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Are collaborative economy platforms an engine for tourism resilience? Evidence from the European Union

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Abstract
The collaborative economy, characterised by peer-to-peer exchanges facilitated by digital platforms, has rapidly emerged as a significant force in various sectors, and especially in tourism. This paper follows a twofold objective: firstly, it investigates the resilience of the collaborative economy platforms during the last shock, and secondly, it scrutinizes whether they serve as an engine for tourism resilience within the European Union. Through a comprehensive analysis of data provided by Eurostat, the study examines the extent to which these platforms contribute to the adaptability of the tourism sector in the face of economic and social challenges. Findings suggest that collaborative economy platforms enhance tourism resilience, however, the mechanisms of this resilience enhancement are still unknown, as the relation between the resilience of collaborative economy platforms and tourism sector is neither evenly distributed among the European regions, nor directly connected to various sector dependent variables. The paper concludes by discussing policy implications and recommending strategies for leveraging collaborative economy platforms to bolster tourism resilience across the EU.

Keywords: collaborative economy platform, tourism resilience, regional resilience, digital economy

Introduction

The tourism sector has witnessed a paradigm shift with the emergence of the collaborative economy, defined by peer-to-peer exchanges facilitated by digital platforms. Central to this evolution are platforms like Airbnb, Booking, and Uber, which have revolutionised traditional tourism and hospitality models by facilitating personalised, affordable travel experiences. This transformative economic model, often referred to as the "sharing economy" (Cheng, 2016; Puschmann & Alt, 2016), has significantly influenced the tourism landscape, creating both opportunities and challenges. Prior to the disruptive impact of the 2020 pandemic, the relationship between tourism and collaborative economy platforms was predominantly framed within narratives of sustained growth, marked by rising tourism arrivals and

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expanding service offerings (Pascariu & Ibănescu, 2018; Pascariu et al., 2021). However, the pandemic catalysed a paradigm shift, redirecting focus from growth to resilience and adaptive capacity in the face of future shocks. This transition has influenced collaborative economy services, which are integral to the tourism ecosystem. Consequently, a new question arises: do these platforms possess the necessary structure to enhance tourism resilience amid periods of instability?

The concept of resilience in tourism has become increasingly relevant, particularly in light of economic shocks, global health crises, and changing consumer preferences (Hall et al., 2017; Pascariu & Ibănescu, 2018). The role of collaborative economy platforms in fostering such resilience is centred on their capacity to mitigate the impacts of disruptions through adaptive business models and distributed risk mechanisms. Studies suggest that these platforms offer advantages by promoting economic flexibility and consumer accessibility (Canales Gutiérrez, 2021; Gerlich, 2023). Through economic flexibility and cost-effective solutions, collaborative platforms like Airbnb have lowered entry barriers for tourism service. This democratised travel and created a more elastic supply of tourism services, thereby contributing to the sector's overall resilience (Canales Gutiérrez, 2021). At the same time, it created a supplementary source of revenues for the local population, although the later effect is still debatable (Gössling & Hall, 2019).

The literature identifies multiple pathways for collaborative economy platforms to foster resilience within tourism. These include sustainable consumption practices that align with environmental and social goals (Gerlich, 2023), cultural exchange and meaningful social interactions to strengthen community ties (Gyimóthy et al., 2020), and trust and safety mechanisms to enhance consumer confidence (Cauffman, 2016). Such intrinsic features reinforce the adaptability and long-term stability of tourism systems in the face of external disruptions, contributing to a more resilient and sustainable sector.

Despite theoretical recognition of these effects, empirical evidence supporting the claims remains scarce, particularly concerning large-scale tourism systems. Robust empirical studies are needed to validate the concepts and guide the strategic integration of collaborative platforms into broader tourism frameworks, ensuring they are utilised optimally to withstand future disruptions. This study addresses the existing research gap by empirically testing the resilience effects of collaborative economy platforms across European regions during the recent pandemic. The research aim is to generate more robust and contextually relevant findings, by extending the analysis to a broader geographic scope and by incorporating a large number of territorial units. This comprehensive approach enhances the validity of the results and offers a clearer understanding of the role collaborative platforms play in fostering regional tourism resilience under crisis conditions.

1. Collaborative economy platforms and their impact on the European tourism sector

A collaborative economy, or shared economy, involves users using sites or applications to interact or provide services without resorting to intermediaries (Vaughan & Daverio, 2016). Online platforms that approach the collaborative economy facilitate P2P (peer-to-peer) services in tourism (Frenken & Schor, 2017), frequently being accessed by those aimed at booking accommodation, restaurants, and various facilities (Airbnb, Uber). They are an alternative to the classic way of organising a holiday, more personalised and cost-effective due to the multiple options and services that can be accessed depending on the desired price or offers. The basis of these platforms is the technology to match demand with supply. The tourism sector is one of the primary beneficiaries, and indirectly, the cities that have tourism services as an essential tourism branch or even engine of the economy (European Commission, 2016; Ibănescu et al., 2022).

