

# *Research of the potential opportunities of crowdshipping: the case study of Ukraine and the Czech Republic*

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Crowdshipping using public transport has more advantages compared to crowd-delivery by private transport:

- car owners are more likely to make detours from their main route and may have parking problems – traffic growing (*Arvidsson et al.*);
- crowdshipping based on private cars may increase the negative impact on the environment (*Simoni et al.*);
- delivery costs for the carrier (when we compare crowdshipping delivery using public transport and tradition delivery) can be reduced by up to 29% per parcel, especially for cities with an extensive route network (*Tapia et al.*)

# QUESTIONNAIRE FOR UNDERSTANDING THE ATTITUDE TOWARDS CROWDSHIPING DELIVERY USING PUBLIC TRANSPORT IN UKRAINE AND THE CZECH REPUBLIC

Запитання Відповіді 204 Налаштування

Розділ 1 з 5

## Опитувальник щодо можливостей краудшипінгу

Кафедра транспортних технологій Національного університету 'Львівська політехніка' проводить опитування щодо ставлення жителів до краудшипінгу та доставки вантажів за допомогою системи громадського транспорту.

Краудшипінг – доставка товарів непрофесійними кур'єрами під час їхніх поїздок (безкоштовна або платна). Насправді краудшипінг означає передачу посилки через людей, які хочуть допомогти доставити товар до місця призначення.

Краудшипінг з використанням системи громадського транспорту передбачає доставку товарів під час щоденної поїздки громадським транспортом (наприклад, на роботу чи навчання)

Заповнення анкети займає не більше 15 хвилин і є анонімним. Дякуємо за співпрацю та бажаємо гарного дня.

Після розділу 1 Перейти до наступного розділу

Розділ 2 з 5

### Соціо-економічні характеристики респондента

Опис (необов'язково)

Скільки вам років? \*

Текст запитання з короткими відповідями

Вкажіть, будь ласка, вашу стать \*

- Чоловік
- Жінка
- Не хочу відповідати

Запитання Відповіді 225 Налаштування

Розділ 1 з 5

## Doručování pomocí crowdshippingu

Dobrý den,

Dopravní fakulta Jana Pernera, Univerzity Pardubice, realizuje průzkum týkající se postojů obyvatel města k crowdshippingu a doručování zboží pomocí veřejné dopravy.

Crowdshipping představuje doručování zboží prostřednictvím neprofesionálních kurýrů během jejich cest (zdarma nebo za určitý poplatek). V podstatě se jedná o přenos balíčku prostřednictvím lidí, kteří se rozhodnou pomoci s doručením zboží na jeho cílovou adresu. Crowdshipping pomocí veřejné dopravy zahrnuje doručování zboží během každodenní cesty veřejnou dopravou (například do práce nebo na studia).

Vyplnění dotazníku Vám zabere maximálně patnáct minut a je anonymní, proto nemusíte mít žádné obavy. Děkujeme Vám za spolupráci a přejeme příjemný zbytek dne.

Після розділу 1 Перейти до наступного розділу

Розділ 2 з 5

### Socio-ekonomické charakteristiky respondenta

Опис (необов'язково)

Jaká je Vaše státní příslušnost? \*

(označte Vámi zvolenou variantu)

- Státní občanství České republiky
- Inše...

Kolik je Vám let? \*

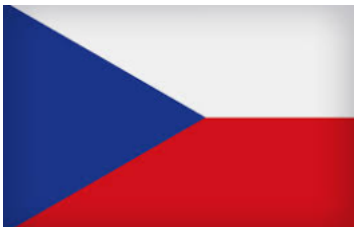
(označte Vámi zvolenou variantu)

- do 18 let

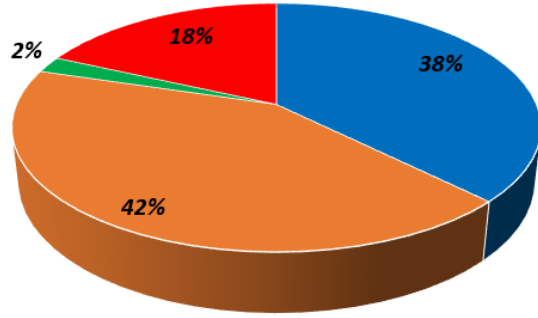
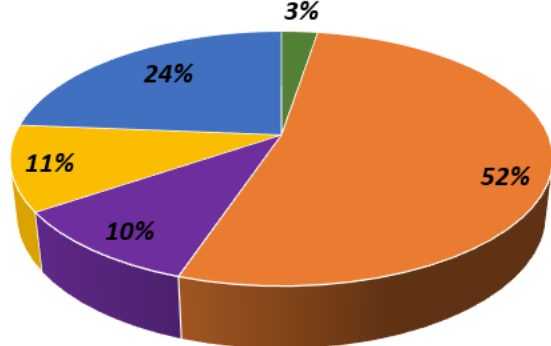
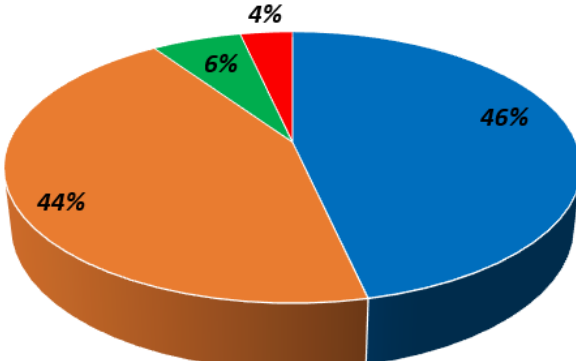
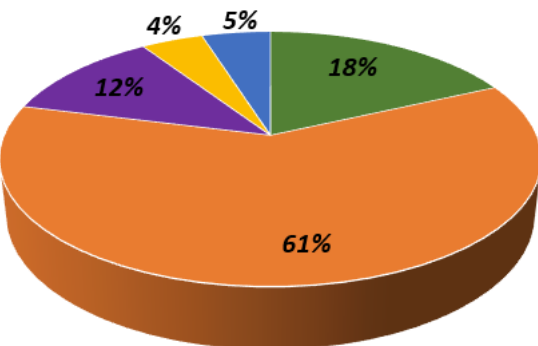
# CHARACTERISTICS OF THE SAMPLES



