Unlocking Opportunities for Logistics Operators: An Exploration of the Sharing Economy in Automotive Industry

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***Abstract**. The sharing economy provides a mechanism for the temporary utilization of underexploited resources, offering advantages to service providers, platforms, and end-users. This study critically examines the impediments and advantages associated with the integration of a sharing economy business model in the automotive industry, specifically concerning the transport of returnable packaging. Employing a methodology that combines literature analysis and expert opinions in the domains of the sharing economy, logistics, and the automotive sector, the research utilizes the Best-Worst Method for data analysis. The acquired results offer preliminary insights into the merits and challenges inherent in transitioning to this novel service model, establishing a foundational framework for subsequent research endeavours within the automotive industry.*

***Keywords.** sharing economy, logistics, automotive industry, best-worst method*

1 Introduction

Under the influence of digital technologies, platforms are being developed for the direct connection of resource/service providers and users. This model of direct connecting offer and demand can be found in the literature under the concepts: sharing economy, collaborative economy, on-demand economy, etc. Sharing economy (SE) has a potential for increasing the efficiency of resources by substituting private ownership with temporary access, which benefits both the environment and the economy. It enables the maximum utilization of products and services by mobilizing social stock resources, which overturned the traditional need to increase new investment to stimulate economic growth continuously (Lombardi et al., 2017). Following the success of sharing economy business model in accommodation and transport many other fields are embracing this opportunity including the sector of logistics, where sharing economy is still in its infancy. This paper aims to investigate the potentials of the sharing economy in the automotive industry using returnable packaging transport (RPT) as a case study. Based on the experts' opinion and application of the Best-Worst Method obstacles and benefits of using sharing economy platforms for RPT are obtained offering preliminary insights on the potentials of this novel service model. The paper is structured into five main parts. After the introduction a brief over view on the uptake of sharing economy in the field of logistics is presented. The third part is about the methodology of research followed by the application, a case study. The paper concludes with main findings and future research directions.

2 Literature review

The introduction of sharing economy platforms in logistics is related to the end of the 20th and the beginning of the 21st century. One of the first platforms was Timocom, developed in Germany in 1997 (Table 1). The dominant regions utilising this business model in logistics are Europe, USA and the China which is the fastest developing market. Some of the platforms developed in this area are Freightos (sharing in freight transport) and Jobdoh (labor sharing). Some platforms are expanding their scope, e.g. Coyote open offices in Netherlands a year after it was launched in USA. Emerging

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economies are also, although slowly, embracing this model, e.g. European platforms Timocom and KleverCargo have representative offices in Serbia.

Table 1. Examples of sharing economy platforms in logistics

Platform, country of origin, launch year	Services offered:
Timocom, Germany, 1997	Enables connecting companies that provide logistics services (transportation, storage) with users. In addition, the platform provides IT support, support for route optimization, collection of claims and necessary documentation.
Road Carrier, Australia, 2009	Offer of unused transport capacities
Freightos, Hong Kong, 2012	Connects thousands of global logistics providers, importers, airlines, ocean liners and leading technology players in order to realize transport efficiently.
Jobdoh, Hong Kong, 2014	Connects companies that have redundant employees, can transfer them to another company, where they do not have to pay them the total salary, because it will be paid by the company that hires them.
Coyote, USA, 2014	Identifying carrier capacity, connecting with users and scheduling transportation
Loadsmart, USA, 2014	Logistic solution which via platform provide automating how freight is priced, booked and shipped.
Saloodo!, Germany, 2016	Allows transporters to find cargo, in order to avoid empty runs, and enables companies to find vehicles quickly and easily.
Lognet, Croatia, 2019	Connects transport orders with carriers, buyers with suppliers, and the warehouse with all parties with whom it is in contact.
KleverCargo, Serbia, 2023	The platform provides the possibility of sharing transport and storage. Users who need transport or storage services can easily find available capacities.