In addition to the popular tourism destinations that have fostered the growth of collaborative economy platforms through shared economic benefits, the swift advancement and widespread accessibility of technology have also been pivotal. This technological proliferation has democratised platform usage (Bănică et al., 2020), enabling broader public engagement and facilitating the seamless integration of the platforms into the tourism landscape, thereby amplifying their impact (Sutherland & Jarrahi, 2018; Valentinas et al., 2021).

Airbnb, Booking.com, Expedia Group, and Tripadvisor have revolutionised tourism through collaborative online platforms. Airbnb (since 2008) facilitates global accommodation rentals, while Booking.com (since 1996) offers diverse travel services. Expedia Group (launched in 1996) provides comprehensive vacation planning, and Tripadvisor (founded in 2000) influences travel decisions with user-generated reviews. Together, these platforms have significantly transformed tourism, enhanced accessibility and reshaping how travellers engage with accommodations and activities.

The past decades brought numerous challenges to the tourism field, especially for tourist destinations of great interest. Their administration suffered constant constraints, which impacted the growth of tourism products and attractiveness of tourist destinations (Mendieta-Aragón et al., 2024). Over time, the platforms' emergence has brought several benefits in order to help tourism destinations better position themselves on the market (Valentinas et al., 2021). Among the most obvious advantages, the higher accessibility and affordability of tourism products, the insertion of local population in the tourism circuit, increasing the number of potential beneficiaries, the creation of tourism networks, the personalization of the product may be mentioned. This movement also led to the revitalization of some unexploited regions or places, while local guides have developed and adapted their work for a global audience. Economically collaborative platforms have brought a plus to the

travel experience in that tourists can experience the tourism activity in a diverse and personalised way (Dredge & Gyimóthy, 2015).

The undeniable success of collaborative economy platforms is supported by economic data (Toni et al., 2018). Key functional features, including the user-friendly interfaces requiring minimal technical skill, accessible support services, and mobile compatibility are contributing to this success. Security measures like reviews, ratings, and verified user data enhance trust, while multiple secure payment options ensure convenience (Kaplan & Haenlein, 2010; Tussyadiah, 2015). Additionally, local regulations have evolved alongside these platforms, addressing short-term rentals and tourist taxes to benefit local economies and maintain organised operations (Mendieta-Aragón et al., 2024).

Collaborative platforms have been associated with more sustainable consumption patterns. Research shows a growing consumer preference for sharing and co-creating travel experiences, which aligns with broader societal shifts towards rational and environmentally conscious tourism consumption (Gerlich, 2023). The collaborative economy has also transformed the sociocultural dynamics of tourism. Platforms encourage greater cultural exchange and social interactions, adding value to travel experiences while reshaping how tourists engage with destinations (Gyimóthy et al., 2020). The success of collaborative platforms hinges on building trust and ensuring safety. Initiatives like trustmarks and transparent policies are crucial for maintaining consumer confidence (Cauffman, 2016).

While collaborative economy platforms offer a series of benefits to the destinations, benefits that cannot contested, they have also brought challenges, particularly in relation to the traditional tourism services. Classic operators, such as travel agencies, have had to modernize their offerings, integrating new services or forming associations to stay competitive in an evolving tourism market. The growth of rental activities has led to housing price inflation, negatively impacting the local residents' quality of life (Shen et al., 2019). In response, authorities have implemented regulations to safeguard community interests and balance the economic benefits of tourism with the local citizens' well-being (Dredge & Gyimóthy, 2015; Frenken & Schor, 2017).

While the positive and negative aspects are still put in balance by local and national policymakers, it cannot be denied that collaborative economic platforms have changed the European tourism sector. Their impact is visible and continues to create changes in the European tourism landscape and beyond. Among the intensely scrutinised effects, resilience rises as one of the most investigated and requiring a deeper look given its complex implications.

2. The resilience of collaborative platforms

Collaborative platforms have fundamentally shaped the tourism sector, providing alternative services that both complement and challenge traditional

business models (Guttentag, 2015; Tussyadiah & Pesonen, 2018). The resilience of these structures during crises, such as natural disasters, socio-political events, economic declines and pandemics, has sparked interest among researchers and policymakers, as they focused on the sector's ability to adapt and recover, emphasising the need for stakeholder collaboration and effective policy-making (Altshuler & Schimdt, 2021; Cellini & Cuccia, 2015; Chen et al., 2020; Dogru et al., 2023; Miguel et al., 2022).

