

8th INTERNATIONAL CONFERENCE
“TOWARDS A HUMANE CITY”
New Mobility Challenges
Novi Sad 11th and 12th November 2021

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CROWDSOURCED DELIVERY SYSTEMS – COMPANIES EXPERIENCES AND APPLICATION POSSIBILITIES

Key Words

Crowdsourced
systems
Delivery
Experiences

Abstract

Fast and successful delivery for companies that provide delivery services is the core of the business and is of great importance for competitiveness in the market. In urban areas, various factors make it difficult to deliver shipments to users, so companies often experiment with technical and organizational improvements to mitigate or eliminate the effects of these factors. Crowdsourced delivery has emerged as one of the solutions. This paper will present the experiences of companies dealing with this type of delivery, as well as point out the possibilities of applying this delivery in the territory of Serbia.

1. INTRODUCTION

In the process of transferring shipments, last-mile delivery is the most time-consuming step, especially in rural areas due to long distances, difficult traffic, and low speed. For these reasons, it is not surprising that there are many innovations related to the optimization of this final, the most expensive, but extremely important step in the shipment transfer process. These innovations have a technical and organizational character. Technical is reflected in: the installation of collection or mailboxes and self-service machines from which end users can pick up their packages at appropriate places; delivery by drones or autonomous delivery vehicles.

Its organizational character is reflected in the software applications for delivery through which it is possible to better coordinate the delivery time with the wishes and needs of end-users. In this sense, the need for solutions to delivery problems in urban areas that can eliminate (or at least control) the factors that hinder delivery and lead to financial losses is particularly pronounced. At the same time, it is necessary to reduce the negative effects on the natural environment that are a direct consequence of the increased volume of motor traffic. These effects are by no means negligible and there is a multitude of national and international initiatives to mitigate, or ideally, to eliminate harmful gases.

2. CROWDSOURCED DELIVERY

Crowdsourcing as a term is derived from the English words crowd and outsourcing and as such came to live relatively recently (2005) [1]. This approach is a type of participatory activity in which an institution or company proposes to a group of individuals, through a flexible open call, to perform tasks voluntarily (often for a particular type of reward). Crowdsourced delivery is a business model that is currently expanding and with which many companies are experimenting. Due to its inherent complexity and the participation of many "external" participants, ultimate cost-effectiveness and efficiency can depend to a large extent on many factors that are not under the direct control of the organization.

To successfully apply the crowdsourced model, in any sphere of business, it is necessary to have effective and efficient information systems. That can connect supply and demand in a timely and optimal manner (or at least to prevent imbalance between them). Such systems are complex and rely on a variety of algorithms and predictive models to solve the many operational problems inherent in crowdsourced business models. They have become an indispensable tool, especially in courier services, because in the dynamic operating environment of postal and courier services, new customer orders can interfere with the optimal delivery plan that was originally defined [2]. In addition, they are an indispensable component through which participants in crowdsourced systems communicate, and it is often possible to access them through a dedicated application that is installed on a mobile device, or an appropriate website.

To fully define the concept of crowdsourced delivery, it is necessary to first explain the concept of sharing economy and show globally popular successful examples of its use, such as ride-sharing and ride-hailing.

Sharing economy as a concept is not completely new, but innovations in this area have recently been a direct consequence of the development and application of modern information technologies. Terms used as synonyms for sharing economy or to describe similar concepts are also "crowd-based capitalism" [3] and "platform economy" [4].

One of the most famous examples of the sharing economy lately is ride-sharing, which is realized by companies like Uber and Lyft. Ride-sharing is a synonym for group transportation organized between individuals, that is, a process where passengers share a vehicle with other passengers. In contrast, ride-hailing is a

service where the passenger hires a personal driver to take him to the required destination.

3. EXPERIENCES OF COMPANIES

According to a report by Zebra technologies [5], 45% of shipments find their way to end consumers through postal, courier, or commodity companies, while 42% of shipments are sent through logistics providers. Considering that total revenue from online sales of physical goods in the United States alone reached over \$ 343 billion in 2019, and is expected to grow to \$ 476 billion in 2024 [6], no one should be surprised by the global trend of increasing investment in start-up companies engaged in delivery. This trend is particularly noticeable in China and Asian countries, where crowdsourced delivery has not yet come to full expression due to issues such as security, regulatory irregularities, and the responsibilities of process participants.

Leaders and larger retail companies are also experimenting with new delivery models. Same-day delivery is extensively tested by Amazon, eBay [7], and Google [8]. Walmart, which is one of the leading retail chains in the United States, provides an opportunity for a customer at the checkout when paying for goods to say where he lives, and deliver a package to another customer who ordered some goods online and lives on his way home. In case the user accepts this offer, Walmart offers him a discount on the purchase invoice which covers the fuel costs for the delivery of the downloaded package. The company runs several projects such as *Walmart to Go* (in partnership with FedEx) for same-day delivery [9], but also a program with Waymo in Chandler (USA) where an autonomous vehicle picks up a customer who orders groceries online, brings it to the store and then returns it to its original location [10]. Amazon is working on a project called *On my way* [11], which deals with urban retailers who pay small delivery fees to interested individuals. Under it, users can download their package and in doing so download packages ordered by users online.

