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CROWDSHIPPING IN LAST-MILE LOGISTICS: WILLINGNESS TO PERFORM DELIVERIES DURING DAILY TRIPS

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Purpose: Assessing the willingness of Poznań agglomeration residents to provide last-mile delivery services within a crowdshipping model during their daily commutes, thereby addressing the growing demand for sustainable urban logistics solutions.
Design/methodology/approach: The research objectives are achieved through a survey conducted on a statistically representative sample of 167 individuals within the Poznań agglomeration, examining the perspectives of potential crowdshipping service providers on the introduction of this delivery model.
Findings: The crowdshipping model demonstrates the greatest potential for small parcels located directly along the commuting routes of potential couriers, provided that attractive remuneration is guaranteed. Furthermore, the results highlight a necessity to find solutions to identified operational risks and barriers.
Research limitations/implications: The primary limitation of this study is its geographic focus on a single Polish agglomeration (Poznań) and a sample size of 167 respondents. Future research could expand both the geographic and demographic scope.
Practical implications: For entities seeking to implement this solution, the findings imply that platform operators must design robust, competitive remuneration, while actively mitigating perceived user risks to ensure operational viability.
Social implications: This research supports sustainable urban development and the deployment of the sharing economy by utilizing spare transport capacity, which can contribute to reducing urban traffic congestion and the carbon footprint of last-mile deliveries.
Originality/value: This paper addresses a significant gap in the literature, as empirical research on crowdshipping within the Polish context remains scarce. It delivers the first empirical assessment of supply-side willingness in the Poznań agglomeration. It offers essential benchmarks for logistics managers, platform developers, and urban policymakers.
Keywords: crowdshipping, crowd logistics, urban logistics, last-mile delivery, questionnaire survey.
Category of the paper: Research paper.

1. Introduction

Last mile is a crucial part of the supply chain. Customer satisfaction depends largely on it. At the same time, the last mile generates a significant part of delivery costs. In recent years, last mile deliveries are becoming more popular due to the constantly growing e-commerce market. The number of deliveries is rising. The customer expectations in terms of speed and flexibility of deliveries are increasing as well. Logistics companies are facing huge challenges regarding fulfilling customers requirement while simultaneously complying with environmental standards and reducing emissions. Conventional delivery models are proving to be insufficient.

Contemporary dilemmas in distribution logistics are not limited to the difficulty of meeting customer requirements and adhering to environmental regulations, but they also include numerous concerns associated with urban logistics. Traffic congestion, limited unloading space and noise are some further encountered obstacles. The literature features a number of innovative solutions designed to address contemporary challenges in the last-mile delivery market. Examples include autonomous and unmanned models, urban micro-hubs and cargo bikes. These represent only a fraction of the proposed solutions. Whilst autonomous vehicles and drones require enormous capital outlays and logistics infrastructure investments, there is untapped potential in solution such as crowdshipping. This model does not require substantial financial investment, as it relies on already existing resources.

Crowdshipping is grounded in the principles of sharing economy and is a part of crowd logistics. By definition, crowdshipping can offer a number of benefits. The model is premised on leveraging underutilized resources, such as empty space within a vehicle, and delivering parcels without generating new routes. Crowdshipping aligns with the principles of sustainable development, as it includes its three main elements- environmental, economic and social. However, crowdshipping is still used to a very limited extent. In Poland it is not widely adopted, although start-ups offering crowdshipping services are beginning to emerge (Strulak-Wójcikiewicz, Wagner, 2021).

The decision to explore this research area was driven by crowdshipping's strong alignment with current trends in urban mobility. In the opinion of the authors of this article, it has the potential to resolve many of the previously mentioned urban logistics issues. Crowdshipping is a relatively new concept – by far, few articles have been written on the subject. Furthermore, an even narrower research gap has been identified, as only a limited number of studies investigate crowdshipping in Poland. From a cognitive perspective, it is worthwhile to investigate whether there would be interest in the concept of crowdsourced deliveries. The authors undertake the topic of crowdshipping form the perspective of potential service providers.

This article aims to assess the readiness and willingness of residents of the agglomeration of Poznań to render delivery services using the crowdshipping model, carried out as part of their daily journeys. A complementary objective of this study is to identify the key factors (motivators and barriers) shaping the willingness to work of potential service providers. The findings presented in this article are intended to answer three research questions:

RQ1: Would the residents of the agglomeration of Poznań be willing to work as 'crowdshippers'?

RQ2: What operational conditions would need to be fulfilled for crowdshipping to have implementation potential from the perspective of potential service providers?

RQ3: What are the main barriers to implementing a crowdshipping model?