Their flexibility and adaptability, which enable them to swiftly pivot in response to evolving market conditions and shifting consumer preferences (Dolnicar & Zare, 2020; Huang et al., 2022), are intrinsic to these collaborative economy platforms. This has been especially visible during the COVID-19 pandemic, when platforms such as Airbnb quickly shifted to focus on extended stays and local travel experiences, catering to the needs of consumers with limited travel options (Birenboim et al., 2023; Jang et al., 2021). This ability to turn around and reorganise their services demonstrates a level of resilience that is often lacking in traditional tourism enterprises, which tend to be more rigid in their operations due to higher fixed costs and less flexibility in service delivery (Gyodi, 2022; Vila-Lopez & Kuster-Boluda, 2021).

In analysing the resilience of collaborative platforms, it is essential to consider their technological foundations and decentralised operation models. Platforms such as Airbnb, Booking.com or TripAdvisor use advanced digital tools, including data analytics, real-time feedback and algorithms to better adjust to market changes and preferences (Dredge & Gyimothy, 2015; Gerwe, 2021; Pergelova et al., 2024). This technology-driven approach enhances the operational efficiency and facilitates effective crisis management through data-driven decision-making. Such capabilities are essential during major disruptions, enabling these platforms to maintain continuous operations and customer engagement. Furthermore, the decentralised nature of these services contributes to their resilience (Adamiak, 2021; Leoni & Parker, 2019; Minoia & Jokela, 2022). Unlike traditional tourism businesses, which are mostly tied to specific locations, collaborative platforms operate across diverse markets and regions. The geographic diversification provides them with a more effective way to mitigate risks, as these platforms can continue to operate and generate revenue in various areas although one region might be affected by a crisis.

One of the key observations emerging from the literature is that collaborative economy platforms and, in particular, those that offer short-term rentals, have shown greater resilience compared to traditional hospitality providers. Adamiak (2023) conducted an extensive study across 31 European countries, and found that short-term renting was more resilient during the pandemic, especially in the domestic tourism sector. This study combined conventional hotel statistics with novel data on short-stay accommodation gathered by Eurostat. The research attributes this resilience to several factors, including the flexibility of short-term rentals in meeting new consumer preferences, such as minimising contact with others and the ability to

self-cater. These factors became critical as travellers sought safer and more secure accommodation options during the pandemic.

The resilience of collaborative economy platforms has also been driven by strategic adaptability (Bresciani et al., 2021; Dogru et al., 2023; Gerwe, 2021). Gyodi (2022) provides an in-depth analysis of how platforms such as Airbnb adjusted their business models in response to the pandemic. The platforms were able to mitigate the negative effects of the pandemic by shifting their focus to promoting local and domestic travel and encouraging longer stays. The ability to adapt not only helped sustain operations during the crisis, but also positioned the platforms to rebound faster when conditions began to improve.

The literature also points to the importance of tourism clusters and agglomeration economies in support of the platforms' resilience (Lee et al., 2020; Miguel et al., 2022). Jang and Kim (2022) explored how different regions and communities in Florida impact the performance of tourism platforms during crises. Based on statistical data on COVID-19 cases, deaths and their correlation with Airbnb operations, they concluded that listings in areas with strong tourism clusters were more resilient, benefiting from the synergies and support provided by the local tourism ecosystem.

The concept of organisational resilience adds a further layer to understanding how tourism platforms have been able to overcome the challenges posed by the pandemic (Yuan et al., 2022). Kiczmachowska (2022) examined how platforms in the peer-to-peer accommodation sector, such as Airbnb, maintained their functionality and recovered from disruptions. The study found that organisational resilience, defined as the ability to mobilise resources and adapt to changing circumstances, was critical for these platforms. This form of resilience was particularly evident in the platforms' swift implementation of new health protocols, flexibility in adjusting cancellation policies, and agility in adapting service offerings to meet the shifting needs of consumers.

Collaborative economy platforms have not only survived the challenges posed by the pandemic, but thrived in the aftermath and seem to have contributed to the overall resilience of the tourism industry as well. As the industry continues to navigate current and future challenges, lessons learned from these platforms will be important in developing strategies to grow and recover in a sustainable manner (Bourdin et al., 2024). Therefore, the need for a better understanding of their mechanism and relation with the resilience mechanism is mandatory for a better management of tourism destinations.

