

MYTHS AND THE TRUTH ABOUT THE INNOVATIVE SUSTAINABLE MODEL OF CAR SHARING IN EUROPE

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Abstract In the time of the 4th Industrial Revolution was introduced the sustainable model of car sharing. People began to realise the costs of owning and suboptimal use of cars, real estate and other goods. Innovative companies have started to promote services based on an economy of sharing, which has led to a change in the culture of ownership of goods. The first applications of the sharing economy were observed in durable goods such as cars and housing. In this article, we will focus on the question of how successful a genuine car-sharing model is in Europe. According to theory, the car-sharing model provides an example of a sharing economy in which the starting point, rather than ownership of an asset, is access to a service, which makes better use of the shared asset and makes it much cheaper to use and accessible to a wider range of people. The theory also emphasises the role of car sharing in urban environments, as it provides a sustainable environmental solution in the context of car electrification. In this way, such a model ensures that no harmful emissions are produced, and the sustainable aspect of this car-sharing model is further underlined by the use of electricity from renewable sources. However, the question is what the gap between theory and practice is. What do the citizens of European conurbations think about this business model, and how successful is it? To this end, we will use an automated content analysis procedure to analyse publications in scientific journals, newspapers and magazines.

Keywords:
europe,
car
sharing,
sustainability,
sharing
economy,
digital
platform.

1 Introduction

As part of the fourth industrial revolution, which accelerated the development of community-based digital platforms and the use of big data, there has been a boom in the sharing economy as a peer-to-peer (P2P) economic model whose activities are linked to the acquiring, providing or sharing access to goods and services between individuals or between businesses and individuals (B2C) and business to business (B2B) (Kauffman and Naldi, 2020). Sharing can be free of charge, or the user pays the sharing costs. The first applications of the sharing economy were observed in durable goods such as cars and housing (Clewlow, 2016). According to the given the far-reaching importance of the sharing economy, the article is focused on research into the importance and problems of the car-sharing model in Europe. Car-sharing has been known in Europe since the late 1980s. Thus, the first car-sharing service was introduced in Germany in 1989, Austria and Denmark in 1997. It has existed in Belgium since 2002, France since 1999. In Great Britain, the so-called small car-sharing was known in the 70s of the 20th centuries, the so-called new car-sharing was established in 1999. The concept has been in use in Italy since 2009.¹

According to theory, the car-sharing model provides an example of a sharing economy in which the starting point, rather than ownership of an asset, is access to a service, which makes better use of the shared asset and makes it much cheaper to use and accessible to a wider range of people (Matzler, Veider and Kathan, 2015; Novikova, 2017). The research findings also emphasise the role of car sharing in urban environments, as it provides a sustainable environmental solution in the context of car electrification. In this way, such a model ensures that no harmful emissions are produced, and the sustainable aspect of this car-sharing model is further underlined by the use of electricity from renewable sources (Cruz and Katz-Gerro, 2016; Dlugosch, Brandt and Neumann, 2020; Julsrud and Farstad, 2020). The question, however, is how great is the gulf between theory and practice. Based on the scientific papers, the authors developed a research question: What are the core issues of the economic models of car-sharing in Europe?

¹ The State of European Car-Sharing Final Report D 2.4 Work Package 2, available at https://www.eltis.org/sites/default/files/trainingmaterials/the_state_of_carsharing_europe.pdf

In this article, authors present the topic of car-sharing economy, based on the analysis of research articles published over a period from 2011 to 2020. Since there are many articles, it is necessary to choose an alternative analytical approach that can effectively and successfully categorise large amounts of data. It is precisely this analysed data that enables the researcher to explain the research phenomenon in a comprehensible way adequately. For the topic under discussion, the method of automated content analysis was used to identify key topics and concepts of interest to the researchers.

3 Research methods

3.1 Data collections

The selection of the papers was made in the following steps. In the first step, the authors used the Scopus platform to search for and identify the scientific articles on thematic car sharing in Europe. The authors used a logical combination of keywords to find the relevant article: TITLE - ABS - KEY (* Carsharing) AND EUROPA. The Scopus database contains articles from 2011 to 2020. Of all articles, the authors have selected only those published in peer-reviewed journals, while we have omitted publications in books and conference proceedings. The review of the articles was limited to those written in English. The search result within Scopus yielded a selection of 314 articles published in peer-reviewed journals. After a thorough review of the abstracts and full texts, 70 irrelevant articles were excluded, i.e., those that did not take into account the importance of the research phenomenon. In this way, it was used to analyse 244 articles published in 127 journals.

