Intertemporal tourism clusters and community resilience

Submitted for exclusive publication consideration in
The Professional Geographer

Yong-Jin (Alex) Lee
Spatial Analyst
Community Spatial Lab
University of Florida,
Gainesville, FL, USA

Seongsoo (Simon) Jang
Senior Lecturer
Cardiff Business School,
Cardiff University,
Aberconway Building, Colum Drive, Cardiff CF10 3EU, UK

Jinwon Kim[+]
Assistant Professor,
Department of Tourism, Hospitality and Event Management,
University of Florida,
FLG 186A, P.O. Box 118208, Florida Gym, Gainesville, 32611, USA

[+] Corresponding author

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Community resilience has attracted increasing interest from cross-disciplinary researchers and policy makers because of the integrated view across multiple capitals of resilience. Researchers have argued that community resilience is associated with the ability of a community to adapt disturbance and external stress through social, politic, economic, and environmental change in social-ecological systems (Adger 2000; Cheer and Lew 2017). Although the definition is still under debate, community resilience indicates a measure of the sustained ability to utilize a community's capabilities to prepare for, respond to, recover from, and mitigate the negative impacts associated with disasters (Cutter, Ash, and Emrich 2014). Because community resilience is a set of adaptive capabilities that provide a strategy for disaster readiness (Norris et al. 2008), it is becoming the de facto framework for improving community sustainability in the face of disasters, and it requires long-term structural change.

Tourism is one field where resilience has prominently emerged in the sustainable development paradigm, which focuses on disasters caused by a dramatic climate change (Becken 2013; Lew 2014). Previous resilience studies of tourism have primarily focused on the tourism's ability to respond to disasters (Ritchie and Jiang 2019). For instance, temporal overtourism may negatively affect community resilience economically (Cheer, Milano, and Novelli 2019), or tourism may positively affect community resilience by building local adaptive capacities based on community resources (Bec, McLennan, and Moyle 2016). Yet, despite tourism's phenomenal growth in academic importance, surprisingly little attention has been given to the relationship between tourism clusters and community resilience.

Notably, the clustering of companies, customers, suppliers, and other organizations increases innovative opportunities via shared infrastructure, skills, demand, technology and other interconnection (Delgado, Porter, and Stern 2010). Research also suggests that the intertemporal stability of industrial specialization enhances regional economic resilience (Martin and Sunley 2015). In the context of tourism, researchers have found that tourism clusters--the clustering of multiple tourism industries--improve lodging performance (Lee, Jang, and Kim 2020; Peiró-Signes et al. 2015), and that tourism-led growth reduces regional inequality (Ma, Hong, and Zhang 2015). However, researchers have failed to examine whether the intertemporal instability (or stability) of tourism clusters--the presence (or absence) of variations or fluctuations in tourism clusters over time--in addition to the level of their specialization, affects community resilience. If the relationship holds, it is worthwhile to further measure the configuration of spatially varying relationships across communities because both tourism supply (e.g., environmental resources and hospitality) and demand (e.g., tourist flows) have spatial interactions between origins and destinations or across different regions (Jiao, Li, and Chen 2020; Ma et al. 2015).

To fill the abovementioned gaps, we attempt to answer the following questions: (1) do both the intertemporal specialization and the intertemporal instability of tourism clusters influence community resilience? and (2) in what extent do these relationships vary across individual and neighboring regions? In this study, intertemporal tourism clusters are characterized by the extent of specialization (Feldman and Florida 1994) and its instability (Crawley, Beynon, and Munday 2013) in the tourism industry. Further, high instability indicates the significant presence of variance in the tourism specialization over time (Dissart 2003). By answering these research questions, we intend to contribute to the resilience literature by understanding the relationship between intertemporal tourism clusters and community resilience to help policy makers improve long-term risk management and decision-making.

The study area is the state of Florida in the United States. which is not only a popular tourist destination but is also vulnerable to natural disasters. We defined the county as the unit of community-level analysis and collected data for county-level community resilience and tourism clusters across 67 counties from multiple sources. We measured community resilience (i.e., the dependent variable) by the 2015 Baseline Resilience Indicators for Communities (BRIC) index (HVRI 2019). Moreover, we measured tourism specialization by the Location Quotient (LQ) index, which is a metric for quantifying how concentrated the tourism industry in each county is compared to the U.S. average (Census Bureau 2015). Based on Lee et al. (2020), we defined two sectors of tourism LQ based on the North American Industry Classification System (NAICS): NAICS 71 (arts, entertainment, and recreation [AER] as attraction-driven tourism clusters) and NAICS 72 (accommodation and food services [AFS] as service-driven tourism clusters) in 67 counties for the 2010-2015 period. Specifically, we operationally defined the level of intertemporal specialization as the average 6-year (2010-2015) LQs, whereas we measured the level of intertemporal instability by the variance of 6-year (2010-2015) LQs. Finally, we measured four independent variables--(a) AER specialization, (b) AFS specialization, (c) AER instability, and (d) AFS instability--for spatial data analysis.

