in China primarily focuses on various aspects of their work experience and well-being, algorithmic management, labor control and worker solidarity, labor protection and policy development, gender disparities in the gig economy. Below is a summary of the key themes in the literature.

(1) Work Experience and Well-being

A wide array of studies has been conducted to investigate the work experience and overall well-being of gig workers, shedding light on the elements that contribute to their job satisfaction, motivation, and overall well-being. Liu et al. (2020) explored psychological contract fulfillment and its effect on task performance among Didi drivers. Lin et al. (2020) linked the perception of meaningful work to the engagement and commitment of food delivery workers. He et al. (2021) underlined work meaningfulness and psychological resilience in managing negative customer interactions. Mukhopadhyay and Chatwin (2020) showed motivation stemming from financial

incentives, career development, social recognition, and job security directly impacts performance. Yao (2020) examined how online gig work affected lawyers' professional autonomy and status, observing a decrease in autonomy due to client and platform control. Wu and Zhou (2022) studied socio-psychological factors such as autonomy, competence, and social support and their impact on job satisfaction and mental well-being. Liu et al. (2022) looked into the effects of occupational stigma on workplace well-being among food delivery workers, proposing increased job control as a countermeasure. Chen et al. (2022) developed a well-being index for migrant gig workers in Hangzhou City, indicating policies focusing on income, social security, work intensity, and flexibility could enhance well-being. Yuan et al. (2022) found a negative correlation between multiple-job holding and health status in the US and China, implying potential detrimental effects of gig work patterns on health.

(2) Algorithmic Management, labor control and Worker Solidarity

Numerous studies have examined the influence of algorithmic management and labor control in the gig economy, exploring the dynamics between gig workers and algorithmic systems governing their work. Sun (2019) studied delivery workers' navigation of algorithmically determined labor conditions, finding workers to develop "organic algorithms" to manage and sometimes subvert the system. Wu et al. (2019) analyzed labor control strategies of digital platforms, such as Uber, on drivers' working hours and income. Lei (2021) examined algorithmic control within the platform economy and its impact on workers' lives. Sun et al. (2021) challenged the supposed flexibility of the platform economy, observing labor management tactics leading to "sticky labor" rather than flexible labor. Wang et al. (2021) noted challenges such as long working hours, low pay, and lack of social support in app-based food delivery work. Despite these challenges, algorithmic management has also prompted unity and resistance. Li (2022), Yu et al. (2022), Zhou and Pun (2022), and Kwan (2022) explored how workers use digital communication to foster solidarity and resist algorithmic governance.

(3) Labor protection and Policy development

Research in labor protection and public policy development for gig workers is crucial. Qin (2022) examined workers' rights protection in the platform economy, focusing on online delivery clerks. The research outlined the difficulties in worker identity identification and rights protection, suggesting legislative measures to address these challenges. Xie (2022) examined the legal developments pertaining to platform workers in China and the steps taken by authorities and unions to fortify labor protection. The study concluded that despite persisting challenges in safeguarding platform workers' rights, significant administrative and legislative measures taken in 2021 demonstrate increased importance given to worker protection. Lin et al. (2023) investigated the influence of institutional governance on gig workers' welfare in China's food delivery sector. The study found that while institutional governance can increase Online Catering Platforms' (OCPs) operating costs, it also sustains gig workers' welfare, emphasizing the need for a balance between market mechanisms and institutional governance. Collectively, these studies underscore the importance of labor protection and policy development in the gig economy, emphasizing the need to understand the evolving legal landscape and the challenges faced by different groups of gig workers to devise effective and targeted policy interventions.

(4) Gender Disparities in the Gig Economy

Research has addressed gender disparities in the gig economy, illuminating the inequalities different genders confront within various sectors. Chen (2022) examined gender gaps among physicians on an online healthcare platform in China. Findings revealed significant gender disparities in prices and quantities offered by male and female doctors, exacerbated by a platform's ranking algorithm that favors males. The study also recognized statistical discrimination against female physicians as a key factor behind the gender gap. Qin (2022) analyzed the protection of workers' rights in the gig economy, focusing on online delivery clerks. The study stressed that challenges in identifying and protecting workers' rights could disproportionately impact female gig workers, who might encounter extra entry barriers. Xu and Prateek (2023) investigated the gender productivity gap in Nanjing's ride-hailing market, revealing a significant gender productivity gap among drivers. Differences in driving behavior and experience partially explained this gap. In conclusion, these studies underscore the necessity to address gender disparities in the gig economy. Policymakers and platform operators must consider the unique challenges various genders face, endeavoring to implement solutions that foster greater equity and inclusivity, possibly through algorithm modifications, targeted support, and more inclusive policies across the gig economy.

