

原著論文

日本の創造経済: 空間分析

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Creative Economy in Japan: A Spatial Analysis

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Abstract

This work aims at identifying and measuring the spatial distribution of creative economic activities in Japanese Prefectures. Although they can be defined in different ways, creative industries correspond to new types of production processes, more flexible and supported by digital technologies, oriented to more personalized and experiential forms of consumption. By adopting a broad definition of creative economy and using global and local indicators of spatial association, this analysis of the Japanese case confirms a global tendency for the agglomeration of creative activities in large metropolitan areas, with a strong concentration around Tokyo and Kanagawa (mostly) and also Osaka and Kyoto (to a smaller extent). When observing the similarity of data from two different moments (2014 and 2021), it was observed that the emergence of this creative economy corresponds to a slow process of structural transformation. The most relevant finding of this work is the observation of the difficulties of peripheral regions to be attractive for these creative industries. Implications, limitations and further developments of this work are discussed, considering the importance of finding new development paths for all the territory.

Keywords: Creative economy, Spatial analysis, Industrial Specialization, Japan

Introduction

New types of production and consumption processes emerge on contemporary post-Fordist economies, with a strong support of digital technologies contributing to the implementation of increasingly flexible processes of production, oriented to more personalized and experiential forms of consumption. Small-scale production units characterize these new creative activities, in sharp contrast with the previously dominant methods of mass production concentrated in large factories.

Different authors ^{1, 2)} identified these trends, along with the rising importance of urban and metropolitan areas for their development. From a policy perspective, institutions like OECD ^{3, 4)} define this new economic system as the “creative economy”. Although its scope is difficult to define with precision – and even more difficult to measure and to compare at the international level – several attempts have been made to analyze the emergence, development and importance of the creative industries in different countries or at the global level ⁴⁾. These conceptual and theoretical questions are discussed in the following Chapter.

The development of creative industries in Japan has been analyzed at the national level from the point of view of their overall economic effects ⁵⁾, the importance of cultural elements for their development ⁶⁾ or their relation to external promotion plans, like the campaign “Cool Japan” ^{7, 8, 9)}. Other analyses have been developed in different countries, both from the point of view of economic specialization or development policies. When looking particularly to the spatial distribution of these industries, examples from Italy ¹⁰⁾ or China ¹¹⁾ are supported by the utilization of techniques for spatial

analysis. A very recent study on European regions ¹²⁾ frames spatial analysis within a broader perspective, with different methodologies combined to offer a comprehensive approach at the continental level.

This study focuses on the regional level and it aims at identifying the spatial organization of the Japanese creative economy, assuming its broad definition proposed by OECD ³⁾, adapted to the characteristics of the official accounts of the country. These results can be perceived as the starting point for a subsequent analysis of the determinants of the location of these activities.

The data about employment in each industrial group were obtained from the Economic Census for Business Activities in 2014 and 2021 and they are presented in the subsequent Chapter (Materials and Methods). With this information, it was possible to calculate location quotients, measuring the level of specialization in each creative activity taken into account. Finally, a global location quotient was obtained for the overall creative sector in each Prefecture. This was used to estimate the spatial effects influencing the distribution and agglomeration of the creative economic activities along the territory of Japan, used for an analysis based on global and local indicators of spatial association ¹²⁾. The final Chapter concludes with a synthesis and brief discussion of the main results, along with the presentation of limitations and possible further developments of this work.

Conceptual Framework: what is the “creative economy”?

Contemporary economic systems can be defined as “creative economies”, corresponding to an increasing integration of “knowledge-based creative activities that link producers, consumers and places by utilizing technology, talent or skill to generate meaningful intangible cultural products, creative content and experiences” ³⁾. Earlier, “*creative activities*” were defined as “those in which the product or service contains a substantial element of artistic or creative endeavour” ¹³⁾. Another study ¹⁴⁾ registered an average growth of 8.8% per year between 2002 and 2011 in the trade of creative goods and services, clearly above the rest of the economy.

As a consequence of the emergence of these forms of production and consumption, cities reinforced their centrality in the global economy, with a demographic concentration into the largest metropolitan areas. This is a consequence of the movement of a creative class looking for highly qualified jobs and business opportunities, but also from the migration of other groups working in different services ²⁾. By combining scale and scope, with very low transaction costs related to mobility ¹⁵⁾, cities concentrate large and diversified markets and resources with relevance for the cultural and creative activities. Consequently, the emergence of this creative economy, supported by developments in digital technologies and oriented to cities, is also followed by a notorious development of urban tourism ^{16), 17)}.

