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The geography of the Super Creative Class in the greater Tokyo area: Place of work and place of residence

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ABSTRACT

Since Richard Florida's theory of the Creative Class was first introduced, many related studies of creativity have been undertaken regarding analyzing the key features and predictors of the knowledge economy. Though the notion of the Creative Class has been popular for over two decades, not many studies have analyzed Creative Class in Japan. The objective of this paper is to analyze the spatial distribution of the Super Creative Class in the Greater Tokyo Area (GTA) to better understand the key predictors that drive the spatial distribution of the Super Creative Class. Based on data from the Japanese Ministry of Internal Affairs and Communication, the spatial distribution of the Super Creative Class seemed highly uneven for the 138 cities and wards of the GTA with significant concentrations in Kawasaki, Tokyo and Tsukuba. A stepwise regression analysis revealed that 60 percent of the spatial distribution in the Super Creative Class by place of work could be best explained by the share of the labor pool. On the other hand, 73 percent of distribution of Super Creative Class by place of residence could be explained by a more traditional human capital predictor. Since a key component of the Super Creative Class differs markedly by place of work and place of residence, it seems geography is a major factor in explaining the distribution of Super Creative Class in the GTA.

1. Introduction

Since Florida's ideas on the Creative Class were first introduced (Florida 2002), many related studies of creativity, such as the creative cities and the creative industries, have been undertaken regarding analyzing the key features and predictors of creative environments (e.g., Andersson et al., 2011; Brille 2010; Florida 2012, 2014, 2019; Florida and Mellander 2009; Landry 2008; Markusen 2006; Marrocu & Paci, 2012a, 2012b; Mellander et al., 2011, 2013; Pratt 2008, 2011, pp. 1–14; Scott 2006). Though the notion of the Creative Class has been popular for over two decades, not many studies have analyzed Creative Class in Japan or Tokyo. Previous studies of creativity in Japan have focused only on the prefectural statistical level (Asada 2015; Yoshimoto 2003, 2009) or on creative industries or creative cities (Kakiuchi 2016; Konno and Itoh 2017; Sasaki 2010). Additionally, many studies have overlooked the importance of geographic distinction.

The objective of this paper is to analyze the spatial distribution of the Super Creative Class by place of work and place of residence for the 138 municipalities (cities and wards) (Jacobs 2012, 2014) of the Greater Tokyo Area (GTA) to better understand the key predictors that drive the spatial distribution of the Super Creative Class in Tokyo. The primary findings of analysis of the spatial distribution of the Super Creative Class will be an important first step to better understanding the creative economy of Tokyo area. The following central research questions will be addressed in this paper: 1) How is Florida's original definition of the Super Creative Class by place of work and place of residence distributed in the GTA? 2) What socio-economic variables best explain this distribution? 3) Is Florida's theory applicable to Tokyo and what is the most suitable urban theory and policies in the GTA and what are the key western/non-western differences? *The findings will shed new light on understanding which aspect the stereotypical advocacy of cultural consumption disconnects with for the socio-economic reality in the Greater Tokyo Area, and how the effect of highly skilled Creative Class workers on sustainable economic growth can be managed and stimulated, particularly based on the much more dramatic socio-economic and demographic characteristics in the GTA.*

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2. Literature review

2.1. The creative class thesis

Urbanization in the twenty first century is undergoing a major model shift from traditional business and governmental district to the creative and cultural environments. Workers in creative occupations play increasingly important roles in this. Richard Florida in the Rise of the Creative Class (2002) claimed that the Creative Class are the engine of regional economic growth. He argued that the creative class help to raise overall productivity in a regional economy by enhancing the entrepreneurial culture of the region because many of them are self-employed (Florida, 2012). Florida (2002, 2003, 2005a, 2012, 2014, 2019) argued that the distinguishing characteristics of the Creative Class were that its members engaged in work whose primary function was to create meaningful new forms or ideas. Many cities, industries and companies focused on increased profitability have evolved to better accommodate and promote the creative potential of their workforce (Florida 2003, 2005a, 2005b, 2008; Kakiuchi 2016; Sokół 2019).