Number of respondents - 191

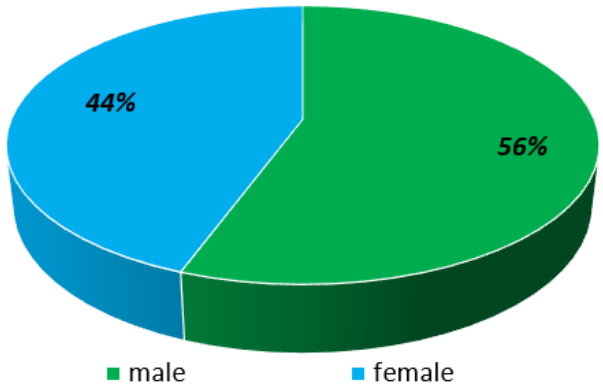
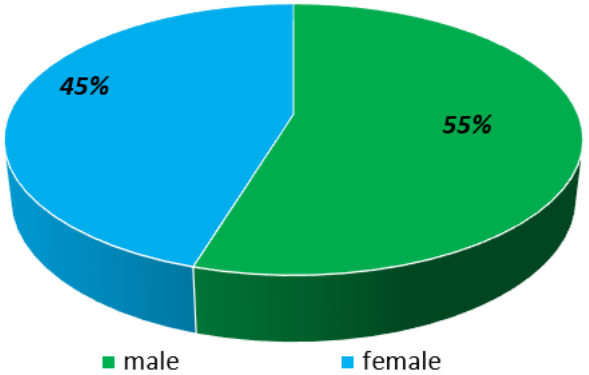


Number of respondents – 187

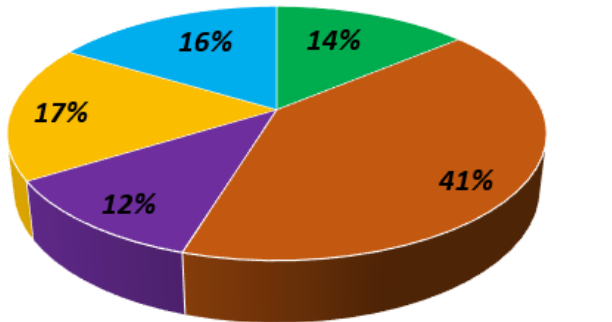


< 18 years old 18 - 29 years old 30 - 39 years old 40 - 49 years old 50 and more years old   
Student Full-time employee Unemployed Retired

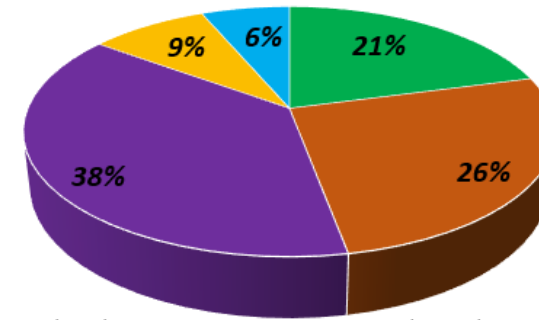
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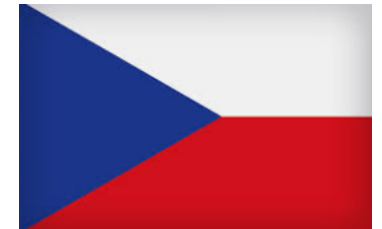
## CHARACTERISTICS OF THE SAMPLES



■ I live alone  
■ married, no children  
■ other  
■ I live with parents  
■ married, children under 18

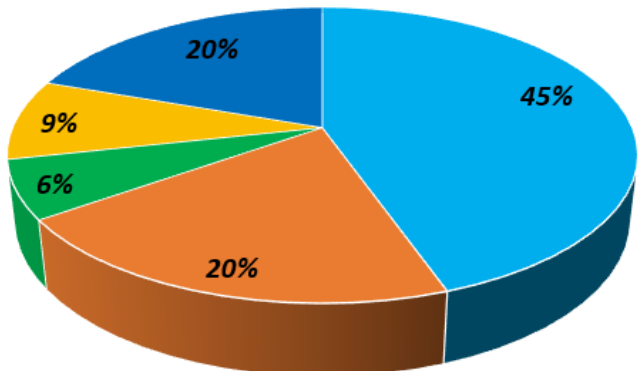


■ I live alone  
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■ married, children under 18

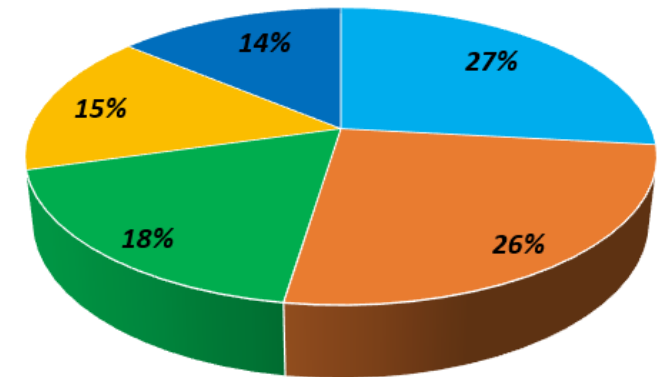


### Division by the level of average monthly income

- range I: up to UAH 10,000 or EUR 250 (Ukraine) and up to CZK 15,000 or EUR 600 (Czech Republic);
- range II: 10,001 - 20,000 UAH or 251 - 500 EUR (Ukraine) and 15,001 - 25,000 CZK or 600 - 1000 EUR (Czech Republic);
- range III: 20 001 - 30 000 UAH or 500 - 750 EUR (Ukraine) and 25 001 - 35 000 CZK or 1000 - 1400 EUR (Czech Republic);
- range VI: more than UAH 30,000 or more than EUR 750 (Ukraine) and more than CZK 35,000 or more than EUR 1400 (Czech Republic).