Most of the articles selected for further analysis are from the next scientific journals: Sustainability Switzerland (21), Journal Of Cleaner Production (12), Transportation Research Part A Policy And Practice (10), Transport Policy (8), Transportation Research Part D Transport And Environment (7), International Journal Of Sustainable Transportation (6), Transportation Research Record (6), World Electric Vehicle Journal (6), Applied Energy (5), Research In Transportation Economics (5), Journal Of Advanced Transportation (4), Journal Of Transport Geography (4), Sustainable Cities And Society (4), Technological Forecasting And Social Change (4), Transportation Science (4),

European Journal of Operational Research (3), International Journal of Automotive Technology and Management (3), Research in Transportation Business and Management (3), Scientific Reports (3), Transport Reviews (3), Transportation Research Part B Methodological (3), Travel Behaviour and Society (3).

3.2 Data analysis

This article aims to present the art topic of car-sharing in Europe. For this purpose, the authors decided to analyse scientific articles on this topic using automated content analysis (ACA) (for more see Krippendorff (2004), Nunez-Mir et al., 2016 and Shapiro et al. 2020). The articles were analysed using the text mining software Leximancer which is a »content analysis emulator that replicates the manual coding procedures within content analysis through a series of algorithms and statistical procedures« (Smith, Grech and Horberry, 2002). More about Leximancer, please see Roblek et al., (2020), Leximancer 5.0 (2020).

4 Results

Leximancer created a total of 35 concepts and seven themes from titles, abstracts, and keywords of 244 articles published in 127 journals. The authors set the slider% Visible Concepts to 100% and changed the number of concepts visible on the map from 50% (automatically) to 100%. The theme size was moved from 33% (automatic) to 46%. A theme is defined as a group or composite of concepts that share common features or connections, as indicated by their spatial proximity in the concept map. The names of themes present names of the most prominent concepts in the group of related concepts (Pucihar, 2020). Table 1 shows themes, hits and related concepts.

Figure 1 shows the related concepts that are connected to the themes, which are presented in circles. Themes on a Leximancer concept map are heat mapped, and this means that hot colours (red, orange) denote the most important themes, while cool colours (blue, green) denote those less critical (Leximancer 2020). The themes are »sharing«, «system«, »mobility«, »model«, »economy«, » car-sharing « and »management«.

Table 1: Themes and concepts

Number	Theme	Hits	Concept
1.	sharing	937	sharing, car, services, potential, environmental, network, market
2.	system	775	system, transport, vehicle, public, travel, private
3.	mobility	648	mobility, cities, urban, sustainable, development, policy, provide, benefits, people
4.	model	342	model, users, cost, information
5.	economy	338	economy, social, innovation, quality
6.	car-sharing	197	car-sharing, cost, power
7.	management	111	management, strong

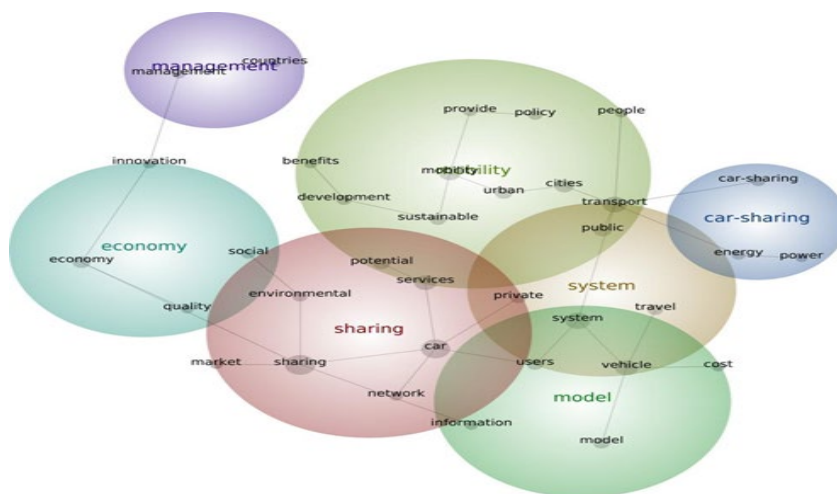


Figure 1: Concept map for selected articles

Figure 1 shows that the circles of specific themes overlapping with the circles of other themes, thus forming cross-sections that contain individual concepts, which thus fall into both overlapping themes. For example, the theme »sharing« overlaps with the themes »economy«, »mobility«, »model« and »system«. The theme »mobility« overlaps with the themes »system« and »sharing«. The theme »private« overlaps with the themes »sharing« and »system«. »users« and » overlaps with the themes »sharing« and »system«. The theme » car-sharing « overlaps with

the theme »system«. The theme »system« overlaps with the themes » car-sharing«, »sharing«, »model« and »mobility«. The theme »economy« overlaps with the themes »sharing«. The theme management is not overlapping with other themes.