In September 2013, DHL launched the *MyWays* platform [12], which facilitates the delivery of shipments to end-users in Stockholm via crowdsourcing. The platform allows individuals requesting flexible delivery to connect with those who travel for minimal fees and agree to deliver packages whose delivery address is within their usual daily route. After registering on the My Ways platform, the user is allowed to specify the time and place of delivery of the shipment, as well as the fee he is willing to pay for delivery. The specificity of this platform is that it focuses primarily on people who pass by DHL service points as part of other daily activities (e.g., going to and from work) and who do not consider multiple tours as a source of additional income.

Crowdsourced delivery companies are developing rapidly, including recognizable companies such as DoorDash, Postmates, Kanga, Hitch, UberEats, Roadie, Nimber, UberFreight, Truux. Most of them provide services at the local level (usually the city or suburban level). Some of them, such as Deliv, Postmates, Roadie, and Kanga, deliver all shipments except a shortlist of prohibited shipments. Other companies such as UberEats and DoorDash focus mainly on food delivery. UberEats, for

example, has partnered with local restaurants and provides delivery of their meals, while DoorDash provides delivery from any restaurant as well as grocery delivery. Shipt and Instacart provide grocery delivery and require independent contractors who not only do delivery to customers but also make purchases for them at a nearby grocery store. Kanga and Hitch, unlike UberEats and DoorDash companies, primarily focus on delivering from and to individuals more than on delivering goods provided by other companies, i.e. connect people who want to send and receive a package or shipment with a driver who is willing to make the delivery.

Compensation for the performed delivery can be generally divided into three types:

- Compensation per hour where the main advantage is predictability in compensation schemes and which is attractive to drivers who prefer a secure inflow of funds during planned hours;
- Compensation per delivery which is the most commonly used type of compensation in crowdsourced delivery systems, where the fee is calculated using pre-defined formulas;
- The deliverer and the buyer determine the compensation where the deliverer and the buyer directly agree on the delivery prices and the platform for their connection takes an intermediary commission.

Archetti et al. [13] consider a situation in which a company that sells and delivers products online in addition to its fleet may hire occasional drivers who are willing to perform a single delivery using their vehicle in exchange for minimum compensation if the delivery location is not too far from their destination. They were the first to model the problem of crowdsourced drivers in logistics networks, by modelling the problem of vehicle routing with occasional drivers.

Crowdsourced delivery systems in the area of parcel delivery have not been implemented on the territory of Serbia. In the future, this can be expected having in mind the trends described in developed countries. These trends are certainly closely related to environmental protection strategies and reducing emissions. However, in contrast to the absence of crowdsourced delivery in Serbia, in the last few years there has been an expansion of companies that provide ride hailing services such as Bla Bla Car. Such a system connects drivers who have free seats in vehicles with people who need transportation on the same route. Another example of a similar system is Car Go, which allows drivers of this system to earn extra income, by driving in this system. The ways in which these systems work are similar to those in developed countries. Positive examples of these two companies will certainly influence the emergence of one of the crowdsourced delivery systems in the territory of Serbia, which has as its main focus the delivery of goods, parcels, etc.

4. CONCLUSION

Crowdsourcing as a model of relocating business processes is becoming increasingly popular in modern times (since technical-technological development has greatly simplified the connection of participants on the side of supply and demand) and that many leading world organizations in the field of retail are

experimenting with its use. This trend, coupled with global efforts to reduce greenhouse gas emissions, promotes a healthy lifestyle that involves more physical activity.

On the territory of Serbia, it would be interesting to consider the use of bicycles by suppliers in the postal systems of urban areas. This can help reduce overall shipping costs. Since the costs of depreciation, use, and maintenance of bicycles are significantly lower than for cars (there is no cost of fuel, maintenance is cheaper, no payment of often expensive parking in central city zones is required) it is realistic to expect lower delivery costs.

In addition, especially in areas with developed cycling infrastructure, more efficient delivery of shipments on time (just in time) can be expected, which should lead to greater trust of end-users and growth of the customer base. From a supplier's perspective, crowdsourced delivery can be a great source of additional or even basic revenue.

From the aspect of countries within which such systems are implemented, EU member states directly contribute to the fulfilment of created strategies by enabling employment growth and job creation (EU Cycling Strategy envisages growth of jobs in the cycling economy from 650,000 in 2017 to 875,000 by the year of 2030 [14]).

Last but not the least, the positive impact on the environment of bicycle-based delivery systems, which are inherently in line with initiatives to reduce CO₂ emissions as well as those related to the cessation of the sale of fossil fuel vehicles by 2030 in some countries, should not be overlooked [15].

ACKNOWLEDGMENT

The results presented in this paper are part of the research project "Development and application of modern tools and research methods in the field of traffic and transport", founded by the Department of Traffic Engineering, Faculty of Technical Sciences in Novi Sad, University of Novi Sad, Republic of Serbia.

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