

Meituan's Instant Delivery in the "Lazy Economy": impacts on rider health and industry growth in Hangzhou, China

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ABSTRACT

The rise of the "lazy person economy" has fueled demand for instant delivery services. This study aims to explore the impact of Meituan's instant delivery service on rider health and the growth of the local delivery industry. Utilizing a descriptive quantitative research design, the study surveyed 376 respondents. The findings revealed that the riders face work pressure even though they come from diverse backgrounds in terms of age, gender, education, and income. Time constraints, complex routes, and safety risks emerged as the top stressors. Health issues such as sleep disorders, anxiety, and burnout were reported across all income levels, with more severe symptoms among riders with longer tenure. Despite technological advancements, manual delivery remains essential in navigating complex urban terrains, especially when personalized service is needed. However, AI-based delivery systems are increasingly being introduced to ease workload and improve efficiency. In addition, there is a significant influence of work tenure on work pressure and health status while monthly income showed no significant differences. Operations managers acknowledged the need for reform and suggested humanized scheduling systems, improved safety infrastructure, and better rider support services. The study highlights the duality of Meituan's growth. It helps boost economic activity and meet consumer demand, but it places psychological and physical strain on its riders. Thus, a hybrid model that balances automation with human-centered practices is important for sustainable progress. This study stresses the need for policy reforms and industry innovations that protect rider well-being while sustaining the growth of China's delivery economy, toward a more sustainable and equitable delivery system.

RESUMO

A ascensão da "economia da conveniência" (ou "economia da preguiça") impulsionou a demanda por serviços de entrega imediata. Este estudo visa explorar o impacto do serviço de entrega imediata da Meituan na saúde dos entregadores e no crescimento do setor local de entregas. Utilizando uma metodologia de pesquisa quantitativa descritiva, o estudo entrevistou 376 participantes. Os resultados revelaram que os entregadores enfrentam pressão no trabalho, independentemente de suas origens diversas em termos de idade, gênero, escolaridade e renda. Restrições de tempo, rotas complexas e riscos à segurança surgiram como os principais fatores de estresse. Problemas de saúde, como distúrbios do sono, ansiedade e "burnout", foram relatados em todas as faixas de renda, com sintomas mais graves entre os entregadores com maior tempo de serviço. Apesar dos avanços tecnológicos, a entrega manual permanece essencial para navegar em terrenos urbanos complexos, especialmente quando é necessário um atendimento personalizado. No entanto, sistemas de entrega baseados em IA estão sendo cada vez mais introduzidos para aliviar a carga de trabalho e melhorar a eficiência. Além disso, observou-se uma influência significativa do tempo de serviço na pressão laboral e no estado de saúde, enquanto a renda mensal não apresentou diferenças significativas. Gerentes de operações reconheceram a necessidade de reformas e sugeriram sistemas de escala humanizados, melhor infraestrutura de segurança e melhores serviços de suporte aos entregadores. O estudo destaca a dualidade do crescimento da Meituan: ele ajuda a impulsionar a atividade econômica e a atender à demanda dos consumidores, mas impõe uma sobrecarga psicológica e física aos entregadores. Assim, um modelo híbrido que equilibre a automação com práticas centradas no ser humano é importante para um progresso sustentável. O estudo enfatiza a necessidade de reformas políticas e inovações no setor que protejam o bem-estar dos entregadores e, ao mesmo tempo, sustentem o crescimento da economia de entregas da China, visando um sistema de entregas mais sustentável e equitativo.

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Introduction

The fast pace of life and work in modern Chinese metropolises, along with the pursuit of cost-effectiveness and efficiency, has created demand for convenient, time-saving services. This demand has directly led to the rise of the 'lazy person economy' industry. As we all know, the term 'lazy people' is derogatory and refers to those who are unwilling to work or make an effort and just want to sit back and enjoy the fruits of their labor. The 'lazy person economy' is a new type of industry that does not serve 'lazy people.' According to Xiao (2022), in this economy, 'lazy people' are not lazy in the sense of the word, and the 'lazy person economy' does not serve only those who do not want to cook or go out. It serves a wide range of user groups who lead fast-paced lives and have full work schedules, as well as those who are willing to spend the least effort to satisfy their needs.