The article consists of the following sections: a review of the literature on crowdshipping, a description of the materials and methods used, a presentation of the results of original research findings, a summary with conclusions and an outline of future research directions.

2. Literature review

The literature review was conducted in December 2025 and January 2026 using the Scopus database, which enables users to search for publications from peer-reviewed sources. A total of 173 publications related to the term 'crowdshipping' were identified, of which only 6 concerned Poland. There were no articles found concerning the agglomeration of Poznań or the city of Poznań in the context of crowdshipping. In recent years, there has been a noticeable increase in the number of articles related to crowdshipping, which is examined from various perspectives (Mohri et al., 2023).

Crowdshipping falls under the umbrella of crowd logistics, defined as "the outsourcing of logistics services to a mass of (not necessarily business) actors, whereby the coordination is supported by a technical platform, which is hosted and managed by a crowd logistics provider" (Frehe, Mehmann, Teuteberg, 2017).

There are many definitions of crowdshipping proposed in the literature. Authors define crowdshipping as:

- "an app-based platform that connects an individual wanting to ship a packet with an individual willing to carry the shipment in the first or last mile logistics of urban areas; a key distinction of the courier (i.e. CS driver-partner) as discussed in this research is that this is not necessarily an additional trip but a trip that leverages the typical travel patterns of the courier; the selected courier may be the closest to the delivery route, offer the cheapest delivery fee, or have the best reputation in the system" (Le, Ukkusuri, 2019);

- "crowdshipping is a goods delivery service that is outsourced to occasional carriers drawn from the public of private travelers and is coordinated by a technical platform to achieve benefits for the involved stakeholders" (Punel, Stathopoulos, 2017).

In the context of the issues discussed in this article, the authors consider the following definition to be the most applicable: "crowdshipping is an information connectivity enabled marketplace concept that matches supply and demand for any kind of transportation of goods with an undefined and external crowd that has free capacity with regards to time and/or space, participates on a voluntary basis, and is compensated accordingly" (Buldeo Rai et al., 2017).

Existing research on crowdshipping focuses both the perspective of potential service providers – the supply side – and that of service users – the demand side. The topic is also analysed in the context of sustainable development (Mohri et al., 2023), which is one of the key challenges for modern urban logistics. The subject has also been examined from the perspective of the socio-demographic characteristics of potential 'crowdshippers' (Bajec et al., 2025).

Survey questionnaire has been used as a research tool in numerous publications (Punel, Ermagun, Stathopoulos, 2018; Le, Ukkusuri, 2019; Bajec, Pivtorak, Svadlenka, 2025; Bajec, Podovšovnik, 2025; Zhou, Rasouli, Wong, 2025). The authors investigated: key factors influencing the willingness to work of potential 'crowdshippers' (Bajec, Podovšovnik, 2025), individuals' willingness to deliver parcels within specific delivery scenarios (Le, Ukkusuri, 2019; Bajec, Pivtorak, Svadlenka, 2025), barriers affecting the willingness to work as a 'crowdshipper' (Bajec, Pivtorak, Svadlenka, 2025) and determinants of crowdshipping usage based on differences between users and non-users of crowdshipping (Punel, Ermagun, Stathopoulos, 2018).

Authors examining crowdshipping in the Polish context have investigated the potential for integrating electric vehicles and crowdshipping systems into urban logistics (Deja et al., 2024), the integration of automated intelligent parcel locker systems, distribution networks, crowdshipping, last-mile deliveries and supply chain management (Sawik, 2024), the potential of sharing economy in the context of goods delivery within Polish cities, crowd logistics and its impact on sustainable urban logistics in the context of legal framework (Kulińska E., Kulińska K., 2019), and a new delivery model integrating a professional delivery fleet with crowdshipping, which is expected to contribute to reducing the total cost of delivery (Gdowska, Viana, Pedroso, 2018). Studies addressing crowdshipping in Poland have employed a variety of research methods such as: case studies, simulation, surveys and stochastic modelling.

In order to assess the potential of crowdshipping, the authors of this article, in line with other scholars, employ a survey-based research method. Understanding the perspective of potential service providers is extremely valuable in this context. The topic of individuals' willingness to work as 'crowdshippers' has already been addressed in previous studies, but none of the studies have focused on the agglomeration of Poznań or the city of Poznań.

3. Methods

For the purpose of evaluating the potential for implementing crowdshipping for parcel deliveries in the city, the standpoint of potential service providers was examined. A questionnaire was developed using Google Forms. An online survey form was designed, divided into five distinct sections: Introduction to the study, socio-demographic profile, driver profile and route characteristics, willingness to participate in crowdshipping (opportunities) and barriers to crowdshipping implementation (threats). The survey aimed to examine the readiness of individuals in the agglomeration of Poznań to perform parcel deliveries as a part of crowdshipping, along with the key enablers and barriers to the functioning of this model. It included single-choice and multiple-choice questions. A five-point Likert scale was used. The questions were mainly closed-ended, with a few allowing respondents to select the 'other' option and provide their own answer. This was intended to facilitate obtaining unambiguous responses that were easy to analyse further. The total number of questions was 25.

