

## **Exploration of Public's Willingness to Participate the Crowd-Sourcing Services: A Case Study of Hong Kong**

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### **ABSTRACT**

With crowd logistics becoming an essential part of the last-mile delivery challenge in many countries and regions, encouraging the public participation of crowd logistics has become an important affair affecting the development of the crowd logistics platform. Learning how people are motivated to participate in crowd logistics can shed light on the industry's policies and efforts to support its further growth. Based on the Push–Pull–Mooring (PPM) theory, this survey developed a research model to illustrate the factors influencing Hong Kong people's participative behavior. Survey data from 78 Hong Kongers were analyzed. The empirical results reveal that monetary rewards, entry barriers for work, and trust are significant factors for the locals to participate in crowd logistics. Meanwhile, previous job enjoyment has a moderate negative correlation with the willingness of the general public to participate in crowd logistics. However, previous job flexibility and cost of participation show the least significant impact on the decision to participate in crowd logistics. According to the findings of this study, it is recommended that crowd logistics platforms provide justifiable monetary incentives and constantly review these incentives. In the meantime, they should also build a high degree of trust between the platform and the general public as well as the workers.

### **INTRODUCTION**

Crowd logistics have emerged as a new logistics organization mode and have become widely adopted in urban logistics. More and more logistics enterprises are outsourcing packages to a growing number of people via online platforms. In Hong Kong, there are also several well-known crowd-sourcing logistics platforms, including Uber Eats, Foodpanda, and Deliveroo. The present study contributes to

improving our understanding of one aspect of this system, the public's willingness to participate in the crowd-sourcing logistics in Hong Kong.

Crowd-sourcing was initially popularized by Howe in 2006 (Howe, 2006). It refers to the outsourcing by a firm of some activities to the crowd. Currently, a generally accepted and comprehensive definition of crowd logistics is “designates the outsourcing of logistics services to a mass of actors, whereby the coordination is supported by technical infrastructure” (Cieplińska & Szmelter-Jarosz, 2020). Li et al. (2019) argued that crowd logistics platforms are of ‘major importance to crowd logistics’, as they help coordinate shippers with drivers and enable drivers to make deliveries according to shippers’ expectations, thereby creating value. It plays a vital role in enhancing the sustainability of urban logistics and has become a major focus for tackling the problem of last-mile delivery.

However, even with the numerous advantages of crowd logistics, many operational problems still exist. One of the significant challenges is how to get more people to participate in crowd logistics and maintain the motivation to participate among crowd workers (Ye & Kankanhalli, 2017). Key reasons that seem likely to decrease the willingness of participation include (Dai et al., 2020): (1) crowd logistics is still in the exploration stage, facing a number of management, technical and legal challenges; (2) monetary reward alone may not be enough to motivate continued participation of crowd workers; (3) the time, energy and equipment costs incurred by the crowd workers may discourage continued participation; (4) risks and safety issues caused by delays in delivery, loss or damage to goods, and traffic accidents may reduce trust between the crowd workers and employer/platform; (5) the related environmental impact. Resolving the problems that may depress participation in crowd-sourcing has become a critical issue in logistics research.

Most of the current studies on crowd logistics have focused mainly on concepts and on the simulation stage. Most of those studies are conducted in a foreign background as well as in mainland China. Hong Kong lacks empirical analysis from the perspective of the public willingness to participate in the crowd-sourcing communities. To address this knowledge gap, this study contributes to the crowd logistics literature by examining the motivations affecting participation among Hong Kong citizens. We modeled and tested the influences of the push, pull, and mooring factors in the process, contributing to the application of PPM theory to a broader range of phenomena. Our study provides insights into how crowd logistics platforms might best attract, motivate and retain crowd workers.

The rest of this paper is organized as follows: the theoretical model and the

research hypothesis are proposed in the following section; then the research method and empirical results are presented; the discussion section is devoted to the theoretical and practical implications; finally, the conclusion is drawn.