Zhang (2021) noted that users nowadays can quickly select different products across different app platforms, while also solving users' everyday problems and saving time and energy, so that users can experience a small sense of relaxation. Nowadays, whether in China, the United States, or Southeast Asia, the 'lazy person economy' industry has not only covered food and drink but also extended to all aspects of housework and purchasing on behalf of others (Jing, 2020).

In this context, Meituan, as a pioneering instant delivery service, is the starting platform for the lazy economy and the fastest growing instant delivery platform. It has had a brand response effect on the daily lives and consumption habits of people in China's major cities. Its main target market is those people who want to wait for food and drinks in their current location due to busy work or long distances, and this service greatly reduces the time they need to shop and wait in their area when satisfying their additional needs. Simply put, Meituan does not provide catering, but only delivers the food or coffee from the store to the customer. Therefore, the Meituan platform also has the largest number of Chinese merchants and catering companies.

While most of the literatures focused on occupational stress among gig workers, limited study has explored on rider health and the applied operational management, assisted artificial intelligence delivery. Therefore, in such a huge economy, how this enterprise succeeds, how it meets the risks, and how it manages merchants, riders, and customers is important to cater the development trends of society. In fact, amidst the global intense rivalry, survival is the cornerstone of organizational growth and sustainability (Wei and Dellova, 2026). It is essential to introduce a platform to prioritize the level of merchants which is focusing on three core objectives such as reducing the proportion of late deliveries, lowering delivery costs, and reducing average order fulfilment times (XU, 2024). Thus, this study aims to explore operational management strategies, technological development, and how to achieve success in the industry by analyzing the current situation of the Hangzhou's lazy person economy industry.

Materials and Methods

This study used a descriptive quantitative research method to explore the issue from the perspective of two groups: riders and Meituan employees chosen purposively. Hangzhou, China, was selected as the research location due to its dynamic and rapidly growing delivery industry and it's also the first experimental city in China to systematize unmanned intelligent delivery. The study focuses on understanding the experiences, perceptions, and work-related stress of delivery workers—key personnel in this ancillary sector. 376 participants were selected through purposive sampling based on the following inclusion criteria: they had been employed as full-time Meituan riders for at least one year.

Purposive sampling was employed to ensure that participants possessed sufficient work experience to provide rich and relevant insights into the phenomena under investigation. The riders typically lead fast-paced lifestyles and use the service to simplify tasks such as grocery, shopping, ordering meals, and accessing essential items. The platform addresses the growing demand for on-demand services by offering rapid and reliable delivery options tailored to urban living. By examining their current working conditions within the broader industry ecosystem, the study aims to provide valuable insights that can support the development of more effective optimization measures.

The study is anchored on two theories namely, Job Demand-Control Theory and Technology Acceptance Model (TAM). Through these two theories, the study can better explain the work pressure and health status of the drivers and their acceptance of new technologies. Job demands refer to time pressure, task volume and complexity at work, while job control refers to an individual's ability to control their own pace, methods, decisions, etc. at work. When job demands are high and control is low, individuals experience greater job stress, which can lead to further health problems such as anxiety, burnout and sleep disturbance (Ding, 2024). While the Technology Acceptance Model often used to study user acceptance of information technology, automation and artificial intelligence technologies (Wang,2024).

The researchers-made instrument was validated. To ensure clarity and relevance, a pilot test was conducted confirming its reliability, with a CITI index above 0.3 and a Cronbach's alpha greater than 0.7. This study adheres to ethical standards to ensure the integrity of the research and the well-being of the participants by obtaining informed consent on voluntary participation and confidentiality from all the respondents.

Results and Discussions

The age distribution of the rider group shows a relatively even trend, with the proportion of each age group ranging from 19% to 21%. In particular, the two age groups of 26-30 years old and 31-40 years old are slightly higher, at 20% and 20.27% respectively. This phenomenon may reflect the flexibility of the occupation and its adaptability to experience and physical strength. In addition, the higher proportions of those under 18 and over 40 (both

19.73% and 20.27%) also reveal that the professional threshold for Meituan riders is low, which can attract young and middle-aged people to participate, and become a choice for multi-age practitioners.