We used two control variables--(a) total disaster exposure estimated by a combined index of the total damage and the number of disaster events in 2010 (Lam et al. 2015) and (b) past community resilience (from the 2010 BRIC index), in the model. These variables considered a recovery timeline of 10-200 weeks (Haas, Kates, and Bowden 1977). To determine both the aspatial and spatial effects of tourism clusters on community resilience, we conducted an ordinary least squares (OLS) regression, a spatial Durbin model (SDM), and a geographically weighted regression (GWR) for the analysis.

Table 1 *Parameter estimates of aspatial and spatial community resilience models.*

Variable	OLS estimate	SDM estimate	GWR estimate Min	GWR estimate Mean	GWR estimate Max	GWR estimate Range
Spatial weight		Contiguity	Kernel function using adaptive bi-square			
AER specialization	-0.004	-0.008	-0.009	-0.004	-0.002	0.007
AFS specialization	0.031^{**}	0.029^{**}	0.000	0.006	0.017	0.017
AER instability	-0.051^{*}	-0.065^{**}	-0.031	-0.022	-0.001	0.030
AFS instability	0.120	0.167	0.050	0.104	0.146	0.096
Total disaster exposure	0.017	0.042	0.009	0.020	0.029	0.020
Past community resilience	0.307^{**}	0.301^{**}	0.299	0.327	0.345	0.046
W * AER specialization		-0.001				
W * AFS specialization		-0.006				
W * AER instability		-0.012				
W * AFS instability		0.007				
W * Total disaster exposure		0.030^{**}				
W * Past community resilience		0.005				
Constant	1.684^{**}	1.722^{**}	1.589	1.646	1.720	0.130
Adjusted R^2	0.714	0.724	0.607	0.722	0.808	0.201
ρ		-0.006				
σ^2		0.003^{**}				
Wald		181.249^{**}				
AIC_c	-187.434	-183.338	-173.612			

$^{**}p$<0.05; $^{*}p$ <0.10.

Note: N=67; AER: art, entertainment, and recreation; AFS: accommodation and food services; W: spatial weighting matrix; ρ: spatial lag effect; σ^2: maximum likelihood residual variance; AIC_c: corrected Akaike information criterion.

The parameter estimates of the OLS regression model (Table 1) showed that the intertemporal AFS specialization was positively related to community resilience (β=0.031, p<0.05), whereas intertemporal AER instability was negatively related (β=-0.051, p<0.10). The SDM results also confirmed that both AFS specialization (β=0.029, p<0.05) and AER instability (β=-0.065, p<0.05) were significantly related to community resilience. However, the results of the two models did not show spatially varying relationships between intertemporal tourism clusters and community resilience. Thus, we conducted GWR to explore spatial non-stationarity in local coefficients. The GWR results showed that the regression coefficient of AFS specialization varied from 0.000 to 0.017 (mean: 0.006) and those of AER instability from -0.031 to -0.001 (mean: -0.022). Figures 1-2 illustrate how the regression coefficients for four variables varied across individual counties and how some coefficients form spatial clusters among neighboring counties (e.g., high-high or low-low), respectively. In Figure 1, the counties with dark-colored (or light-colored) show higher (or lower) values of positive or negative GWR coefficients. Particularly, community resilience in the northwest counties was enhanced by less specialization in AER clusters (Figure 1-b), greater specialization in AFS clusters (Figure 1-c), less instability in AER clusters (Figure 1-d), and/or greater instability in AFS clusters (Figure 1-e). In addition, community resilience in the northwest counties was negatively related to the instability of the AER clusters (Figure 2-c), whereas community resilience in the northwest counties was enhanced mainly by the greater specialization of AFS clusters (Figure 2-b). Finally, the corresponding model can explain the relationship between tourism clusters and community resilience better in the southern counties (i.e., urban areas) than the northern counties (i.e., rural areas), See Figure 1-f: local R^2.