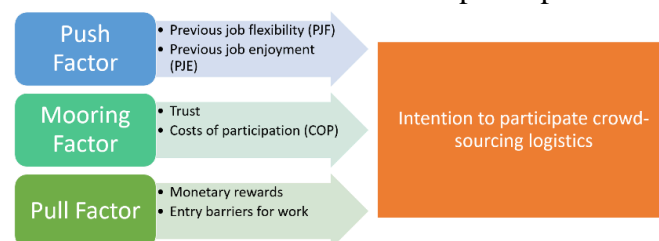
## THEORETICAL MODEL AND HYPOTHESIS

### PPM Theory

PPM theory is a widely adopted theory when studying switching intention or behavior. The research related to PPM framework can be dated back to 1885 (Guo et al., 2021). It comprehensively illustrated that individual's migrating decision from an original place to a new one in a particular period is influenced by push, pull, and mooring factors (Fan et al., 2021). Push factors are often referred to as stressors denoting the negative factors that force people away from the original place, such as the decline in a natural resource, loss of employment, and lack of opportunities for personal development (Nguyen et al., 2021). Pull factors, often mentioned as attractors, are the positive factors that destination offers to people, including superior employment opportunities, higher income or education, preferable environment, and opportunities for new activities. Mooring factors refer to the personal or social factors which decide potential migrants either to stay at the original place or facilitate them to move to a new destination. Building on these previous theory and practice, the PPM theory is adopted as a framework for determining the factors affecting the Hong Kong public's willingness to participate in crowd logistics.

### Hypothesis

This paper proposes several research hypotheses based on the three PPM aspects and analyzes the specific factors influencing Hong Kongers' intentions to participate in crowd logistics. Push factors include flexibility and enjoyment from the previous job, pull factors include monetary rewards and entry barriers for work, while mooring factors include trust and the cost of participation.



**Figure 1. A model for the willingness of participation in crowd-sourcing logistics**  
**Push Factors**

Push factors primarily refer to the unfavorable and tedious aspects of the general public's previous work. These negative factors drive Hong Kongers to

participate in crowd logistics instead of returning to their previous jobs. In this study, the push factors are summarized based on previous studies (Kähkönen et al., 2021; Mladenow et al., 2016; Nurse & Devonish, 2008).

**H1** (Previous job flexibility): *The lower the work flexibility of people's past working experience, the stronger their intention to participate in crowd logistics.*

**H2** (Previous job enjoyment): *The lower the enjoyment of people's past working experience, the stronger their intention to participate in crowd logistics.*

**H3** (Mooring Factors): *The higher the trust between the people and the platform (crowdsourcer), the stronger the people's intention to participate in crowd logistics.*

**H4** (Costs of participation): *The higher the participation cost, the lower the people's intention to participate in crowd logistics.*

#### **Pull Factors**

According to the previous works, pull factors represent the positive and favorable factors in crowd logistics that encourage participation (Allgulin & Ellingsen, 2002; Tikkanen & Nissinen, 2018; Yan et al., 2021).

**H5** (Monetary rewards): *Monetary reward is positively correlated with people's intention to participate in crowd logistics.*

**H6** (Entry barriers for work): *Entry barriers for work are negatively correlated with people's intention to participate in crowd logistics.*

## **RESEARCH METHODOLOGY AND RESULTS**

### **Questionnaire Design and data collection**

The questionnaire consisted of two parts, including basic demographic information and validated scales for the key variables. The basic information section covered the respondent's gender, age, income, occupation, education, and length of time involved in crowd logistics. The scale information section included six latent variables. A Likert scale was used to quantify the latent variables, and it consisted of five levels: (1) strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree, and (5) strongly agree (Norman, 2010).

Affected by the COVID-19 pandemic in Hong Kong and other limitations, the survey was conducted online. The survey adopted the snowball sampling method to enrich its sample base (Hadžić & Kantar, 2021). The questionnaires were distributed through WhatsApp, Signal, and Email. The average time taken to finish the questionnaire was about 10 minutes. The survey lasted for a month, from June 2021 to July 2021. A total of 78 questionnaires were issued and received. Table 1 to Table 3 shows the detailed statistical results of the basic information section. It is

noticed that the distribution of respondents was concentrated on the age group of 18-25. Therefore, the following data analysis would mainly reflect on young adults' preferences and thoughts about participating in crowd logistics. Meanwhile, each observable variable was connected to a specific latent variable, which was based on the findings and recommendations of previous studies, as summarized in Table 4.