Table 1.
Demographic Profile of the Respondents

Dimensional	Items	Frequency	%
Gender	Female	188	50.13
	Male	187	49.87
Age	18 to 25 yrs old	74	19.73
	26 to 30 yrs old	75	20.00
	31 to 40 yrs old	76	20.27
	40 yrs old and above	76	20.27
	Under 18 yrs old	74	19.73
Education level	High school or below	94	25.07
	Bachelor's degree	94	25.07
	Junior College	94	25.07
	Master's degree or above	93	24.80
Monthly income			
	1500-3000 yuan	81	21.60
	3000-5000 yuan	69	18.40
	5000-8000 yuan	75	20.00
	8000 yuan and above	75	20.00
	Less than 1500 yuan	75	20.00
Length of employment			
	1-3 years	188	50.13
	4-7 years	93	24.80
	8-11 years	94	25.07
Total		375	100.0

For the educational background, the proportions of riders with a bachelor's degree, high school diploma or below, and associate's degree are exactly the same. This shows that the educational distribution in this group also reflects that some highly educated people choose to engage in this type of work due to fierce market competition or other personal reasons.

In terms of monthly income, the 1,500–3,000-yuan bracket has a slightly higher proportion at 21.6%. The income distribution indicates that while delivery riders' work provides a certain income source, it has not yet formed a significant high-income group. From an external perspective, Hangzhou is considered a first-tier city in China, so the local consumption level can drive the development of the food delivery industry. However, the large number of food delivery riders in the city also correspondingly lowers the average delivery fee per order.

The riders with 1-3 years of experience identified as the largest proportion. This trend reflects the high mobility of the rider occupation and its relatively short career life cycle. It may

also be because the rider job is suitable as a short-term employment option, and once personal career goals or conditions change, they will move to other fields.

Based on findings, the group composition of Meituan riders shows a high degree of diversity, whether in terms of gender, age, education level, or income distribution, which reflects the broad appeal and inclusiveness of this profession. Regarding the gender distribution of Meituan's food delivery workers, existing studies generally emphasize the gender differences in the food delivery industry and believe that manual labor positions tend to attract men (Tao and Shen, 2021), however, this study found that the gender ratio of Meituan food delivery workers is close to balance. This finding suggests that Meituan's low barrier to entry and flexibility may help attract a more diverse gender population.

Work-Related Pressures in the 'instant delivery' industry

Table 2.

Time requirements

Items (N=375)	Mean	Sd.	Interpretation
My daily delivery schedule is very tight, with almost no buffer time.	3.12	.97	Agree
To meet delivery time, I often have to ride faster.	3.21	.90	Agree
The time requirements of the platform make me feel very stressed at work.	3.19	.94	Agree
Due to the time pressure, I often unable to eat or take breaks.	3.21	.91	Agree
I feel that the time requirements of the platform are unreasonable and cause considerable pressure on me at work.	3.17	.90	Agree
Overall Assessment result	3.18	.92	Agree

3.26-4.00 Strongly agree., 2.51-3.25 Agree., 1.76-2.50 Disagree., 1.00-1.75 Strongly disagree.

Meituan riders generally agree that their schedules are very tight, with little buffer time (mean = 3.12, standard deviation = 0.97). Chen (2021), who found tight schedules to be a key issue in Meituan's operational service quality gap model. Chen's study highlights that overly tight schedules stem from algorithm-driven optimization aimed at minimizing delivery times and improving customer satisfaction. However, these schedules place undue pressure on riders as they lack the flexibility to cope with unexpected delays. Bomyea et al. (2020) provide further context, noting that chronic exposure to stress without adequate coping mechanisms can lead to mental health issues, further exacerbating the difficulties of riders.

The overall mean assessment reflects the consensus among riders that the platform's time requirements significantly impacted their work experience. While participants did not fully agree with all statements, the overall consistency highlights a systemic issue in the on-demand delivery industry. Chen (2021) emphasizes that improving service quality requires balancing customer satisfaction and rider well-being. Bomyea et al. (2020) add that addressing occupational stress is critical to maintaining a stable workforce and productivity.

