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Sharing Economy Development: Empirical Analysis of Technological Factors

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Abstract: The development of the sharing economy is accelerated using digital technologies. Such a topic is not widely discussed in the literature and requires knowledge to fill the existing gaps. The authors analyzed technology-driven variables which have the highest impact on expanding sharing activities. The research helps to examine the degree of integration of society into the process of sharing economy development. This paper aims to create a methodology that helps to evaluate the development of sharing platforms dependent on technological variables such as society's access to digital services. Two activities are foreseen to achieve the goal. The first activity includes the steps necessary for revising technological variables (the compilation of an initial list of variables, the selection of variables, normalization, and the formation of correlation matrix). The second activity is designed to form a panel regression model using several sharing platform cases. Using the developed methodology, the revision of technological variables is carried out to expand the knowledge of economic science about the intensifying processes of the digitization of society, the resulting changes in consumption, and the redistribution of conventional economic solutions in the markets for goods and services. The authors compared the technological variables which had the highest impact on sharing platforms. The study results demonstrated that among ten sharing platforms, the highest dependence on technological variables is evident in the number of visitors visiting the Uber sharing platform.

Keywords: sharing economy; sharing platforms; acceleration; digital technologies

JEL Classification: C230; O330; O390

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1. Introduction

The world faces challenges such as poverty, the excessive depletion of resources of nature, the scarcity of non-renewable energy sources, climate warming, and environmental degradation, which are forcing us to look in new directions to make fundamental decisions on how to preserve nature, tackle climate change, reduce pollution, and promote sustainable consumption. One of the recent trends, the sharing economy (SE), promotes circularity, sustainability, and a more efficient usage of resources [1–3]), and has the potential to promote sustainable development [4]. Today's world is changing very fast, and new technologies are developing rapidly, bringing new opportunities that did not exist before and enabling new business models to emerge. The digital platforms in the SE make it possible to link individuals and organizations (businesses or nonprofits) with idle assets or use existing skills to share with those looking for them. Therefore, the SE expands the accessibility of products to an extensive range of users. The SE eliminates barriers to entry for users who want to share or obtain assets and streamlines communication, payments, and other activities that reduce transaction costs. In addition, the SE contributes directly to the circular economy development by extending the effective lifetime of products and materials [5]. In a circular economy, products, materials, and resources are used efficiently

and sustainably, ensuring that their value is retained for as long as possible and waste is minimized. The sharing economy model is based on the secondary use of goods, thus extending their lifetime. Furthermore, the sharing economy model is based on swapping, bartering, and renting products and product service systems to get more value from underutilized assets or resources.

The "SE" (or "sharing economy") is seen as a peer-to-peer exchange using digital platforms and mobile applications. To emphasize the role of digital technologies in sharing, Pouri and Hilty (2021) proposed the "digital SE" term and underlined that online platforms that are reachable through smartphones and various end-user devices could be labeled as "coordination platforms" as they enable new forms of sharing activities [6]. The role of digital platforms is to provide coordination mechanisms that match the accessibility of resources with users' needs. Gansky (2010) points out that sharing covers the shift from owning things to borrowing, exchanging, and giving them for free [7]. Such a process involves many different stakeholders, uses new models of economic activities, and changes the ways of working. Mont et al. (2020) distinguish two models in the SE: one is about a more economically and environmentally sustainable approach that supports the idea of market-based digitalization that can create new business activities [8]. The transition to new business activities is based on the mutual approach of companies operating through online platforms or markets that connect consumers with products sellers.

The SE has been described as a challenge to traditional practices, fundamentally transforming a social and economic system that focuses on overconsumption and private ownership [9]. The SE emerged between 2007 and 2008 during the financial crisis and the accompanying recession. In addition, technological advances allowed this peer-to-peer exchange to expand into global markets. Campbell et al. (2020) pointed out that given the severe economic slowdown worldwide, consumers are interested in finding new ways of managing their finances [10]. The SE has also enabled people with unusable resources to share them and earn extra money when their incomes have decreased [11].

The methodological framework proposed in this article focuses on revising technological variables that impact the acceleration of sharing activity. According to research where examples were analyzed, Airbnb and Uber, as technological variables, had the highest impact on activities performed using such sharing platforms. This paper seeks to revise which technological variables have the highest relationship to the usage of concrete sharing platforms. The authors aim to investigate which technological variables have an impact on the growth of sharing activities.

The article is organized as follows: Section 2 presents a literature review emphasizing the acceleration of sharing activities. Section 3 describes how to evaluate the acceleration of sharing. Section 4 mentions technological solutions applied to stimulate SE development. Section 5 presents the methodology for researching digital technologies' impact on access to individual sharing platforms; Section 6 shows the research results. Finally, the paper ends with a discussion and conclusions.

2. Literature Review

2.1. Relationship between Technology and the Sharing Economy

The sharing economy, also known as collective consumption, has aroused great interest among researchers in various disciplines such as economics, sociology, and technological research. Several theories have been put forward that explain the relationship between technology and the sharing economy. Here are five of these theories, each of which is described below:

- Theory of platforms:

According to the theory of platforms, technology, especially digital platforms, plays an essential role in stimulating the sharing economy. These platforms, such as Uber, Airbnb, and TaskRabbit, bring together users who want to share or use resources such as travel, accommodation, or skills. This technology builds trust based on user reviews and ratings [12], the basis of sharing. By minimizing transaction costs and facilitating

interoperability, platforms become intermediaries to help develop the sharing economy [13]. This theory emphasizes the importance of creating, managing, and scaling these platforms in shaping the sharing economy [14].

- Theory of network effects:

According to the theory of network performance, the value of collaborative economy platforms is growing as more and more users face them [15]. Technology catalyzes network impact in this context, providing wider and more efficient user connections. The theory shows that the critical mass of platform users is the key to success [16]. The concept highlights how technology contributes to the development and sustainability of collaborative economy platforms by connecting users and fostering participation [17].

- The theory of trust and reputation:

The theory of trust and reputation emphasizes that user feedback, ratings, and identity validation play a key role in building trust in the sharing economy. The theory states that creating trust mechanisms is crucial to reducing the uncertainty associated with planning transactions [18]. Digital technologies play an important role in monitoring and sharing information on past user behavior and contribute to a more transparent and accountable environment. Trust mechanisms and the reputation of collaborative platforms can be considered key elements of exchanging information between them, and their operation depends on technology [19].

- Resource-based vision theory:

Based on a resource-based vision, the sharing economy thrives by effectively distributing technology's untapped resources. In this context, the technology acts as a resource distributor that links untapped resources (such as technology) to those who need them [20]. Digital tools allow us to effectively identify, access, and use these resources, and create value for suppliers and consumers. The theory emphasizes the role of technology in optimizing resource use and sustainability in the sharing economy [21].

- Institutional theory:

The institutional theory states that technology provides an institutional framework and norms for the sharing economy. Digital platforms create new rules and governance structures for exchanging goods and services, often challenging traditional regulatory and legal frameworks [22]. The tensions between collaborative economy platforms and established sectors and regulations have highlighted the role of technology in shaping these institutions [23]. This theory emphasizes that the success and growth of the collaborative economy are closely related to how technology affects broader social and institutional factors [24].

These theories provide insights into the interrelationship between technology and the sharing economy, emphasizing this new economic and social phenomenon's mechanisms, dynamics, and consequences.

2.2. Acceleration of Sharing through Digital Technologies

This sharing economy will enable millions to find new customers, build new relationships, and adopt new working methods. The cooperative economy has the potential to transform the way workers work and use the workforce. This creates a completely new way of working, directly corresponding to the rapid development of modern technologies.

