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Analyzing the characteristics of potential last-mile crowdshippers: insights from survey data in Slovenia, Ukraine, and the Czech Republic

Patricija Bajec^{a,*}, Halyna Pivtorak^{b,c}, Libor Švadlenka^c, Radek Vrba^c

^aUniversity of Ljubljana, Faculty of Maritime Studies and Transportation, Pot pomorscakov 4, 6320 Portoroz, Slovenia

^bLviv National Polytechnic University, Institute of Mechanical Engineering and Transport, S.Bandery 12, 79013 Lviv, Ukraine

^cUniversity of Pardubice, Faculty of Transport Engineering, Studentska 95, 53210 Pardubice, Czech Republic

Abstract

Crowdshipping, regarded as a promising last-mile delivery solution, especially in urban settings, differs from traditional delivery methods by relying on a critical mass of volunteers known as crowdshippers. Understanding their characteristics is crucial for effective targeting. This study seeks to analyze the willingness of potential crowdshippers to deliver/pick up ordered items (parcels) and sociodemographic characteristics influencing the willingness to work (WTW) as a crowdshipper in three different countries (Slovenia, the Czech Republic, and Ukraine). The primary sociodemographic data are investigated using survey data. Utility functions for decision-making in crowdshipping delivery are derived from questionnaire data processing and a discrete hierarchical Bayesian multimodal logit model was utilized to discern variations among the countries. By examining the unique sociodemographic features of potential crowdshippers in these countries, this study not only uncovers the traits of potential crowdshippers in each country but also points out the differences or similarities among the three different countries. The resulting data enables parcel delivery companies in each country to comprehend better which population groups are potentially more inclined to undertake this job. The comparative insights from this study can provide a basis for developing general business models that can be applied across those countries with some degree of uniformity.

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* Corresponding author.

E-mail address: patricija.bajec@fpp.uni-lj.si

1. Introduction

Last-mile crowdshipping is an innovative delivery service that is particularly useful for e-commerce (Gatta et al., 2019, Le and Ukkusuri, 2018a, Mohri et al., 2023). It originated from sharing mobility models. Within this delivery option, delivery personnel are known as crowdshippers. They are individuals who regularly make various daily trips for work, study, or other purposes. A digital platform connects these crowdshippers with parcel senders or recipients (Le and Ukkusuri, 2019a, Le and Ukkusuri, 2019b). Crowdshippers usually receive payment for each delivery they make.

Studies have found that crowdshipping has economic, social, and environmental benefits: lower prices, reduced delivery time and environmental emissions, personalized delivery, flexibility to send or receive a parcel on the weekend or after working hours, meeting the growing demand for faster and cheaper home deliveries, reduces operating costs for crowdshipping providers, flexible working schedule, meeting new people, earning some extra money etc. (Tapia et al., 2023, Gatta et al., 2019, Pourrahmani and Jaller, 2021). However, the main challenge lies in ensuring a critical mass of crowdshippers (Samad et al., 2023). This is because crowdshippers perform the work voluntarily (Le and Ukkusuri, 2019a). To ensure successful last-mile crowdshipping implementation, it is crucial to have a significant number of crowdshippers available. Moreover, there are different groups of crowdshippers such as students, employed individuals, unemployed individuals, and retired persons. Each group has different requirements that should be taken into account when promoting and designing a crowdshipping solution (Mohri et al., 2023).

In light of the risks mentioned above, there has been a noticeable rise in the number of studies on Willingness to Work (WTW) as a crowdshipper (Paloheimo et al., 2016, Miller et al., 2017, Nguyen et al., 2023, Galkin et al., 2021, Le and Ukkusuri, 2019a, Le and Ukkusuri, 2019b, Fessler et al., 2022, Gatta et al., 2019, Neudoerfer et al., 2021, Upadhyay et al., 2022, Bathke and Münch, 2023, Karli et al., 2022, Tapia et al., 2023, Wicaksono et al., 2022). The WTW concept explores the sociodemographic and other factors that influence potential crowdshippers to pursue this line of work. Most studies have been conducted in Southern and Western Europe. However, research on Eastern European countries' respondents' WTW remains limited, and most studies only examine the characteristics and WTW of crowdshippers in a single country. Only two articles to date has compared the preferences of crowdshippers in two different countries (Le and Ukkusuri, 2018a, Dietmann and Limbourg, 2020). The most frequently analyzed sociodemographic attributes were found to be gender, age, education, income, employment status, means of transport, and social media usage.