The research subjects were adult residents of the agglomeration of Poznań who regularly travel around Poznań or commute to Poznań as part of their daily routine. This specific group was selected as potential service providers. For the purposes of this article, the geographical scope of the Poznań agglomeration was adopted, corresponding to the territory of the Poznań Metropolis Association. This area encompasses the city of Poznań, the municipalities of Poznań County, as well as Oborniki, Skoki, Szamotuły, and Śrem. Based on data from the Central Statistical Office, the size of the study population was determined to be 896 163 individuals (Local Data Bank, 2026). Due to the absence of more recent data, population statistics for the year 2024 were adopted. Assuming a significance level of 5%, which ensures 95% certainty that the results obtained from the sample will be consistent with reality, and an allowable estimation error of 8%, the sample size is 151, which indicates the minimum number of surveys that needed to be conducted. An allowable estimation error of 8% was adopted, as this is the closest error value for which the sample is statistically valid. A total of 167 correctly completed surveys were collected, indicating that the survey was statistically representative.

The survey questionnaire was distributed through social media (Facebook). It was conducted throughout January and February 2026. It was anonymous. The results of the survey will be presented in the next section of the article.

4. Results and discussion

The aim of the survey was to gain insight into the attitudes of the Poznań agglomeration residents concerning the possibility of taking on the role of a 'crowdshipper'. The survey provided information on the preferences and concerns of individuals regarding crowdshipping. This article presents an analysis of the responses to selected questions from the online survey. A total of 167 completed questionnaires were obtained.

In terms of gender distribution, the sample comprised 55.1% female and 43.1% male respondents, with the remaining 1.8% of respondents selecting the option "other/prefer not to say". The largest age group among respondents was those aged 18-24 (43,1%). The second largest group consisted of those aged 25-34 (25,7%). Regarding employment status, employed individuals accounted for 57,5% of the respondents, followed by students at 38,3%, while the remaining 4,2% were unemployed or retired. Over half of those taking part in the survey live in the city of Poznań. The most frequently indicated trip purpose was commuting to work. Individuals travelling by car accounted for 52,7% of the respondents, while 41,3% reported using public transport. Only a small proportion of respondents (6,0%) indicated travelling by bicycle, scooter, or on foot.

At the beginning of the survey, respondents were asked about their familiarity with the concept of crowdshipping (Figure 1). As many as 74,3% of respondents encountered the concept for the first time. Only 13,8% were familiar with it. Given that crowdshipping is a relatively new concept and the crowdsourced delivery model itself is not yet widely adopted in Poland, the observed distribution of responses appears to be reasonable. The findings regarding familiarity with the concept of crowdshipping are similar to those obtained by researchers studying crowdshipping in other European countries. The authors found that around 60–70% of residents in Slovenia, the Czech Republic and Ukraine are unfamiliar with this delivery method or do not have sufficient knowledge of it (Bajec et al., 2025). Awareness of the concept was also surveyed amongst students in Rome – the majority of whom had not encountered the term before (Mohri et al., 2023).

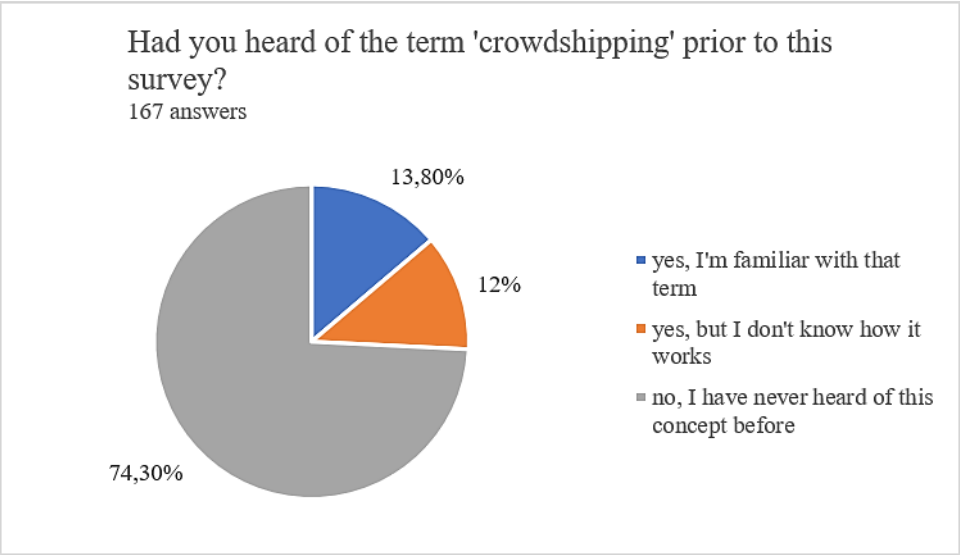

Figure 1. Familiarity with the term ‘crowdshipping’.