Although this is considered as a crucial structural transformation within contemporary economies, there is no consensus about the definition of “creative economy”, what sectors can be classified as “creative” or what jobs contribute to its development. Many countries use this concept in different ways (with different methods to measure and to assess its importance), as noted by OECD ⁴⁾ when proposing a list of industrial sectors very oriented to a conventional perspective of cultural production and distribution, while neglecting different forms of digital creation and consumption. Moreover, this list is notoriously influenced by the official classification of European accounts, with difficult application in other contexts. For that reason, this study adopts a broader formulation also proposed by OECD ³⁾, as presented in detail in the following Chapter.

Materials and Methods: the creative economy in Japan

This work offers a spatial analysis of the development of the creative economy in Japan, by identifying the prefectures where these activities tend to concentrate, along with the assessment of potential spatial effects that promote this concentration. Different methods for spatial analysis have been recently applied to the study of the Japanese economy, including aspects related to farm production ¹⁸⁾, impacts of digitalization on economic growth ¹⁹⁾ or tourism activities ²⁰⁾. Closer to the

concerns of the current study, spatial modeling has been also used to analyze the determinants of industrial location ²¹⁾.

The case of Japan is particularly interesting because its economy was one of the most successful at the global level when the Fordist processes of production were dominant. Traditional manufacturing industries from this period include machinery for production (employing almost 0.7 million persons in 2021 in Japan), transportation equipment (1.1 million), transportation services (3.3 million), along with wholesale and retail trade (more than 11 million) or finance (1.5 million) and real estate (1.6 million).

For the purposes of this analysis, the list of creative activities proposed by OECD ³⁾ is adopted, with adaptations to the structure of the official statistics of Japan. It should be noted that this connection is problematic, once each economic activity (even the most conventional, like agriculture) may involve some degree of creativity, while not all the tasks done in the creative sectors can be

considered as creative. As noted by OECD ⁴⁾ some authors or countries prefer to identify the creative economy through the identification of creative jobs, rather than creative sectors. However, this type of classification is even more complex from a statistical point of view.

Following the definition proposed by OECD ³⁾, the outputs generated by companies working on multimedia production and distribution, ICT (hardware and software), architecture and design, communication and advertising, fine and performing arts, cultural production and distribution, leisure or gastronomy are considered creative products and services. As it also assumed that high level of specialized skills are required for these activities, research, higher education and specialized training are also considered. Table 1 represents the relation between these activities and the sectors identified in the Japanese national accounts (Economic Census for Business Activities, 2014 and 2021, available at the e-Stat, the portal for Japanese Government Statistics).

Table 1: Creative activities and industrial groups in Japanese accounts

OECD (2014)	Industrial group (Japanese official accounts)	
ICT	30	Manufacture of information and communication electronics equipment
Architecture and design	32	Miscellaneous manufacturing industries (activities with large incorporation of design, like jewelry)
Communication	37	Communications
Communication	38	Broadcasting
Multimedia	41	Video picture information, sound information, character information production and distribution
Communication	39	Information services
ICT	40	Internet based services
Research, education and training	71	Scientific and development research institutes
Architecture and design	726	Design services
Fine and performing arts	727	Authors and artists
Advertising	73	Advertising
Architecture and design	742	Engineering and architectural services
Architecture and design	743	Mechanical design services
Architecture and design	746	Photographic studios
Gastronomy	762	Specialty restaurants
Leisure	80	Services for amusement and hobbies
Research, education and training	816	Institutions of higher education
Research, education and training	817	Specialized training colleges and miscellaneous schools

The indicators presented in Table 2 are based on the number of persons working in Japan, which is reflected in the first two columns for each year (with light background). The first line is for the national total and then each line represents a Prefecture. At the national level, the total number of workers in the overall economy increased from 61.8 million to 62.4 million between 2014 and 2021 (first column for each year, titled “Total”). However, considering the industrial groups listed in Table 1 (second column for each year, titled “Creative”), the number of workers involved in creative activities remained stable (around 6.3 million persons). As noted in the third column for each year (showing the percentage that creative industries represent on the overall economy), this implied a slight reduction of the importance of the creative sectors in the overall economy: it was 10.1% in 2014 and it became 10.0% in 2021.