Florida (2002) argued that creative class occupations are the magnets to which human capital mobile, high-tech and high-growth firms are drawn. The creative class serve as an alternative measure of skill that is based not strictly on educational achievement but on the actual work that people do. In this way, it is not a proxy for, but a direct measure of, jobs (Florida et al., 2008, 2010a, 2010b, 2011, pp. 1–14; Andersson et al., 2011; Florida, 2002, 2012; Lee and Kaga, 2013; Mellander et al., 2013; Sokół 2019; Watanabe, 2014; Westlund Calidoni-Lundberg, 2007). In turn, he argued that which attracts the people who populate these occupations is tolerant or liberal communities and work environments plus a bohemian consumption space. Eventually, the creative class will lead to the future prosperity of local, regional and national economy (Andersson and Andersson, 2011; Boren and Young, 2013; Grodach, 2012; Lazzeretti, 2015; Novy et al., 2013; Grant, 2014; Pratt, 2011; Richards 2020; Scott, 2006; Trip and Romein, 2010).

Florida (2002) divided the Creative Class into two sub-categories. The first sub-group is the Super Creative Class, the elite level of his occupational classification, included those whose occupations are in technology, business, medicine, the arts, education, and professional services, lies at the heart of Florida's creative analysis. Florida argued that the Super Creative Class produces new forms or designs that are readily transferable and widely useful, such as designing a product that can be widely made, sold and used. In addition, cultural creators, made up of poets and novelists, artists, entertainers, actors, designers and architects are a symbol of the Creative Class because their geographical distribution represents locational levels of tolerance and diversity (Badgett et al., 2019; Sokół. 2019; Florida et al., 2012; Florida and Mellander 2009; Mellander et al., 2013; Mellander and Florida 2021; Richards 2020).

The second subgroup is Creative Professional Class including high-tech, financial services, the legal and health care professions. Florida and others have argued that the Creative Professional Class engaged in problem-solving, drawing on complex bodies of knowledge to solve specific problems (Florida 2002, 2012, 2014, 2019; Andersen et al., 2010; Glaeser 2005; Jacobs 2008; Marrocu & Paci, 2012a, 2012b; McGranahan and Wojan 2007; Mellander et al., 2013; Mellander and Florida 2021; Trip and Romein 2010). Florida explained that people doing this kind of work may sometimes come up with methods or products that turn out to be widely useful. However, he also suggested why it is not part of their basic job description. According to Florida (2012, 39), "what the Creative Professional Class are required to do is to think on their own, apply or combine standard approaches in unique ways to fit different situations, exercise a great deal of judgement, and perhaps even try something radically new from time to time …. As they do more of this latter kind of work, perhaps through a career shift or promotion, they move up to the Super Creative Class" (2012, 39).

The Creative Class was found to be a significant factor in determining economic growth rates, particularly in Western countries. According to the Martin Prosperity Institute (2015) ranking of the most creative nations in the world, Luxembourg leads the way with 53.7 percent of its workforce classified as Creative Class, followed by Bermuda (48.0), Singapore (47.3), down from the top spot in 2011, and Switzerland (46.5). While the United States ranked just 34th, with 32.6 percent of its workforce classified as Creative Class, Japan's Creative Class workforce accounted for only 19 percent of the workforce (Martin Prosperity Institute 2015). This finding raises important questions regarding the spatial distribution of the Creative Class in Japan and the capital city of Tokyo where the major node of the creative activity, and whether or not the key predictors in Japan differ from those in the rest of the world (Table 1). Other studies ranked Japan higher on various measures, suggesting a lack of consensus exists regarding the most significant measures of creativity.