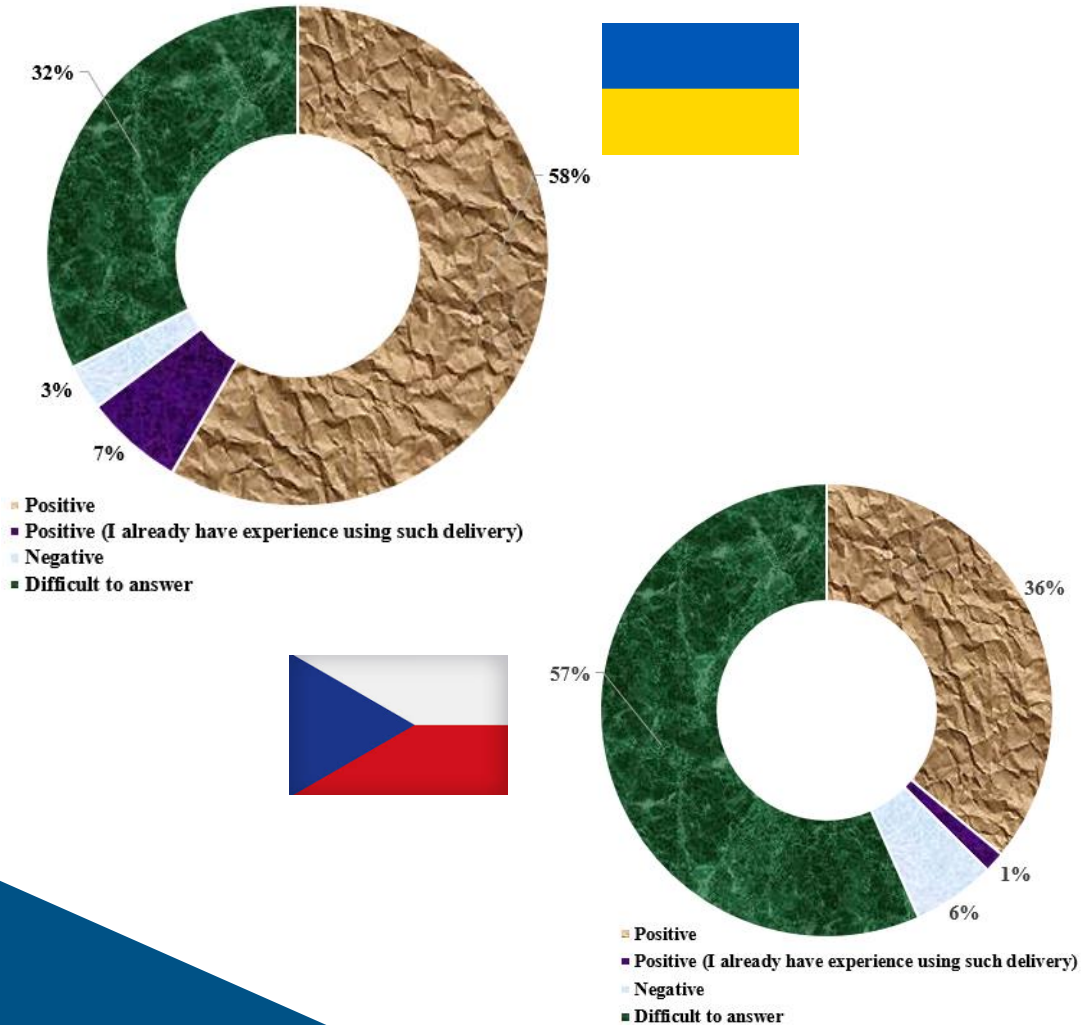
■ range I  
■ range II  
■ range III  
■ range VI  
■ no respond



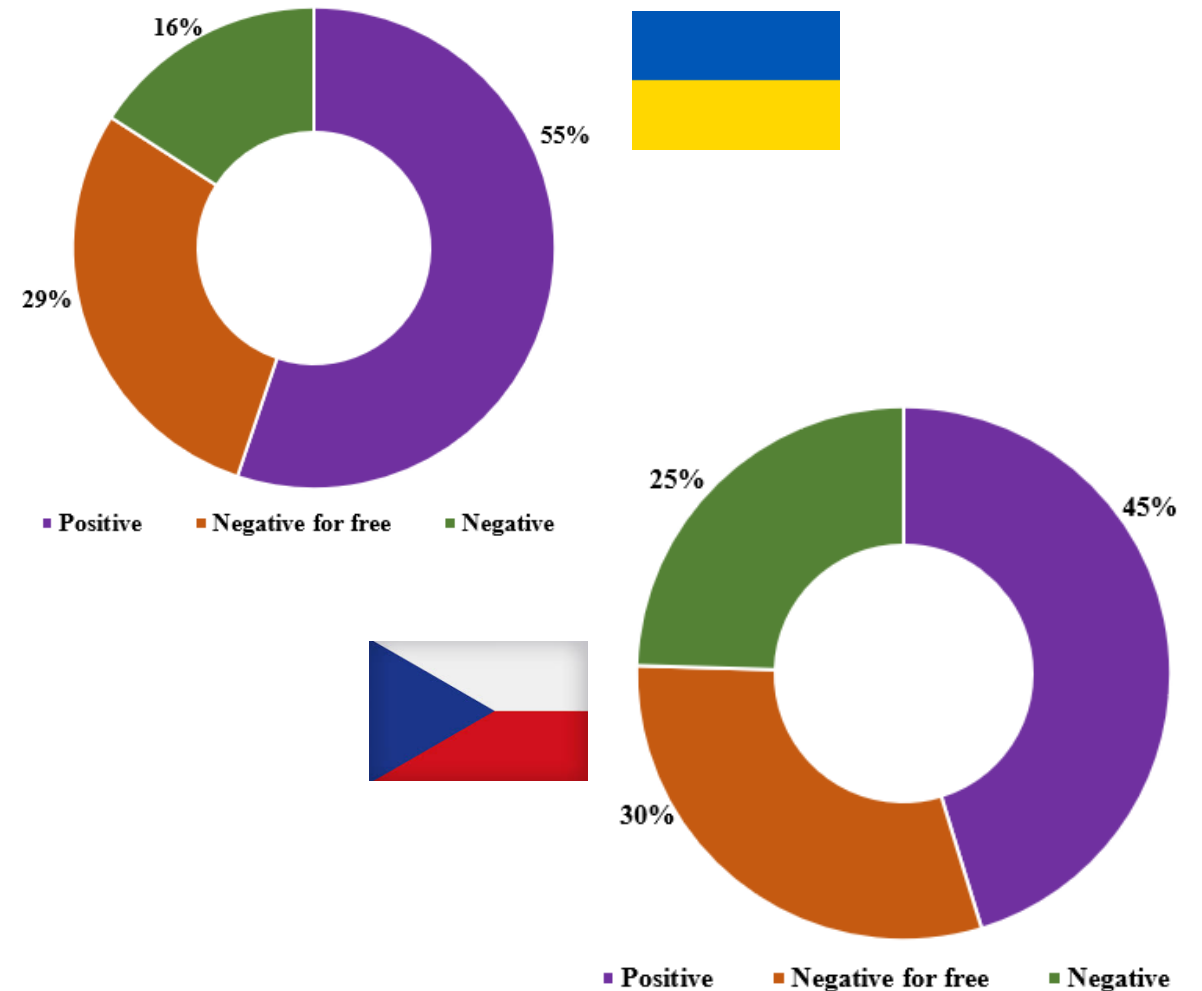
■ range I  
■ range II  
■ range III  
■ range VI  
■ no respond

# ATTITUDE TO CROWDSHIPPING

## Attitude to the possibility of receiving goods using the crowdshipping service



## The willingness to make crowdshipping delivery while travelling by public transport



THE FREQUENCY OF CROWDSHIPING DELIVERY

	Ukraine		Czech	
	regularly	rarely	regularly	rarely
Free	34,9	19,8	22,2	16,7
For a monetary reward	61,3	22,6	55,6	27,8
For certain bonuses	57,5	23,6	33,3	33,3

Regularly – readiness to deliver at least once a week

Rarely – readiness to deliver a maximum of several times a month

## ADEQUATE REWARD FOR DELIVERY

Why the question of adequate fee for delivery is important?



The high fee of crowdshipping services can encourage trips made specifically for delivery. Because of this, the main essence of crowdshipping (to reduce the number of trips) is losing.