**Table 1. Descriptive Statistics of the Respondent's Basic Information.**

Category	Item	Ratio
<b>Gender</b>	Male	56.4%
	Female	43.6%
	Others	0%
<b>Age</b>	18-25	92.3%
	26-30	5.1%
	31-35	1.3%
	36-40	0%
	41-50	0%
	>50	1.3%
<b>Education level</b>	≤ Primary School	0%
	Secondary School	12.8%
	≥ Bachelors	87.2%
<b>Have you ever participated in crowd logistics (as a worker)</b>	Yes	5.1%
	No	94.9%

**Table 2. Statistics of Respondents Who Had Participated in Crowd Logistics.**

Category	Item	Ratio
<b>Job nature</b>	Full-time crowd worker	0%
	Part-time crowd worker	100%
<b>Duration of participation in crowd logistics</b>	< 0.5 year	100%
	0.5 – 1 year	0%
	1 – 1.5 years	0%
	> 1.5 years	0%
<b>Income before participating in crowd logistics (monthly)</b>	<10,000 HKD	100%
	10,000 – 20,000 HKD	0%
	20,001 – 30,000 HKD	0%
	30,001 – 40,000 HKD	0%
	>40,001 HKD	0%
<b>Income while participating in crowd logistics (monthly)</b>	<10,000 HKD	50%
	10,000 – 20,000 HKD	50%
	20,001 – 30,000 HKD	0%
	30,001 – 40,000 HKD	0%
	>40,001 HKD	0%
<b>Concurrent occupation</b>	Formal staff in the catering industry (including food delivery)	0%
	Formal staff in the logistics industry	0%

	Freelancer	0%
	Office workers	0%
	Student	100%
	Unemployed	0%
	Other	0%

**Table 3. Statistics of Respondents Who Hadn't Participated in Crowd Logistics.**

Income range	Logistics.	
	<10,000 HKD	74.3%
	10,000 – 20,000 HKD	17.6%
	20,001 – 30,000 HKD	8.1%
	30,001 – 40,000 HKD	0%
	>40,001 HKD	0%
Current occupation	Formal staff in the catering industry (including food delivery)	1.4%
	Formal staff in the logistics industry	0%
	Freelancer	2.7%
	Office workers	18.9%
	Student	68.9%
	Unemployed	2.7%
	Other	5.4%

**Table 4. Item of Constructs in the Proposed Model (Key Variables).**

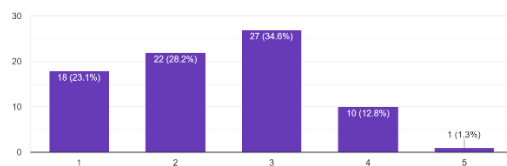
Category	Item
Previous job flexibility (PJF)	3a: My previous job had very little flexibility.
	3b: I had a hard time balancing the relationship between work and family in my previous job.
	3c: My previous job hindered my autonomy in life and work.
Previous job enjoyment (PJE)	4a: My previous job was boring
	4b: My previous job was boring and I often felt anxious
Trust	5a: The crowd logistics platform will give me a fair and just monetary reward.
	5b: The crowd logistics platform will respect my schedule.
	5c: The crowd logistics platform will protect our privacy.
Costs of participation (COP)	6a: It takes a lot of energy to get involved in crowd logistics.
	6b: I need to spend more time on learning and training.
	6c: I need to provide my transportation to participate in crowd logistics.
Monetary rewards	7a: Crowd logistics offers me the opportunity to make money.
	7b: My monthly income has increased.
	7c: The more money I made, the more I wanted to work.
Entry barriers for work	8a: I can participate in crowd logistics as long as I want.
	8b: It doesn't take any special skills to get involved in the work.
	8c: The platform doesn't check my qualifications at all.