Sharing economy activities, from borrowing to exchange, are technology-driven and show no signs of slowing down. Digital platforms enable people and societies, at least in part, to exchange products.

Based on the study by PricewaterhouseCoopers (2023), adults familiar with the SE see many benefits in using sharing economy platforms [25]. According to respondents, running a SE business is more efficient (86%), more convenient (83%), greener (76%), helps build a stronger community (78%), and is "more enjoyable" than running a traditional business (63%).

Therefore, there are four main elements (4Ts) that the SE can focus on:

- **T**rust in human and material resources;
- **T**ogether, build equal relationships;
- **T**echnical platform;
- **T**raditional manufacturer transformation—user/derivative relationships [26].

The first element of a common economy is the division of human and material resources, that is, those professionals and individuals who integrate tangible and intangible assets into a common network.

The second element that regulates relations between participating countries is created through equal relations, where all parties have equal opportunities for joint efforts to gain access to goods/services and values. These are not separated by socio-demographic variables or depend on the power of purchase but are seen only as access to common resources. In the case of a pure partnership economy, operators link the same product users to the Union at the same time and then share their experiences through peer-reviewed systems and shape their identity. According to Täuscher and Laudien (2018), Airbnb is an offline peer service as a business model for connecting people to private advertising, search, and accommodation [27].

The third element concerns a technical platform involving digital technologies, allowing relationships between the system and consumers to feel like the common society. In this case, the company's role will change immeasurably when the relationship system exchanges goods and services. The company is no longer a supplier of goods/services but represents a product that is collected simultaneously. The value of such a service is "a new service with the community inside and outside the digital platform".

The fourth element is about the SE model, which operates in such a way that new relationships are created that change the production and consumption economy. For example, the roles of hosts and guests, manufacturers and consumers are becoming clear, and platforms such as Airbnb should not only be seen as hotel companies but also as new "industries" that generate demand for special services. At the same time, guests and hosts are advised to continue improving their properties or products/services to improve online viewing. Business is not just about homeowners, guests, and connections; it can enrich directions and increase the destination's competitiveness. Another aspect of the transformation of goals can be seen in social spaces, where shared spaces can stimulate tourist engagement, and Airbnb can contribute to expanding sharing activities.

Digital technologies accelerate sharing and are a critical factor in technology adoption, as adopting digital technologies helps maintain efficiency. Information technology makes it possible to share idle assets quickly, conveniently, and cost-effectively in the short term. Furthermore, it radically changes consumer habits by enabling individuals to consider and evaluate the advantages and disadvantages of accessible resources. However, not only the development of digital technologies is significant for the growth of SE activities, but technology-related literacy is an equally important factor, i.e., people's ability to use digital technology, which reflects their level of use of the Internet, the availability of computers, and the knowledge of the use of tablets and smartphones. With no internet access or a smartphone, it is impossible to be part of the SE and to share or access unused assets through digital platforms. Adequate digital infrastructure, "digitalization", is one of the significant factors for the emergence of SE platforms [28]. According to Pouri and Hilty (2021), the transition to the digitization of society has led to a transformation of sharing activities [6]. As pointed out by various authors (e.g., [29–31] and others), the emergence of the Internet, and in particular of technologies of social media, has played an essential role in stimulating new sharing practices. The availability and use of the Internet as a significant factor for stimulating SE activities is supported by various authors (e.g., [6,32–34]).

Digital technologies are protecting the workforce and the productivity of operations. However, there are still gaps in digitization, and one of the long-term legacies of many countries is the wider adoption of digital technologies. Having Internet and computer access from home is now traditional, and many sectors have expanded their online activities,

including sharing. As the crisis subsides, we can see that digitalization, measured by the individuals' percentage of computers connected to the Internet, is a positive aspect in many economies. This has a significant and long-term impact on sharing markets. Several years ago, the extent of digitalization significantly differed among countries, industries, and individuals. According to Eurostat (2023), in 2019, more than four out of five Swedish people had access to internet computers, while in Greece, they were less than two-fifths [35]. Two years later, Greece's share rose by almost 8% to 45%, reducing the gap with Sweden, one of the most significant increases. The digitization of society has increased by an average of 6% in developed countries. The results show how society has accelerated digital transformation, especially in underdeveloped regions. In many countries, digitalization has always been lower in high-impact regions, and small businesses tend to lag behind larger partners. However, it should be noted that these differences are only due to differences in the industry. Small businesses, which have historically been less digitized, have made the biggest profits. Smaller sectors have also invested more in digitalization. The rapid rise of digitalization during recent years has saved many services, helped them adapt to online activities, and built the foundations for accelerating sharing. Telecommunications can boost the sharing market in countries where teleworking is more common. However, given the persistent gap between governments and sectors, politicians should seize the opportunity to reduce the digital divide further and ensure that digitalization's benefits are widely promoted. This includes introducing measures to promote healthy competition in digital markets and adapting regulations to facilitate new services. This could lead to a more resilient economy which is better equipped to respond to future needs.

3. Sharing Economy Index to Investigate the Acceleration of Sharing Activity

An increasing number of scientific articles shows researchers' interest in this new phenomenon. Researchers study different aspects of the SE, among which are regulation issues, the SE's effects on the various sectors (e.g., accommodation, transportation, and others), trust in the SE services, the SE's effect on sustainability, etc. ([36–40] and others)). However, while interest in the SE is increasing and new studies are emerging, there is still a dearth of research aiming to identify drivers behind countries adopting this new consumption pattern.

Researchers seek to identify which country or city is more eager to adopt the sharing model and what the drivers influencing the spread of the SE are. Therefore, various attempts to assess the SE have been identified in the academic literature by compiling composite indexes containing various variables. These indexes have different designations, as follows:

- sharing economy index [41];
- sharing index [42];
- the city index of SE [43].

For example, [41] has launched an SE Index, which aims to provide information on SE services and their availability to consumers in 50 cities worldwide. The [41] SE Index ranks the world's cities and identifies which cities are the most favorable regarding the SE services available to consumers [41]. Researchers Petruzzi et al. (2021) have applied the SE Index to determine the extent to which individual organizations which have positioned themselves as the SE part represent the SE [36].

Other researchers have analyzed the drivers of the SE further. It would be impossible to distinguish just one single factor influencing the spread of the SE. For example, Lee (2016) and Hussain et al. (2023), to measure the SE in a country, constructed an SE Index that includes such variables as "total population, urbanization, GDP per capita, the share of millennials in population, tourist arrivals, internet users percent, broadband subscription per capita, mobile subscription cost, broadband speed, and Facebook users percent" [42,43]. In addition, Lee (2016) also presented the city index of SE, which is similar to the country index of SE, except that city-level data on tourist arrivals, population, and the total number of nights replaced the urbanization variable [43]. Bergh et al. (2018) constructed a global

Timbro SE index using data on monthly traffic volume and scraped information for 286 SE services [44]. The Timbro SE index was calculated for 213 countries. Although the Timbro SE index provides insight into what drives the development of the SE, the key focus was put on the regulatory environment. For identifying the factors that influence the use of SE services, such indicators as "GDP per capita, Economic freedom, Limited government, Legal integrity, Sound money, Freedom to trade, Regulatory freedom, Average years of schooling, Globalization (KOF), Share under 40 years, Share with broadband, Social trust, Broadband use per capita" were employed in the research. However, it should be noted that the index only provides data for 2018, so it is impossible to evaluate the dynamics of index change.

Similarly, Kim and Suh (2021) focus on the institutional environment and seek to identify its impact on the diffusion of sharing platforms globally [31]. Their research was based on a sample of Uber. For research purposes, Kim and Suh (2021) employed variables such as "Rule of Law, Quality of Regulation, Real GDP (logged), Human Capital, Population (million), Urban Population (%), Level of Democracy, State Fragility, Government Expenditure, Size of Trade (% of GDP), Size of Tourism (% of exports), Unemployment Rate, Service Sector Employment".