3. Methods and results

The methodology of this study employs a quantitative approach utilising diverse datasets from Eurostat to analyse regional and sectoral trends across the European Union. The primary data sources include guest nights spent at short-stay

accommodations offered via collaborative platforms, as well as comparative data on nights, establishments, bed capacity, and net occupancy rates in hotels, alongside internet usage statistics. Transport infrastructure metrics, such as passenger air traffic and road and rail networks were added in order to further enrich the analysis and obtain a more solid result (Table 1). This multi-dimensional approach facilitates a nuanced understanding of how collaborative platforms influence tourism resilience across various European contexts.

Table 1. List of variables used for the analysis

Indicator	Explanation	Unit	Source
nights_plat	Guest nights spent at short-stay accommodation offered via collaborative economy platforms by NUTS2	number	Eurostat
nights	Nights spent at tourist accommodation establishments by degree of urbanisation and coastal/non-coastal area and NUTS2 regions	number	Eurostat
est_tour	Establishments, bedrooms and bed-places in tourist accommodation, by NUTS2 regions	number	Eurostat
SELLS	Individuals who used the internet - selling goods or services (%)	percentage	Eurostat
bed_occ	Net occupancy rate of bed-places and bedrooms in hotels and similar accommodation (NACE Rev. 2 activity I55.1) by NUTS2 regions	number	Eurostat
AIR	Air transport of passengers by NUTS2 regions	Thousand passengers	Eurostat
use_int	Individuals who used the internet, frequency of use and activities	% of individuals	Eurostat
access_int	Households with access to the internet at home	% of househol	Eurostat
MOTOR	Road, rail and navigable inland waterways networks by NUTS2 regions	Kilometre	Eurostat

Source: authors' representation

In the first step, the analysis compares the resilience of nights spent via collaborative economy platforms to the overall nights spent across the EU. Considering the multidimensional nature of resilience (Sutton et al., 2023) and the standard procedure in resilience literature (Giannakis & Bruggeman, 2020), resilience is defined for each region during the COVID-19 shock through three major approaches: the resistance phase, the short-term recovery, and the overall resilience level. Resistance is defined as the change in 2020 compared to 2019, short-term recovery is the change in 2021 compared to 2020, and overall resilience level is calculated as the overall changes in 2022 compared to 2019.

The formulas are:

$$Resistance = \frac{Nights^{R}_{2020} - Nights^{R}_{2019}}{Nights^{R}_{2019}} \quad (1)$$

$$Recovery = \frac{Nights^{R}_{2021} - Nights^{R}_{2020}}{Nights^{R}_{2020}} \quad (2)$$

$$Resilience = \frac{Nights^{R}_{2022} - Nights^{R}_{2019}}{Nights^{R}_{2019}} \quad (3)$$

Following the calculation of resistance, recovery, and resilience indicators, mean values for both groups were computed. The results, presented in Table 1, reveal that nights spent via collaborative economy platforms exhibit higher mean values across all indicators compared to total nights spent. To determine if these differences are statistically significant, independent t-tests were performed between the two groups on the resistance, recovery, and resilience indicators. The results showed statistically significant differences in resistance and overall resilience approaches. No statistically significant difference is found between the means of the groups for the short-term recovery phase.