## Data Analysis and Findings

### *Willingness to participate in crowd logistics*

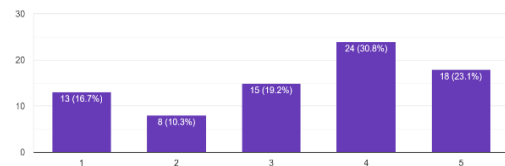
To begin with, Figures 2 and 3 illustrated respondents' willingness to participate in crowd logistics as full-time or part-time workers. It is observed that about half of the respondents were reluctant to participate in crowd logistics as their full-time job. Meanwhile, the acceptance of taking crowd logistics as their part-time job was higher than taking it as a full-time job. More than 50% of the respondents were willing to be part-time crowd workers.

I am willing to participate crowd logistics as my full-time job. 我願意以群眾物流作為我的全職。  
78 則回應



**Figure 2. Full-time job preference**

I am willing to participate crowd logistics as my part-time job. 我願意以群眾物流作為我的兼職。  
78 則回應



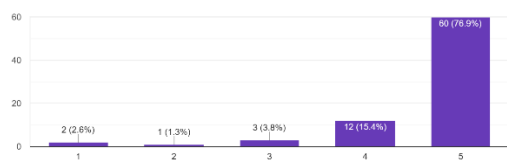
**Figure 3. Part-time job preference**

### *Significant Influence Factors*

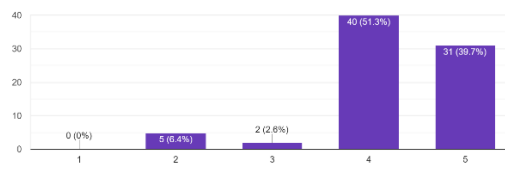
#### (1) Monetary rewards

Monetary rewards have a significant positive impact on the willingness of the Hong Kong general public, especially among young adults, to participate in the crowd logistics. Most responses to these questions, presented in Figure 4, are positive. This result is consistent with related research findings (Allgulin & Ellingsen, 2002; Al-Shamaileh et al., 2020; Yan et al., 2021). Thus, monetary reward is probably an essential driving factor for attracting the general public to enter crowd logistics, particularly for the demographic profile of monthly income is below 10,000HKD.

My monthly income increased by participating in crowd logistics.  
我的月入因加入群眾物流而有所提升。  
78 則回應



The more money I made, the more I wanted to get involved in crowd delivery.  
從群眾物流工作中賺取越多的金錢會令我更想進一步在此行業發展。  
78 則回應

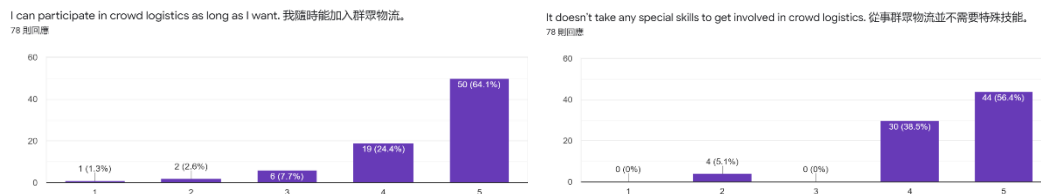


**Figure 4. The responses regarding the monetary reward factors.**

#### (2) Entry barriers for work

Entry barriers for work also demonstrate a considerable influence on the willingness of the Hong Kong general public to participate in the crowd logistics. Figure 5 shows that the lower the entry barriers for work, the greater their willingness for the public to participate in crowd logistics. This argument is also supported by

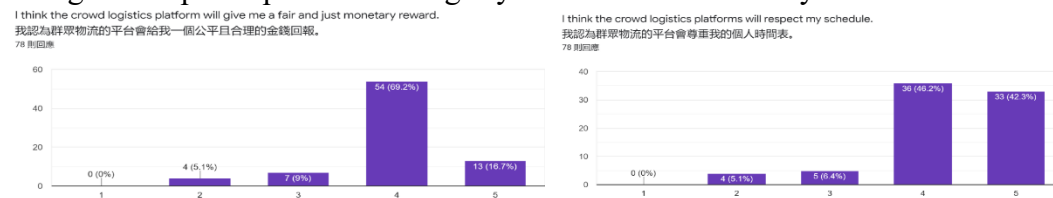
previous studies (Gałuszka, 2016; Huang et al., 2020). It might be due to the reason that crowd logistics has a lower access threshold, encouraging initial participation.