Some authors, such as Navickas et al. (2022), focused on the tourism sector and analyzed the drivers influencing sharing in that sector. The authors' study was not limited to one specific group of factors that could have influenced SE development in the tourism sector but covered different dimensions: economic and political, socio-cultural and technological, environmental, and legal. Therefore, the authors have included various indicators in their study: "Internet penetration; The number of people choosing to use new or improved IT infrastructure; Quality of Internet connection; Big data" (technological factors); "21–49 years old population, Persons with tertiary education level number (5–8), Monthly income, Number of households with children" (social-cultural); "Membership in the EU, Amount of EU support, Regional level of the tourism services management, National level tourism services management, Political Stability Index (WGI)" (political); and others [45].

Giovanini (2021) constructed an SE Index using the traffic data of websites and sharing applications for 175 countries to identify factors that can explain the development of the SE [46]. Identifying the factors influencing the spreading of the shared consumption model, for research purposes, Giovanini (2021) employed such variables as "Confidence percentage; GDP per capita, PPP; Logarithm of the population; Subscriptions, fixed broadband (per 100 people); Population with Internet access; Mobile cellular subscriptions (per 100 people); Percentage of adults who use social networks; Tourist arrivals per capita (logarithm); Tax burden; Property Rights; Fiscal Health; Business Freedom; Labor Freedom; Monetary Freedom; Commercial Freedom; Freedom of Investment; Financial Freedom" [46].

The analysis of the literature reveals that SE indices developed by various authors contain different variables and are used to assess different facets of the SE. Also, researchers aiming to assess SE spreading factors employ various variables for research purposes.

The SE spans many sectors, a consumption pattern changing how we transact globally [47,48]. There is a dearth of research in the academic literature that identifies the factors that explain countries' engagement with this model. The most widespread and well-known international quality indicator, the Timbro Sharing Economy Index, is little studied. It is a valuable tool for understanding the growth and impact of the sharing economy. This index has limitations that restrict its use [49–51].

To assess countries' entry into the SE, defining the factors that most influence the development of the sharing economy is necessary. The main groups of factors influencing the development of the sharing activity are presented in Table 1.

The five key factors listed in Table 1 promote sustainable SE development and contribute to the value of economic, social, and, to some extent, environmental creation. SE processes influence the environmental, economic, and social factors, and by adjusting the co-

operation strategies of the parties involved in the SE to incorporate circularity into their processes, it is possible to increase environmental, economic, and social value simultaneously.

Table 1. Main factors affecting the sharing economy development.

Factor Name	Description	References
Legislation and regulation	The state's regulatory framework and attitude toward the SE is an important factor influencing the Timbro index. The regulations' scope, clarity, and flexibility influence the index results: favorable legislation can encourage the emergence and development of new SE platforms.	[47–50,52–54]
Economic and business environment	The general economic and business environment also influences the Timbro index. A favorable business environment, transparency, investment opportunities, and the promotion of innovation increase a country's attractiveness to the SE and consequently lead to higher index scores.	[43,49,55,56]
Consumer confidence and legal protection	Consumer confidence and legal protection are relevant factors influencing the functioning of the SE. High consumer protection standards, transparency, responsibility clarity, and dispute resolution access increase consumer confidence and promote SE growth.	[50,56,57]
Technological infrastructure	Technological infrastructure, consisting of high-speed internet connections and broadband networks, is an important factor influencing SE indices. Good infrastructure allows SE platforms to operate efficiently and reach a larger audience.	[22,58–60]
Social factors	Social factors such as population attitudes, acceptance, and the culture of using new technologies also influence the Timbro index. Countries where people are more willing to accept and use SE services show better index results.	[49,51,56]

Zhyhlei and Zakharov (2021) analyzed the aspects of digital transformation, and looked at the technological infrastructure, the modern platforms of online networks, their classification, and the characteristic features of the current economic changes in the world's industrial internet infrastructure, big data, cloud technologies, and artificial intelligence [51].

Further on, this paper will focus on technological factors that stimulate SE development.

4. Digital Technologies: The Driver for the Sharing Economy

As the world's population grows, so does the use of resources, requiring sustainable solutions for both lifestyle and business. Through technological solutions, SE can offer new ways to make money and reduce environmental impact, as it is more ecologically organized than traditional business and certainly offers many benefits, but it is not widely used. Beyond that, it is significant to identify the reasons or factors that would increase interest in the SE. In their work, Räisänen et al. (2021) investigated the factors facilitating trust in SE platforms and explored the aspects of trusting in the SE and the technological solutions that have been applied to increase trust on sharing platforms [61]. Demary (2015)

noted that the essential driver of the SE is technology, which makes economic activity cheaper and easier [62]. Cui et al. (2021) investigated the factors of influence of digital platforms applied by the SE that promote both social and economic development [63]. The authors identified two business models for using digital platforms in the SE, with the digital platform emphasizing social connectivity in the user-to-consumer model and economic benefits in the business-to-consumer model. To gain a competitive advantage, Constantiou et al. (2017) described four SE models in which technology platforms combine organizational and market mechanisms with two main participant-oriented aspects: strong or no control and great or low competition between participants [64]. This allows companies to participate in the SE process using their technology platforms to identify business threats and opportunities [17]. Ritter and Schanz (2019), noting the importance of the SE in the transition to sustainability, describe a framework of categories of business models, which identifies four segments of the SE market: two types of models, one-off transactional and subscription-based, as well as two types of platforms, fee-based and unlimited [17].

We can now see that digitization will have far-reaching and long-term effects on the development of the SE. Digital adoption has taken a conceptual leap at the regulatory and industrial levels. Consumers have moved more towards online channels during the pandemic, and businesses and industries have responded. This shows that adoption rates are years ahead and that at least 80 percent of business operations are digital.

In the service compensation model, the owner sells access to their idle assets to those who need it. Such a model is called a sharing model. SE process owners are responsible for the supervision and quality of the provided service. Typically, the usage period of the sharing platform model is much shorter, and the number of users of the resources on the sharing platform is much larger, so this behavior change is called "collaborative consumption". The sharing platform type is designed to provide an alternative approach to product/service distribution options and is used to combine the functionalities discussed above.

Digital technologies that are important in the SE context are listed in Table 2.

Table 2. Digital technologies that are applied in the sharing economy.

Digital Technology	Descriptions	Examples of Digital Technologies	References
Mobile technology/ Internet connection technology	Mobile connectivity and smart devices are becoming essential to the SE. Mobile technology enables the quick and easy sharing of information and services by communicating with other users through mobile applications or online platforms.	Mobile technology/ Internet connection technology	[58,59,65]
Mobile apps	Mobile apps are one of the most important technologies that make it easy and convenient for people to share their wealth. For instance, the Airbnb app allows people to rent their homes or apartments to others for a certain period, while Uber will enable drivers to earn money by driving passengers.	Uber, Lyft, Lya, Breeze, JustPark, Wingz, BlaBlaCar, Airbnb, HomeAway, WeWork, Gumtree, e-Bay, Etsy, Craiglist, UpWork, Amazon, TaskRabbit, Freelancer, Mechanicalturk, Fiverr, Kickstarter, Vinted	[22,58,59,65–72]
Internet platforms	Online platforms like Airbnb, Uber, Lyft, etc., allow users to share their assets or transportation services with others. These platforms are becoming an important alternative to traditional service companies, allowing people to generate income from their assets and services.	Types of Internet platforms: • Car sharing; • Short-term accommodation rental; • Available labor and expertise; • Tools and equipment; • Food supplies; • Sharing closes.	[22,58–60,70,71,73–77]