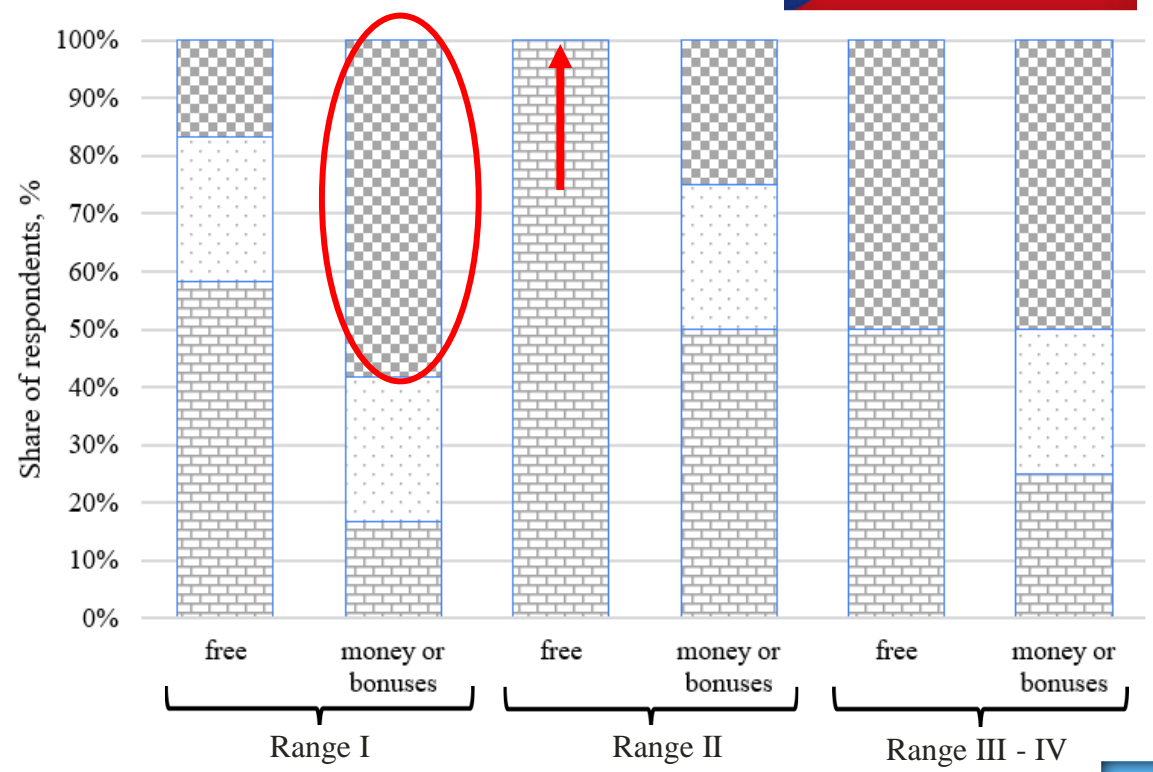
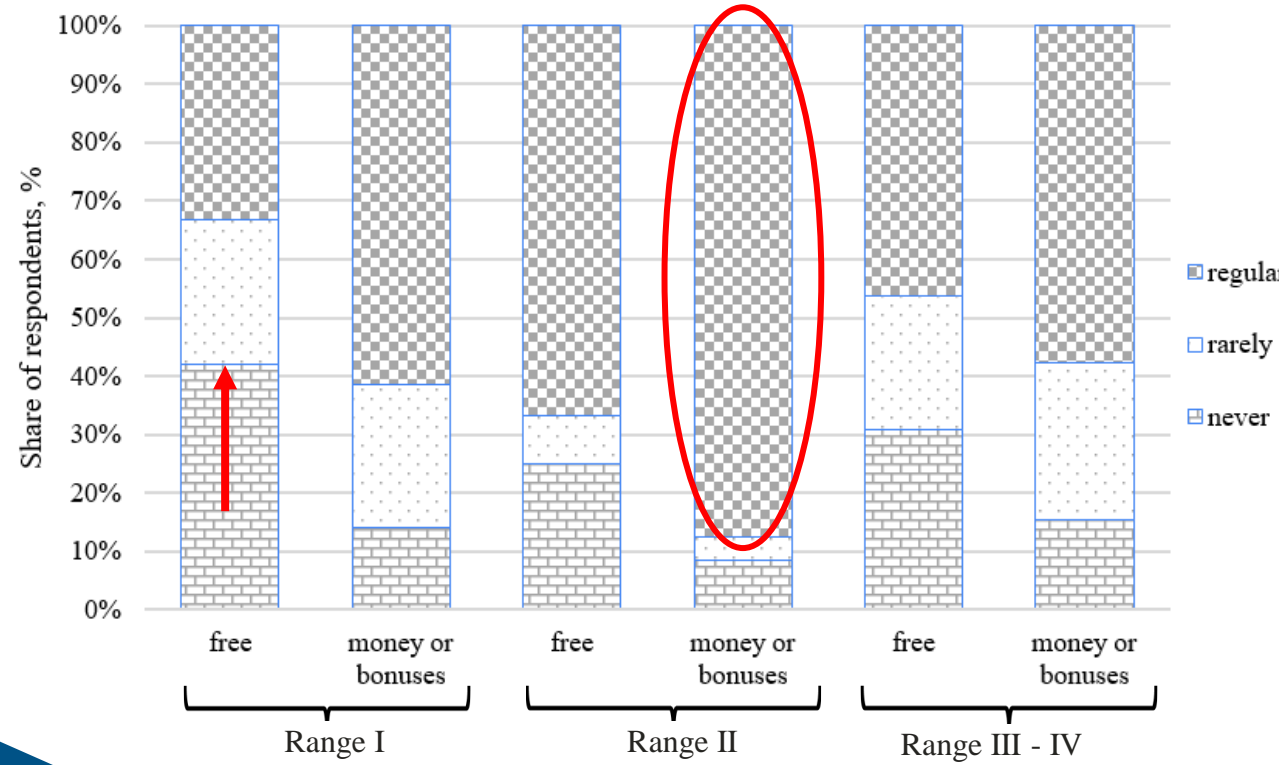
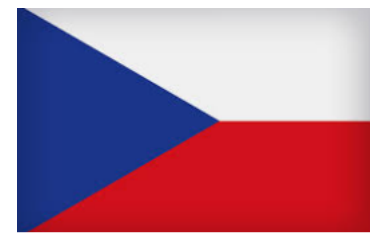


Too little fee value may reduce the number of crowdshippers or the quality of services.