In the fourth column for each year, a location quotient for the creative industries is calculated. This indicator compares how much a region is specialized in a certain economic activity, in comparison with some pre-defined reference. In this case, the reference is the share of creative activities within the national economy (10.1% in 2014 and 10.0% in 2022). Then, the same percentage is calculated for each prefecture and the scores are depicted in the third column. It is possible to observe that the creative activities represented 7.7% of the economy of Hiroshima in 2014 and 7.6% in 2021. Finally, the share of creative activities in a prefecture is divided by the share obtained in the country. By doing this, it is possible to assess whether a Prefecture is more specialized than the overall economy of the country (if the location quotient is larger than 1), or if it is less specialized (if the location quotient is smaller than one). A first important observation of this study is that, both in 2014 and 2021, only 4 Prefectures are more specialized in creative industries than the country: Tokyo (1.74 in 2014 and 1.87 in 2021), Kanagawa (1.29 and 1.21), Kyoto (1.0 and 1.06) and Osaka (1.03 and 1.07). This confirms a general global tendency for the concentration of creative activities within large metropolitan areas.

Table 3 represents the information about each of the creative sectors considered in Table 1. In the first line, the figures show the percentage of each sector within the overall employment in the Japanese economy (with dark background). It is noteworthy that each of these sectors is much smaller than other traditionally important economic activities in Japan, as mentioned in the previous Chapter. Taking this importance into consideration, it is possible to anticipate that the transition to a different economic structure – like the one related to the creative economy – is necessarily gradual and relatively slow. In the other lines of Table 3, location quotients for 2021 are calculated for each creative activity in each Prefecture, also taking the overall economy of Japan as the reference. The cells with light background show the sectors in which each Prefecture is more specialized than the overall country. It is clearly observed that Tokyo, Kanagawa, Kyoto and Osaka register higher levels of specialization in a large number of creative activities. Hiroshima Prefecture registers higher levels of specialization than Japan in “Miscellaneous manufacturing industries”, Communications, Engineering and architectural services, mechanical design services and photographic studios.

Based on the location quotients for the creative industries obtained in the previous Chapter (and represented in Table 2), a spatial analysis of agglomeration processes is conducted. This analysis aims at testing whether there are significant spatial effects promoting the concentration and agglomeration of activities in certain locations; and identifying where these agglomerations can be observed. The analysis is conducted for both 2014 and 2021, in order to identify potential differences. It is supported the computation and utilization of Moran-I statistics, both for a global perspective (GISA, a global indicator of spatial autocorrelation) and a local perspective (LISA - local indicator of spatial autocorrelation). The calculations and geographical representations were done with the software application Geoda 1.14 for Mac OS ²²⁾.

Table 2: The creative economy in Japan (2014 and 2021)