3.3 The main challenges faced by China's gig workers

Table 3: Results of spatial durbin model

	W_1	W_2	W_3
<i>employ</i>	2.6299*** (3.0359)	2.4171*** (2.7242)	2.0685** (2.4114)
<i>rd</i>	10.3385*** (4.8456)	10.5943*** (4.7701)	12.4802*** (5.9722)
<i>edu</i>	1.0248*** (3.8238)	1.0956*** (3.9782)	0.7952*** (3.1810)
<i>pergdp</i>	72.3105*** (5.5175)	57.4676*** (3.9443)	65.2959*** (4.5352)
<i>trade</i>	0.2849 (1.1455)	0.3939 (1.6339)	0.2617 (1.0958)
<i>employ*W</i>	3.6913* (1.8399)	11.3534*** (3.0438)	7.3591*** (3.9024)
<i>rd*W</i>	0.1742 (0.0414)	-16.1830* (-1.7272)	-5.7490 (-1.2647)
<i>edu*W</i>	-0.7702 (-1.6205)	0.7306 (0.6247)	0.2163 (0.2610)
<i>pergdp*W</i>	-58.6904** (-2.1715)	-91.7551** (-2.1313)	-19.4557 (-1.2051)
<i>trade*W</i>	-0.6116 (-1.5841)	0.1034 (0.1344)	-1.1217* (-1.7274)
<i>rho</i>	0.4173*** (5.1512)	0.3902*** (3.1650)	0.3245*** (2.7993)
<i>sigma</i> ²	0.0000*** (7.8254)	0.0000*** (7.8882)	0.0000*** (7.8312)
<i>Log-likelihood</i>	-762.4429	-756.7814	-760.4860
<i>N</i>	126	126	126
<i>R</i> ²	0.889	0.900	0.915

Note: ***, ** and * mean significant at the level of 1%, 5% and 10% respectively.

Chinese gig workers grapple with similar issues as their global counterparts, like job insecurity, inconsistent income, and inadequate benefits. Yet, unique elements specific to China intensify these problems.

Firstly, job insecurity and income instability are significant challenges. Gig workers, being independent contractors, lack traditional employee protections, making their work vulnerable to demand fluctuations. This is exacerbated for migrant workers due to their transient lifestyles, limited local connections, and insufficient regional market knowledge, leading to unstable income. Platform algorithms further add to the unpredictability of earnings and job opportunities. Different subsets of gig workers, such as ride-hailing or food delivery drivers, face additional instability due to factors like off-peak hours, seasonal fluctuations, and adverse weather. This scenario necessitates policy interventions to enhance job stability and income security.

Secondly, gig workers struggle to access social security benefits and labor protections. This is attributed to the ambiguity of their employment status, often leaving them without essential benefits. Lack of clear legal definitions and institutional frameworks for regulating digital labor compound these issues. Algorithmic management further intensifies labor control, pushing gig workers to assume risks traditionally borne by employers or the government. Workers' rights, labor protection, and comprehensive social security coverage need legislative solutions and policy attention.

Thirdly, Chinese gig workers endure poor working conditions and compromised well-being, grappling with issues such as occupational stigma, mental health problems, and reduced life quality. Prolonged work hours and high-intensity tasks further impede their satisfaction. Liu et al. (2022) and Wu et al. (2022) disclose that these factors negatively affect gig workers' mental well-being, emphasizing the need for improved working conditions and well-being solutions. Dominant monopolies like Meituan and Didi Chuxing are accused of ignoring workers' rights, underlining the necessity for collective responsibility and policy support for a balanced gig economy.

Fourthly, regulatory challenges surrounding gig work, such as workers' rights, social security, and employment status, have emerged due to the sector's swift growth. Despite the Chinese government's efforts to regulate the gig economy, enforcing these regulations remains challenging. Scholars Zou (2017), Zhou and Pu (2022), Qin (2022), and Wei et al. (2022) highlight the need for worker-centric regulations to protect gig workers' rights and propose legislative changes to improve their status and protections.

Finally, the Chinese social credit system, affecting gig workers' financial access, could potentially harm their overall well-being and work-life balance. They are compelled to accept lower-paying jobs or work longer hours to maintain a high social credit score. This emphasizes the need for comprehensive regulations addressing the gig economy's unique challenges, underscoring the importance of creating a fair and sustainable gig economy through collaborative efforts from policymakers, platforms, and workers.

4. CONCLUSION

This literature review on China's gig economy reveals key themes and challenges that gig workers encounter. Topics span work experience, well-being, algorithmic management, labor control, worker solidarity, labor protection, policy development, and gender disparities. Gig workers in China grapple with job insecurity, income instability, limited social security, labor protections, and variable working conditions affecting well-being. Central issues include algorithmic management and labor control, with implications for worker solidarity and labor activism. Legal challenges, clear gig worker employment status, gender disparities, and discrimination demand attention. The COVID-19 pandemic has amplified these issues, prompting a gig economy reevaluation. Collaboration among policymakers, platform operators, and gig workers is crucial for addressing these issues and promoting a fair, sustainable gig economy. Future research should explore the evolving gig work landscape and assess intervention and policy response effectiveness, helping stakeholders create an inclusive, supportive environment for gig workers.

In the construction of highway bridge project, we must take effective measures to control the existing diseases. Low pressure grout repair is commonly used for cracks and irregular settlement. In different actual repair processes, specific treatment methods need to be developed according to the size of crack width. In the actual construction of roads and Bridges, concrete must be used to seal, and in the process of processing must be thoroughly cleaned cracks to repair cracks, must ensure the density of the repair. Limestone extrusion piles are recommended to settle the foundation soil. In the construction process, a large amount of quick lime and debris are used for the construction of rubble pile, and in the ramming process, the rubble pile is mashed and mixed with a proper amount of fly ash. In the construction of pile top sealing, the structural layer depth below the road must be filled with cement concrete.

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