Ukraine: 36.5% consider an adequate reward of up to 40UAH, 50% are ready to transport parcels for reward from 41 to 70 UAH (the minimum price of delivering a parcel weighing up to 5 kg around the city for the postal operator Ukrposhta is 42 UAH (approximately 1 EUR) to the post office and 72 UAH (1.8 EUR) by courier home)

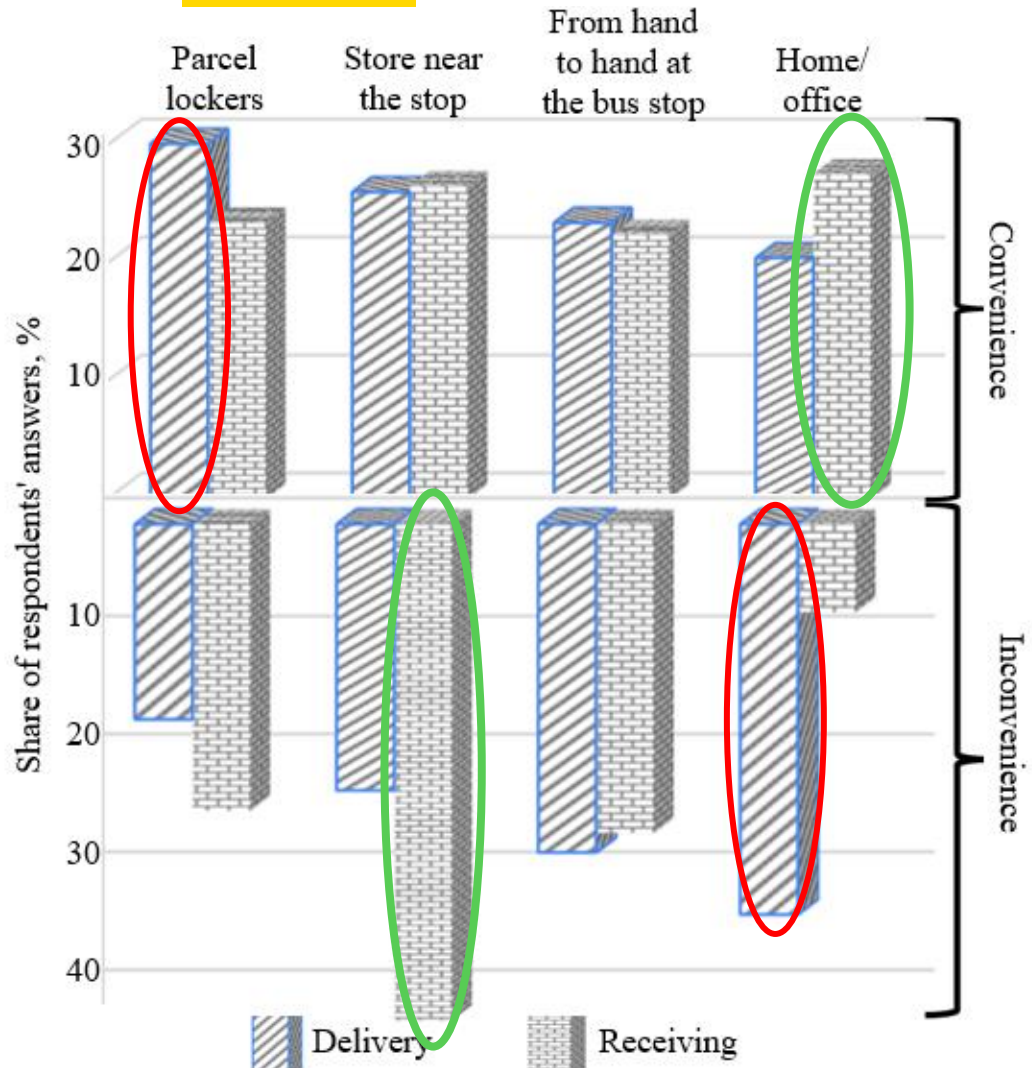
Czech: 37% consider an adequate reward from 40 to 59 CZK, 31,3% are ready to transport parcels for reward from 60 to 79 CZK (the minimum price of a similar delivery by the operator Česká pošta is 109 CZK (4.5 EUR) to the post office and 129 CZK (5.4 EUR) by courier home)

# INFLUENCE OF SOCIO-ECONOMIC CHARACTERISTIC ON THE READINESS TO BE CROWDSHIPPER: AVERAGE MONTHLY INCOME





## EVALUATING THE CONVENIENCE OF DELIVERY OPTIONS

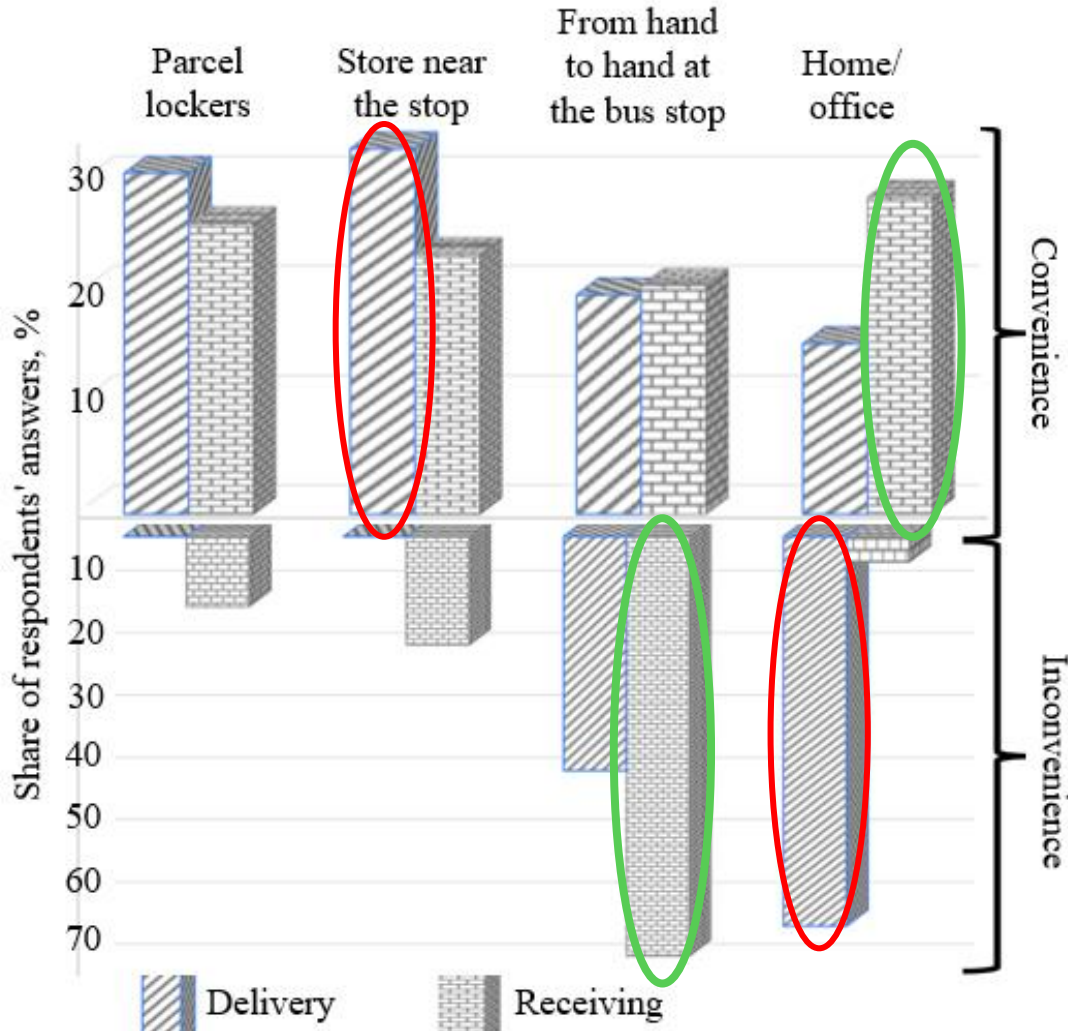


Potential crowdshippers consider the most convenient option to deliver a parcel to a parcel locker at a public transport stop, and the *least convenient* option is to deliver it to a *home or office*.