	2014				2021			
	Tot (million)	CR	crea %	crea QL	Tot (million)	CR	crea %	crea QL
Japan	61.8	6.3	10.1%		62.4	6.3	10.0%	
Hokkaido	2.445	0.198	8.1%	0.80	2.409	0.185	7.7%	0.77
Aomori	0.576	0.034	6.0%	0.59	0.562	0.031	5.6%	0.56
Iwate	0.595	0.041	6.9%	0.68	0.575	0.034	6.0%	0.60
Miyagi	1.101	0.102	9.3%	0.91	1.124	0.097	8.6%	0.86
Akita	0.465	0.030	6.4%	0.63	0.442	0.026	5.9%	0.59
Yamagata	0.531	0.034	6.4%	0.63	0.514	0.031	6.1%	0.61
Fukushima	0.874	0.065	7.4%	0.73	0.874	0.059	6.8%	0.68
Ibaraki	1.321	0.129	9.8%	0.96	1.335	0.133	10.0%	0.99
Tochigi	0.931	0.087	9.4%	0.93	0.930	0.075	8.1%	0.81
Gumma	0.968	0.078	8.1%	0.80	0.965	0.069	7.1%	0.71
Saitama	2.761	0.234	8.5%	0.84	2.790	0.210	7.5%	0.75
Chiba	2.281	0.224	9.8%	0.97	2.333	0.211	9.0%	0.90
Tokyo	9.657	1.707	17.7%	1.74	10.094	1.892	18.7%	1.87
Kanagawa	3.726	0.486	13.0%	1.29	3.770	0.456	12.1%	1.21
Niigata	1.125	0.074	6.6%	0.65	1.091	0.068	6.3%	0.63
Toyama	0.551	0.040	7.3%	0.72	0.549	0.038	7.0%	0.69
Ishikawa	0.589	0.053	9.0%	0.88	0.589	0.050	8.5%	0.85
Fukui	0.409	0.036	8.7%	0.86	0.408	0.034	8.3%	0.83
Yamanashi	0.401	0.038	9.4%	0.93	0.401	0.035	8.7%	0.87
Nagano	1.021	0.086	8.4%	0.83	1.018	0.082	8.0%	0.80
Gifu	0.956	0.069	7.3%	0.72	0.960	0.063	6.6%	0.66
Shizuoka	1.858	0.147	7.9%	0.78	1.853	0.135	7.3%	0.73
Aichi	3.984	0.371	9.3%	0.92	4.057	0.369	9.1%	0.91
Mie	0.877	0.061	7.0%	0.69	0.872	0.053	6.1%	0.61
Shiga	0.658	0.051	7.8%	0.77	0.673	0.050	7.4%	0.74
Kyoto	1.242	0.126	10.2%	1.00	1.239	0.132	10.6%	1.06
Osaka	4.729	0.495	10.5%	1.03	4.765	0.508	10.7%	1.07
Hyogo	2.386	0.210	8.8%	0.87	2.397	0.200	8.3%	0.83
Nara	0.487	0.042	8.5%	0.84	0.491	0.035	7.2%	0.71
Wakayama	0.420	0.028	6.7%	0.66	0.421	0.024	5.8%	0.58
Tottori	0.261	0.019	7.1%	0.70	0.261	0.019	7.4%	0.74
Shimane	0.329	0.022	6.6%	0.65	0.335	0.021	6.2%	0.62
Okayama	0.885	0.064	7.3%	0.72	0.906	0.063	7.0%	0.69
Hiroshima	1.397	0.108	7.7%	0.76	1.408	0.107	7.6%	0.76
Yamaguchi	0.644	0.039	6.0%	0.59	0.632	0.036	5.7%	0.57
Tolushima	0.346	0.025	7.3%	0.59	0.339	0.024	7.1%	0.70
Kagawa	0.481	0.033	6.9%	0.68	0.474	0.031	6.5%	0.65
Ehime	0.628	0.044	7.0%	0.69	0.618	0.041	6.6%	0.66
Kochi	0.322	0.022	7.0%	0.69	0.314	0.023	7.2%	0.72
Fukuoka	2.389	0.216	9.0%	0.89	2.463	0.214	8.7%	0.87
Saga	0.388	0.025	6.4%	0.63	0.397	0.023	5.9%	0.59
Nagasaki	0.619	0.041	6.7%	0.66	0.587	0.037	6.4%	0.64
Kumamoto	0.783	0.055	7.1%	0.70	0.789	0.051	6.5%	0.65
Oita	0.533	0.039	7.4%	0.73	0.523	0.039	7.4%	0.74
Miyazaki	0.501	0.034	6.8%	0.67	0.492	0.032	6.5%	0.65
Kagoshima	0.748	0.049	6.5%	0.64	0.733	0.045	6.1%	0.61
Okinawa	0.610	0.054	8.8%	0.87	0.657	0.059	9.0%	0.90