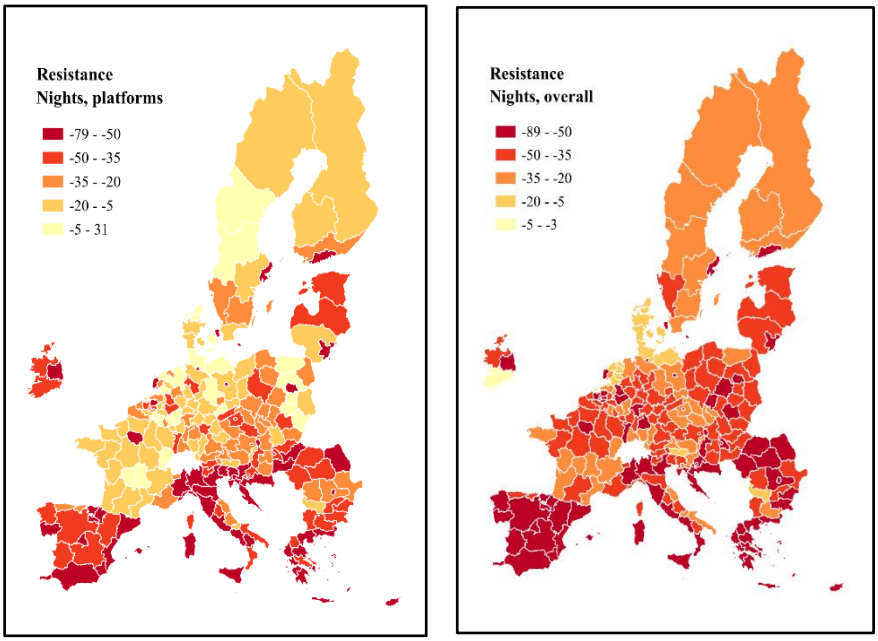
Table 2. Means and t-test results

	Mean (Nights, platforms)	**Mean (Nights, overall)**	***t*-value**	***p*-value**
Resistance	-33.27257	-45.57681	13.1290	0.0000
Recovery	29.50034	28.88021	0.4356	0.6635
Resilience	18.34945	-4.385303	12.8258	0.0000

Source: authors' representation

These findings indicate that tourism demand on online collaborative economy platforms demonstrated greater adaptability during the COVID-19 shock, with higher resistance and resilience compared to overall tourism demand. Figure 1 illustrates the maps of the first phase, the resistance across NUTS 2 regions. A couple of observations emerge from the first maps: the first is that the resistance of the nights booked via online collaborative platforms displayed higher values throughout the European Union; the second is that this particular effect is not evenly distributed, with the central and Nordic part of the continent benefiting more from this positive effect. An important aspect that may have affected the vast majority of the southern regions, in the well-developed Mediterranean tourist areas, is that countries like Greece, Italy, and Spain have been hit harder by the pandemic, therefore, an overall fall in tourism attractiveness can be observed.

Figure 1. Resistance phase: nights spent via platforms and overall

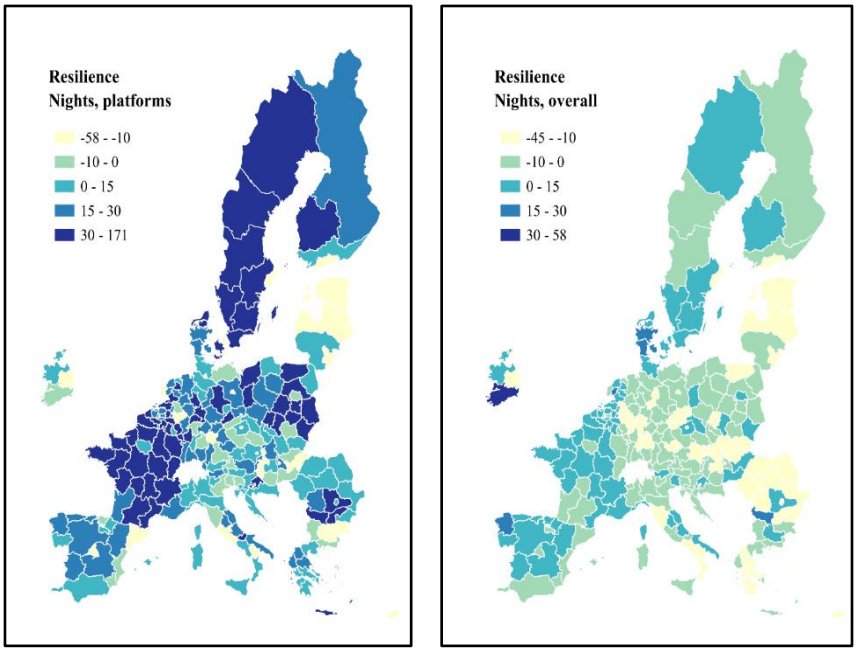


Source: authors' representation using the data of the GISCO and Eurostat

Figure 2 shows a relatively similar image, with higher values for resilience in the central and northern part of the EU. A surprising aspect, later tested in the paper, is signalled by the relatively lower score of the metropolitan capital regions compared with the surrounding regions. In some countries, such as Spain, France, or Romania, the difference between the capital region and the surrounding areas is even more significant. Overall, the capital regions took a little longer to recover from a tourism point of view than the peripheral regions.

Given the outcomes, the subsequent part of this research focuses on identifying the determinants that drive the resistance and resilience of tourism demand on these platforms. Since these services are provided via the Internet, the regions with a higher percentage of individuals using the Internet for selling goods or services (SELLS) are expected to demonstrate greater resilience. Additionally, transport availability is hypothesised to impact regional resilience in tourism demand on these platforms. Therefore, variables such as air transport of passengers (AIR) and road, rail, and navigable inland waterways networks (MOTOR) are included. Martin and Sunley (2015) argue that a region's resilience is tied to its historical growth characteristics, so the explanatory variables are based on pre-COVID-19 data from 2019, in order to respect the overall view on the resilience approach.