Users of crowdshipping delivery consider delivery to their home or office the most convenient option, and *store near the stop* is the *least convenient*.



## EVALUATING THE CONVENIENCE OF DELIVERY OPTIONS



The most convenient way of delivery is delivery to a store near the stop or parcel lockers at the stop, the *least convenient* way for potential crowdshippers is *home or office* delivery

The most convenient way to receive a parcel is home or office, and the *least convenient* way - *personal receipt* from a crowdshipper courier *at a bus stop*.

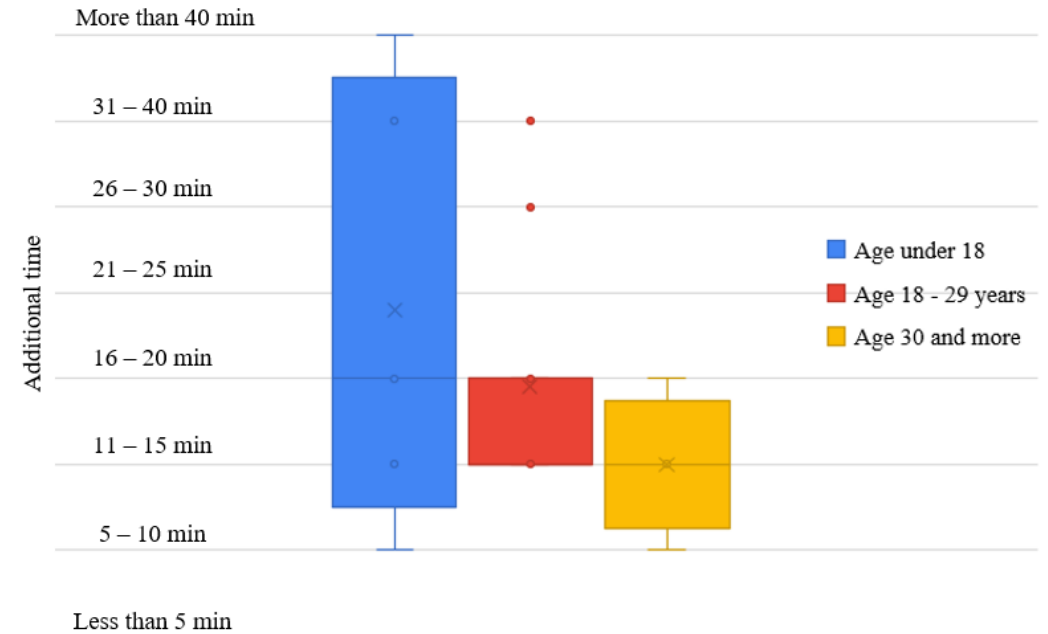
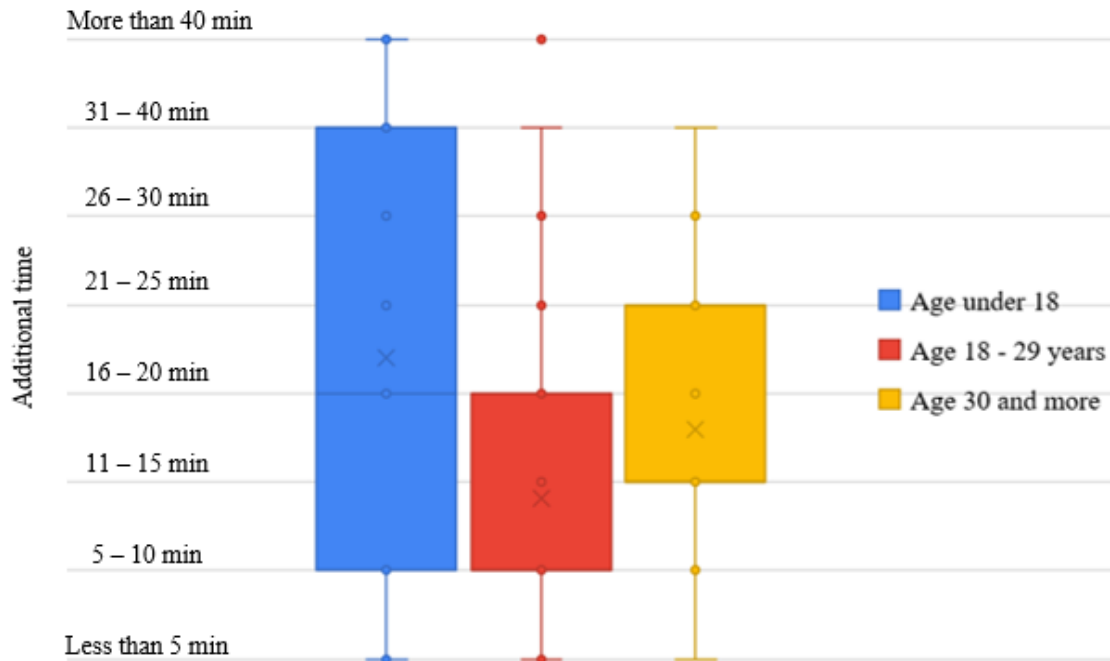
## TIME WINDOWS OF DELIVERY AND RECEIVING

Time	Ukraine			Czech		
	Receiving, %	Delivery, %	Difference, %	Receiving, %	Delivery, %	Difference, %
05 <sup>00</sup> – 09 <sup>00</sup>	2,56	10,20	7,64	5,15	24	18,85
09 <sup>00</sup> – 12 <sup>00</sup>	12,31	13,61	1,3	13,97	12	-1,97
12 <sup>00</sup> – 15 <sup>00</sup>	12,82	17,69	4,87	10,29	16	5,71
15 <sup>00</sup> – 18 <sup>00</sup>	12,31	18,37	6,06	22,79	24	1,21
18 <sup>00</sup> – 21 <sup>00</sup>	31,28	17,69	-13,59	26,47	4	-22,47
21 <sup>00</sup> – 05 <sup>00</sup>	2,05	2,04	-0,01	2,94	0,8	-2,14
Does not matter	26,67	20,41	-6,26	18,38	19,2	0,82