Table 3: Proportion and location quotients of creative sectors

		2021																		
		30	32	37	38	41	39	40	71	726	727	73	742	743	746	762	80	816	817	
		(Japan: % of each sector in the national economy; Prefectures: location quotients)																		
Japan		0.24%	0.38%	0.25%	0.10%	0.40%	2.11%	0.32%	0.50%	0.07%	0.00%	0.23%	0.71%	0.21%	0.07%	2.10%	1.27%	0.89%	0.17%	
Hokkaido		0.06	0.37	0.60	0.90	0.71	0.54	0.55	0.50	0.65	0.81	0.62	1.50	0.14	0.96	0.83	1.02	1.01	0.95	
Aomori		0.45	0.44	0.30	1.03	0.41	0.31	0.24	0.36	0.25	0.79	0.25	0.94	0.21	1.03	0.66	0.91	0.66	0.54	
Iwate		0.97	1.31	0.16	1.12	0.49	0.25	0.25	0.40	0.27	0.42	0.27	1.06	0.15	0.80	0.62	0.92	0.61	0.94	
Miyagi		1.12	0.62	0.83	1.01	0.48	0.57	0.65	0.68	0.59	0.90	0.67	1.54	0.43	1.12	0.95	0.89	1.25	1.26	
Akita		0.70	0.79	0.13	1.44	0.40	0.19	0.11	0.36	0.57	0.37	0.27	1.32	0.12	1.07	0.71	0.86	0.71	0.64	
Yamagata		2.43	1.65	0.14	1.13	0.32	0.19	0.11	0.43	0.37	1.10	0.27	0.89	0.10	1.04	0.78	0.76	0.57	0.34	
Fukushima		4.67	1.05	0.07	0.84	0.39	0.23	0.16	0.51	0.49	0.65	0.44	1.16	0.28	1.01	0.74	0.82	0.45	0.75	
Ibaraki		0.63	1.42	0.08	0.30	0.15	0.53	0.71	5.30	0.28	0.76	0.25	0.90	0.70	0.96	0.89	1.27	0.73	0.79	
Tochigi		1.27	1.28	0.20	0.64	0.29	0.24	0.16	2.18	0.22	1.61	0.27	0.74	1.99	0.94	0.96	1.32	0.51	1.10	
Gumma		1.44	1.41	0.13	0.29	0.23	0.32	0.20	1.15	0.44	0.63	0.52	0.78	1.10	0.80	0.89	0.95	0.61	0.98	
Saitama		1.15	1.72	0.32	0.22	0.24	0.29	0.26	1.05	0.32	1.02	0.28	0.74	0.57	1.02	1.12	1.06	0.60	0.82	
Chiba		0.54	0.75	0.22	0.55	0.22	0.43	0.62	1.11	0.34	0.57	0.26	0.63	0.24	1.05	1.21	2.11	0.88	0.70	
Tokyo		0.70	0.75	2.57	2.10	3.82	3.35	4.04	0.95	2.83	0.81	3.46	1.27	1.02	1.06	1.07	0.89	1.47	1.29	
Kanagawa		2.66	0.62	0.22	0.28	0.28	1.41	0.54	2.92	0.64	1.13	0.31	0.69	3.74	0.90	1.22	1.08	1.00	0.71	
Niigata		0.63	0.77	0.23	0.79	0.41	0.35	0.24	0.32	0.53	0.89	0.40	1.02	0.20	0.99	0.84	0.74	0.76	1.34	
Toyama		0.26	2.67	0.32	1.19	0.49	0.45	0.14	0.32	1.06	2.51	0.44	1.00	0.25	0.79	0.76	0.75	0.71	0.88	
Ishikawa		1.93	1.39	1.27	1.04	0.56	0.51	0.44	0.60	0.94	0.96	0.41	1.03	0.74	1.03	1.04	0.87	0.91	0.74	
Fukui		0.38	4.98	0.68	1.28	0.37	0.37	0.14	0.71	0.65	1.29	0.43	0.98	0.56	0.91	0.83	0.84	0.84	0.90	
Yamanashi		2.16	3.04	0.16	1.92	0.56	0.31	0.14	0.45	0.35	0.20	0.34	0.98	0.18	1.06	0.98	1.22	1.15	0.67	
Nagano		6.28	1.75	0.24	1.09	0.59	0.37	0.18	0.51	0.59	1.15	0.39	0.93	0.60	0.85	0.86	0.85	0.40	0.74	
Gifu		0.42	1.02	0.27	0.50	0.30	0.18	0.24	0.44	0.50	2.78	0.31	0.83	0.56	0.88	1.06	1.10	0.67	0.51	
Shizuoka		1.00	1.70	0.41	0.72	0.40	0.35	0.15	1.35	0.46	1.00	0.44	0.70	1.13	0.98	0.94	0.95	0.41	0.78	
Aichi		0.78	1.10	0.79	0.92	0.54	0.75	0.39	0.80	0.87	0.98	0.77	0.81	2.47	1.02	1.05	0.96	0.99	1.09	
Mie		0.30	1.01	0.43	0.80	0.14	0.18	0.11	0.38	0.23	1.76	0.39	0.68	0.20	0.91	1.00	1.23	0.42	0.53	
Shiga		1.06	1.13	0.24	0.45	0.23	0.16	0.07	0.84	0.25	1.26	0.16	0.65	1.35	0.80	0.98	1.12	1.51	0.47	
Kyoto		1.20	1.04	0.60	0.34	0.67	0.47	0.38	1.15	1.53	2.25	0.43	0.65	1.20	1.13	1.40	0.81	2.92	1.36	
Osaka		0.58	1.01	2.70	0.91	0.95	1.12	1.00	0.89	1.54	0.60	1.18	1.07	0.50	0.96	1.08	0.90	1.05	1.38	
Hyogo		1.63	1.03	0.34	0.39	0.27	0.39	0.18	1.20	0.54	0.61	0.27	0.66	1.62	1.16	1.03	1.07	1.34	0.73	
Nara		0.28	2.06	0.40	0.27	0.32	0.07	0.19	0.64	0.26	1.24	0.16	0.77	0.10	1.31	1.09	1.06	1.21	0.60	
Wakayama		0.48	1.02	0.28	0.63	0.31	0.16	0.25	0.31	0.40	0.58	0.25	0.81	0.38	0.84	0.92	0.87	0.53	0.81	
Tottori		0.69	0.82	0.56	2.11	0.46	0.30	0.11	0.52	0.43	1.70	0.47	1.50	0.13	0.90	0.80	0.83	1.33	1.46	
Shimane		1.16	0.47	0.70	1.48	0.34	0.25	0.13	0.61	0.28	0.60	0.36	1.87	0.05	1.08	0.61	0.72	0.55	1.20	
Okayama		0.21	0.80	0.32	0.98	0.35	0.41	0.23	0.38	0.84	2.28	0.46	0.79	0.67	1.13	0.92	0.86	1.16	0.82	
Hiroshima		0.44	1.06	1.29	0.92	0.46	0.46	0.24	0.44	0.55	0.57	0.62	1.11	1.59	1.16	0.86	0.83	0.97	0.86	
Yamaguchi		0.06	0.58	0.40	1.24	0.37	0.18	0.09	0.38	0.24	0.90	0.27	0.81	0.46	0.79	0.78	0.95	0.75	0.87	
Tolushima		0.22	0.84	0.50	1.53	0.45	0.19	0.16	0.52	0.35	0.60	0.20	1.37	0.05	1.18	0.86	0.92	1.51	0.45	
Kagawa		0.00	0.98	1.69	0.70	0.39	0.31	0.19	0.67	0.36	1.28	0.42	0.93	0.41	1.03	0.81	0.90	0.62	0.88	
Ehime		0.02	0.68	0.74	1.33	0.61	0.35	0.22	0.40	0.42	0.59	0.67	0.88	0.92	0.91	0.84	0.92	0.72	0.68	
Kochi		0.02	1.05	0.62	1.17	0.68	0.27	0.11	0.47	0.35	0.90	0.52	1.53	0.26	0.84	0.80	1.14	0.91	1.21	
Fukuoka		0.15	0.57	1.48	0.91	0.59	0.76	0.82	0.27	0.91	1.07	1.04	1.27	0.51	0.98	1.06	0.88	0.90	1.31	
Saga		0.41	0.99	0.32	1.17	0.45	0.20	0.24	0.41	0.28	1.84	0.31	0.89	0.06	0.89	0.89	0.82	0.58	0.63	
Nagasaki		0.92	0.51	0.28	1.55	0.36	0.25	0.08	0.64	0.14	0.90	0.28	0.74	2.14	0.98	0.76	1.01	0.68	0.57	
Kumamoto		0.39	0.52	0.38	0.75	0.47	0.26	0.32	0.40	0.41	0.82	0.43	1.08	0.23	0.85	0.90	0.94	0.83	1.04	
Oita		3.29	0.58	0.25	1.63	0.38	0.32	0.19	0.36	0.31	0.70	0.42	1.21	0.28	0.97	0.85	1.03	0.82	1.15	
Miyazaki		1.02	0.74	0.44	1.48	0.36	0.27	0.44	0.36	0.28	0.74	0.52	1.13	0.26	0.81	0.84	0.94	0.58	1.10	
Kagoshima		0.23	0.64	0.39	1.05	0.37	0.22	0.25	0.38	0.43	1.55	0.36	1.01	0.23	1.08	0.83	1.01	0.67	1.07	
Okinawa		0.01	0.47	0.78	1.14	0.66	0.59	1.06	0.52	0.98	3.57	1.34	1.83	0.05	1.16	1.04	1.17	0.72	2.03	