Source: compiled by the authors based on original survey data.

A fundamental question, crucial in the context of the conducted study, concerns respondent’s willingness to collect a small parcel and deliver it to its destination for a small fee, provided that the delivery point is located along their commuting route. This survey question addressed the first research question (RQ1). 62,9% of respondents expressed a willingness to perform such a delivery (Figure 2). Assuming that those who were undecided (16.2%) did not identify themselves as outright opponents of the solution, three-quarters of respondents are potentially willing to engage in crowdshipping, which is a very optimistic result. Men expressed a greater willingness compared to women, though the difference between genders was small. Among age groups, the youngest respondents (18–24 years) showed the greatest willingness. Those in the oldest age group (65+) were the least willing to undertake deliveries. The authors investigated people’s willingness to engage in crowdshipping in other European countries – the results were very similar to those obtained in Poznań. The majority of respondents in the Czech Republic, Slovenia and Ukraine said they were willing to deliver parcels with varying degrees of regularity: 77,0% of Czechs, 77,0% of Slovenians and 86,0% of Ukrainians (Bajec et al., 2025). As many as 87,0% of students in Rome would also be willing to work as ‘crowdshippers’ (Mohri et al., 2023). The authors also investigated the willingness of people living outside Europe to engage in crowdshipping. These results were also similar to those obtained in Poznań – as many as 78,0% of respondents in the US were willing to work as ‘crowdshippers’ (Le, Ukkusuri, 2019).

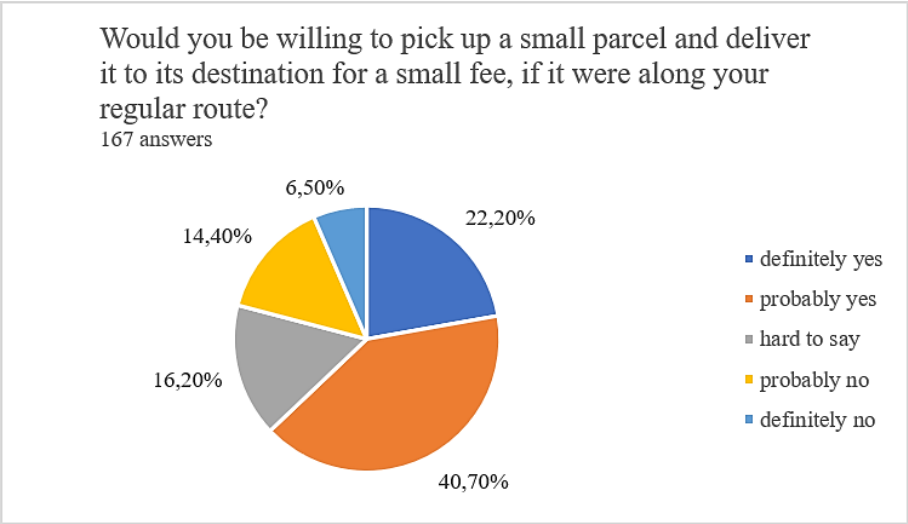

Figure 2. Willingness to participate in crowdshipping.

Source: compiled by the authors based on original survey data.

In order to assess the feasibility of implementing the delivery model in question, it is important to identify the conditions under which this service has the greatest operational potential. The next three survey questions relate to the second research question (RQ2). In the survey, respondents were asked about the specific conditions for carrying out crowdshipping if they were to undertake such a service. The largest proportion of respondents (44,9%) indicated a maximum allowable detour time of up to 5 minutes for the purpose of parcel pickup or delivery. The second most frequently selected option (29,9%) was a time range of up to 10 minutes. Respondents prefer the parcel to be on their route (16,8%), or are willing to make only a short detour to collect it (Figure 3). By way of comparison, students in Rome indicated that the maximum accepted deviation from their route is around 3 km (Mohri et al., 2023), whilst Americans indicated that an acceptable additional delivery time would be around 23 minutes (Le, Ukkusuri, 2019).