## ADDITION TIME FOR DELIVERY

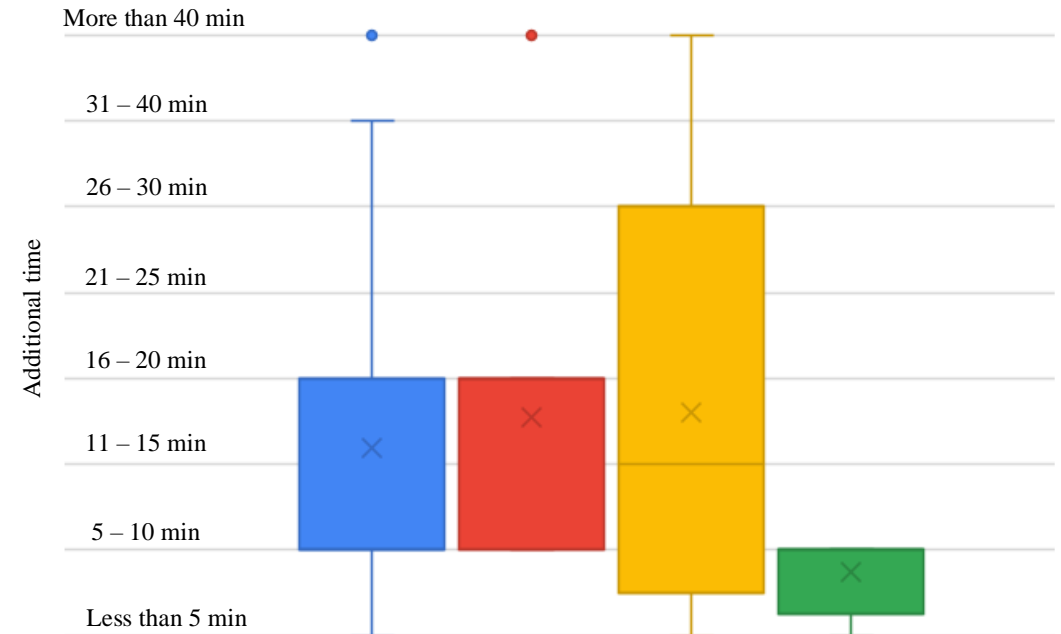
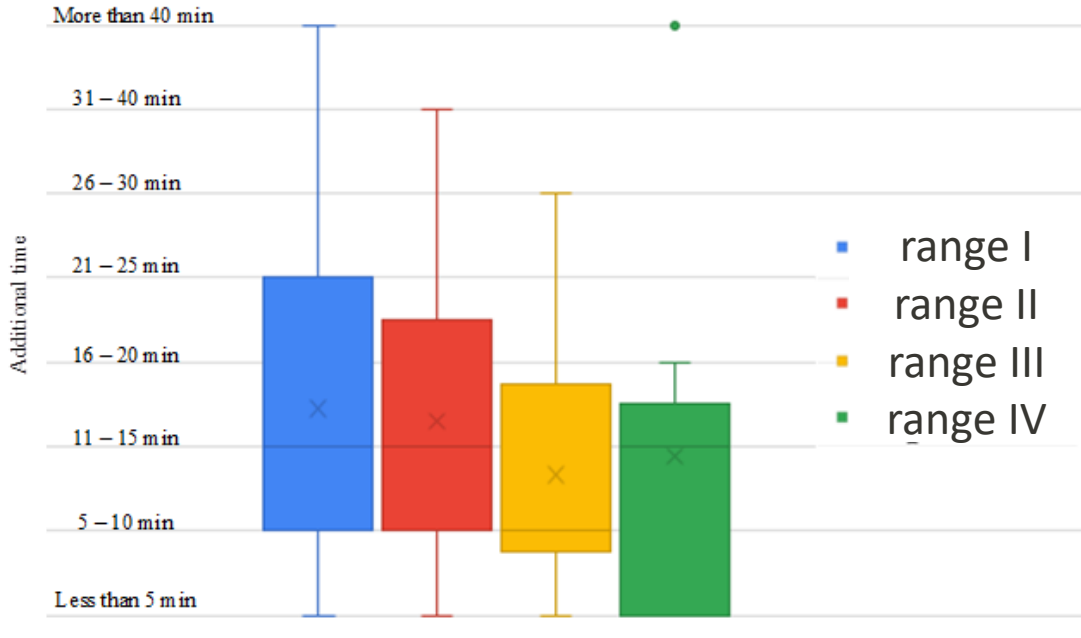
63% of Ukrainian respondents and 70,6% of Czech respondents are ready to spend no more than 15 minutes in addition to their usual travel time to make a crowdshipping delivery (take the package for delivery and give it to the recipient): 16.7% of Ukrainian respondents and 5,9% of Czech respondents are not ready to spend more than 5 minutes, another 31.5% and 47% respectively - from 5 to 10 minutes. This parameter is influenced by the respondent's age and average monthly income.

## ADDITION TIME FOR DELIVERY: INFLUENCE OF AGE



The maximum variation in the possible values of additional time spent on delivery is observed among respondents under the age of 18. Ukrainian respondents aged 18 to 29 and Czech respondents over 30 are the least willing to spend time.

## ADDITION TIME FOR DELIVERY: INFLUENCE OF AVERAGE MONTHLY INCOME



The higher the income of the Ukrainian respondents, the less inclined they are to increase the usual duration of their trip. Among Czech respondents, the maximum variation in the possible values of additional time spent on delivery is observed among the people with an income level within the III diapason. People with income in diapason IV are ready to spend the least extra time.

## GROUP OF CROWDSHIPPING'S BARRIER FACTORS

The questionnaire contains 21 statements to identify the main factors that are barriers to the respondent's readiness to make crowdshipping delivery. Respondents rated each statement on a 5-point scale.

Using correlation analysis, these factors were formed into 7 groups.

$$\text{corr}(X, Y) = \frac{E[(X - \mu_x)(Y - \mu_y)]}{\sigma^x \sigma^y}$$

$\mu_x, \mu_y$  - mathematical expectation;  
 $\sigma^x, \sigma^y$  - dispersion

## GROUP OF CROWDSHIPPING'S BARRIER FACTORS

1) Group 1: concerns about the confidentiality of personal data (I am concerned about the security of personal data; I don't want to provide my phone number or other personal information; I don't want the sender/recipient of the parcel to track my movement; I don't want to ensure the risk of non-delivery/loss/theft of the parcel using my bank card; I am uncomfortable communicating with strangers; I am uncomfortable with the sender/recipient of the parcel assessing the quality of my services);

The intraclass correlation coefficient = 0,62 (UK) / 0,7 (CZ)

2) Group 2: concerns about the cargo (I am afraid that I may accidentally deliver dangerous or prohibited items; I am afraid that I may lose/damage the parcel);

ICC = 0,73 / 0,62

3) Group 3: concerns about the process of transporting the cargo (I may have difficulty boarding or disembarking a vehicle or travelling in a vehicle due to the presence of the parcel; I may disturb other passengers in public transport if the package is too large);