Table 2. *Cont.*

Digital Technology	Descriptions	Examples of Digital Technologies	References
E-commerce	Online commerce allows users to share their goods and services without geographical or time constraints. This means that users can easily buy goods from suppliers worldwide and sell them to others.	Different online commerce processes and operations	[65,70,76]
Data analysis technologies	Data analytics is an important aspect of the SE as it allows platforms to collect and analyze large amounts of data to expand their services and user experience. The SE model is data-driven, so data analytics technologies are critical to its success.	Airbnb uses data analytics to predict rental prices and ensure fair user competition.	[55,58,59,71]
Social media	Social media are an important technology in SE because they allow people to quickly reach large audiences and share their experiences, knowledge, or opinions.	Facebook and LinkedIn are popular social media that allow people to share their skills and join professional communities.	[65,78]
Blockchain technologies	Blockchain technology is relevant for the SE, as it allows user transactions to be handled securely and reliably without intermediaries.	Slock uses blockchain technology to create secure and automated ways to share physical resources.	[76,77,79]
Internet of Things (IoT)	IoT can be described as a collection of devices that do not require the Internet to perform their primary function but have an Internet connection. More or less, all the gadgets that have the tag "smart" in front of their names in the last few years can be considered "things".	Smart internet devices. People can install smart lights, smart thermostats, smart refrigerators, smart doorbells, smart locks, and many other smart things in their home that they control with their phone.	[76,77,79]

Shaheen (2016) examined general mobility, i.e., the ability of consumers to obtain short-term access to shared vehicles, bicycles, or other means of transport when they need to use them. Shared mobility comes in different forms: sharing of cars, sharing of bikes, sharing of rides, on-demand services of ride-hailing, and micro-transportation controlled by smartphones and mobile "apps" that aggregate and optimize these mobility services and are critical to many common mobility modes [80]. Zhu et al. (2017) examined users' motivations for sharing apps and platforms and found what drives users to use one of the new mobile phone-sharing economies: travel-sharing programs. Sedkaoui and Benaichouba (2019) analyze how SE companies like Uber, Airbnb, BlaBlaCar, etc., use data and advanced analytics to strengthen their business models using sharing platforms and apps [58]. Different authors such as Anwar (2018), Sedkaoui and Benaichouba (2019), Wu and Yang (2021), Wirtz (2021), and Garud et al. (2022) analyze different SE companies based on digital platforms, examine the key concepts of analytics and big data, their challenges, importance, and the role they play in creating new opportunities for SE companies, and they also analyze how companies with SE economic business models use data analysis to create value [22,58,66–68].

Many authors examine the services provided on different internet platforms such as Uber, Airbnb, Gumtree, eBay, Amazon, and others [58–60,68,70,71,73–77]. Lingaitienė et al. (2022) examined customer habits using digital sharing platforms when they need to share products and services that help save natural resources and support sustainable development [60]. Kirchner and Schüßler (2019) described the role of online profit-seeking platforms for ride-hailing, housing rental, shopping, repair, and other services in the SE,

with the help of which conventional services have been transferred to the online space [73]. Ariesty and Sari (2021) wrote about the use of the Internet for economic activities, the challenges faced by e-platform providers in the face of the increasing number of e-platforms, how to properly withstand the competition, and what strategies to apply [70]. The authors investigated whether customer loyalty affects e-commerce and which factors influence it. Akin et al. (2021) investigated a feasibility study of the Norwegian neighborhood-sharing platform Nabohjelp, which looked at the motivations of the users, their experiences using the platform, and the allocations invested in the technological aspects of the implementation and support of the platform [71]. Burinskienė et al. (2021) performed a theoretical and statistical analysis of the data in the study promoting sustainable sharing activities, analyzing macroeconomic variables, and determining how popular sharing platforms are, including user behavior patterns and the acceptance of different technologies [55].

Social media platforms have become especially relevant during the COVID-19 pandemic. In some disorders, SE practice activities with social aspects are carried out by choosing a social media platform. To prevent the spread of the virus, cases where social media have been investigated became the main choice of election participants for campaigning [78].

Another important aspect is the usage and application of blockchain technology and the Internet of Things for shared economy applications that allow people to generate wealth by selling or reusing their belongings and making money from them [81]. A great example of this is sharing in the digital economy, complementing the well-known SE apps Airbnb, Lyft, BlaBlaCar, and others with other sharing apps that provide mechanisms of peer-to-peer automatic payment, platforms of foreign exchange, the management of digital rights, and culture [76,77,79].

5. Materials and Methods

This study aims to determine the main technological variables which are important for accelerating sharing activity. Most of these methods are mentioned by Lingaitienė et al. (2022) [60]. The authors of this paper integrated several quantitative methods for the first time to get higher quality research results which are important for constructing the panel regression model. The authors used the robust least squares (RLS) method to remove outliers, and by using this method, they constructed a model that includes technological variables and shows their importance for the development of sharing activity.

The study was delivered in two stages and integrated into the formed methodology (Table 3).

Table 3. Research methodology.

Methods Integrated into the Methodology	Argumentation	Realization Steps	Output
1. Correlation analysis method	Revision of technological variables and identification of strong and weak connections.	Formation of panel data, normalization, and construction of correlation matrix.	Identification of technological variables that could be used for further research.
2. Robust least squares (RLS) method	Construction of equations using RLS and identification of probabilities that meet RLS requirements.	Removal of outliers and revision of probability change after outlier removal.	Confirmation of equations, forecasting the number of visitors selecting specific sharing platforms

After the first stage, the authors selected those technological variables whose probability met the critical values. The second stage was used repeatedly to check that probability values do not exceed critical values.

To analyze the dynamic interactions, selected variables are taken from the publicly available Eurostat database for the 12-year-period 2011–2022 [35]. The authors selected 13 variables across the EU-27 countries to examine whether they have an impact on the use

of 10 sharing economy platforms (Airbnb, BlaBlaCar, eBay, Fiverr, Gumtree, Kickstarter, Lime, Uber, UpWork, and Vinted). The authors of this dataset tested the significance of correlation (according to Appendix A) by using the probability of visiting sharing platforms.

The authors of this paper used a robust least squares approach between the dependent and the regressors, converting the regression coefficients into a model representing a robust estimation (focusing on a class of techniques called M-estimators).

This analysis removes outliers and allows assumptions about relationships' existence (non-existence) in pairs. The dependent variables were selected using the number of visits to sharing platforms. Such data for the last month of the year were collected from Google Trends [82].

Following the dynamic regression method, the regression equation (Equation (1)) was developed to estimate how technological variables affect the number of visits to different sharing platforms (following Appendix A):

$$Pl\_\mathrm{sh}_{(t)} = \beta_0 + \beta_1 Pl\_\mathrm{sh}_{(t-1)} + \beta_2 acv_{(t)} + \beta_3 fbb_{(t)} + \beta_4 fbs_{(t)} + \beta_5 iuifi_{(t)} + \beta_6 iuiog_{(t)} + \beta_7 iuip_{(t)} + \beta_8 iui_{(t)} + \beta_9 \mathrm{oubi}_{(t)} + \beta_{10}\, lia_{(t)} + \beta_{11}\, mia_{(t)} + \beta_{12} mcb_{(t)} + \beta_{13} mcs_{(t)} + \beta_{14}\, pict_{(t)} + u_{(t)} \quad (1)$$

The elements of this equation are explained in the Table 4.

Table 4. The elements of this Equation (1).