The DHL, a world leader of innovations in logistics, is also exploring new business models of the sharing economy in three segments: transport, workforce and warehouse capacities and parking space. DHL has developed a transport sharing platform Saloodo! and pioneered a platform DHL Spaces too offer unused warehouse space (Heutger et al. 2017). The platform offers to users the exact location of the space and how many square meters are available, and provides contact information for booking the space. A competitor to DHL spaces is the Fleke platform from America. Compared to the traditional way of providing logistic services and particularly RPT, SE platforms offer several advantages like expanding the service request to a larger number of companies, reducing staff efforts, less time to complete the service, etc. (Table 2).However, building a trust in platforms may prevent its larger uptake. Traditional option may be seen as safer based on the company's previous familiarity with service provider.

Table 2. Comparative analysis of the traditional way organization and organization through the platform (Source: Authors' work)

Traditional model	Sharing economy model
The request is sent by mail (by phone) to the selected companies	The request is placed on the platform and it is available to a large number of companies
Knowledge of the company's work (service quality) based on previous experience	Monitoring the company's performance through reviews posted by previous users
Forwarding the same request multiple times	A request made once is enough
Intensive engagement of employees to find a vehicle	The platform performs the matching itself, the engagement of employees is only necessary when placing a request
Monitoring the status of the vehicle by contacting the company's operator	Real-time vehicle status tracking (GPS)

Shift to the SE in logistics requires comprehensive understanding of the perceived pros and cons of this model from the potential users which is the subject of this research. Using an example of RPT service of a real world company in automotive industry, main obstacles and benefits of this shift are examined.

3 Methodology

This applied methodology entails five main steps (Figure 1). In the first step main obstacles and benefits of SE model in logistics are extracted and structured. These are further subjected to the appraisal from experts: academic (form the field of SE and field of logistics) and practitioners engaged in the service delivery in the observed company. Best-Worst Method (BWM) was applied to calculate weights and rank obstacles and benefits.

Figure 1. Methodology steps

BWM was chosen as an easy-to-use method for weight calculation and ranking and is proven to be useful in this type of research (Govindan et al., 2020). This method helps decision maker to choose which criteria from a group of *n* criteria is the best and which is the worst (Rezaei, 2015). In this work a five step procedure is applied as proposed in Zhang (2021). The steps are:

1. Defining a set of obstacles and benefits for analysis;
2. Determining the best (e.g. most desirable, most important) and the worst (e.g. least desirable, least important) obstacle/benefit (based on the expert's opinion);
3. Determining the preference of the best criteria over all the other criteria using a number between 1 and 9;
4. Determining the preference of the best criteria over all the other criteria using a number between 1 and 9;
5. Calculating the optimal weights for obstacles/benefits (eq. 1).

BWM is applied with the following equation and BWM Solver (Rezaei, 2015):

$$\min\max_j\left\{\left|W_B - a_{Bj}W_B\right|, \left|W_j - a_{jW}W_W\right|\right\} \qquad (1)$$

With limitation:

$$\sum_j x_j = 1$$

$$x_j > 0, \text{for all j},$$

where a_{Bj} indicates the preference of the best criterion B over criterion j. It is clear that $a_{BB} = 1$. a_{jW} indicates the preference of the criterion j over the worst criterion W. It is clear that $a_{WW} = 1$. W_B , W_W and W_j are unknown weights of the best, worst and j criteria, respectively.

The application of BWM also included the following recommendation for the case of a larger number of ranking units (here obstacles): obstacles are first grouped into several clusters to gain another level in the hierarchy and problem solving (Zhang, 2021). Obstacles were grouped into 2 clusters and BWM is applied separately for these clusters. Obstacle weights obtained using BWM are multiplied by the weight of the associated cluster. In this case, there are only 2 clusters, so the weights are assigned based on expert opinion. In the case of multiple clusters, their ranking is also done using BWM. The first cluster includes obstacles which have directly affect the company's operations and the second cluster includes obstacles which have indirect effect.

4 Case study

The methodology is applied to a real-world example a company from automotive industry which is currently using traditional approach for RPT service. The RPT service involves the transport of returnable packaging between the company and customers. This packaing is industrial and they are mainly used in industrial environments for product transportation and storage (Katsanakis et al., 2023).