This study seeks to investigate the interest in WTW as a crowdshipper and sociodemographic characteristics of potential crowdshippers and their impact on WTW in three East European countries that have not yet been analyzed: Slovenia, the Czech Republic, and Ukraine. Expanding on prior research, this study includes new factors—work experience and logistics-related education—to assess their impact on WTW and compare them with similar studies from other countries.

To effectively accomplish the stated objective, the following research questions (RQs) will guide our investigation: RQ1: Which sociodemographic characteristics influence the probability of crowdshippers' WTW in Slovenia, the Czech Republic, and Ukraine?

RQ2: What is the probability of crowdshipping delivery's frequency (regular, periodical and occasional delivery) in all three countries?

Insights into the identified sociodemographic characteristics in each country will help logistics providers to optimize their search for potential crowdshippers and uncover untapped market segments. Identifying similarities among the three countries can also assist in designing standardized and culturally relevant business models.

2. Literature review

After checking numerous articles about people willing to work as crowdshippers, we found that there are not many available. The articles can be split into two groups. Some focus on the supply side, looking at people's WTW as crowdshippers, and the others look at both the demand and supply sides or the willingness to pay for crowdshipping.

Out of the sixteen analyses, eleven were undertaken in European countries: two in Italy (Marcucci et al., 2017, Gatta et al., 2019) and the Netherlands (Wicaksono et al., 2022, Tapia et al., 2023), one in Germany (Bathke and Münch, 2023), Slovakia (Galkin et al., 2021), Norway (Mordey and Kolb, 2021), Austria (Neudoerfer et al., 2021),

Denmark (Fessler et al., 2022), and one study included respondents from three countries – Germany, Belgium and Italy (Dietmann and Limbourg, 2020). Four articles involved respondents from the United States of America (Le and Ukkusuri, 2019a, Le and Ukkusuri, 2019b, Le and Ukkusuri, 2018b, Le and Ukkusuri, 2018a), one from India (Upadhyay et al., 2022), and one from the United States and Vietnam (Le and Ukkusuri, 2018a).

Commonly used sociodemographic attributes include gender, age, education, income, remuneration, employment status, means of transport, and social media usage. Additionally, specific attributes related to the content, such as detour distance and time, parcel dimensions (size, weight, number of parcels), and delivery time, are also important. Some studies, specifically Tapia et al. (2023), Bathke and Münch (2023), Wicaksono et al. (2022), Fessler et al. (2022), Neudoerfer et al. (2021), and Marcucci et al. (2017), have looked into the importance of carbon footprint.

The following part of the literature review discusses studies focusing solely on an individual's WTW as a crowdshipper, examining sociodemographic characteristics such as age, gender, income, occupation, and employment in logistics.

Miller et al. (2017) discovered that both high-income and low-income earners are less likely to engage in crowdshipping. Le and Ukkusuri (2018a) emphasized that individuals with higher income levels are less inclined to become crowdshippers. In studies by Le and Ukkusuri (2018b, 2019a, 2019b) exclusively involving USA respondents, it was noted that individuals over 30 years old are more likely to participate in crowdshipping. Additionally, those with a college degree or higher, a lower income, and women with more children are more likely to work as crowdshippers. Conversely, individuals living with elderly family members are less likely to engage in crowdshipping compared to those living in mortgaged houses.

Gatta et al. (2019) found that older individuals are less interested in crowdshipping. Dietman and Limborg's (2020) survey indicated that individuals willing to become crowdshippers are, on average, 30.6 years old and anticipate higher economic benefits. In a study conducted in Bratislava (Galkin et al., 2021), gender was identified as a significant factor in willingness to work. This observation was consistent with Neudoerfer's et al. (2021) study.

Serafini et al. (2018) also noted that older individuals are less interested in acting as crowdshippers, particularly when using public transport. Fessler et al. (2022) reported that respondents below 40 years old have a higher base utility for parcel delivery, while older respondents (above 60 years old) have a lower base utility. Students, and to a lesser extent, employed individuals, are more inclined towards crowdshipping compared to unemployed individuals. Furthermore, older respondents and those with higher incomes exhibit a higher marginal disutility for time, whereas individuals with a higher education background are more willing to accept extra time for picking up parcels. Bathke and Münch's (2023) study revealed that full-time employees are a more promising target group.