There have been several elaborate empirical studies that dealt with the Creative Class in the Asia-Pacific regions that took the context of their localization into account. In China, young artists, musicians, and entrepreneurs' worldwide move to Shanghai in search of new opportunities. This city could be expected to thrive in an urban context in which clustering of creative activities has its impulse and effects. Shanghai's cosmopolitan status has strong spillover effects (O'Connor and Xin 2014). In China, factors of the "sense of place," although the subjective dimensions of attractiveness are sometimes difficult to explain, is important for the Creative Class along with job opportunities (Dai et al., 2012). In Bangkok, Thailand, providing more amenities such as shopping centers, movie theaters, museum publicly accessible parks not only benefit the overall population but also potentially attracts Creative Class (Mansury et al., 2012). Lee and Kaga's (2013, 587–588) results presented important implications for urban revitalization of Osaka, Japan. They found that creative clusters are likely to be located near parks, riverfronts, and places have high integration values and connectivity. Lee and Kaga concluded that the streets near the park or riverfront at inner block in the concentrated districts of creative design companies show highly local integration values and connectivity from the results of local axial analysis. According to empirical studies in rural Australia, the Creative Class prefers places with high amenity and high socio-economic status areas (Brennan-Horley et al., 2009). Luger (2019) took Singapore as an example and demonstrated that it is not easy to transfer the essential value of creative urbanism to countries with different socio-political systems. In many cases, state-driven creativity-engendering policies have deviated from their original intentions.

2.2. Critiques of the creative class

The creative class notion attracted several critics. Some critics suggested that much of Florida's work merely describes symptomatic aspects of economic growth rather than focusing on the actual causal triggers of economic growth (Hoyman and Faricy 2009; Markusen 2006; Peck 2005; Perry 2011). As such, critics targeted the central concept of creativity introduced by Florida for its alleged fuzziness (Marcuse 2003; Ponzini & Rossi, 2010). Urban and regional studies scholars critically evaluated Florida's ideas, especially in regard to their internal consistency and rigor (Markensen 2006; Scott 2006; Ponzini & Rossi, 2010). Florida's Creative Class notion also faced criticism for being elitist, tending to ignore or downplay the working class and more conventional service employment (Boren and Young 2013; Ponzini & Rossi, 2010; Sasaki 2010). Many argued that Florida avoided providing detailed prescriptions about how his theory should be applied to specific contexts of urban policy (Ponzini & Rossi, 2010). They also suggested that Florida has not attempted to analyze the multifaceted relationships that exist between sectors, or the various resources such as political, legal, or economic, and the set of socio-spatial and socio-economic practices co-existing in the urban field (Ponzini & Rossi, 2010; Boren and Young 2013; Luger 2019). Other critics of the creative class theory suggested that it only focused on urban areas in Western cities (Markusen 2006).

Table 1
The global "creative" index.

	Creative Class Share (%)	The Global Creativity Index (Composition of the 3Ts)	The Global Technology Index (R&D Investment and Patents Per Capita)	The Global Talent Index (Educational Attainment)	The Global Tolerance Index (Racial and Ethnic Minorities, Gays and Lesbians)
Rank	Country	Country	Country	Country	Country
1	Lexembouurg (53.68)	Australia	South Korea	Australia	Canada
2	Bermuda (47.96)	United States	Japan	Iceland	Iceland
3	Singapore (47.30)	New Zealand	Israel	United States	New Zealand
4	Switzerland (46.53)	Canada	United States	Finland (tie with U.S.)	Australia
5	Iceland (45.43)	Denmark	Finland	Singapore	United Kingdam
Japan	64th (18.65)	24th	2nd	3rd	11th
United States	34th (32.61)	2nd	4th	58th	39th

Source: Martin Prosperity Institute. The Global Creativity Index 2015.

Zhao et al. (2020) and others argued that Florida's theory that preferences among different creative occupations remain similar is debatable. The Creative Class includes wide range of occupation, but those occupations do not have much in common (Kratke 2011; Vitalisova et al., 2020; Zhao et al., 2020).

2.3. Tokyo's theorical debate: world city or nested city?

Before discussing the Creative Class, it is necessary to explore the study area of this paper, the Greater Tokyo Area (GTA). The GTA is the largest urban agglomeration in Japan and is one of three major global centers of economy, trade and commerce, along with New York City and London (Csomos 2017; Csomos and Derudder 2014; Cybriwsky 1998, 2011, pp. 1–14; Fujita 1991, 2003; Jacobs 2005, 2011, 2012; Sassen 1991, 2011, pp. 1–14). Unlike London and New York, however, Tokyo offers a more powerful lens for viewing the evolution and prospects of postindustrial cities including those in East Asia and other Asian countries (Yusuf and Nabeshima 2006). Furthermore, 19 percent of Tokyo's total workforce is classified as part of the creative class (Somusho 2015). The central GTA is the principal metropolitan market and clearly the trendsetter for the rest of the country and wider region. Many of Japan's technology-intensive companies prefer to keep some of their leading research facilities in the GTA (Fujita and Hill 2005; Yusuf and Nabeshima 2006; Somusho 2015). The central GTA leads the field in terms of the number of major public and private universities and research institutions. Those universities and institutes are a source of talent, highly skilled knowledge workers.