Table 3.
Route Recognition

Items (N=375)	Mean	Sd.	Interpretation
I find the delivery routes assigned by the platform complex and difficult to understand.	3.22	.90	Agree
During the delivery, I often encounter unfamiliar or complicated roads, which affects work efficiency.	3.23	.89	Agree
The navigation system of the platform is not accurate enough, causing me to take the wrong road during delivery.	3.26	.93	Strongly agree
I think I don't have a good grasp of the delivery route and often have to rely on the navigation system.	3.21	.90	Agree
Route recognition and planning make me feel that delivery work is full of challenges.	3.20	.91	Agree
Overall Assessment result	3.22	.90	Agree

The overall mean score was 3.22 (SD = .90), which indicates that there is a general perception that food delivery work is challenging and stressful. This is consistent with the findings of Ding (2024) and Cropley et al. (2020), which highlight the impact of unclear task definitions and reliance on flawed systems on occupational stress. Across all items, respondents expressed dissatisfaction, suggesting a need for systemic changes, including better navigation tools, clearer route assignments, and improved training programs. Cropley et al (2020) highlight that these challenges can lead to job rumination, as employees constantly think about ways to improve performance, often at the expense of mental recovery. These findings are in line with Ding (2024) and Cropley et al. (2020) analyses of occupational stress, and highlight the need for better tools, training and support systems.

Table 4.
Personal safety

Items (N=375)	Mean	Sd.	Interpretation
I often worry about my own safety while I'm working.	3.22	.91	Agree
I feel that there are major safety risks during delivery, such as vehicle and pedestrian interference.	3.17	.93	Agree
Sometimes I have to ride quickly and in unsafe conditions in order to meet deadlines.	3.14	.95	Agree
The platform does not provide enough safety for riders, which makes me feel that my work is risky.	3.17	.95	Agree
I don't think the safety training and measures provided by the platform are enough to deal with the actual safety problems during delivery.	3.15	.89	Agree
Overall Assessment result	3.17	.92	Agree

The overall mean score reflects the consensus among riders that there are significant safety risks in their work environment. Arunan and Crawford (2021) and Barlow (2019) have

both highlighted the importance of addressing these risks, as prolonged exposure to unsafe conditions can lead to physical injury and psychological distress. The consistency across all items suggests that there is an urgent need for systemic reform of safety policies and practices in the on-demand delivery industry. This study shows that personal safety is a major concern for Meituan riders, with key issues including safety risks, inadequate training, and the stress of working in dangerous conditions. These findings align with Arunan and Crawford's (2021) analysis of systemic risks and Barlow's (2019) study of anxiety in the workplace.

The rider's health in the ‘instant delivery’ industry

Table 5.
Perception of sleep disorders

Items (N=375)	Mean	Sd.	Interpretation
Working long hours makes me tired and seriously affects the quality of my sleep.	3.21	.93	Agree
I often can't sleep because of work stress or night delivery duties.	3.15	.96	Agree
My work schedule means I can't maintain a regular routine.	3.18	.92	Agree
Physical fatigue after work often prevents me from enjoying quality sleep.	3.22	.91	Agree
I think my sleeping problems are caused by the stress and irregular hours of my delivery work.	3.19	.92	Agree
Overall Assessment result	3.19	.92	Agree

The overall mean score of 3.19 (SD = .92), indicates that drivers generally agree that work has a significant impact on sleep health. Both Ding (2024) and Dong (2022) have highlighted the interplay between occupational stress, irregular work schedules, and sleep disturbances, and the need for systemic reforms to platform management practices. This study suggests that sleep disturbances among Meituan riders are caused by long working hours, irregular work schedules, and work-related stress. Platforms should prioritize policies that promote regular work and rest schedules, reduce stress, and support physical and mental health to improve the quality of life of riders.

Table 6.
“Perception of Burnout”

Items (N=375)	Mean	Sd.	Interpretation
I often feel exhausted and have lost my motivation and enthusiasm for work.	3.18	.95	Agree
I feel that I have grown tired of my work and find it difficult to find satisfaction again.	3.17	.94	Agree
The constant high intensity of work makes me feel like I'm experiencing burnout.	3.18	.928	Agree
Pressure of my work is immediately felt when increasing and I can't cope up.	3.16	.92	Agree
I lost confidence what is the future because of fatigue.	3.22	.97	Agree
Overall Assessment result	3.18	.94	Agree

The overall mean score of 3.18 (SD = .94), implies that the riders suffer from high levels of burnout due to high workloads, chronic fatigue, and a lack of support mechanisms. Edú-Valsania et al. (2022) and Fang et al. (2019) both highlighted the importance of addressing burnout to improve employee well-being and productivity. The findings highlight the need for systemic reforms, including workload adjustments, improved support systems, and career development programs. To combat burnout, platforms should implement workload adjustments, stress management programs, and career development opportunities to improve riders' long-term job satisfaction and productivity.