3. Methodology

3.1. Survey design and data description

An online survey was conducted during the summer and fall of 2023 in three countries: the Czech Republic, Slovenia, and Ukraine. The questionnaire consists of three parts: (1) information on socioeconomic characteristics of respondents (age, gender, education, average monthly income, employment), (2) respondents' attitude to the possibility of receiving the ordered goods through the crowdshipping service, and (3) the willingness of respondents to undertake crowdshipping delivery and the possible parameters of such delivery.

The surveys resulted in 247 completed questionnaires from Czech respondents, 400 questionnaires from Slovenian respondents, and 207 questionnaires from Ukrainian respondents. By gender, the sample of Slovenian respondents is evenly split. There are slightly fewer men in the structure of the Czech and Ukrainian samples (44% and 45%, respectively). The majority of responses were received from the population aged 18–29 (47% of the Czech, 40% of the Slovenian and 53% of the Ukrainian sample); the percentage of respondents aged 30–39 is 13%, 13% and 9%, respectively; aged 40–49, 11 %, 14% and 13%. Another 24% of the Czech sample, 27% of the Slovenian and 11% of the Ukrainian sample are respondents over 50 years old. Among the Czech sample, 47% are employed and 34% are students, among the Slovenian, there are 44% and 39% respectively, and among the Ukrainian respondents, 43% and 47%, respectively. Regarding the level of education, 2% of Czech respondents, 33% of Slovenian and 12% of Ukrainian respondents have secondary professional education, and there are 19%, 25% and 14%, respectively with a

bachelor's degree, 26%, 20% and 24% with a master's degree, and 7%, 5% and 4% respectively with a scientific degree.

Respondents are divided into four ranges according to the average monthly income. Since the minimum salary level varies from country to country, the actual rang limits differ. Among the Czech sample, 27% of respondents have an income of less than 600 EUR, 27% - from 600 to 1,000 EUR, 23% from 1,000 to 1,400 EUR and the rest - more than 1,400 EUR. In the Slovenian sample, 44% indicated that they belong to the rang I (less than 1000 EUR of average monthly income), 36% - to the rang II (1000 - 2000 EUR), 14% - to the rang III (2000 - 3000 EUR). Among the respondents from Ukraine, 35% have an average monthly income of less than 150 EUR, 34% - from 150 to 400 EUR, 20% - from 400 to 800 EUR, and 11% - more than 800 EUR.

A general analysis of the respondents' answers allows us to highlight positive attitudes towards the idea of crowdshipping in general and any lack of information about crowdshipping. Only 6% of Czech respondents, 2.8% of Slovenian respondents, and 3% of Ukrainian respondents said they did not support this method of last-mile delivery. Moreover, 38% of Slovenian respondents said that they were not familiar with this delivery method, and another 32% said that there was not enough information. Among Czech respondents, the respective figures are 38% and 30%, and among Ukrainian respondents, 41% and 22%.

The majority of respondents expressed their willingness to perform crowdshipping delivery with more or less regularity: 77% of Czech respondents, 77% of Slovenian respondents, and 86% of Ukrainian respondents. The status of the sender and recipient of a parcel does not have a significant impact on crowdshippers. Ukrainian respondents are somewhat more willing to deliver goods to individuals than to businesses (a difference of 3%), while Czech respondents are the opposite (a difference of 4%). For Slovenian respondents, the status of the recipient does not matter. Regarding senders, Ukrainian and Slovenian respondents have a slight preference for businesses (4% and 7% difference, respectively), while Czech respondents have no preference.

3.2. Formation of a logit model of the probability of crowdshipping delivery

Logit models assume that, given several alternatives, an individual makes a decision to choose the alternative that has the maximum utility from the point of view of that individual. In general, utility is defined as the sum of two elements:

$$U_i^j = V_i^j + \varepsilon_i^j \quad (1)$$

where V_i^j is the systematic utility of choosing the alternative j for individual I and ε_i^j is the stochastic error, distributed as a Gumbel distribution with a parameter ϑ .

The probability of choosing a certain alternative is determined:

$$p_i^j = \frac{\exp(V_i^j / \vartheta)}{\sum_{j \in J} \exp(V_i^j / \vartheta)} \quad (2)$$

Assuming that a person makes consistent decisions, a hierarchical logit model is an effective solution. Using the hierarchical Bayesian multinomial logit model HB-MNL, it is possible to create fairly accurate models even with a relatively small amount of data from respondents (Hein et al., 2020).

A person's decision to perform a crowdshipping delivery can be presented in the form of a one-level hierarchical logit model. This type of model presents the choice problem as a decision tree. At the root of the tree, a binary choice is made between two alternatives: yes (willingness to perform crowdshipping delivery) or no (unwillingness to perform crowdshipping delivery). In the intermediate node, the individual decides on the frequency of such delivery (among the three proposed alternatives: once a week or more often (regular delivery), several times a month (periodical delivery), once every few months (occasional delivery)).