Global indicators of spatial autocorrelation (GISA) measure whether there are significant mechanisms reinforcing the importance of space for the location decisions. In this particular case, this will indicate if there is a tendency to concentrate new creative activities around areas that already register the highest levels of concentration (and, reversely, if regions with low concentration of these activities are less attractive). Mathematically, the GISA (global indicator) corresponds to the sum of the LISA (local indicators) identified for each of the regions⁹⁾. In this case, the Moran-I statistic will be used for the computation of the LISA, using the following expression:

$$I = z_i \sum_j w_{ij} z_j$$

where:

z_i is the original variable x_i in "standardized form" (x_i are the location quotients)

w_{ij} is the spatial weight

The "spatial weight" measures the impact of a region (i) on another²³⁾. There are several methods to define proximity, assuming that the impact of a location tends to decrease with distance. Geographic measures like contiguity or distance are the most common, but other types of indicators can be used, like the intensity of traffic or trade between regions. This study adopts a measure based on geographical distance. As the territory of Japan includes some prefectures with a very small number of adjacent units (like Kochi, Kagawa, Aomori or Nagasaki) or even without any adjacent unit (Hokkaido or Okinawa), the contiguity criterion is not an adequate solution. Thus, proximity is defined taking into consideration the closest 5 Prefectures. The calculations will identify whether there is an impact of the location in a certain Prefecture on the 5 closest other Prefectures.