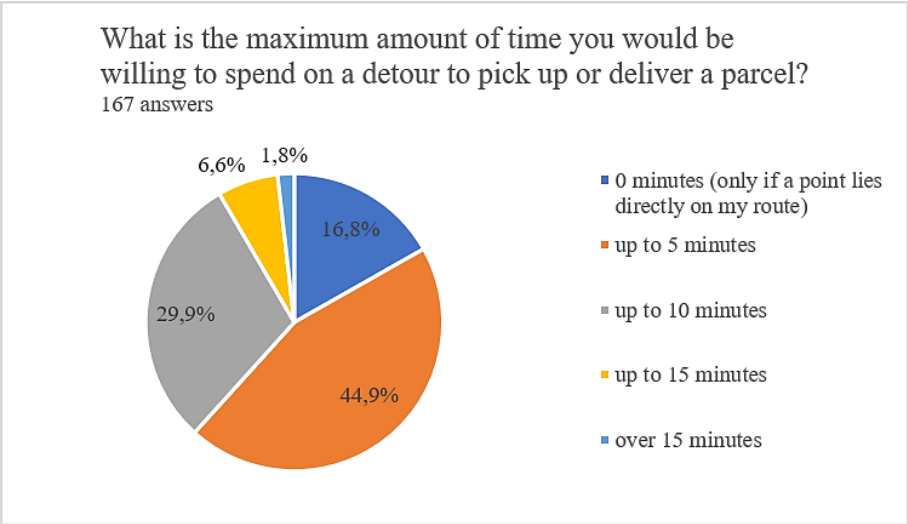

Figure 3. Maximum acceptable detour time in crowdshipping.

Source: compiled by the authors based on original survey data.

Crucial to the operational viability of delivery operations was also the question regarding the types (sizes) of parcels that respondents would be willing to carry. A significant correlation was observed between parcel size and people's willingness to carry them: the smaller the parcel, the greater the proportion of people who would agree to carry it. For example, as many as 86,2% of respondents would agree to transport envelopes weighing up to 3 kilograms, whereas only 1,8% would agree to transport oversized items (Figure 4).

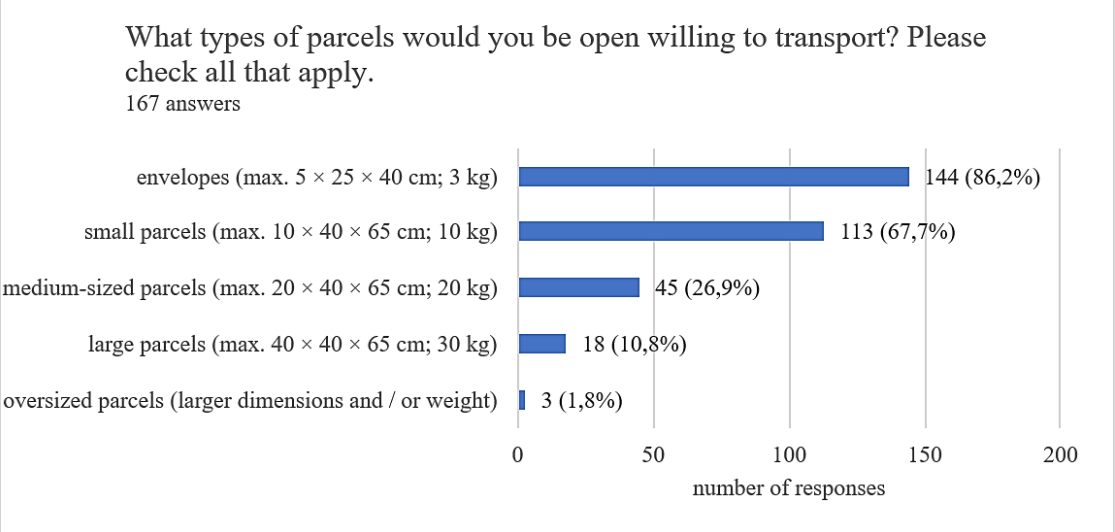

Figure 4. Preferences regarding the size and weight of parcels in crowdshipping.
Source: compiled by the authors based on original survey data.

Possible reasons for this distribution of responses include the issue of available resources – whether a potential delivery person has the space to load the parcel or is physically able to transport it – and the ease of delivery: a small, light parcel is much easier to transport than a large, heavy one. The vast majority of respondents stated that they travel by car or public transport. A larger parcel would probably fit in a car. However, public transport (without additional charges) limits the ability to carry parcels to smaller sizes only. Researchers studying crowdshipping in Europe point out that the large size of a parcel has a negative impact on individuals' willingness to undertake deliveries (Mohri et al., 2023). Most Americans, on the other hand, are willing to deliver any parcel provided they got paid (Le, Ukkusuri, 2019).