Figure 2. Overall resilience of nights spent via platforms and overall



Source: authors' representation using the data of the GISCO and Eurostat

In regional resilience, it is advisable that research should employ a spatial regression approach due to its ability to account for spatial dependencies often overlooked by traditional regression models. Sutton and Sutton (2024) recommend a three-step procedure: first, run an OLS model and subsequently perform Moran's I test to determine the appropriateness of a spatial model; second, select an appropriate spatial model; and finally, choose a spatial weight matrix.

As shown in Tables 2 and 3, we initially ran the OLS model and conducted Moran's I test, which was statistically significant, indicating spatial correlation among the residuals and confirming the suitability of a spatial regression model. Additionally, we verified the absence of multicollinearity among independent variables, with a VIF value of 1.06, well below the common threshold of 5. The second step involved selecting a spatial regression model. Spatial models address spatial dependence by incorporating spatial weight matrices in the dependent variable, explanatory variables, or error terms, and can produce global or local spillover effects (Elhorst, 2014). In regional resilience research, where local spillovers are prevalent, the Spatial Durbin Error Model (SDEM), which we selected, is recommended (LeSage, 2014; Sutton & Sutton, 2024). Finally, to ensure robustness, we repeated estimates by using various weight matrices: first-order contiguity matrix with default spectral normalization in Stata (C), first-order (C1) and second-order (C2) row-standardised contiguity weight

matrices, inverse distance weight matrix with a 500 km threshold (W), and an inverse-distance contiguity matrix containing inverse distances for first-order neighbours and 0 otherwise. The assessment metrics for spatial regression models include the log-likelihood criterion (LogLik), pseudo R^2, and Akaike Information Criterion (AIC), as recommended by Kopczewska (2020).

The model can be written as follows:

$$Y = \beta_0 + X\beta + WX\theta + u, u = \lambda Wu + e \quad (4)$$

In this equation, Y represents the N × 1 vector of the dependent variable, which is the resistance/resilience of tourism demand on online collaborative economy platforms for EU NUTS 2 regions. X denotes the N × K matrix of observations on the explanatory variables, including SELLS, MOTOR, and AIR. β is the K × 1 vector of coefficients to be estimated, while θ is the K × 1 vector of unknown parameters to be estimated. Wis the non-negative N × N spatial weight matrix. WXθ represents the exogenous interaction effect among the explanatory variables, and Wu captures the interaction effect among the error terms of different units. e is the N × 1 vector of error terms.

Conclusively, Table 2 provides the SDEM model estimates for the resistance of tourism demand on online collaborative economy platforms.

Table 3. SDEM estimates, resistance phase

	OLS	**SDEM (C)**	**SDEM (C1)**	**SDEM (C2)**	**SDEM (W)**	**SDEM (CN)**
SELLS	1.117***	0.675***	0.842***	0.738***	0.660**	0.793***
	(0.183)	(0.221)	(0.263)	(0.222)	(0.267)	(0.226)
MOTOR	0.000324	-0.00244	0.000151	-0.00309	0.00135	-0.00111
	(0.00403)	(0.00429)	(0.00429)	(0.00503)	(0.00443)	(0.00415)
AIR	-0.000601***	-0.000557***	-0.000582***	-0.000531***	-0.000664***	-0.000585***
	(0.0000987)	(0.0000982)	(0.000102)	(0.0000963)	(0.000116)	(0.000100)
Cons	-50.63***	-48.99***	-49.98***	-51.36***	-46.61***	-49.66***
	(3.593)	(3.808)	(3.951)	(3.649)	(4.461)	(3.949)
W*SELLS		1.099***	0.363	0.391	1.291	0.925*
		(0.388)	(0.259)	(0.250)	(0.811)	(0.502)
W*MOTOR		-0.00417	-0.00100	-0.00440	-0.00198	-0.000870
		(0.00942)	(0.00492)	(0.00789)	(0.0276)	(0.0155)
W*AIR		-0.000519	-0.000157	0.000450**	-0.00129	-0.000432
		(0.000340)	(0.000215)	(0.000176)	(0.00128)	(0.000379)
λ		0.366*	0.165	0.110	0.657**	0.580***
		(0.198)	(0.107)	(0.130)	(0.325)	(0.185)
N	108	108	108	108	108	108
VIF	1.06					
Moran's I	6.99***					
LogLik	-455.4028	-447.2371	-453.1908	-448.7605	-451.5316	-450.1396
R^2/*Pseudo* R^2	0.4069	0.4740	0.4183	0.4720	0.4182	0.4094
AIC	918.8057	912.4742	924.3816	915.521	921.0632	918.2792