Meaning	Description
$\mathrm{sh}_{(t)}$	logarithmic dependent variable—the number of customers visiting a particular sharing platform (*Pl*) in EU27 countries in year *t*;
β_0	Intercept;
$acv_{(t)}$	dlog of computers availability, percentage of households in EU27 countries in year *t*;
$fbb_{(t)}$	dlog of fixed broadband basket prices of gni (fbb);
$fbs_{(t)}$	dlog of number of fixed broadband subscriptions per 100 inhabitants in EU27 countries per year *t*;
$iuifi_{(t)}$	dlog of people using the Internet to find information on goods and services, percentage of people in EU27 countries per year *t*;
$iuiog_{(t)}$	dlog of people using the Internet for ordering goods and services, percentage of people in EU27 countries in year *t*;
$iuip_{(t)}$	dlog of individuals using the Internet to participate in social networks, percentage of people in EU27 countries in year *t*;
$iui_{(t)}$	dlog of individuals using the Internet for selling goods or services of people in EU27 countries in year *t*;
$oubi_{(t)}$	dlog of the Internet use by individuals, percentage of individuals in EU27 countries in year *t*;
$lia_{(t)}$	dlog of the level of Internet access, percentage of households in EU27 countries in year *t*;
$mia_{(t)}$	dlog of mobile internet access, percentage of individuals who used a mobile phone or smartphone to access the Internet in EU27 countries in year *t*;
$mcb_{(t)}$	dlog of mobile cellular basket prices of gni in EU27 countries in year *t*;
$mcs_{(t)}$	dlog of mobile cellular subscriptions per 100 people;
$pict_{(t)}$	dlog of the percentage of the ICT sector on GDP ICT services in EU27 countries in year *t*;
$u_{(t)}$	random model error;
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}$	elasticity coefficients reflecting the influence of independent variables on sharing.

The authors of this paper included all variables in the constructed regression model, which, according to Appendix A (Table A1), had a probability value lower than 0.05.

6. Results

The authors analyzed technological variables and identified variables with the highest impact on sharing platform development. Three of the most significant technological variables have an impact on customers' number of visits to the analyzed sharing platforms; in particular, such variables are the percentage of the ICT sector on GDP, the Internet use by individuals, and individuals using the Internet for participating in social networks (Table 5). All variables mentioned in Table 5 are in logarithm.

Table 5. Impact of technological variables on sharing platforms: coefficients and probabilities.

Variables	Airbnb	BlaBlaCar	eBay	Fiverr	Gumtree	Kickstarter	Lime	Uber	Upwork	Vinted
AIRBNB (−1)	0.6157 *** 0									
BLABLACAR (−1)		1.0042 *** 0								
EBAY (−1)			1.0728 *** 0							
FIVERR (−1)				0.4018 *** 0						
GUMTREE (−1)					0.9907 *** 0					
KICKSTARTER (−1)						0.0107 * 0.0816				
UPWORK (−1)									0.0293 *** 0	
UBER (−1)								0.5800 *** 0		
LIME (−1)							0.5159 *** 0			
ACV				−0.0223 *** 0		0.0253 *** 0				
FBB									−0.2099 *** 0.0018	
FBS	0.1478 ** 0.0441	−0.3729 ** 0.0335					8.5002 *** 0.0001			
IUIFI	−0.0275 *** 0.0023					−0.0326 ** 0.0307				
IUIOG	0.0251 *** 0							0.1341 *** 0.0001	0.1725 *** 0.0016	
IUIP	0.0191 *** 0		−0.0077 *** 0	0.0252 *** 0.0002	−0.01532 *** 0.0082			0.0328 *** 0		
IUI										4.3356 *** 0
OUBI				−0.0423 ** 0.0285			−30.6970 *** 0.0029	−0.0425 ** 0.0254		−4.2714 *** 0
LIA							30.6354 *** 0.003			
MCB		0.0564 *** 0						−0.1473 *** 0.0006		
MCS	−0.1702 ** 0.0136	0.3437 ** 0.0367					−8.0929 *** 0.0001			
MIA										
PICT	−0.0073 ** 0.0337	−0.0417 *** 0		0.0166 *** 0.0071		−0.015086 *** 0.0037		−0.0200 *** 0.0038		

Abbreviations of variables are explained before Appendix A. Note: *—the probability is higher than 0.5; **—the probability is higher than 0.1; ***—the probabity is lower than 0.1.

Table 5 shows that five technological factors impact the level of use of the Uber platform. However, the eBay and Gumtree sharing platforms are dependent on a single technological variable representing individuals using the Internet to participate in social networks. Among the variables, the variable representing individuals using the Internet to sell goods or services has a single impact on the Vinted platform's development. However, the variable representing the level of Internet access has a single impact on the development of the Lime sharing platform.

The results show that a single technological variable is absent from all formed equations, which represents mobile internet access by individuals (Table 5).

The equations were constructed with eViews 13 software. Figure 1 illustrates the constructed equations. The signaling tables for Equations (2)–(11) are provided in Appendix B (see Figures A1–A10). For testing statistics, the authors applied the robust least squares method.

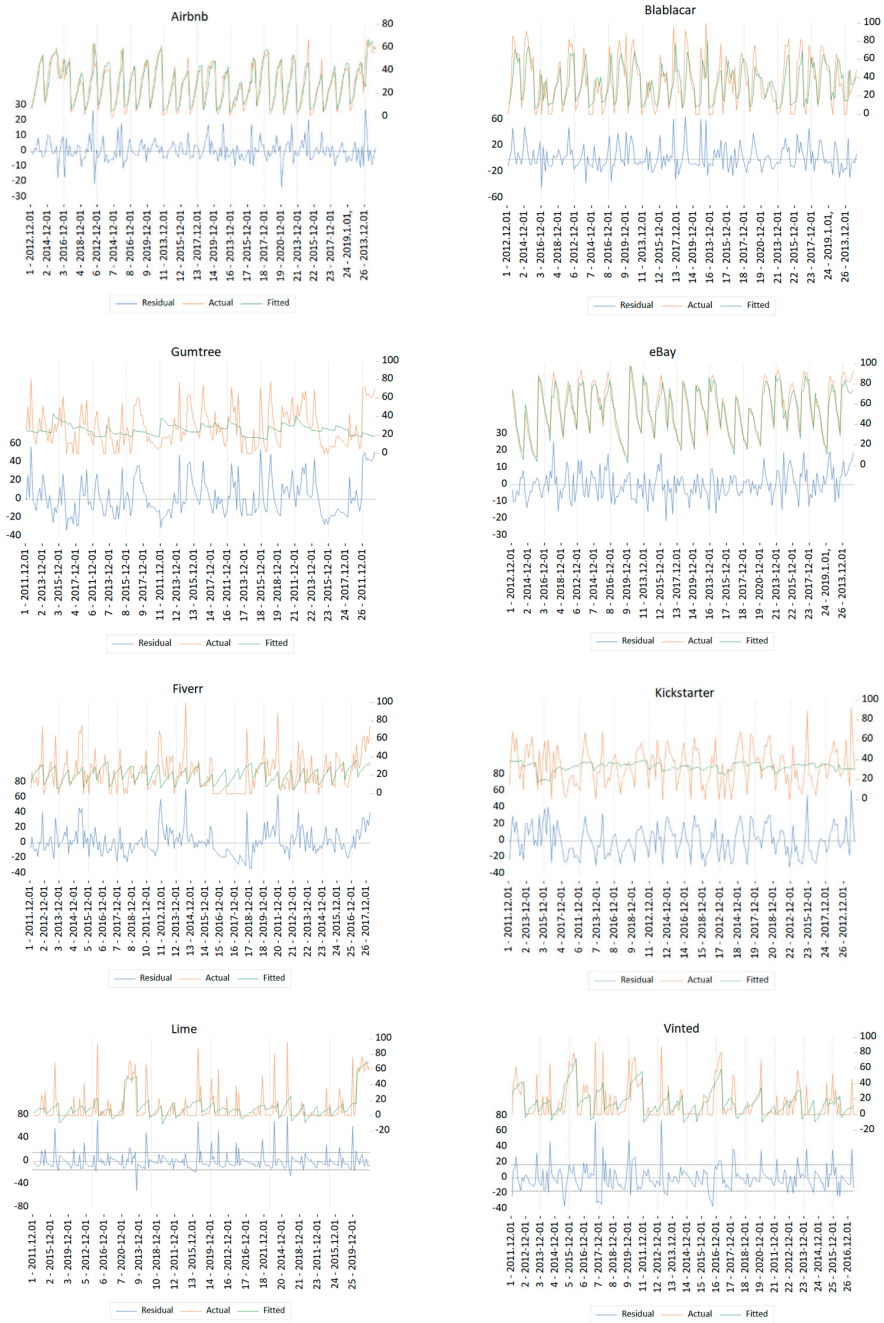

Figure 1. Forecasting accuracy: the number of visits to sample sharing platforms in the EU27 countries. Source: constructed by the authors.