Respondents were then asked about their main motivation for undertaking crowdshipping deliveries. Extra income was the most frequently chosen option – as many as 71,3% of respondents selected it. Helping others was chosen by 16,8% of individuals, whilst a positive impact on the environment was selected by 9,6% of respondents (Figure 5). The financial aspect is frequently featured in other authors' studies as well – financial gain is a key factor in motivating people to work as 'crowdshippers' (Gdowska, Viana, Pedroso, 2018; Le, Ukkusuri, 2019; Mohri et al., 2023; Bajec, Pivtorak, Svadlenka, 2025; Bajec, Podovšovnik, 2025).

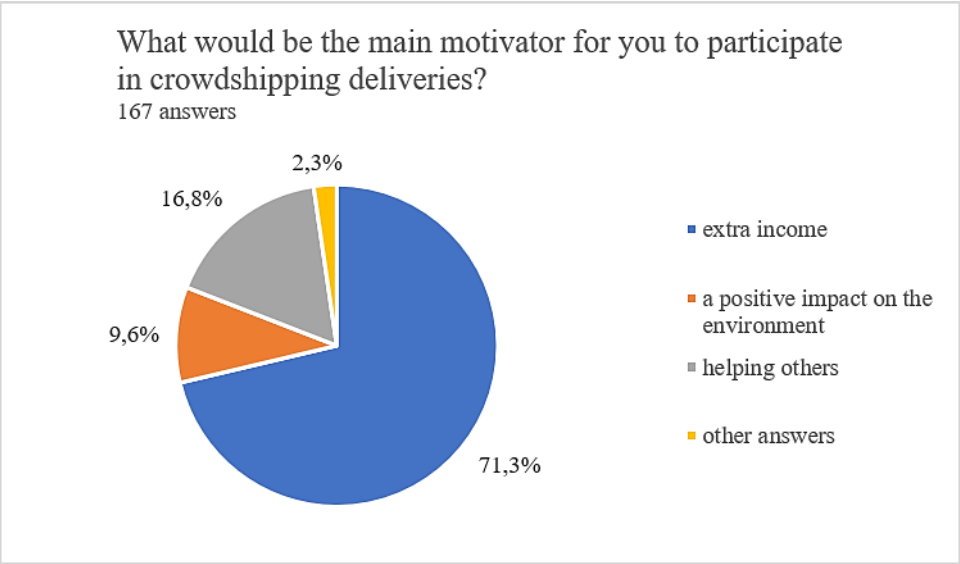

Figure 5. Motivators for undertaking crowdshipping deliveries.

Source: compiled by the authors based on original survey data.

Based on the questions in the 'opportunities' category, it can be concluded that the crowdshipping model has the greatest potential for small parcels located along the commuting routes of potential 'crowdshippers', provided that an appropriate (attractive) remuneration is offered for deliveries.

Six of the survey questions addressed the concerns that might be associated with performing a crowdshipping service. These survey questions corresponded to the third research question (RQ3). In order to identify potential barriers to crowdshipping service implementation, respondents were asked to rate the extent to which these concerns might apply to them – on a scale of 1 to 5, where 1 indicates little significance and 5 indicates great significance. The concerns respondents were asked about were: concerns about illegal contents of the parcel, concerns about contact with a stranger, concerns about parking facilities at collection/delivery points, concerns about the lack of appropriate legal framework, concerns regarding the further use of personal data, concerns regarding financial liability for parcel damage or loss, and concerns about remuneration being too low. According to the respondents' assessment, concerns regarding illicit package contents hold the greatest significance the most significant concerns relate to the illegal contents of parcels (Figure 6), financial liability for the parcel (Figure 7) and the further use of personal data (Figure 8) – only these will be discussed in the article.

The illicit content of parcels constitutes a substantial challenge – 61% of respondents report this issue. The chart shows that this concern is a major factor – ratings of 5 and 4 predominate (the right-hand side of the chart in Figure 6). Concerns about the illegal contents of parcels are also highlighted in studies by other authors. The fear of unknowingly delivering illegal or dangerous items has been identified as a major barrier amongst staff and students in Ukraine and the Czech Republic (Bajec, Pivtorak, Svadlenka, 2025). Research in the United States also reveals widespread concern about the contents of parcels (Le, Ukkusuri, 2019).