The concepts »potential« and »services« lie between the intersection of the themes »mobility« and »sharing«. The concept »potential« lies between the intersection of the themes »sharing« and »innovation«. The concepts »private« and »services« lie between the intersection of the theme's »sharing« and »transport«. The concepts »system«, »vehicle« and »users« lie between the intersection of the themes »model« and »system«. The concept »information« lies between the intersection of the themes »model« and »sharing«. The concepts »public« and »transport« lie between the intersection of the themes »system« and »mobility«.

5 Discussion

The basic definition of the sharing economy is that it is an economic system in which property and services are shared between private individuals. Originally, these were business models revolving around on-demand access to products and services, mediated by online platforms that bring together many small suppliers or service providers with many small buyers. In recent years, we have seen the rise of on-demand business models in Slovenia, where a single entity offers products or services to many small buyers (e.g., Avant2Go in Slovenia). An example of the first type is ride-hailing platforms that match independent drivers with individual riders. An example of the second type is car-sharing services that offer short-term vehicle rentals to individual users (Bebaafar & Hu, 2019). Other manifestations of the sharing economy are not based on on-demand access to a product or service, but on the matching of many buyers and providers mediated by online platforms (e.g., Kickstarter, Yelp, Etsy, Airbnb, and Upwork) (Chen et al., 2019; Cui et al., 2020).

The European Economic and Social Committee has defined the sharing economy as a system in which property and services are shared between private individuals, that sharing can be free or for a fee, and usually takes place online.² The European Commission states that the economics of cooperation refers to

² Office Journal of the EU2018/C 081/09, p.66.

business models in which certain economic activities are facilitated by cooperation platforms that create an open market for the temporary use of goods or services that are often provided by private individuals. In this case, the sharing economy is not limited to activities in which the ownership of a good change, but in most cases implies activities aimed at creating and gaining profit, but it can also refer to voluntary activities (European Commission, 2016).

Two factors are important for the rise of the sharing economy (and as a sharing business model). The first factor is that internet technologies, smart technologies (smartphones, GPS...) and digital platforms emerged after 2008 and the second factor is that the world witnessed the financial crisis of 2008-2009, which led to the greater redistribution of wealth and consequently increased social inequality and stratification (Piketty, 2014). Both factors have an important influence on the fact that changes occurred in terms of ownership and the transformation of the co-ownership model into the co-sharing model (Roblek, Meško and Meško, 2016; Lietaert, 2010).

In Europe, car sharing emerged between 1987 and 1988, during which time people in Switzerland and Germany came up with the idea of replacing a private car with a shared car at almost the same time. At that time, all European cities had centres that were open to car traffic. The negative impact of traffic on the environment in the centres themselves was already beginning to emerge, and social groups began to draw attention to it and demand action from the authorities. For example, advocates of car sharing proposed the introduction of a sharing model to reduce the dependence of most households on cars and introduce more sustainable modes of transport. This would take into account that people would not be denied access to cars (). The basic dividing line between the definition of car sharing and car rental itself is that car sharing is about the ability to share a car when needed. This coincides with the idea of providing a public car that can be used as easily as a private car.

The concept itself has gained momentum in the last decade with the advent of internet technologies and smart devices. Collaborative vehicle sharing has taken on a new organisational form, centred around digital platforms and smart applications to deliver car sharing services. It should be noted that the process of renting a car and the fact that access to the car is not autonomous is more

reminiscent of traditional car rental in the case of providers such as Avant2go and Giro car share in Slovenia. However, peer-to-peer providers have also started to experiment with other procedural plans, such as the introduction of advanced technology for opening private cars, which will enable a new type of car sharing in the future. It is likely that with the development of peer-to-peer technology, it will even be possible to distinguish between a private and a public car.