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: authors' calculations

As observed in the table, there are consistent results showing a direct and statistically significant positive impact of SELLS, indicating that a higher number of individuals using the Internet for selling goods or services contributed to the increased resistance of online collaborative platforms. The significance of the SELLS variable (individuals who used the internet to sell goods or services) is unsurprising, as this indicator forms the foundation of the collaborative economy model. The prevalence of such activities reflects several underlying factors critical to the success of this economic model. On one hand, it shows the existence of a robust technical infrastructure (reliable internet connectivity, digital platforms, and supporting technologies that facilitate seamless transactions), which is essential for enabling and sustaining internet-based collaborative services. On the other hand, it highlights the population's readiness to engage with the collaborative economy, the openness of individuals to adopt innovative modes of economic interaction, as well as the necessary know-how and digital skills required for participation. The willingness to use such services often correlates with broader societal factors, such as digital literacy, cultural adaptability, and trust in online systems. Thus, the SELLS variable acts as a composite indicator, capturing both the technical and socio-cultural readiness required to enable and sustain a collaborative economy.

MOTOR is not statistically significant, while AIR is statistically significant and negative across all models. The fact that the variables MOTOR and AIR do not contribute positively to the model aligns with expectations, as collaborative platforms are widely perceived as mechanisms to mitigate the influence of these variables on development. Specifically, these platforms serve as tools for reducing reliance on traditional transportation infrastructure and air connectivity. This effect is important for peripheral regions, where collaborative platforms represent an alternative that alleviates dependency on physical accessibility. This can be seen as a form of digital "equalization", where regions with limited physical connectivity can overcome traditional barriers to tourism development.

Moreover, the coefficients of spatially lagged variables are generally not statistically significant, suggesting that the resilience of tourism demand via collaborative economy platforms was primarily influenced by the inherent characteristics of the regions, with minimal impact from neighbouring regions. The findings underscore the localised nature of these platforms' impact, suggesting that regional attributes (such as infrastructure, governance, or digital readiness) play a decisive role in determining resilience outcomes. This observation contrasts with earlier theoretical discussions on the transformative role of digitalization in diminishing geographical constraints. While the current study does not fully align with the notion of "death of geography" (Cairncross, 1997; Camagni, 1995; Longhi, 2005), it does highlight the capacity of collaborative platforms to mitigate certain spatial disadvantages. Specifically, these platforms enable some regions to escape the spatial trap, offering pathways to economic resilience and development that are less dependent on traditional spatial hierarchies. Collaborative economy platforms

empower regions to forge more autonomous developmental trajectories, reducing their reliance on proximity to traditional economic hubs. This phenomenon calls for further investigation to better understand its implications for regional economic policy and planning.

In the table that follows, the SDEM model estimates for the resilience of tourism demand on collaborative economy platforms are displayed.

Table 4. SDEM estimates, resilience phase

	OLS	SDEM (C)	SDEM (C1)	SDEM (C2)	SDEM (W)	SDEM (CN)
SELLS	0.800***	-0.0345	0.0512	-0.0347	-0.0826	0.0557
	(0.255)	(0.284)	(0.340)	(0.305)	(0.300)	(0.283)
MOTOR	0.0114**	0.00293	0.00726	0.00354	0.00482	0.00485
	(0.00560)	(0.00545)	(0.00555)	(0.00620)	(0.00523)	(0.00519)
AIR	-0.000629***	-0.000545***	-0.000585***	-0.000552***	-0.000624***	-0.000565***
	(0.000137)	(0.000129)	(0.000135)	(0.000132)	(0.000140)	(0.000127)
Cons	2.276	7.247	6.661	7.922	9.942*	5.979
	(4.989)	(5.190)	(5.732)	(6.097)	(5.527)	(5.138)
W*SELLS		1.511***	0.689*	0.795**	0.519	1.300**
		(0.562)	(0.352)	(0.370)	(1.088)	(0.582)
W*MOTOR		-0.00258	-0.000205	-0.00830	0.0164	0.00653
		(0.0132)	(0.00689)	(0.0119)	(0.0337)	(0.0197)
W*AIR		-0.000320	-0.00000679	0.000397*	0.000534	-0.0000814
		(0.000433)	(0.000282)	(0.000227)	(0.00153)	(0.000473)
λ		0.627***	0.410***	0.487***	0.896***	0.684***
		(0.156)	(0.0926)	(0.105)	(0.0921)	(0.150)
N	108	108	108	108	108	108
VIF	1.06					
Moran's I	29.39***					
LogLik	-490.8511	-472.2708	-480.0477	-477.5183	-471.3112	-475.1122
R^2/*Pseudo* R^2	0.2263	0.3721	0.2580	0.2749	0.2974	0.3298
AIC	989.7021	962.5416	978.0955	973.0365	960.6224	968.2244