The regression equations are presented below (Equations (2)–(11)):

$$Airbnb\_sh_{(t)} = 1.759 + 0.615\ Airbnb\_sh_{(t-1)} + 0.147\ fbs_{(t)} - 0.027\ iuifi_{(t)} + 0.025\ iuiog_{(t)} + 0.019\ iuip_{(t)} - 0.170\ mcs_{(t)} - 0.007\ pict_{(t)} \quad (2)$$

$$Blablacar\_sh_{(t)} = -0.169 + 1.00\ Blablacar\_sh_{(t-1)} - 0.372\ fbs_{(t)} + 0.056\ mcb_{(t)} + +0.343\ mcs_{(t)} - 0.041\ pict_{(t)} \quad (3)$$

$$eBay\_sh_{(t)} = -0.404 + 1.072\ eBay\_sh_{(t-1)} - 0.007\ iuip_{(t)} \quad (4)$$

$$Fiverr\_sh_{(t)} = -2.091 + 0.401\ Fiverr\_sh_{(t-1)} - 0.022\ avc_{(t)} + 0.025\ iuip_{(t)} - 0.042\ oubi_{(t)} + 0.016\ pict_{(t)} \quad (5)$$

$$Gumtree\_sh_{(t)} = -0.040 + 0.990\ Gumtree\_sh_{(t-1)} - 0.015\ iuip_{(t)} \quad (6)$$

$$Kickstarter\_sh_{(t)} = 3.551 + 0.010\ Kickstarter\_sh_{(t-1)} + 0.025\ avc_{(t)} - 0.032\ iuifi_{(t)} - 0.015\ pict_{(t)} \quad (7)$$

$$Lime\_sh_{(t)} = 6.329 + 0.515\ Lime\_sh_{(t-1)} + 8.500\ fbs_{(t)} + 30.635\ lia_{(t)} - 8.092\ mcs_{(t)} - 30.697\ oubi_{(t)} \quad (8)$$

$$Uber\_sh_{(t)} = 1.042 + 0.580\ Uber\_sh_{(t-1)} + 0.134\ iuiog_{(t)} + 0.032\ iuip_{(t)} - 0.147\ mcb_{(t)} - 0.042\ oubi_{(t)} - 0.020\ pict_{(t)} \quad (9)$$

$$Upwork\_sh_{(t)} = 2.901 + 0.029\ Upwork\_sh_{(t-1)} - 0.209\ fbb_{(t)} + 0.172\ iuiog_{(t)} \quad (10)$$

$$Vinted\_sh_{(t)} = 4.176 + 4.335\ iui_{(t)} - 4.271\ oubi_{(t)} \quad (11)$$

Such a finding suggests that other values not included in early sharing studies are also very important when studying the number of visits to sharing platforms. The authors identified which technological variables are the most important and impact the number of visits to sharing platforms. The results show which technological variable prevails, i.e., the percentage of the ICT sector on GDP ICT services in EU27 countries. The data provide a model and are normalized using a logarithmic process.

In Figure 1, there are three curves, which present how closely the fitted curve matches the actual curve, i.e., in terms of forecasting accuracy. The residual curve shows the difference between fitted and actual values.

The number of visits to the sharing platform is identified after removing outliers while applying the RLS method. The results are shown in Figure 1.

The negative direction of technological variables in the constructed model shows that concrete sharing platforms must put more effort into specific areas represented by variables in order not to lose their market share and keep their competitive advantage.

In this article, the authors identified that technological variables are important for developing sharing activity. The constructed equations allow us to forecast the development of sharing platforms. Among ten sharing platforms, the highest dependence on technological variables is represented in the regression equation dedicated to Uber; such variables are the percentage of individuals using the Internet for ordering goods or services, the percentage of individuals using the Internet for participating in social networks; the percentage of individuals using the Internet; mobile cellular basket prices of GNI; and the percentage of the ICT sector on GDP ICT services.

Technological variables have a significant impact on the development of the sharing economy. The percentage of people who use the Internet to order goods or services is an important indicator because it reflects the potential customer base of various sharing economy platforms such as Uber, Airbnb, and food delivery services. As this percentage increases, it will provide a larger user base for sharing services.

It is also important to determine what percentage of people use the Internet to participate in social media, as this reflects internet connectivity and trust between individuals, which is essential to the success of the platform economy.

The number of people using the Internet is an important driver of economic growth, as it reflects digital literacy and the availability of potential users. More and more Internet users believe that using the services of the sharing economy is becoming easier and easier.

The development of the sharing economy is also influenced by another economic indicator, expressed as a percentage of gross national income (GNI). The price of mobile

phone services, which is the lowest, is likely to increase the availability and acceptability of mobile services across the collaborative economy.

The contribution of ICT to GDP is also a key indicator of national infrastructure and technological readiness. A strong ICT sector lays the foundations for developing the technologies needed to improve these services.

Uber is a great real-life example of people accessing a transport service through a sharing platform that connects people who need transport services with those who provide those services—self-employed drivers who share their vehicle and personal time. This highlights the availability of services related to car ownership, which is one of the basic principles of the sharing economy.

Uber's success has changed people's attitudes towards transportation and helped them efficiently use untapped resources like private vehicles. The collaborative economy, of which Uber is a key player, is characterized by a peer-to-peer model in which technology is used to facilitate the exchange of goods and services to make them more accessible to all stakeholders.

With Uber, drivers can enjoy comfortable charter rides and evaluate their vehicles when not in use, turning them into revenue-generating assets. This symbiotic relationship reflects the ethics of the collaborative economy, which prioritizes resource sharing and economic efficiency in traditional patterns of ownership and consumption. Uber's success has paved the way for the development and diversification of the sharing economy, not just transportation.

7. Discussion and Conclusions

An analysis of the scientific literature shows a scarcity of research on digital technologies contributing to accelerating the sharing economy. The paper's authors described the key technological variables that drive sharing activities to fill the identified research gap. The developed methodology could be used for researching other sharing platforms and for the comparative analysis of the development of the sharing economy in other countries.

Main idea: A transition towards the growth of the sharing economy has many linkages with technologies. Such interactions are essential in helping ensure that consumers, via sharing, can contribute to saved resources. In this article, the authors conducted a study identifying important technological variables for the number of customers visiting a particular sharing platform as the main indicator of sharing economy development.

Contribution to research: According to previous studies, technological variables had the highest impact on sharing development. The authors proposed a methodological framework that focuses on revising technological variables and identifying which technological variables have the highest impact on customers fostering the usage of sharing platforms.