Prior to the notion of the Creative Class becoming popular, the concepts of the global/world City were predominant in urban debate (Friedmann, 1986; Sassen 1991). Friedman argued (1986, 317) that "the world city hypothesis is about the spatial organization of the international division of labor." According to Sassen (1991, 4), the world city is "key structures of the world economy are necessarily situated in cities". She argued that "the world city is shaped its position in the new international division of labor and integral to contemporary globalization processes". The global/world cities are economies of interaction, incorporating both quantity and quality, and the center of other major cities. These cities also reflected the varied history of mankind and are at the same time contemporaneous expressions of the diversity of urban culture to future generations. The model of the globally dominated cities focused strongly on networks of highly specialized advanced services such as accounting, finance, advertising, telecommunications as well as R&D and scientific innovation (Sassen 1991, Girade 2011, 413; Grant 2014; Csomos 2017).

The most vocal opposition to applying global/world city theory to Tokyo comes from Nested Cities theorists led by Hill and Fujita (2003) and supported by Hill and Kim (2000) as well as Jacobs (2005, 2006, 2008, 2011, pp. 1–14). These Nested Cities theorists argued that Tokyo is a product of the Japanese Capitalist Developmental State. Hill and Kim (2000) and Fujita (2003) rejected the premise that urban Japan fits the world city status model in which large cities have been converging in "economic base, spatial organization and social structure'' (Hill and Kim 2000, 2157). Instead, these scholars argued that Japan's municipalities are not market-centered bourgeois cities, but rather are embedded within a state-centered plan-rational system. Hill and Kim (2000, 2176) also argued that "Tokyo's relationship to the world economy is not driven in the first instance by market efficiency, by a strategic concern to preserve national autonomy through global economic power ". Therefore, nested cities theorists conclude that the policies of the Japanese government have the greatest impact on that nation's urban spatial configurations (Jacobs 2005, 2008). For example, as Hill and Fujita (2003, 213) asserted that Tokyo has nested in relationships with the Tokyo Metropolitan Government (TMG) and the Kanto Region (GTA). In reference to the Japanese Developmental State, Hill and Kim (2000) contended that the Japanese government has utilized national statutes, policies, and plans to keep a tight rein over corporate and local spatial investment decisions (Jacobs, 2003, 2005, 2008, 2011, pp. 1–14). Therefore, the Japanese government has remained leading agency in shaping Tokyo's development path.