The sharing economy has evolved in recent years to represent a broad term that refers to a variety of online economic transactions that can even include business-to-business (B2B) interactions (Sharif and Hu, 2020). Sharing economy platforms made it easier for everyone to find a variety of potential jobs that are more flexible and offer more flexible work hours and opportunities compared to traditional jobs. PricewaterhouseCoopers (PwC, 2016), in its report commissioned by the European Commission, had divided sharing economy activities into five different sectors: (i) peer-to-peer accommodation (Airbnb, LoveHomeSwap, HomeAway platform; (ii) peer-to-peer transport, (iii) on-demand household services (TaskRabbit, ZipJet, Instacart, Deliveroo), (iv) on-demand professional services (Upwork, HolterWatkin), (v) collaborative finance (on crowdfunding and lending platforms).

Since the article focuses on the analysis of car sharing, we will only further define business models that relate to the research phenomenon. So, peer-to-peer transportation services include the mutual provision of transport services, rental of vehicles or parking spaces. A further division of collaborative transportation services is into applications that offer short-distance transportation services such as, e.g., Laft and Uber and on ridesharing platforms over longer distances such as, e.g., BlaBlaCar. In addition to these services, collaborative transportation services include car-sharing platforms between individuals, such as GetAround, and corporate car-sharing platforms such as, e.g., Enjoy or ZipCar or Car2Go (Puschmann and Alt, 2016).

The sharing economy can also be classified according to the sectors in which they operate, i.e., the main sectors in which they operate. Looking at the transportation sector, examples of platforms where providers and demanders of transportation services connect are Uber, Zipcar, Getaround, Liquid, BlaBla car

(Ranjbari, Morales-Alonso and Carrasco-Gallego, 2018). Uber³ allows individuals, drivers to provide transportation, taxi services using their private cars. The Zipcar platform⁴ allows individuals to rent a car for shorter distances, such as a short trip or a trip to the grocery store. The Getaround platform⁵ allows individuals to rent their car, while bikes can be rented through the Spinlister platform⁶. BlaBla car⁷ is a platform that connects providers and demanders of transportation services. Namely, the platform allows an individual to offer free seats to other individuals who need transportation on the specified route when they travel in their cars, provided that the individuals who travel in the specified manner share the cost of travel. Thus, there are two types of transportation services that exist in the sharing economy. The first is renting the property itself, such as renting a car, bike, or another form of transportation. Some of the companies in this segment of the sharing economy are ZipCar, Car2Go, and Autolib. The second is the renting of the property along with labour, i.e., human capital, and it implies, for example, the renting of a car or other vehicle with the person who drives it. The most well-known and prominent companies in this field are Uber and Lyft. These cars and other car rental services existed before the advent of the sharing economy.

Nevertheless, information and communication technology has reduced the time required for individual transactions, and people can rent cars for an hour as technological changes have drastically simplified the process (Basili and Rossi, 2020). Car sharing providers in Europe also face problems related to local legislation, different consumers behaviour and competition in local transport. In Germany, for example, a court in Frankfurt banned Uber from operating as a ride-hailing service in 2019. The court made this decision because, according to the court, the mobility app Uber does not have the proper license to operate in Germany.⁸ From Paris, is known the 2018 case of the collapse of the French car-sharing system Autolib, which was operated on a non-profit basis. The collapse

³ <https://www.uber.com/gb/en/>

⁴ <https://www.zipcar.com>

⁵ <https://www.getaround.com>

⁶ <https://www.spinlister.com>

⁷ <https://www.blablacar.com>

⁸ Politico (2019), available at: <https://www.politico.eu/article/uber-germany-court-ruling/>

was due to increased competition in the alternative transport sector, which includes hailing apps such as Uber, and poor fleet maintenance.⁹

According to the Deloitte research (2017)¹⁰ about in Europe shows that car sharing is successful in Germany¹¹, UK, France, Switzerland, Austria, Netherlands, Sweden, Spain, Belgium, Norway and Denmark. The use of car-sharing varies in Europe depending on the level of car ownership and geographical characteristics of European countries. It is important to note that residents across Europe have begun to adopt car sharing as an alternative form of mobility, as it allows them to retain the features of a private car, but without the cost of ownership (Ramos et al., 2020). EU rules and air quality standards¹² have a significant impact on the introduction of alternative public transport and vehicles powered by alternative fuels such as gas and electricity (Mounce and Nelson, 2019). The use of car sharing can be considered as an alternative sustainable mobility solution because it reduces people's decision to drive, reduces the number of private cars and because car-sharing fleet owners increasingly choose to buy electric cars. All these solutions have a positive effect on reduced pollution and greenhouse gas emissions (Liao et al., 2020; Zhou et al., 2020).