**Figure 5. The responses regarding the entry barriers for work factors.**

### (3) Trust

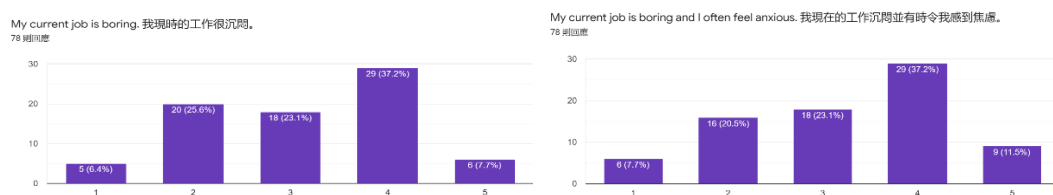
Trust is also an important element affecting the decision of participating the crowd logistics. The results presented in Figure 6 are consistent with a previous study conducted by Ye & Kankanhalli (2017). They surveyed 156 crowd workers from the TaskCN platform and demonstrated that trust in platforms could promote people's willingness of participation and magnify the effects of monetary rewards.



**Figure 6. The responses regarding the trust factors.**

### (4) Previous job enjoyment (PJE)

The enjoyment of the previous job has a moderate negatively correlated with the willingness of the general public to participate in crowd logistics. Figure 7 implies that the lower the previous job enjoyment a person got, the greater the willingness of that person to participate in crowd logistics. A possible reason is that crowd workers could voluntarily choose the delivery task and working time. This degree of flexibility and opportunity for novel experiences can provide job satisfaction.



**Figure 7. The responses regarding the PJE factors.**

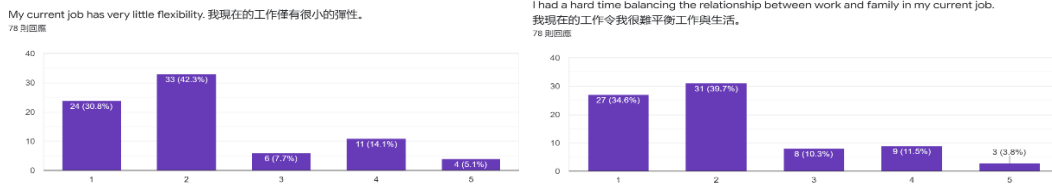
## **Non-Significant Influence Factors**

### (1) Previous job flexibility (PJF)

Flexibility in previous jobs did not show a substantial effect on the willingness of the Hong Kong people to participating in crowd logistics. From Figure 8, we notice that the questions scored relatively lower compared to other questions



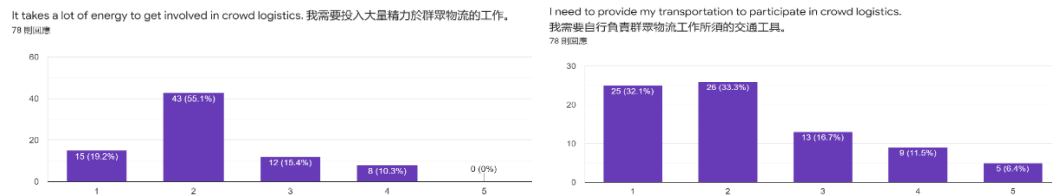
on average. This may be because the participants are mostly university students without fixed jobs. They are already given high autonomy and flexibility in their original job as a university student. Their participation in crowd logistics is therefore motivated by a desire to get a job for financial reasons, and this motivation supplants concerns for work-life balance or flexibility in the work environment.