ICC = 0,79 / 0,79

## GROUP OF CROWDSHIPPING'S BARRIER FACTORS

4) Group 4: concerns about the process of transferring the cargo to the recipient (I do not want to make a second delivery in the absence of the customer; I do not want to deliver to another location in the absence of the customer at the previously agreed location);

ICC = 0,88 /  
0,71

5) Group 5: concerns related to technical difficulties (I don't know how to use crowdshipping platforms or applications; I will be worried about not being able to open the parcel locker or face other technical problems);

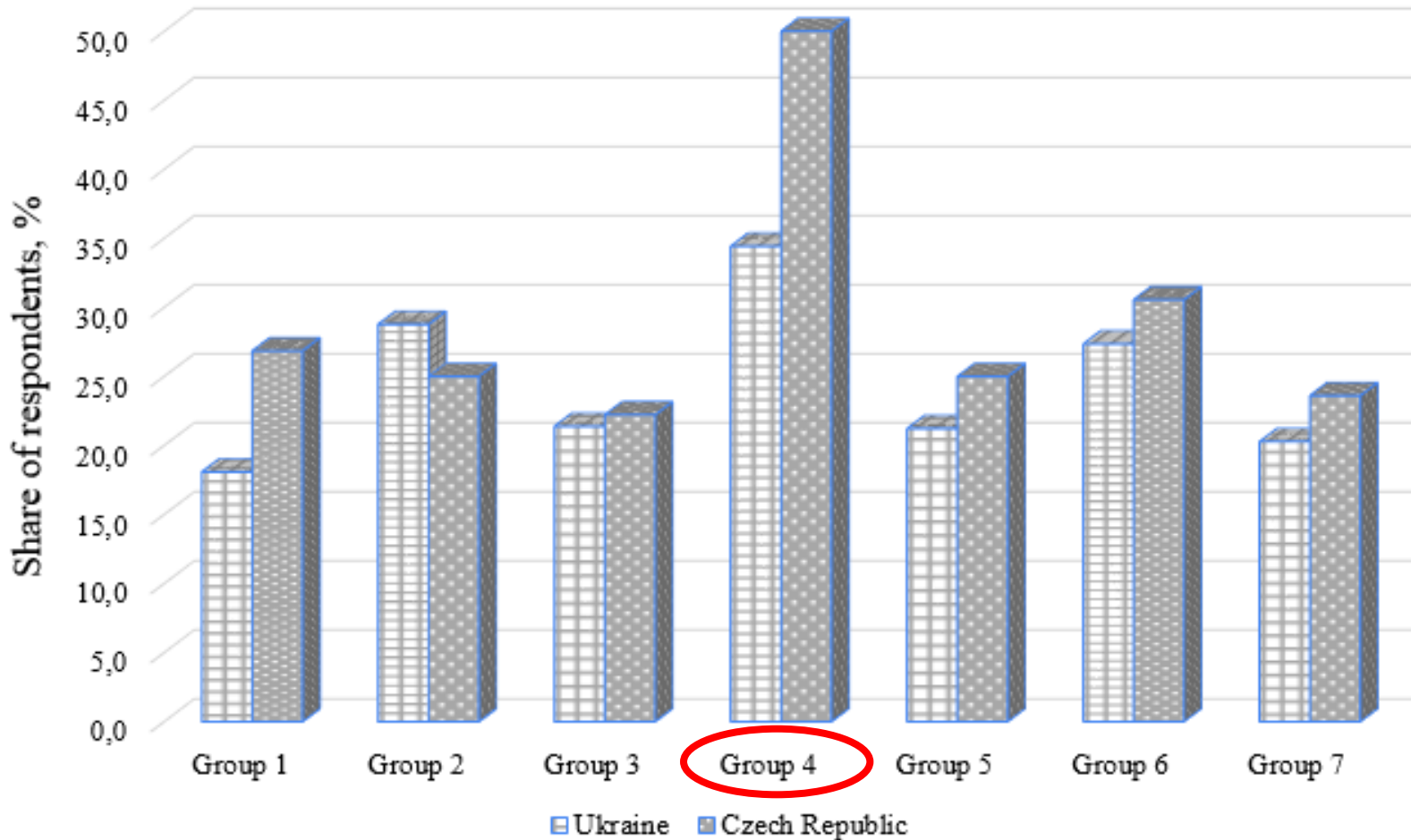
ICC = 0,6 /  
0,75

6) Group 6: time-related concerns (I will worry that I might be late for work/study because of the parcel delivery; I am afraid that I will not be able to make the delivery on time);

ICC = 0,63 /  
0,85

Group 7 includes statements that cannot be combined with any of the groups: I think that the amount of payment for delivery will be insufficient for me; I am not familiar enough with this method of parcel delivery; I do not support this method of delivery; I don't have enough time.

## SIGNIFICANCE GROUPS OF BARRIERS TO CROWDSHIPING DELIVERY



In general, the significance of certain groups of barriers to crowdsipping delivery is comparable for Ukrainian and Czech respondents. The main factors that are a warning for all potential crowdsippers are the factors of the fourth group. The second most important factors for Ukrainian respondents are the factors of the second group, and for Czech respondents - time-related concerns.

## MAIN STATEMENTS ARE COMMON

### MAX BARRIERS

- I don't know enough about this method of parcel delivery;
- I don't want to make a second delivery in the absence of the customer;
- I don't want to do a delivery to another location in the absence of the customer at the previously agreed location.

### MIN BARRIER

- I don't support this method of delivery.

## THE BIGGEST DIFFERENCE BETWEEN UKRAINIAN AND CZECH BARRIERS

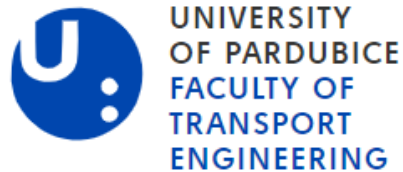
- I am afraid that I may accidentally deliver dangerous or prohibited items (concerns Ukrainian respondents much more);
  - I don't have enough time (concerns Ukrainian respondents much more);
  - I may have difficulty boarding or disembarking a vehicle due to the presence of the parcel (concerns Czech respondents much more);
  - I am afraid that I may lose/damage the parcel (concerns Ukrainian respondents much more).

## CONCLUSIONS

Crowdshipping is a relatively new initiative that has good prospects for increasing the sustainability of last-mile delivery. The purpose of the conducted research is to study the attitude of people to the possibility of receiving ordered goods through the crowdshipping service and the implementation of crowdshipping delivery during a trip by public transport.

The obtained results may be of interest both to last-mile service providers and to city management bodies that make decisions regarding the sustainable development of the city transport system.

This theses is part of the research project: “Using the public transport system for sustainable urban freight delivery”. It is funded by the MSCA4Ukraine program.



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Department of Transport Technologies



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