As such, the matrix W has 48 rows (i) and columns (j), corresponding to the number of Prefectures under analysis. The values of this matrix are 1 when a Prefecture (j) is among the 5 closest Prefectures to Prefecture (i); all the other elements of the matrix are 0 (zero). The Moran-I for each Prefecture is obtained by multiplying its standardized location quotient (z^i) by the sum of the product of all the location quotients of each other Prefecture (z^j) by the weights matrix (whose values – w^{ij} – reveal the spatial impacts between regions). As these values are 1 or 0 (zero), the Moran-I is the product of the

location quotient of a Prefecture by the sum of the location quotients of the 5 closest regions.

Results:

spatial analysis – creative agglomerations in Japan

For the global level, the scores obtained for the Moran's I statistic (by summing up the local indicators) were 0.362 (2014) and 0.232 (2021). The statistical relevance of these scores is then compared with 99 permutations of random spatial distributions automatically generated. Based on this comparison between the Moran-I statistic computed using the spatial weights matrix and the random distributions, "z scores" (based on standard deviations) can be obtained (4.816 in 2014 and 3.270 in 2021), allowing for the assessment of the statistical relevance (probability) of the results. As the scores are above the threshold of 1.96, it is possible to conclude that spatial effects exist (rather than a random distribution), with a statistical significance level of 5%. Thus, the location of creative activities in one Prefecture will reinforce its attractiveness for the location of new creative activities.

The local indicators are represented in Figure 1 (for 2014) and Figure 2 (for 2021), in the maps on the right-hand side of the figures. On the left-hand side there is a geographical representation of the scores obtained for the location quotient in each Prefecture, while in the center these indicators are presented in a boxplot, along a vertical axis. Similar methods and representation were utilized in a previous study about spatial distribution of tourism activities in Japan²⁰⁾.

The data show small differences between 2014 and 2021. In both cases, the boxplots in the center of both Figures reveal the outstanding performance of Tokyo, with a much higher score than the others (and a larger difference in 2021), revealing an increasing concentration of creative activities in the capital. The only exception is Kanagawa (in the Tokyo Metropolitan Area), also positioned above the bar that represents the median plus 2 times the standard deviation. Osaka and Kyoto have location quotients above 1 but their score is already close to that obtained in other Prefectures.

The maps of the left-hand side also have a very similar configuration. However, in 2021 the number

of Prefectures with the lowest scores (less than 0.6) increased in Northern areas of Japan (Iwate and Akita) and also in the South (Saga), again revealing the concentration of the creative industries in the central areas of the country. On the other hand, one of the Prefectures adjacent to Tokyo (Saitama) also registers a lower score (it was above 0.8 in 2014 and below that level in 2021), reinforcing the idea of concentration in the capital city of Japan.

The maps on the right-hand side, based on local indicators of spatial association, indicate areas where Prefectures with high scores are surrounded by others also with high scores (colored in dark red). There is a cluster of regions with high concentration of creative activities located around Tokyo, both in 2014 and 2021. It is also noteworthy that, although Osaka and Kyoto also have location quotients above 1, no cluster was identified in the Kansai area. The explanation for this is related with the scores

obtained in the other Prefectures of this area, which are not especially high.

The Prefectures represented with dark blue color are those registering low scores, being surrounded by other regions also with low scores. Hokkaido and Kagoshima are in these conditions in both years. Kochi and Hiroshima were also in this condition in 2014, but not in 2021, while the reverse happens in Iwate Prefecture. The Prefectures depicted in light blue color have low scores but they are surrounded by Prefectures with high scores. This happens around Tokyo Metropolitan Area and the number of Prefectures with this type of performance increased in 2021, also confirming the concentration in Tokyo. Conversely, the Prefecture indicated with light red color (Fukuoka) has a relatively high score and it is surrounded by regions with low score.