3. Methods

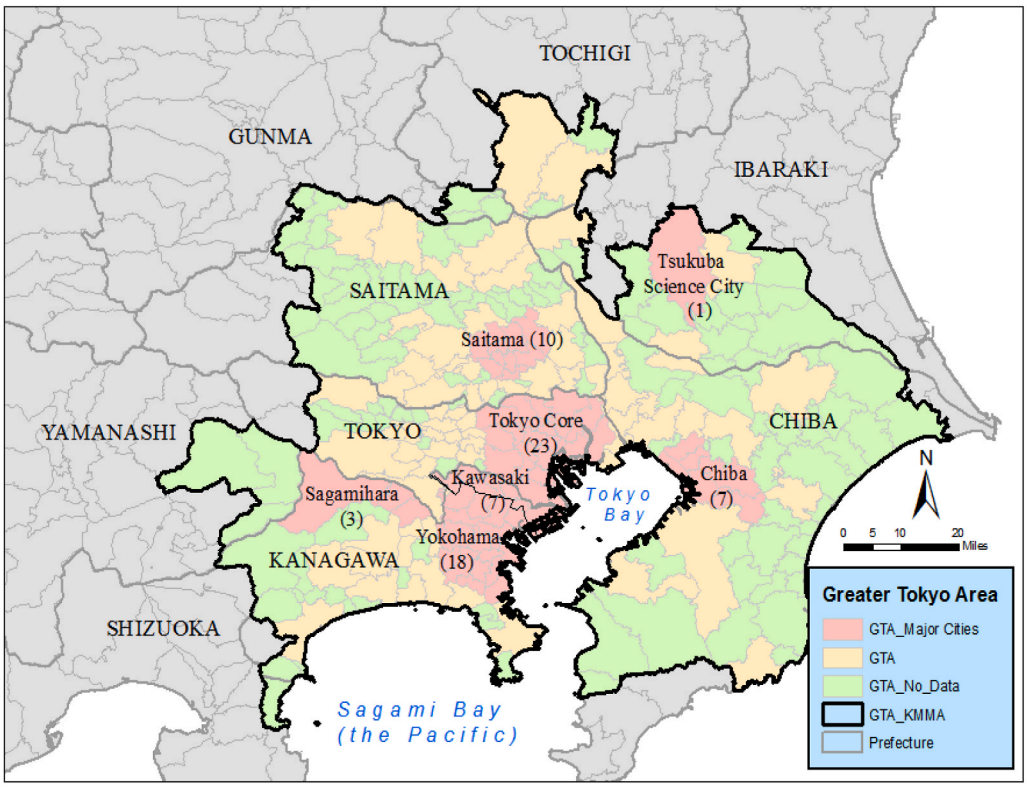
3.1. Study area

The Greater Tokyo Area (GTA) (Fig. 1) was selected as the geographic unit of analysis for this paper because much of the creative class in Japan is located in the GTA. Approximately 19 percent of Tokyo's total workforce is classified as part of the Creative Class (Yoshimoto 2009; Somusho 2015; Asada 2016) (Table 1). Additionally, the GTA is the largest urban agglomeration in Japan and is one of three major global centers of economy, trade and commerce, along with New York City and London (Fujita 1991, 2003; Sassen 1991; Jacobs 2005, 2012, 2016; Aoyama et al., 2011; Somusho 2015).

In 2010, the GTA had 15 million workers of which 18.6 percent were classified as part of the Creative Class (2.85 million) by place of work and (2.75 million) by place of residence. 11.8 percent were considered Super Creative Class while 6.8 percent were part of the Creative Professional Class. In this sense, the GTA can be considered a hyper-skilled market where the Super Creative Class outnumbers the Creative Professional Class at a nearly 2:1 ratio. Place of residence data showed similar trends (Table 2).

3.2. The super creative class, data and variables

Florida (2002, 2012, 2019) identified the occupations of the creative worker by utilizing the U.S. Standard Occupational Classifications (SOC)



Note 1: Pink shaded areas include the central cities (e.g. Kawasaki and Yokohama) plus the Tokyo Core and Tsukuba Science City (the number in parentheses represents the number of sub-areas); Note 2: Pink and orange shaded areas include those sub-areas with a population greater than 100,000 (N=138); Note 3: Green shaded areas include those sub-area populations less than 100,000 which have no SOC data.

Fig. 1. The greater Tokyo area (GTA) and major cities.
Note 1: Pink shaded areas include the central cities (e.g., Kawasaki and Yokohama) plus the Tokyo Core and Tsukuba Science City (the number in parentheses represents the number of sub-areas); Note 2: Pink and orange shaded areas include those sub-areas with a population greater than 100,000 (N = 138); Note 3: Green shaded areas include those sub-area populations less than 100,000 which have no SOC data.
(For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Table 2
The creative class in the GTA, 2010.

	Total Workers	Creative Class in Aggregate	Super Creative Class	Creative Professional Class
GTA Place of Work	15314730	2848980 (18.6%)	1811930 (11.8%)	1037050 (6.77%)
GTA Place of Residence	14760770	2753890 (18.7%)	1740440 (11.8%)	1013450 (6.87%)

system developed by the U.S. Bureau of Labor Statistics (BLS). The Japanese Ministry of Internal Affairs and Communication (MIC) developed the equivalent of the American SOC system. The dependent variable for this paper is the percent of the Super Creative Class (e.g., researchers) by 138 political units with population greater than 100,000 of the GTA. The independent variables selected for the regression analysis are based on previous scholarly work but also include other independent variables that might better capture the geography of the Super Creative Class in the GTA. Florida's original definition of the Super Creative Class is used as the basis for this paper and acts as the dependent variable for the subsequent spatial and regression analysis. The Super Creative Class dependent variable includes the following occupational sectors (Table 3).