By 2020, car sharing was on the rise in Europe. However, the COVID -19 outbreak led to the closure of car-sharing providers. In Italy, for example, where car-sharing is popular, there is a 60% to 70% reduction in services used, while elsewhere, for example in Berlin, bike rental has increased. It is predicted that the post-pandemic recovery in car-sharing will continue. For example, job losses and revenue losses are expected due to the consequences of the pandemic in this sector, so companies are moving to new mobile solutions that also offer users more cost-flexible approaches (system such as the introduction of "pay-as-you-go") and increase payment via apps. The consequences of a pandemic will be

⁹ France 24 (2018), available at: <https://www.france24.com/en/20180621-france-paris-end-road-car-sharing-system-autolib>

¹⁰ Deloitte (2017). Monitor Deloitte: Car sharing in Europe.

¹¹ The biggest car sharing Market in Europe with expectations to grow.

¹² European Commission, Environment, Air quality standards, available at: <https://ec.europa.eu/environment/air/quality/standards.htm>

probably also seen in the emergence of innovations based on micro-mobility solutions which will emerge - sharing scooters, bicycles and scooters).¹³

At the economy field it should not ignore the fact that venture capital plays an important role in the development of sharing business models. For it is the owners of venture capital who have become the biggest players in the sharing economy and, with the help of their rise, have gained considerable power in the global economy. The actors have gained such power in the global economy by influencing information asymmetry and the lack of control between the platform and the participants, as well as by promoting concerns about growing inequality (Gerwe and Silva, 2020). All of this has led researchers such as Slee (2015) and Scholz (2017) to argue that the sharing economy has nothing to do with sharing itself. Calo and Rosenblat (2017) even point out that it is a business model that takes something away from its customers. In effect, then, its owners are gaining more and more value from participants while presenting themselves to the outside world as a socially oriented business. Based on these views, Srnicek (2017) writes that this new phenomenon of the sharing economy and its business models are better described as "a form of platform capitalism".

6 Conclusion

The sharing economy is a new economic system. In this system, property and services are shared between individuals. Companies operating in the sharing economy have enabled and provided people with a new way of buying and using everyday products and services. Today, the term sharing economy is used to describe an online marketplace that allows users to offer and buy any goods or services. So, in the global market, a new form of competition has emerged for traditional companies. These are the online start-ups of the sharing economy. These are web platforms that connect people who own an unused property with people who want to rent that property for a short period of time. The type of property these start-ups work with is very different, it's free time for everyday tasks (example: TaskRabbit, Fiverr), free time and cars for driving people (example: Uber, Lyft). It is important to keep in mind that the sharing economy

¹³ Deloitte (2020). From now on. Available at: https://www2.deloitte.com/content/dam/Deloitte/it/Documents/strategy/Deloitte_Future_of_mobility_COVID19_ENG.pdf

has boomed incredibly as part of the fourth industrial revolution (after 2011). So, it cannot be longer discussing a monolithic phenomenon, but rather a series of different digital and cyber-physical platforms, business models and transactions (Cheng, 2016).

The characteristics of car-sharing can be seen in the case of Germany as the largest market for car-sharing in Europe, where there has been an increase in users since 2012 (0.26 million users), it has been detected the risks on which the further success of this economic model depends. For example, experts point out that there is no planned reduction in car ownership, that there are differences between urban and regional areas, that Germans have a particularly emotional attachment to car ownership and that younger users appreciate high-performance cars from well-known brands (Kearney, 2018). These factors also apply to Slovenia (Kremzer, 2013). However, it is worth mentioning, particularly in Slovenia, that the development of public transport from the regions to the urban centres is worse and that it is coming to even more regional fragmentation than in Germany. Also, worth mentioning are the effects of the coronavirus pandemic and possible phenomena in the coming years that are likely to have a negative impact on the performance of the model.

The general criticism of the sharing economy relates to regulatory uncertainty, lack of government oversight and the issue of the security of the information that users share on the online platform. When exchanging information with the online platform, the possibility of racial and/or sexual bias based on algorithms must also be pointed out (Cherry and Pidgeon, 2018; Ganapati and Reddick, 2018).

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