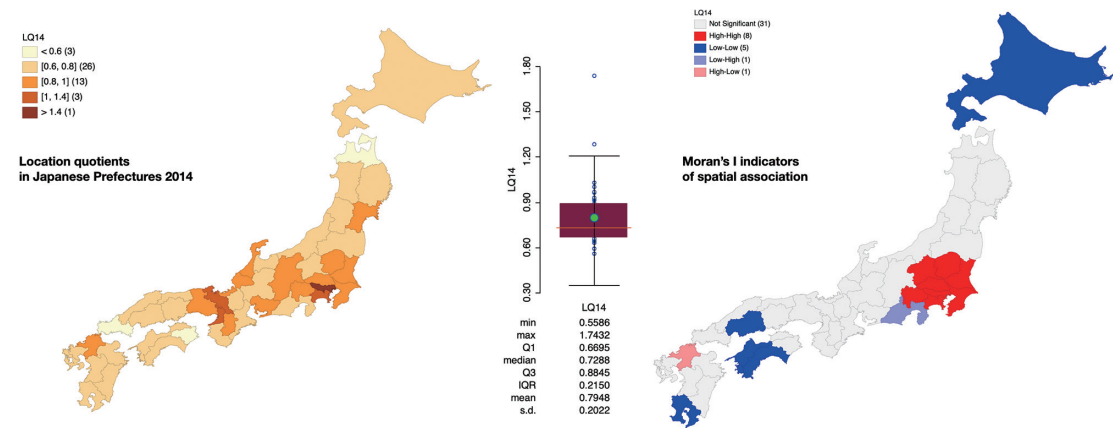


Figure 1: Spatial analysis for 2014

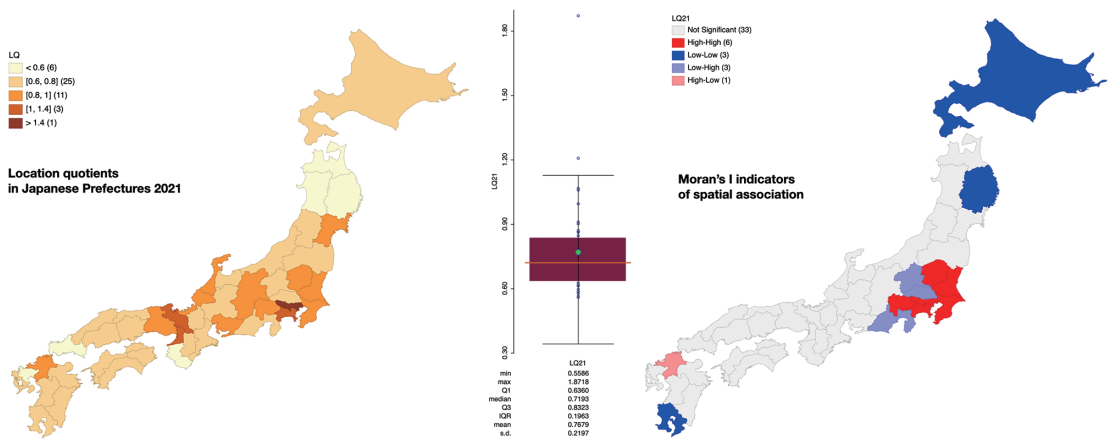


Figure 2: Spatial analysis for 2021

Discussion

This study confirms that indicators of spatial association are relevant to understand location decisions, in this case related to creative activities. This analysis identified a global indicator (revealing the overall impact of space on agglomeration processes of creative industries) and also local indicators, showing where clusters of regions with similar performance are concentrated. Then it was possible to observe the strong tendency for the agglomeration of creative industries in the largest metropolitan areas, and in particular in Tokyo. This result confirms other similar analyses undertaken in different parts of the world and considering different sectors, pointing out the increasing relevance of metropolitan areas for the concentration of economic activities. The results also show a strong stability in terms of regional specialization along a period of almost one decade. This is related to the strong and consolidated development of other industries with global importance, impact and recognition within the Japanese economy. These industries will certainly persist in the foreseen future.

The specific case of the creative industries still lacks a solid theoretical support for the identification its scope. Different authors, countries or institutions define creativity in different ways, creating difficulties for international comparisons. Moreover, differences in national account systems between countries increase the difficulties and limitations of these studies, mostly when they aim at making international comparisons. Possible developments of this work relate to its industrial scope (type of sectors considered), territorial level (different results can be obtained by looking into municipalities, rather than Prefectures) or the questions under analysis. Understanding the determinants of the location of creative industries and the impacts of their presence on regional development may contribute to obtain more relevant policy implications to support a better integration of peripheral areas into the dynamics of the creative economy, a problem clearly identified in this study.

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