Some branches of the company in other countries are already utilizing SE platforms for RPT. The obstacles are collected from the work of Manzoor et al. (2022), Govidan et al. (2020) and Fellander et al. (2015). Manzooret al. (2022) analysed the obstacles to the introduction of the sharing economy in the automotive industry, while the rest of the studies dealt with general obstacles. Benefits are extracted based on the works of Sadik et al. (2023), Ocicka et al. (2017) and Yildiz et al. (2019). All these studies are about the general benefits of the sharing economy in logistics. Obstacles and benefits of the shift to SE platforms for RPT service along with rankings obtained by BWM method are presented in Table 3. According to results, the most influential obstacle is threatened privacy, and the least influential is lack of determination and commitment of the company's management. The most pronounced benefit is the optimization of logistics costs and the least pronounced is the creation of business partnerships.

Table 3. The rank of obstacles and benefits after using BWM (Source: Authors' work)

Rank	Obstacles	Weights	Benefits	Weights
1	Threatened privacy	0.21	Optimization of transport routes	0.28
2	A small number of platforms on offer	0.20	Optimization of logistics costs	0.28
3	The fear of breach of the company's reputation	0.12	Activation of unused resources	0.17
4	Lack of awareness about the benefits of the sharing economy	0.12	Ecologically oriented solution	0.09
5	Impossibility of predicting the flow of resources	0.08	Reduced number of empty rides	0.07
6	The risk of delivering services on time	0.06	Expansion of the range of services	0.05
7	Lack of expertise to use the platform	0.06	Monitoring in real time	0.04
8	Lack of will to change	0.05	Creation of business partnerships	0.02
9	Absence of regulation for the platform and guidelines for users	0.05		
10	Lack of determination and commitment of the company's management	0.02		
11	Distrust in the platform, inability to assess its reliability	0.02		

Privacy risk is perceived as the biggest obstacles to larger SE adoption in our research which aligns with findings of previous studies in and out of the field of logistics. Another detected problem is the small number of SE platforms in the field. The company's reputation and its rating on user portals is recognised as the key for success to further partnerships. In line, the fear of breach of the company's reputation effects the decision to accept SE platforms for RPT service. Companies fear that when using the platform, they cannot predict the flow of resources which is a direct risk of service availability, and can damage their Just-In-Time business model. All mentioned obstacles have a direct impact on company reputation. The benefits detected as the most influential are the optimization of transport routes and the optimization of logistics costs. This implies that the respondent recognize SE model as a solution that aims to reduce environmental impact by optimizing storage and transport capacities.

5 Conclusion

This study analysed the potentials of sharing economy platforms in the automotive industry for returnable transport packaging. By examining relevant literature in the field, a set of potential obstacles and benefits was extracted. Using the Best-Worst Method, they are ranked based on the opinions of academic experts and practitioners. The method was applied using a real-world example - a branch of an automotive industry company operating in Serbia. The obstacles identified as the most influential are threatened privacy, the small number of platforms on offer, the fear of a breach of the company's reputation, and the impossibility of predicting resource flows (service availability risk). These obstacles may hinder management decisions to use sharing economy platforms for Returnable Transport Packaging (RPT) and imply that raising awareness and providing training on the 'how and why' of using SE platforms may alleviate management reluctance. Good practice examples and experiences from peer companies can be of great help. Top ranked benefits according to the results

are optimization of transport routes, optimization of logistics costs, activation of potentially unused resources and positive ecological impact. Other obstacles and benefits obtained smaller scores, but they should not be ignored. Each recognized obstacles and benefits provides a basis for better management decision-making. The presented results offer only one approach to unlocking potentials of SE platforms for logistics, limited to one service and one company as case study. It is a pre-scanning exercise while full implementation requires additional steps and methodological improvements in order to have a final insight on what drives and what hinders using SE platforms for RPT in automotive industry. Future research should be aimed at multi stage analysis of obstacles and benefits that would entail a preliminary analysis, before moving to the final evaluation of both obstacles and benefits. This should also include considering some other methods or combining with BWM to assure robustness of the results.

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