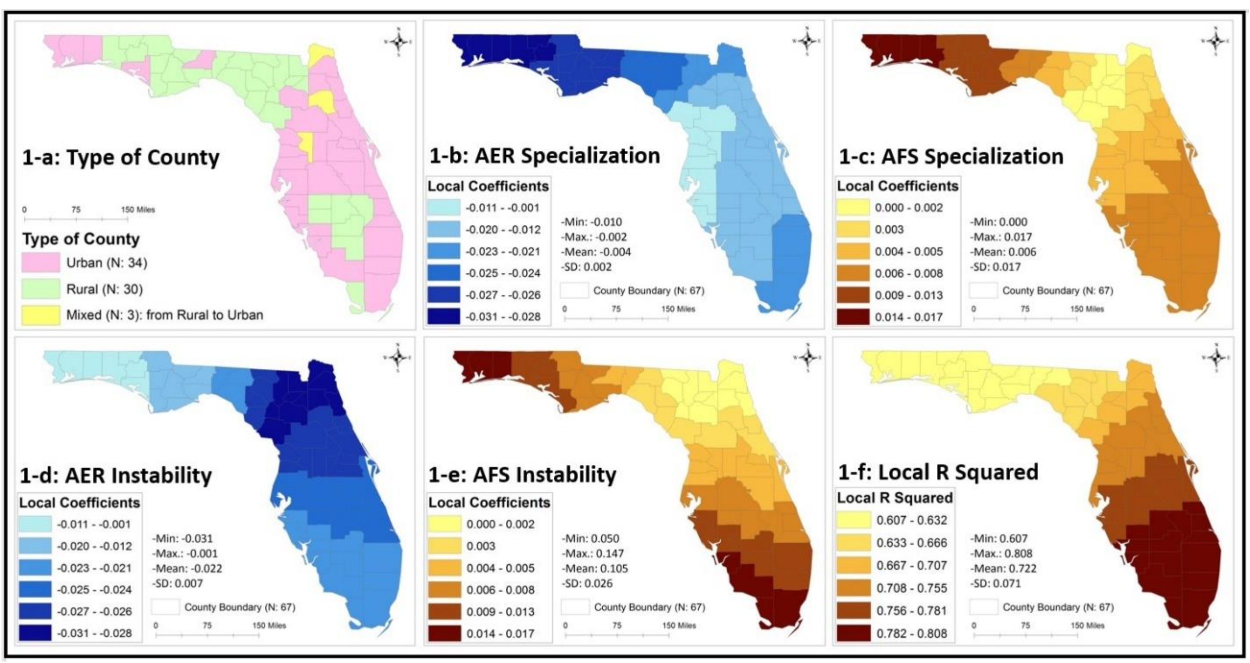

Figure 1 *Spatial distribution of local regression coefficients and local* R^2.