Practical implications: In this article, the researchers studied technological variables important to developing sharing platforms, excluding other less significant ones. The authors revised and recommended the regression equation characterizing the variables impacting the number of customers visiting a particular sharing platform. The authors analyzed ten sharing platforms and identified which technological variables impact their development. The system can be applied in practice and could serve and be useful for those interested in analyzing sharing economy development cases.

Originality/Value: This paper analyzes and investigates the number of customers visiting a particular sharing platform by applying the dynamic regression method, which is quite a new application in similar studies.

The authors delivered empirical research to identify the most essential variables for accelerating the sharing economy. To qualitatively assess the development of sharing platforms, the authors revised the technological variables (mainly those representing the availability of digital services for society) and constructed regression models using several cases of sharing platforms. The results of the equation formation show that the most fundamental variable in the development of sharing platforms is the percentage of the ICT sector on GDP. Less significant but distinguishable variables for developing sharing

platforms represent individuals using the Internet to sell goods or services and the level of Internet access. The regression equation showed that the variable representing individuals with mobile internet access is not included in the regression equation, which could indicate that sharing platforms should do more work on the target audience that uses mobile Internet. However, the research has some limitations. Not all the technological variables were analyzed in the paper. Such investigations could be the future direction for further studies. Moreover, the authors could analyze the necessary digital technologies in the SE context, investigating more influential technological variables.

This paper has some further limitations. The authors analyzed only ten sharing platforms, 13 variables, and 27 EU countries. Twelve years covering the period 2011–2022 were analyzed.

Continuing the research cycle, the authors plan to investigate the acceleration of the sharing economy by expanding all the parameters mentioned: adding more variables (referred to as the Sharing Index) that reflect the political, economic, legal, and social environment, and expanding the geographical area to include the same and additional countries. It is also likely that a future study will cover a different time period than the one chosen in this paper. An area for further research could be the search for an answer to the still unanswered question: What is the place of technological variables among the factors included in the sharing economy index?

Author Contributions: Conceptualization, V.G. and O.L.; methodology, A.B.; validation, A.B.; formal analysis, O.L.; investigation, V.G.; data collection, V.G.; writing—original draft preparation, O.L.; writing—review and editing, A.B. All authors have read and agreed to the published version of the manuscript.

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Abbreviations

ACV	Availability of computers, percentage of households;
FBB	Fixed broadband basket prices of GNI;
FBS	Fixed broadband subscriptions per 100 people;
IUIFI	Individuals using the Internet for finding information about goods and services, percentage of individuals;
IUIOG	Individuals using the Internet for ordering goods or services, percentage of individuals;
IUIP	Individuals using the Internet for participating in social networks, percentage of individuals;
IUI	Individuals using the Internet for selling goods or services, percentage of individuals;
OUBI	Internet use by individuals, percentage of individuals;
LIA	Level of internet access, percentage of households;
MCB	Mobile cellular basket prices of GNI;
MCS	Mobile cellular subscriptions per 100 people;
MIA	Mobile internet access percentage of individuals who used a mobile phone or smartphone to access the Internet;
PICT	Percentage of the ICT sector on GDP ICT services.

Appendix A

Table A1. Correlation matrix before the removal of outliers.

Matrix	Variable	AirBnB	BlaBlaCar	eBay	Fiverr	Gumtree	Kickstarter	Lime	Uber	Upwork	Vinted
ACV	Corr.coef.	−0.27	0.14	0.28	−0.29	0.33	0.36	−0.17	0.07	0.18	−0.32
	Prob.	0	0	0	0	0	0	0	0	0	0
FBB	Corr.coef.	−0.14	0.10	0.17	−0.09	0.30	0.21	−0.25	−0.05	0.18	−0.22
	Prob.	0	0	0	0.1	0	0	0	0	0	0
FBS	Corr.coef.	0.24	0.20	−0.27	0.29	−0.05	0.16	0.18	0.27	0.27	0.12
	Prob.	0	0	0	0	0	0	0	0	0	0
IUIFI	Corr.coef.	0.27	0.03	−0.18	0.13	−0.37	−0.07	0.29	0.17	0.01	0.21
	Prob.	0	1	0	0	0	0.2	0	0	1	0
IUIOG	Corr.coef.	0.13	0.34	−0.03	0.03	0.22	0.30	0.01	0.30	0.27	0.00
	Prob.	0	0	1	1	0	0	1	0	0	1
IUIP	Corr.coef.	0.49	0.14	−0.34	0.23	−0.43	−0.17	0.31	0.19	−0.10	0.14
	Prob.	0	0	0	0	0	0	0	0	0.1	0
IUI	Corr.coef.	0.22	0.07	−0.12	0.14	−0.33	−0.01	0.19	0.15	0.00	0.15
	Prob.	0	0	0.0	0	0	0.8	0	0	1	0
OUBI	Corr.coef.	0.36	0.10	−0.25	0.13	−0.39	−0.12	0.32	0.25	−0.06	0.24
	Prob.	0	0	0	0	0	0.0	0	0	0	0
LIA	Corr.coef.	0.43	0.14	−0.28	0.22	−0.46	−0.13	0.39	0.27	−0.06	0.25
	Prob.	0	0	0	0	0	0	0	0	0	0
MCB	Corr.coef.	−0.27	−0.02	0.24	−0.10	0.49	0.21	−0.31	−0.21	0.18	−0.29
	Prob.	0	1	0	0.1	0	0	0	0	0	0
MCS	Corr.coef.	−0.15	−0.01	0.05	−0.16	0.12	0.11	−0.10	0.06	0.01	0.05
	Prob.	0	0.8	0.3	0	0	0	0.1	0.3	0.9	0
MIA	Corr.coef.	0.30	0.51	−0.16	0.15	0.20	0.32	0.05	0.36	0.33	0.01
	Prob.	0	0	0	0	0	0	0	0	0	1
PICT	Corr.coef.	0.10	0.16	−0.12	0.14	0.10	0.11	−0.10	0.18	0.19	0.00
	Prob.	0	0	0	0	0	0.1	0.1	0	0	0.9

Appendix B

Dependent Variable: LOG(AIRBNB)
Method: Robust Least Squares
Date: 08/19/23 Time: 14:23
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficien	Std. Error	z-Statistic	Prob.
C	1.759879	0.092216	19.08438	0
LOG(AIRBNB(-1))	0.615748	0.005805	106.0695	0
LOG(FBS)	0.147865	0.073462	2.012803	0.0441
LOG(IUIFI)	-0.027501	0.009003	-3.054745	0.0023
LOG(IUIOG)	0.025133	0.002778	9.048453	0
LOG(IUIP)	0.019113	0.003335	5.731856	0
LOG(MCS)	-0.170236	0.069015	-2.466641	0.0136
LOG(PICT)	-0.007349	0.003461	-2.123184	0.0337

Robust Statistics

R-squared	0.53506	Adjusted R-squared	0.523353
Rw-squared	0.900112	Adjust Rw-squared	0.900112
Akaike info criterion	429.8127	Schwarz criterion	461.2936
Deviance	24.872	Scale	0.244503
Rn-squared statistic	14808.66	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	2.755416	S.D. dependent var	2.906611
S.E. of regression	2.608097	Sum squared resid	1891.003

Figure A1. Statistics for Airbnb.

Dependent Variable: LOG(BLABLACAR)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:58
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.169994	0.204758	-0.830222	0.4064
LOG(BLABLACAR(-1))	1.004263	0.005759	174.3695	0
LOG(FBS)	-0.372924	0.175456	-2.125459	0.0335
LOG(MCB)	0.056435	0.00838	6.734448	0
LOG(MCS)	0.343703	0.164536	2.08892	0.0367
LOG(PICT)	-0.041725	0.008263	-5.0498	0

Robust Statistics

R-squared	0.143752	Adjusted R-squared	0.128462
Rw-squared	0.992867	Adjust Rw-squared	0.992867
Akaike info criterion	567.5853	Schwarz criterion	594.8778
Deviance	303.768	Scale	0.735889
Rn-squared statistic	36125.38	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	-0.446145	S.D. dependent var	7.795133
S.E. of regression	8.088312	Sum squared resid	18317.82

Figure A2. Statistics for BlaBlaCar.