Table 7.
Perception of Anxiety

Items (N=375)	Mean	Sd	Interpretation
I often feel nervous and anxious at work, worrying not to complete tasks on time.	3.24	.87	Agree
My anxiety increases whenever I encounter complex delivery tasks.	3.20	.87	Strongly agree
The platform's demands on time and efficiency often leave me feeling extremely stressed.	3.14	.92	Agree
I often feel anxious about order evaluations and customer feedback.	3.22	.91	Agree
The uncertainty and high pressure at work leave me feeling in a constant state of anxiety.	3.22	.93	Agree
Overall Assessment result	3.20	.90	Agree

Anxiety is a major challenge for Meituan riders. Jiao (2023) and Jin (2024) have emphasized the systemic nature of this problem, which has its roots in algorithm-driven management, unrealistic performance expectations, and the centrality of customer feedback. Addressing these issues requires a multi-pronged approach, including revised platform policies, enhanced training and support, and the implementation of a more equitable evaluation system. This study reveals the widespread anxiety among Meituan riders, with time pressure, complex tasks, and uncertainty in the work environment as the driving factors behind it. These findings are consistent with the analyses of the systemic challenges of the platform economy by Jiao et al. (2023).

The assessment of work pressure among riders with different monthly incomes and years of experience

As presented in Table 8, the Jarque-Bera test showed that Time requirements, Route recognition, Personal safety, Sleep disorders, Burnout, Anxiety all showed significance ($p < 0.05$) which means that Time requirements, Route recognition, Personal safety, Sleep disorders, Burnout, Anxiety all do not have the quality of normality.

Table 8.

Difference in the assessment of work pressure among riders with different monthly incomes and years of experience

Dimension	χ^2	df	p
<i>Time requirements</i>	25.519	2	0.000
<i>Route recognition</i>	26.774	2	0.000
<i>Personal safety</i>	25.672	2	0.000
<i>Sleep disorders</i>	31.011	2	0.000
<i>Burnout</i>	25.730	2	0.000
<i>Anxiety</i>	26.798	2	0.000

Based on the results of this analysis, a nonparametric analysis (Kruskal-Wallis H-test) was considered for the subsequent analysis of variance, and since the absolute value of kurtosis in this dataset was less than 10 and the absolute value of skewness was less than 3, the data, although not absolutely normal, could be accepted as basically normally distributed. In order to ensure the rigor and reliability of the research investigation, the researcher used the Kruskal-Wallis H-test in the subsequent analysis of variance derivation.

The researchers used the statistical analysis of variance to test whether the assessment of work pressure varied among the rider groups with different monthly income and different work experience, so as to further understand the details of the assessment.

Table 9.

The results of the Kruskal-Wallis H test for assessing work stress among cyclists with different monthly incomes.

Monthly income	Kruskal-Wallis H $\square$	p	Decision
<i>Time requirements</i>	3.207	.52	Accept Ho1
<i>Route recognition</i>	0.746	.94	Accept Ho1
<i>Personal safety</i>	2.647	.61	Accept Ho1

p < 0.05 at the time, indicating that the components are significantly different or significantly correlated.

The Kruskal-Wallis H test was used to assess differences in work stress among riders with different income levels. The statistical results indicate that riders with different monthly incomes did not exhibit significant differences in the following three work stress factors: time

requirements ($p=0.52$), route recognition ($p=0.94$), and personal safety ($p=0.61$). These results indicate that there is no significant statistical relationship between monthly income and these specific work stress factors, and the null hypothesis (i.e., there are no significant differences in work stress levels among riders with different income levels) cannot be rejected. This suggests that income levels do not directly influence these work stress factors among riders.

Table 1.