**Figure 8. The responses regarding the PJJ factors.**

## (2) Costs of participation (COP)

Costs of participation, including cognitive effort, currency, time, and mental effort, merely exhibit a significant impact on people's motivation to working in crowd logistics. The results shown in Figure 9 contradict previous studies (Nurse & Devonish, 2008), which found that the high cost of participation may discourage the public from entering the industry. One possible explanation is that crowd logistics is perceived to be easier to learn and implement compared to other jobs like ordinary logistics workers. Crowd logistics workers only have to be familiar with the online platform and could deliver the goods on foot. Thus, the perceived cost of participation is low from the perspective of the general public.



**Figure 9. The responses regarding the COP factors.**

## DISCUSSION

These survey findings supported four of the six hypotheses we developed from the literature regarding the effect of key variables on the public intentions to participate in crowd logistics work. Monetary rewards, entry barriers for work, and trust were believed to be by far the most important variables, which could be directly influenced by crowd logistics platforms. In addition, previous job enjoyment is believed to have moderately negatively correlated with the willingness to participate in crowd logistics. Additionally, previous job flexibility and cost of participation show the least significant impact on the decision to participate in crowd logistics.

In terms of theoretical implications, this study has two major theoretical

contributions. First, it enriches the literature on crowd logistics. Multiple literatures had studied crowd logistics in Mainland China as well as other countries or regions, but few studies in local background. This paper provides a novel perspective and can serve as a reference for crowd logistics platforms seeking to develop appropriate incentives. Second, this study testified that PPM theory provides a robust framework for identifying and studying the factors affecting the willingness for participation in crowd logistics. Meanwhile, this study could also contribute to the gradual extension of PPM theory from demography to other disciplines.

From a practical perspective, some recommendations could be offered to crowd logistics platforms and relevant enterprises based on this study to formulate reasonable actions that would encourage participation. First, crowd logistics platforms should regularly evaluate their monetary incentives. This study found monetary rewards have a considerable positive correlation with the willingness to participate in crowd logistics. Crowd logistics platforms should offer appropriate monetary compensation for every delivery and incentivize performance and increased participation. Second, crowd logistics platforms should be proactive in trying to develop a high degree of trust (e.g., providing economic and psychological support) and long-term cooperation among existing and potential crowd workers. It is found that trust is positively correlated with the willingness to participate in crowd logistics in Hong Kong. Nevertheless, possible participation risks, such as financial instability and lack of social security, can produce uncertainties and stress, which could lead to crowd workers changing jobs after they participated.

## **CONCLUSIONS**

The rapid development of crowd logistics suggests an important response to the last-mile delivery challenge, making the general public participation in crowd logistics a fundamental issue in today's logistics industry. However, motivating participation in crowd logistics has some obstacles. To understand the underlying factors behind the Hong Kong general public's motivations, a model based on the PPM theory was developed and implemented. The empirical results reveal that monetary rewards, entry barriers for work, and trust are significant factors for the locals participating in crowd logistics. Meanwhile, previous job enjoyment has a moderate negatively correlated with the willingness of the general public to participate in crowd logistics. However, previous job flexibility and cost of participation show the least significant impact on the decision to participate in crowd logistics. The results of this study contribute to the growing literature on crowd

logistics, especially for Hong Kong. Based on the findings of this survey, it is recommended that crowd logistics platforms provide justifiable monetary incentives and constantly review these incentives. In the meantime, they should also build a high degree of trust between the platform and the general public as well as the workers. The suggestions based on the results of this study can aid crowd logistics platforms to formulate suitable policies and implement measures that would encourage participation in crowd logistics in Hong Kong.

Nonetheless, it should be acknowledged that this study has some limitations. First, the survey data comes from the local background of Hong Kong. Thus, the questionnaire design may be very different from others, as geographical location is a significant influence of crowd logistics operation. Further studies can be conducted for different regions and countries to compare with the results of this study. Second, most of the survey participants were university students or young adults, thus making this study cannot reflect the preference from other age groups. Further research is needed with improved methods spreading to a broader range of ages. The research on crowd logistics is still in the beginning stage in Hong Kong, and studies on many other facets regarding crowd workers, platforms, consumers, and related enterprises are required to facilitate the sustainable development of the crowd logistics industry.

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