The formula for the probability of choosing a certain alternative is the product of two probabilities:

$$p[j] = p[f] \cdot p[j/f] \quad (3)$$

These probabilities depend on the systematic utility of making a certain choice for an individual:

$$p[j/f] = \frac{\exp(V_j)}{\sum_{j=1+3} \exp(V_j)} \quad (4)$$

$$p[f] = \frac{\exp(V_f)}{\sum_{f=1,2} \exp(V_f)} \quad (5)$$

The systematic utilities of making a crowdshipping delivery V_f and frequency of crowdshipping delivery V_j are linear functions of the individual's socioeconomic characteristics:

$$V_f = \sum_{i=1+n} \beta_i x_i + asc_f \quad (6)$$

$$V_j = \sum_{i=1+n} \beta_i x_i + asc_j \quad (7)$$

where asc - alternative specific constant, which represents all factors not expressed in terms of parameters that are considered in the model.

The modeling did not reveal a statistically significant effect of gender and work experience and educational background in the field of logistics in any of the cases. Accordingly, the final model includes the following attributes:

- x_1 : age — age of the crowdshipper, discrete variable equal to 1 if the age of the potential crowdshipper is less than 18 years, 2 for the age range of 18–29, 3 for the age range of 30–39, 4 for the age range of 40–49, and 5 for the age 50 and over;
- x_2 : average monthly income level — discrete variable equal to 1 for income level within the range I, 2 for income level within the range II, 3 for income level within the range III, 4 for income level within the range VI;
- x_3 : education — discrete variable equal to 1 if the highest level of education of the respondent is school, 2 for secondary professional education, 3 for bachelor degree, 4 for master degree, 5 for scientific degree;
- x_4 : employed — dummy variable equal to 1 if potential crowdshipper is employed, 0 otherwise;
- x_5 : student — dummy variable equal to 1 if potential crowdshipper is student, 0 otherwise.

Table 1 shows the parameters of the logit model for estimating the probability of crowdshipping delivery for representatives of each of the analyzed countries. The resulting utility functions are linear functions of the socioeconomic parameters of potential crowdshippers.

Table 1. Systematic utility's parameters for a model for estimating the probability of crowdshipping delivery.

	β_{x_1}	β_{x_2}	β_{x_3}	β_{x_4}	β_{x_5}	<i>asc</i>
Czech Republic	-0.816	-0.941				4.372
Statistic of binary logit-model:						
Model parameters: Pr > Chi ²	0.100	0.031				0.134
-2 Log(Likelihood): Pr > Chi ²	< 0.0001					
AUC (ROC curve)	0.827					
Slovenia		0.573		-0.980	-0.088	-0.534
Statistic of binary logit-model:						
Model parameters: Pr > Chi ²		0.007		0.022	0.818	0.219
-2 Log(Likelihood): Pr > Chi ²	0.029					
AUC (ROC curve)	0.705					
Ukraine	0.297	0.228				-1.008
Statistic of binary logit-model:						
Model parameters: Pr > Chi ²	0.165	0.251				0.040
-2 Log(Likelihood): Pr > Chi ²	0.073					
AUC (ROC curve)	0.646					

The average monthly income level is a parameter that affects the probability of crowdshipping delivery regardless of country. In the case of Slovenia and Ukraine, this dependence is direct; in the case of the Czech Republic, it is inverse. Age is a statistically significant parameter for respondents from the Czech Republic and Ukraine. Ukrainian respondents' readiness to be a crowdshipper increases slightly with increasing age, while Czech respondents' readiness to deliver decreases, and the influence of age is more highlighted. In the case of Slovenia, the probability of crowdshipping is reduced in the case of the employees. The level of education does not have a statistically significant effect on the first stage of choice (WTW as a crowdshipper).

The next step in the modeling process is to assess the impact of socioeconomic characteristics on the likely frequency of crowdshipping (regular, periodical or occasional delivery). The model parameters obtained from the survey results are presented in Table 2.