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: authors' calculations

For the overall resilience of collaborative economy platforms, in contrast to the resistance phase, only AIR has a statistically significant negative direct impact. MOTOR is significant only in the non-spatial model, losing significance when spatial dependencies are included. The analysis further indicates that aerial connectivity plays a dominant role, as it serves as a primary mode of transportation for users of collaborative platforms. This observation suggests two key implications. Firstly, it highlights the internationalization of demand, as platforms such as Airbnb tend to attract users traveling across greater distances, heavily relying on air travel. Secondly, it points to a reduced reliance on collaborative platforms for proximity tourists, who may prefer more direct means of accessing accommodation or services, such as traditional booking channels or personal networks. These findings point to significant variations in user behaviour based on travel distance and transport preferences. This duality offers important insights for stakeholders aiming to optimize the resilience and accessibility of collaborative economy platforms.

In the context of SELLS, which showed a direct impact during the resistance phase, its positive influence on the overall resilience of collaborative economy platforms can be linked to indirect effects. This indicates that the increased use of the Internet for selling goods or services in neighbouring regions enhanced the resilience of these platforms.

Discussions and conclusions

This study examined two key topics: first, the resilience of collaborative economy platforms during the recent pandemic shock, and second, their potential role as drivers of tourism resilience within the European Union. Using a comprehensive analysis of Eurostat data, the research showed the extent to which these platforms contribute to the adaptability and recovery of the tourism sector, as well as their limits in expanding the positive impact. The findings indicate that collaborative economy platforms can, indeed, enhance tourism resilience, but three critical observations require further attention.

First, and the most important, the positive impact of collaborative platforms is strongly tied to the presence of strong digital infrastructure and a population accustomed to digital tools. Regions with advanced digital connectivity and a digitally literate society are better positioned to benefit from these platforms. This centres the debate on the importance of fostering a "digital society" where both users and businesses are equipped to engage in technology-driven activities.

Second, while the platforms can mitigate accessibility issues associated with road networks, they remain heavily reliant on air travel as the main mode of being accessed by clients. This dependency highlights a structural limitation, particularly for regions where air connectivity is limited.

Finally, an important observation is the platforms' tendency to benefit peripheral and less-developed tourism regions, potentially serving as a catalyst for regional development. However, the long-term impact of this effect requires further investigation. If validated, this could represent a transformative opportunity for regional disparities and inclusive growth.

While the positive outcomes of collaborative economy platforms in tourism are compelling, it is crucial to take into consideration their potential downsides, which are often challenging to quantify due to the volatile and dynamic nature of these aspects. One critical issue is the absence of a harmonised legal framework across EU countries, which has led to significant uncertainty for collaborative platforms. This lack of cohesion results in disparities in regulation, undermining fair competition and consumer protection. Consequently, the sustainability of these models is often jeopardised, as inconsistent rules create an uneven playing field that may advantage some platforms while disadvantaging others (Rodrigues, 2019).

Additionally, the disruptive nature of these platforms has reshaped market dynamics, frequently challenging traditional tourism service providers.

Collaborative platforms often benefit from cost structures and operational models that differ significantly from conventional businesses. While this can drive innovation, it has also raised concerns about predatory business practices and the erosion of traditional operators' market share (O'Regan & Choe, 2017). Tax regulation within the collaborative economy remains a contentious and unresolved issue. Traditional tourism operators frequently contend that platforms benefit from regulatory loopholes, creating an uneven competitive landscape. Scholars emphasize that these tax disparities deny a fair marketplace, compliance, and long-term economic equity (Garcia & Palomar, 2018).

Critics also caution against "greenwashing", instances where sustainability claims are exaggerated or misleading, highlighting the pressing need for transparency and accountability mechanisms to validate claims of sustainable effect of collaborative platforms.

To address these challenges, the European Union has implemented policies aimed at promoting fair operation of collaborative platforms. However, significant gaps remain, particularly in managing platform accountability and ensuring adherence to ethical business practices. Without adequate oversight, the economic potential of collaborative platforms risks being overshadowed by their unintended consequences, including market distortions and reduced transparency.

For collaborative economy platforms to contribute effectively to tourism and regional development, their regulation must be both comprehensive and adaptive. Policymakers must prioritize creating a harmonised framework that fosters innovation while safeguarding competition, consumer rights, and the long-term sustainability of the tourism sector.

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