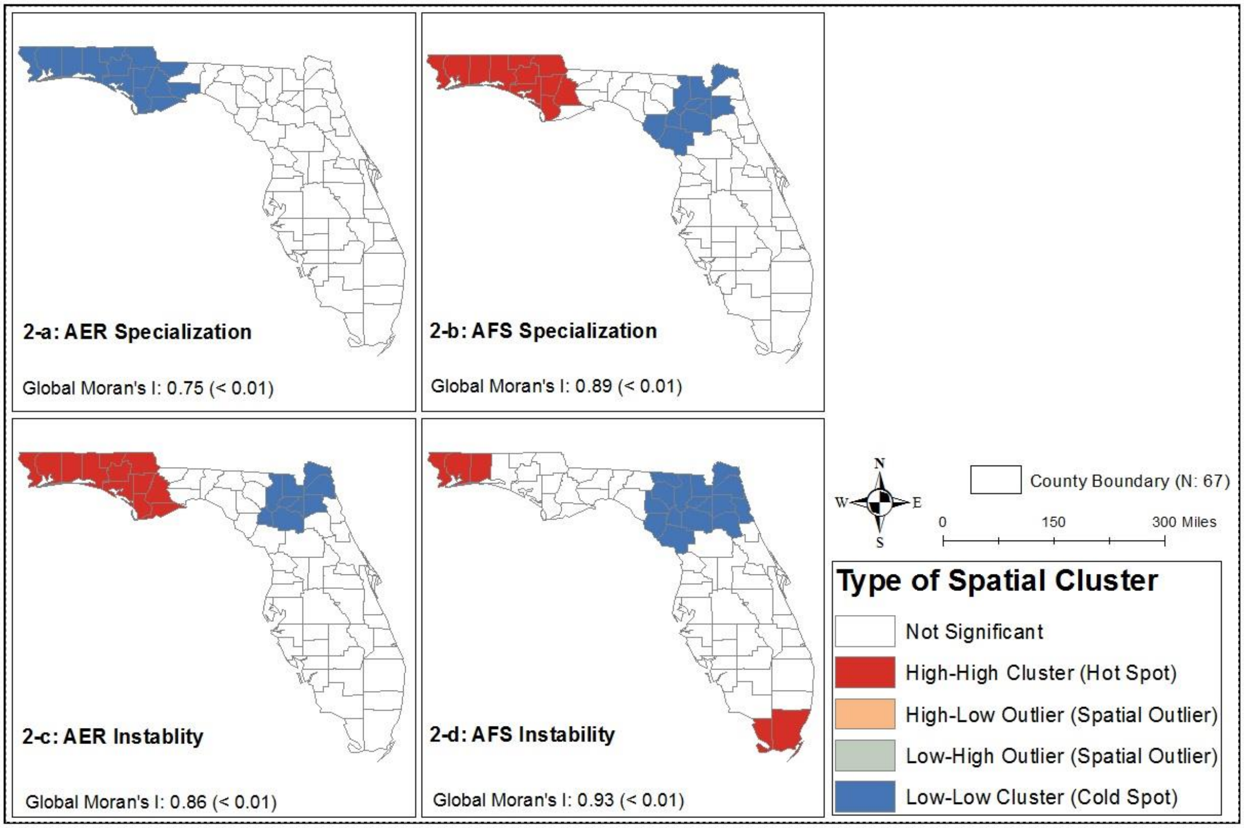

Figure 2 *Local indicators of spatial association for GWR local coefficients*.

Three major conclusions can be drawn from this study, and each of them raises new questions for further research. First, intertemporal AFS specialization (or AER instability), overall, has positive (or negative) effects on community resilience. This contrasting result may suggest the importance of adjusting a community-level tourism carrying capacity--that is, the number of tourists a destination can tolerate and absorb without economic stress or negative impacts on the economy (Swarbrooke 1999)--to achieve sustainable development and avoid overtourism problems from a long-term perspective (World Tourism Organization 1983). The positive effect of AFS specialization (or AFS instability) may mean that the intertemporal concentration (or growth) in the service-related tourism businesses is highly related to the positive side of economic carrying capacity, including high levels of per-capita income, labor, capital, and transportation, which could positively affect the community resilience. Conversely, the negative effect of AER instability (or AER specialization) may imply that the intertemporal overgrowth (or concentration) of attraction-related tourism businesses is highly related to the negative side of environmental and resource carrying capacity, including the high pressures of land and water resource use (Dodds and Butler 2019). The latter finding could suggest that policy makers should identify appropriate actions in communities that will promote the economic capacity but mitigate the resource and environmental induced negative impact on community resilience. Hence, future researchers will have the opportunity to examine what specific configurations of attraction-related or service-related tourism subindustries strengthen or weaken community resilience in the long run.

Second, the effects of intertemporal tourism clusters on community resilience vary across counties where various social, economic and environmental settings coexist, indicating the importance of both interdisciplinary categories and regional approaches in the community resilience and tourism research (Cutter et al. 2014). For example, community resilience can manifest very differently in urban settings in comparison to rural settings, or in coastal economies versus inland economies (Cutter et al. 2016). Our findings (Figure 2) indicate that the importance of tourism industry clusters for enhancing overall community resilience is more pronounced in urban areas (e.g., the northwest and south Floridan counties) than in rural areas (the north-central Floridan counties). Future research needs to decompose the integrated community resilience index into separate domains and explore whether and how the intertemporal specialization and growth of tourism clusters influence a specific resilience domain across urban and rural areas with heterogenous tourism carrying capacities.

Finally, these findings will enable researchers and policy makers to better understand how spatially-varying balanced management of tourism specialization and growth is critical for achieving long-term community resilience because the combination of tourism economic benefits, environmental costs, and tourism carrying capacity in a community may enhance or reduce the community's capacity to adapt to natural disasters. The elevation of tourism carrying capacity will lead to an enhanced resilience--that is, selectively specializing in specific tourism industries and preventing the downside of overtourism can contribute to community resilience in the face of disasters. Hence, future studies can develop the interrelationships between tourism specialization, overtourism, and tourism carrying capacity within communities in other regions in shaping and reinforcing community resilience for the longer term.

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