Two socioeconomic parameters (education and average monthly income) influence the likely frequency of crowdshipping in all three countries. Other indicators are statistically significant only for a certain country. The probability of regular crowdshipping delivery among Czech respondents decreases with increasing income and education level (income level has a more significant impact). The same situation occurs in the group of Slovenian respondents, but there is another significant parameter here; age has a positive effect. Analysis of the results of Ukrainian surveys shows that the probability of regular delivery increases with age and income level but decreases among respondents with a higher level of education and among students. Modeling based on Czech respondents' answers also shows that with increasing age and education level, the probability of periodical delivery decreases, but people with higher education levels are more likely to undertake occasional delivery occasionally. Age has a slightly higher impact on the probability of occasional delivery by Slovenian crowdshippers than on the probability of periodic delivery. The increase in income has the most negative impact on the probability of regular delivery. As for the Ukrainian sample, students are more likely to make irregular deliveries. With increasing age, the probable frequency of delivery decreases, the level of income has a slightly higher impact on the increase in the frequency of regular and occasional delivery, and the level of education has a negative impact on the frequency of delivery.

Table 2. Systematic utility's parameters for a model for estimating the probability of crowdshipping delivery's frequency.

	β_{x_1}	β_{x_2}	β_{x_3}	β_{x_4}	β_{x_5}	<i>asc</i>
Czech Republic						
V_{f1} – regular delivery		-1.347	-0.774			6.059
V_{f2} – periodical delivery		-1.500	-0.294			5.373
V_{f13} – occasional delivery		-2.096	0.135			5.298
Statistic of multinomial logit-model:						
Model parameters: Pr > Chi ² (V_{f1})		0.006	0.073			0.016
Model parameters: Pr > Chi ² (V_{f2})		0.004	0.493			0.031
Model parameters: Pr > Chi ² (V_{f3})		0.001	0.787			0.037
-2 Log(Likelihood): Pr > Chi ²	< 0.0001					
R ²	0.48					
Slovenia						
V_{f1} – regular delivery	1.236	-1.343	-0.934			2.387
V_{f2} – periodical delivery	1.113	-0.969	-0.952			2.130
V_{f13} – occasional delivery	1.234	-1.206	-0.921			2.115
Statistic of multinomial logit-model:						
Model parameters: Pr > Chi ² (V_{f1})	< 0.0001	0.0002	0.0010			0.0006
Model parameters: Pr > Chi ² (V_{f2})	0.0002	0.0045	0.0006			0.0017
Model parameters: Pr > Chi ² (V_{f3})	< 0.0001	0.0007	0.0011			0.0023
-2 Log(Likelihood): Pr > Chi ²	< 0.0001					
R ²	0.32					
Ukraine						
V_{f1} – regular delivery	5.837	3.689	-5.983		-1.562	2.371
V_{f2} – periodical delivery	6.394	3.613	-6.110		-2.067	1.940
V_{f13} – occasional delivery	7.670	3.669	-5.922		0.483	-3.089
Statistic of multinomial logit-model:						
Model parameters: Pr > Chi ² (V_{f1})	0.012	0.007	0.004		0.517	0.588
Model parameters: Pr > Chi ² (V_{f2})	0.006	0.009	0.003		0.391	0.659
Model parameters: Pr > Chi ² (V_{f3})	0.001	0.008	0.005		0.845	0.498
-2 Log(Likelihood): Pr > Chi ²	< 0.0001					
R ²	0.63					

4. Discussion and Conclusion

The study aims to investigate the sociodemographic characteristics of potential crowdshippers (students and employed individuals) influencing WTW in Slovenia, the Czech Republic, and Ukraine, within different delivery frequencies. Gender did not show statistical significance in our survey, diverging from previous studies (Galkin et al., 2021; Neudoerfer et al., 2021; Le and Ukkusuri, 2018b, 2019b) that found women more willing to become crowdshippers. This insight allows logistics providers to tailor marketing strategies without emphasizing gender-related preferences. Average monthly income was significant in all three countries, with positive dependence in Slovenia and Ukraine, consistent with Miller et al.'s (2017) study. In the Czech Republic, higher income potential crowdshippers were less likely to engage, aligning with Le and Ukkusuri's (2018a, 2019a) findings. It is possible that