Kruskal-Wallis H test for assessing work stress among riders

Length of employment	Kruskal-Wallis H □	p	Decision
Time requirements	23.504	.00**	Rejected Ho1
Route recognition	19.047	.00**	Rejected Ho1
Personal safety	15.780	.00**	Rejected Ho1

P<0.05 at the time, indicating that the components are significantly different or significantly correlated

There are significant differences in the work pressure experienced by riders (including time requirements, route identification, and personal safety) across different groups with varying levels of work experience (p -values are all 0.00, far below the significance level of 0.05), indicating that riders' work experience has a significant impact on the work pressure they perceive. As work experience increases, riders experience significant changes in their perception and coping of work pressure.

Andreychik (2019) found that empathy toward others' emotions may lead to higher occupational burnout, suggesting that new riders may be more susceptible to the negative impact of external emotions (such as customer dissatisfaction or complaints), thereby exacerbating work stress and increasing the risk of occupational burnout. Additionally, Bomyea et al. (2020) found that improved emotional regulation skills can significantly alleviate anxiety symptoms, and similar mechanisms are effective in managing work stress among riders.

The difference in the assessment of their own health among riders with different monthly incomes and years of experience

The Kruskal-Wallis H test indicate that there are no significant statistical differences between the monthly income of Meituan delivery riders and the three main physical health factors (sleep disorders, occupational burnout, and anxiety) (p -values of 0.44, 0.98, and 0.25, respectively, all greater than 0.05). This implies that there is no significant association between monthly income and these physical health factors, and the null hypothesis cannot be rejected,

indicating that there are no significant differences in physical health among riders in different income groups.

Table 2

The results of the Kruskal-Wallis H test for assessing the health status of Meituan riders with different monthly incomes.

Monthly incomes	Kruskal-Wallis H □	p	Decision
<i>Sleep disorders</i>	3.691	.44	Accept Ho2
<i>Burnout</i>	0.396	.98	Accept Ho2
<i>Anxiety</i>	5.317	.25	Accept Ho2

p < 0.05 at the time, indicating that the components are significantly different or significantly correlated.

Job burnout is a long-term health issue associated with work stress, and prolonged high-intensity work demands may lead to deteriorating physical and mental health. Although the results of this study did not show a direct relationship between income and physical health, it can be inferred from the findings that low-income riders face greater work stress and may be more prone to health issues such as job burnout (Bianchi et al., 2019).

Studies on the effects of shift work on health have found that the stress and circadian rhythm disruption associated with night shifts may lead to health issues, particularly under long-term high work demands (Boivin et al., 2022). Low-income riders may need to sacrifice sleep time to complete more delivery tasks, which may exacerbate physical health issues (Bohnen & Hu, 2019).

Table 3.

The results of the Kruskal-Wallis H test for assessing the health status of Meituan riders with different Length of employment

Length of employment	Kruskal-Wallis H □	p	Decision
<i>Sleep disorders</i>	7.428	.02*	Reject Ho2
<i>Burnout</i>	10.889	.00**	Reject Ho2
<i>Anxiety</i>	12.486	.00**	Reject Ho2

p < 0.05 at the time, indicating that the components are significantly different or significantly correlated.

Kruskal-Wallis H test revealed significant differences among Meituan delivery riders with different years of service in the three main factors related to physical health (Sleep disorders, Burnout, and Anxiety) (p-values of 0.02, 0.00, and 0.00, respectively, all less than 0.05). This indicates that the length of service of delivery riders has a significant impact on these health factors, meaning that as the length of service increases, riders' perceptions of their health in these areas change.

The digital stress faced by delivery riders varies with the complexity of platform operations and the experience of riders. More experienced riders can effectively utilize digital tools and platform rules to reduce work-related stress caused by technical inexperience, thereby improving their health (Dong, 2022). They may be better able to balance work and rest, thereby reducing such health risks (Fang et al., 2019).

In conclusion, work experience plays a key role in riders' physical health. While new riders face greater challenges and health risks, experienced riders benefit from better coping skills, time management, and safety practices. These highlight the significant of providing support such as training for new riders to reduce stress and improve their well-being early in their careers.