Dependent Variable: LOG(EBAY)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:39
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.404586	0.023334	-17.33893	0
LOG(EBAY(-1))	1.072816	0.005558	193.0335	0
LOG(IUIP)	-0.007772	0.001611	-4.822931	0

Robust Statistics

R-squared	0.609127	Adjusted R-squared	0.606365
Rw-squared	0.941815	Adjust Rw-squared	0.941815
Akaike info criterion	390.6046	Schwarz criterion	403.8754
Deviance	12.09925	Scale	0.176838
Rn-squared statistic	37765.06	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	3.700722	S.D. dependent var	1.763747
S.E. of regression	2.459261	Sum squared resid	1711.574

Figure A3. Statistics for eBay.

Dependent Variable: LOG(FIVERR)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:53
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	2.091821	0.088975	23.5103	0
LOG(FIVERR(-1))	0.401859	0.00542	74.14208	0
LOG(AVC)	-0.0223	0.004712	-4.732623	0
LOG(IUIP)	0.02521	0.006816	3.698813	0.0002
LOG(OUBI)	-0.042394	0.019359	-2.189844	0.0285
LOG(PICT)	0.016636	0.00618	2.692034	0.0071

Robust Statistics

R-squared	-0.076006	Adjusted R-squared	-0.095221
Rw-squared	0.442123	Adjust Rw-squared	0.442123
Akaike info criterion	592.5564	Schwarz criterion	620.7255
Deviance	312.2177	Scale	0.729437
Rn-squared statistic	5942.825	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	0.162703	S.D. dependent var	7.080605
S.E. of regression	6.493047	Sum squared resid	11804.7

Figure A4. Statistics for Fiverr.

Dependent Variable: LOG(GUMTREE)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:56
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.040428	0.036937	-1.094503	0.2737
LOG(GUMTREE(-1))	0.990741	0.005069	195.4587	0
LOG(IUIP)	-0.01532	0.005796	-2.643106	0.0082

Robust Statistics

R-squared	0.315107	Adjusted R-squared	0.310266
Rw-squared	0.994583	Adjust Rw-squared	0.994583
Akaike info criterion	569.921	Schwarz criterion	582.5898
Deviance	167.342	Scale	0.543925
Rn-squared statistic	38693.34	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	-1.059494	S.D. dependent var	7.889337
S.E. of regression	7.387027	Sum squared resid	15442.79

Figure A5. Statistics for Gumtree.

Dependent Variable: LOG(KICKSTARTER)
Method: Robust Least Squares
Date: 08/19/23 Time: 23:01
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficien	Std. Error	z-Statistic	Prob.
C	3.551394	0.071816	49.4514	0
LOG(KICKSTARTER(-1))	0.010761	0.00618	1.741236	0.0816
LOG(AVC)	0.025396	0.003857	6.584977	0
LOG(IUIFI)	-0.03262	0.015094	-2.16122	0.0307
LOG(PICT)	-0.015086	0.005193	-2.905158	0.0037

Robust Statistics

R-squared	0.073183	Adjusted R-squared	0.05999
Rw-squared	0.197963	Adjust Rw-squared	0.197963
Akaike info criterion	415.3035	Schwarz criterion	437.4894
Deviance	129.5285	Scale	0.562613
Rn-squared statistic	53.27399	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	1.333111	S.D. dependent var	6.009585
S.E. of regression	6.343603	Sum squared resid	11307.8

Figure A6. Statistics for Kickstarter.

Dependent Variable: LOG(LIME)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:47
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	6.329205	2.406975	2.629526	0.0086
LOG(LIME(-1))	0.515992	0.057346	8.997936	0
LOG(FBS)	8.500283	2.186031	3.888455	0.0001
LOG(LIA)	30.63549	10.3096	2.971549	0.003
LOG(MCS)	-8.092967	2.046324	-3.954881	0.0001
LOG(OUBI)	-30.69709	10.31309	-2.976516	0.0029

Robust Statistics

R-squared	0.32881	Adjusted R-squared	0.316824
Rw-squared	0.427515	Adjust Rw-squared	0.427515
Akaike info criterion	328.6329	Schwarz criterion	350.8728
Deviance	15565.72	Scale	7.008067
Rn-squared statistic	147.7926	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	-6.890671	S.D. dependent var	9.418827
S.E. of regression	8.117541	Sum squared resid	18450.45

Figure A7. Statistics for Lime.

Dependent Variable: LOG(UBER)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:41
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.042428	0.168281	6.194576	0
LOG(UBER(-1))	0.580043	0.009982	58.11016	0
LOG(IUIOG)	0.134124	0.03407	3.936752	0.0001
LOG(IUIP)	0.03282	0.006692	4.904251	0
LOG(MCB)	-0.147306	0.043039	-3.422647	0.0006
LOG(OUBI)	-0.042574	0.019049	-2.234976	0.0254
LOG(PICT)	-0.020053	0.006935	-2.891412	0.0038

Robust Statistics

R-squared	0.296606	Adjusted R-squared	0.281479
Rw-squared	0.667878	Adjust Rw-squared	0.667878
Akaike info criterion	453.4238	Schwarz criterion	481.9637
Deviance	138.0563	Scale	0.558643
Rn-squared statistic	3754.391	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	1.918448	S.D. dependent var	5.033893
S.E. of regression	4.756832	Sum squared resid	6313.058

Figure A8. Statistics for Uber.

Dependent Variable: LOG(UPWORK)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:51
Sample (adjusted): 2012 2022
Included observations: 286 after adjustments
Method: S-estimation
S settings: tuning=1.547645. breakdown=0.5. trials=200. subsmpl=4. refine=2. compare=5
Random number generator: rng=kn. seed=1199865052
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	2.901822	0.206555	14.0487	0
LOG(UPWORK(-1))	0.029381	0.005068	5.796908	0
LOG(FBB)	-0.20995	0.067398	-3.115098	0.0018
LOG(IUIOG)	0.172506	0.054738	3.151497	0.0016

Robust Statistics

R-squared	0.113396	Adjusted R-squared	0.103964
Scale	0.641509	Deviance	0.411534
Rn-squared statistic	42.9526	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	-0.512786	S.D. dependent var	7.897706
S.E. of regression	8.854914	Sum squared resid	22111.48

Figure A9. Statistics for Upwork.

Dependent Variable: LOG(VINTED)
Method: Robust Least Squares
Date: 08/19/23 Time: 22:45
Sample: 2011 2022
Included observations: 312
Method: M-estimation
M settings: weight=Bisquare. tuning=4.685. scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	4.176067	1.959505	2.131185	0.0331
LOG(IUI)	4.335613	0.609273	7.116039	0
LOG(OUBI)	-4.271443	0.673794	-6.339394	0

Robust Statistics

R-squared	0.040481	Adjusted R-squared	0.034271
Rw-squared	0.092343	Adjust Rw-squared	0.092343
Akaike info criterion	577.7032	Schwarz criterion	582.2833
Deviance	22871.1	Scale	6.36207
Rn-squared statistic	51.19713	Prob(Rn-squared stat.)	0

Non-robust Statistics

Mean dependent var	-4.542674	S.D. dependent var	9.35729
S.E. of regression	10.14003	Sum squared resid	31771.42

Figure A10. Statistics for Vinted.

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