the differences in the relationship between income and engagement in crowdshipping among various countries can be attributed to a combination of economic, cultural, social, and regulatory factors. For instance, the Czech Republic and Slovenia have a similar economic position. However, there is a possibility that in the Czech Republic, there might be alternative opportunities or higher-paying jobs available, which makes crowdshipping less attractive compared to Slovenia. In Slovenia, entrepreneurship and green innovations are highly valued. Therefore, individuals with higher income levels may be more inclined to engage in crowdshipping activities to supplement their income while making the environment greener. The engagement patterns of crowdshipping can be affected by differences in regulatory frameworks and policies across countries, as well as the lack of regulatory and enforcement frameworks. In some countries, regulatory barriers or uncertainties may deter individuals with higher incomes from participating in crowdshipping due to concerns regarding legal or financial risks. Alternatively, promotion of the positive impact of crowdshipping on the environment may encourage people with higher income to participate in crowdshipping. Additionally, being close to the package pick-up/drop-off point by or having the option to pick up or drop off the package at a nearby parcel might also help encourage participation. The positive dependence in Slovenia and Ukraine, along with the negative correlation in the Czech Republic, provides nuanced insights. Logistics providers can adapt pricing structures and incentives based on the income profiles of potential crowdshippers in each country.

Age was statistically significant for Czech Republic and Ukraine potential crowdshippers (positive dependence), contrary to Gatta et al. (2019) and Serafini et al. (2018). The level of engagement in crowdshipping may be influenced by the economic conditions and job market dynamics of each country. In the Czech Republic, there is a negative relationship between age and engagement. This suggests that older individuals in the Czech Republic may have access to more stable and higher-paying job opportunities compared to crowdshipping. On the other hand, in Ukraine, there is a positive relationship between age and engagement, which may indicate that older individuals in Ukraine face greater economic challenges or fewer traditional job opportunities, leading them to engage more in crowdshipping as a source of income. Logistics providers in Ukraine can target age-specific campaigns, while providers in the Czech Republic can consider incentives to increase participation among older age groups. In Slovenia, employee status reduces the probability of crowdshipping, opposing Bathke and Munsch's (2023) findings that full-time employees are the most promising potential crowdshippers. The level of development of the crowdshipping industry might influence the behavior of full-time workers. In more developed markets, like the ones analyzed by Bathke and Munsch, full-time employees could be more inclined to participate in crowdshipping because of their familiarity with the platforms and the availability of established opportunities to earn extra income. Currently, there are also no regulatory frameworks in Slovenia regarding crowdshipping, which may affect its appeal to full-time employees. The logistics providers may need to establish defined regulatory frameworks or provide more knowledge about crowdshipping to engage full-time Slovene employees in crowdshipping activities. The aforementioned findings address RQ1.

The study found that income and education influence crowdshipping frequency in all three countries. Age was positively correlated with all crowdshipping delivery frequencies only in Slovenia and Ukraine. The probability of regular crowdshipping delivery among Czech respondents decreases with increasing income and education levels. With the Slovenian respondents, the probability also decreases with rising income and education levels but increases with age. However, the probability of regular crowdshipping delivery among Ukrainian respondents increases with age and income levels, while decreases with increasing level of education and among students. In the modeling based on Czech respondents' answers, it is observed that the probability of periodical delivery decreases with increasing income and education level. Similar patterns are found among Slovene respondents, where the probability decreases with rising income and educational level but increases with rising age. In the case of the Ukrainian sample, the probability of periodical delivery increases with age and rising income, while decreasing with increasing education level and among students.

Among Slovenian respondents, the probability of occasional deliveries decreases with rising income and education levels but increases with age. In the Czech respondent group, the probability decreases with increasing income but increases with higher education levels. For Ukrainian respondents, the probability of occasional delivery increases among students, with age, and higher income levels, but decreases with increasing educational levels. Unfortunately, the above results (see the last three paragraphs) cannot be compared with past findings as no prior research has estimated the probability of crowdshipping frequency. The outlined outcomes directly respond to RQ2.

It seems that there are no major variations in the frequency of deliveries among different countries, except for the Czech Republic (occasional). However, there are differences in delivery frequency among individual countries. The

minor differences observed in certain countries could be attributed to a lack of awareness about crowdshipping or a lack of interest in it among individuals. However, further investigation is needed to understand the reasons behind this observation. Economic disparities between Slovene/Czech and Ukraine employees might play a role. Thus, employees in Ukraine with higher income, which is still lower than in Slovene and the Czech Republic, may rely on crowdshipping for additional income. It is interesting to note that students in Ukraine prefer occasional deliveries instead of periodical or regular ones, even though they commute almost every day. It would be worthwhile to investigate the reasons behind this preference, such as lack of knowledge, time constraints, or low remuneration, since many students work part-time.

The identification of both similarities and differences across three countries emphasizes the importance of considering regional nuances in crowdshipping dynamics. Besides, the study highlights variations that indicate a lack of consensus in crowdshipping engagement factors. This opens avenues for future in-depth research within the studied countries and also across diverse geographical areas.

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