Table 4.
Results of Hypothesis

Statistical test results	Conclusion
According to the assessment of riders' perceptions in different income situations, the non-parametric test finally tested that there is a non-significant difference between riders with different incomes, i.e., it can be assumed that both low-income and high-income face the same amount of pressure.	Accept Ho1, monthly income has no significant effect on the assessment of work stress.
According to the assessment of riders' perceptions of different working hours, the non-parametric test finally tested that there is a significant difference between riders with different working hours, i.e., it can be assumed that the work pressure faced by novices and veteran employees is different.	Reject Ho1, years of work experience has a significant effect on the assessment of work stress.
According to the assessment of riders' perceptions of different incomes, the non-parametric test ultimately shows that there is a non-significant difference between riders with different incomes, i.e., it can be assumed that both low-income and high-income face the same physical health problems.	Accept Ho2, monthly income has no significant effect on the assessment of health status.
According to the assessment of riders' perceptions of different working hours, the non-parametric test finally tested that there is a significant difference between riders with different working hours, i.e., it can be assumed that the physical health situation faced by novices and veterans is different from each other, which forms a link with and echoes back and forth with the work pressure in HO1.	Reject Ho2, years of work experience has a significant effect on the assessment of health status.

The table above discusses the results of the final test of the research hypotheses.

Hypothesis 1: The effect of monthly income and work experience on work stress.

Monthly income and work stress.

The hypothesis test showed that there is no significant difference in work stress levels—including time pressure, route recognition, and safety concerns—among Meituan riders with different monthly incomes ($p > 0.05$). This supports Zhang (2021), who noted that platform systems are designed to enforce uniform efficiency standards, resulting in similar stress experiences for all riders, regardless of how much they earn.

Using the Job Demand-Control (JDC) Theory, this result makes sense: high job demands, like tight delivery schedules and complex routes, are imposed by the platform's algorithm—not by the rider's income level. While higher-income riders may take more orders and lower-income riders may feel pressured to meet performance standards, both groups face the same structural demands. This suggests that work stress in the platform economy is systemic and algorithm-driven, not income-dependent.

Work experience and work stress

There were significant differences in work stress assessments between riders with different years of experience ($p < 0.05$), and the F-values indicated that the levels of stress in terms of time requirements, route recognition, and safety increased with experience. This finding supports Yang's (2024) observation that experienced riders often work in high-pressure environments due to their familiarity with complex routes and higher expectations from the platform.

Hypothesis 2: Work experience and monthly income's impact on health

Monthly incomes Impact on health

There are no significant differences as revealed in the hypothesis in health conditions such as burnout, anxiety and sleep disorders with different income levels ($p > 0.05$). This support the study of Zhang (2021), stated that platforms use the same high performance leading to parallel levels of mental and physical stress regardless of the amount of income. This is mainly due to high demands of job as emphasized to the Job Demand-Control Theory. The findings suggest that health problems are widespread and systemic, not tied to income levels. Therefore, to improve riders' well-being, platform reforms should focus on reducing job stress and improving working conditions, rather than targeting income groups.

Work experience and health.

The study found significant differences in health issues—including sleep problems, burnout, and anxiety—based on riders' years of service ($p < 0.05$). More experienced riders reported worse health outcomes, suggesting that long-term exposure to high job demands

leads to accumulated physical and psychological stress. This supports Yang’s (2024) finding that prolonged courier work increases the risk of fatigue and mental strain.

Using the Job Demand-Control Theory, the results suggest that sustained high demands with limited recovery or growth opportunities worsen riders' health over time. The Technology Acceptance Model also explains that riders may see current digital systems as inadequate in addressing long-term well-being, which adds to their stress.

While monthly income showed no significant effect on work stress or health (consistent with Zhang, 2021), work experience did, highlighting the systemic nature of these issues. The findings emphasize the need for platform-wide reforms, such as flexible scheduling, health support programs, and career development pathways—especially for long-serving riders.

Ultimately, this study shifts focus from income-based solutions to experience-based interventions, echoing calls by Yang (2024) and Zhang (2021) to improve rider well-being through structural and policy changes.

Proposed Program to Optimize the Delivery Plan

Based on the findings, a program below was proposed. This can be piloted in order to improve the collaborative business relationship between merchants, Meituan, and delivery personnel.