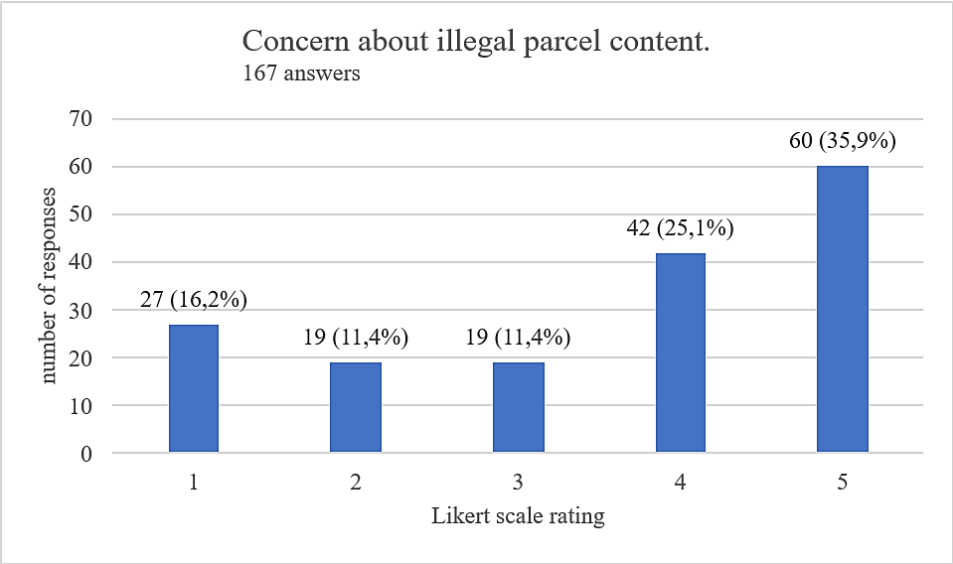

Figure 6. Concerns about illegal parcel contents in crowdshipping.

Source: compiled by the authors based on original survey data.

Financial liability for the transported parcel is also a major concern for respondents – 77,8% of those surveyed cited this as a concern. As in the previous chart, ratings of 5 and 4 predominate. In studies by other authors, financial risk and additional costs were also identified as barriers to undertaking crowdshipping deliveries (Bajec, Pivtorak, Svadlenka, 2025; Bajec, Podovšovnik, 2025).

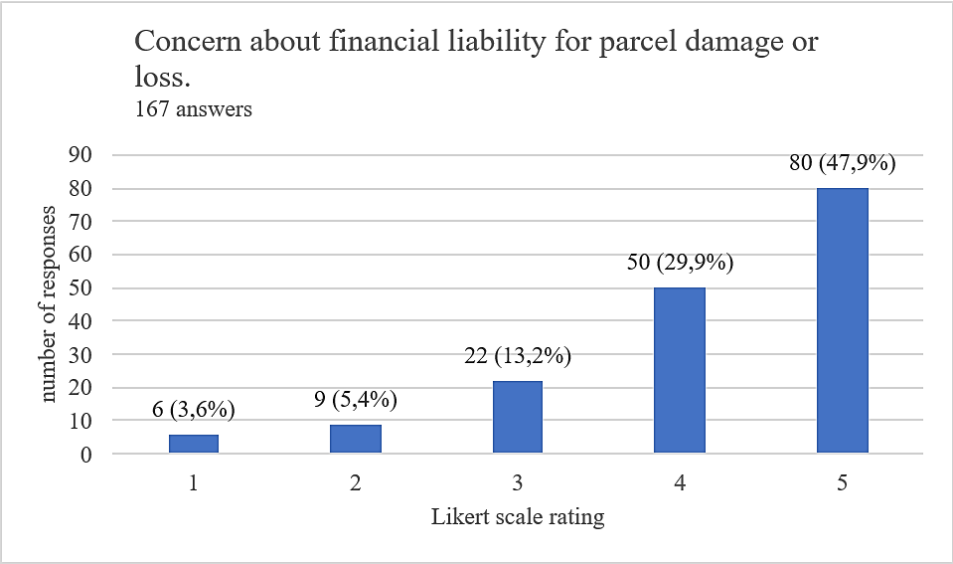

Figure 7. Concerns about financial liability for parcels in crowdshipping.

Source: compiled by the authors based on original survey data.

Respondents are also concerned about the unauthorised use of personal data – 53,9% are aware of this risk. A rating of 4 was the most commonly selected option, although ratings of 3 and 5 were also a frequent choice. It is noteworthy that financial liability for parcels represents another major concern. This concern has also been highlighted in studies by other authors (Mohri et al., 2023; Bajec, Pivtorak, Svadlenka, 2025; Bajec, Podovšovnik, 2025).

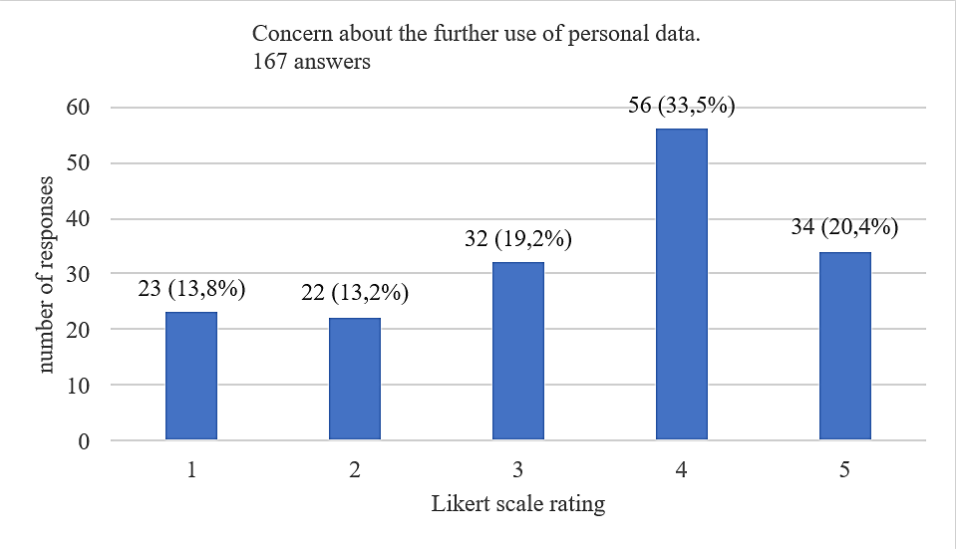

Figure 8. Concerns about the unauthorised use of personal data in crowdshipping.

Source: compiled by the authors based on original survey data.

Questions relating to risks highlight three significant barriers to this delivery model. There is a lack of trust. Respondents are concerned about the risk of illegal parcel contents. In the crowdshipping model, parcels are not checked by a sorting centre or any other entity. The delivery person never knows for certain what is inside the parcel. Furthermore, the concern regarding financial liability also emerges as critical. In the traditional delivery model, parcels are typically covered by insurance – similarly, the crowdsourced delivery model should also include parcel insurance. The survey results also indicate that data security is an important issue for respondents. Individuals fear that their personal data may be misused.

Both women and men cite the same three main concerns: financial liability, illegal parcel content and data misuse. However, women rate each of these concerns higher on a five-point scale.

5. Summary

The aim of this article was to assess the potential for implementing a crowdshipping service in the Poznań agglomeration. Based on the responses obtained from the survey, it is possible to identify the factors that influence the willingness to work of potential 'crowdshippers'. The study also identified the concerns of potential service providers, highlighting areas requiring particular attention during the implementation and development of this delivery model. The results obtained largely correspond with the findings of other researchers.

The survey responses reveal a lack of familiarity with the concept of crowdshipping. This last-mile delivery model has the potential to be implemented successfully, but it is essential to promote this model and raise awareness among potential users regarding the potential

benefits of its implementation. Despite low familiarity with the term, over 55% of respondents indicated a willingness to perform deliveries (RQ1).

The crowdshipping model has the greatest potential for small parcels located along the commuting routes of potential 'crowdshippers', provided that an appropriate (attractive) payment is offered for deliveries (RQ2). It is precisely this additional payment that is the main motivator cited by respondents. However, the survey results highlight the need to find solutions to the identified risks. The findings clearly indicate that the main barrier hindering the development of crowdshipping in the Poznań agglomeration is not a lack of physical readiness to deliver parcels, but a high perception of risk. A problem typical of the sharing economy – a lack of trust – arises. In addition, potential service providers fear the consequences of a parcel being lost or damaged. In an era of growing awareness of cybersecurity, potential suppliers are also concerned about data privacy – the fear of losing their anonymity (RQ3).

Unlocking the real potential for crowdshipping's market integration and operation requires addressing the identified risks. Entities seeking to implement a crowdshipping platform in the future must be aware of the potential service providers' concerns. In order to attract service providers, it will be essential to find solutions to the identified operational barriers. Specifically, the implementation of automated insurance policies and robust user verification protocols could significantly alleviate these anxieties. What is more, establishing a transparent legal framework is critical to fostering trust and ensuring long-term participant retention.

The study focused on the Poznań agglomeration, but the findings of this article are also applicable to other agglomerations and cities in Poland. Moreover, the research sample could be wider, which would result in greater certainty of the results (limitations). A comparative survey could also be conducted in other agglomerations to assess the potential for implementing crowdshipping.

This paper addresses a significant gap in the literature, as empirical research on crowdshipping within the Polish context remains scarce. It delivers the first empirical assessment of supply-side willingness in the Poznań agglomeration (new knowledge).

The research results are important for both platform developers seeking to implement crowdshipping solution (practical implications) and urban policymakers support sustainable urban development and the deployment of the sharing economy (social implications). This article thus responds to the growing demand for sustainable logistics solutions in cities. The research results have broad implications, so the information obtained should be used further.

Acknowledgements

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