Table 15.
Plan and build the foundation

Research Finding	Solution	Potential New Challenges
1. Time Pressure: Delivery personnel face tight schedules, lack of buffer time, and pressure to speed up deliveries.	a. Introduce flexible delivery windows to accommodate traffic delays.	Potential resistance from merchants and customers due to longer delivery times.
	b. Implement algorithm adjustments to account for real-world variables like weather and traffic.	
	c. Create mandatory rest periods between deliveries.	Additional operational complexity in managing flexible scheduling.
2. Route Recognition Issues: Delivery personnel often struggle with complex and unclear delivery routes.	a. Improve the navigation system with real-time updates and more accurate route planning.	Initial costs for technology upgrades.
	b. Offer training on common routes and provide riders with map-reading skills.	Riders’ resistance to relying on new systems or technologies.

	c. Use AI to adjust routes dynamically based on traffic and rider expertise. a. Introduce safety protocols with gear and insurance for riders.	
3. Personal Safety: Safety risks are heightened, especially when riders have to speed up to meet deadlines or face complex traffic situations.	b. Develop a system to allow riders to report dangerous conditions, triggering alerts for safety interventions. c. Increase safety training programs and ensure better emergency response systems. a. Implement a health support system with access to counseling, stress management, and medical checks.	Increased operational costs for providing safety gear and insurance. Challenges in monitoring real-time safety reporting.
4. Health Concerns (Sleep Disorders, Burnout, Anxiety): Long working hours and high-intensity demands affect rider health, leading to fatigue, sleep disorders, and burnout.	b. Redesign work shifts to allow more regular breaks and promote healthier sleep schedules. c. Provide incentives for reducing fatigue, such as wellness programs or lighter workloads. a. Introduce tiered incentives based on rider experience and performance to reduce income-related stress.	Increased operating costs for health and wellness programs. Potential difficulty in maintaining efficiency with reduced rider hours.
5. Income Inequality and Stress: Riders in lower-income brackets face more stress due to pressure to meet deadlines for higher earnings.	b. Offer additional support (financial or task flexibility) for low-income riders to alleviate pressure. a. Develop a mentorship program where experienced riders guide new hires.	Complexity in managing different incentive systems. Difficulty in balancing income equity without affecting service quality.
6. Work Experience: New riders are under more stress due to unfamiliarity with routes and platform operations.	b. Provide onboarding sessions focused on time management,	Additional costs and effort for mentoring programs. Possible dissatisfaction from experienced riders if mentoring adds to their workload.

- navigation skills, and stress coping mechanisms.
 - c. Gradually increase workload for new riders to allow adaptation.
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Conclusion

The study indicates that riders endure immense time pressure in their daily work. The platform's strict time requirements leave riders with little to no buffer time, forcing them to frequently increase their riding speed to meet efficient delivery demands. This high intensity work pace not only impacts riders' physical and mental health but also exacerbates sleep disorders and occupational burnout. Additionally, the complexity of delivery routes and the insufficient accuracy of navigation systems are commonly reported issues by riders. Many riders report encountering unfamiliar or complex roads during deliveries, which reduces work efficiency and further exacerbates workplace stress. Additionally, riders face significant safety risks during deliveries, especially under time pressure, often forcing them to take risks to ensure timely deliveries.

The riders also expressed widespread concerns about potential human resource issues arising from automated systems. As unmanned delivery technology advances, riders believe that some job positions may be replaced by technology, which could not only affect their income but also threaten their job security. Especially in densely populated urban areas, complex road conditions and unpredictable traffic situations make fully automated delivery challenging. Riders argue that human delivery remains indispensable in handling complex environments and addressing emergencies.

Meituan's development strategy in this process is to mitigate this issue through the synergistic cooperation of human resources and technology. Meituan employs a hybrid delivery model, relying on manual delivery during peak hours and complex delivery tasks, while promoting unmanned delivery technology in low-density areas and standardized tasks. This collaborative model not only improves delivery efficiency but also alleviates the work pressure on riders to some extent and reduces their health risks.

Meituan plans to continue optimizing its intelligent dispatch system to enhance technological support for the delivery process, enabling riders to better handle challenges at work. Through data-driven service personalization, the company aims to provide consumers with more efficient and reliable services. A developed operational plan was established to address the relationships among the three groups, with the goal of achieving positive improvements and sustained industry enhancement.

Finally, future researchers are encouraged to conduct longitudinal studies to examine the long-term effects of platform work on rider health, comparative studies across different delivery platforms and cities, investigations into the continued development of AI-assisted and unmanned delivery systems, and evaluations of platform policies and organizational interventions designed to improve rider safety, well-being, and sustainable platform management.

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