- Researchers (SOC B-4) (e.g., natural science researchers, humanities, social science, other researchers),
- Engineers (SOC B-5) (e.g., Architecture, civil engineers, manufacturing engineers and surveyors),
- Teachers and other specialist professionals (SOC B-10 and B-15) (e.g., university professors, secondary school teachers, elementary and junior and senior high school teachers, librarian, curators, sports professionals) and,
- Authors, journalists, editors, artists, designers, photographers, film operators, musicians and stage designers (SOC B-12 to B-14) (e.g., authors, journalists, editors, sculptors, painters, industrial artists, designers, photographers, film operators, musicians, dancers, actors and directors)

Overall, the dependent variable will be defined as the percent of the Super Creative Class by occupation relative to the total workforce in each of the 138 GTA subareas. The spatial analysis will then largely focus on explaining why certain areas in the GTA generate disproportionately large numbers of creative workers relative to others.

The independent variables selected for the regression analysis are based on previous scholarly work but also include other independent variables that might better capture the geography of the Super Creative Class in the GTA. The source for each independent variable is also from Japan's Population Census by the Japanese Ministry of Internal Affairs and Communications (MIC) in 2010 unless otherwise specified. The

Table 3
The standard occupational classifications (SOC) used to derive the super creative class dependent variables.

Richard Florida	Japan		USA	
	Ministry of Internal Affairs and Communications (MIC)		Department of Labor: Bureau of Labor Statistics (BLS)	
	Census		SOC	
Super-Creative Class	B	Professional and Engineering Workers	19	Life, physical, and social science occupations
	4	Researchers		
	5	Engineering	17	Architecture and engineering occupations
	10	Teacher	25	Education, training, and library occupations
	15	Other Specialist		
	12	Authors, journalists, editors	27	Arts, design, entertainment, sports, and media occupations
	13	Artists, designers, photographers, film operators		
	14	Musicians, stage designers		
	C	Clerical workers		
	22	Office appliance operators	15	Computer and mathematical occupations

selected independent variables describe quality of life indicators and can be broken into three broad categories: population measures, socio-economic factors and employment composition (Table 4).

4. Results

4.1. Descriptive analysis: spatial distribution of the super creative class

The spatial distribution of the percent Super Creative Class in the Greater Tokyo Area (GTA) is uneven, and many subareas have disproportionate shares of the Creative labor by place of work and by place of resident. A visual representation and spatial distribution of the Super Creative Class by place of work and place of residence (Figs. 2 and 3) illustrates an intense yet unique spatial distribution of the labor pool. Tsukuba Science City is one of the few peripheral locations in the GTA that has a high concentration of Super Creative Class. Overall, the distribution of the Super Creative Class by place of work has a higher concentration in the central part of the GTA. By contrast, the spatial distribution by place of residence is more evenly distributed especially in the suburban northern and eastern sub-areas of the GTA. That said, a disproportional share of the Super Creative Class is located in the central part of the GTA by both place of work and place or residence.

Despite the drastic shifts in the share of Super Creative Class workers both temporally and spatially in the central GTA, the list of top ten Super Creative Class subareas was relatively stable. Four Tokyo sub-areas and two Kawasaki sub-areas feature in both the 2000 and 2005 top ten listing. Furthermore, in 2010, five of the top ten sub-areas were in the Tokyo Core. The first detailed impression of the GTAs' sub-area rankings for the Super Creative Class by place of work is that each of the top ten sub-areas has an above average share of engineering related occupations, which accounts for roughly half of the Super Creative Class in the entire GTA (Table 6). Another trend for the top ten subareas by place of work is the geographic proximity of the three leading geographic clusters of the Super Creative Class including 1) The Tokyo Core (Minato-Ku, Shibuya-Ku, Shinagawa-Ku, Bunkyo-Ku and Koto-Ku) and Kawasaki-shi (Nakahara-ku and Saiwai-ku); 2) along the Chuo main train line in the Tokyo Suburbs (Fuchu-shi and Tama-shi) and 3) Tsukuba Science City (Fig. 2). The only sub-area in the Super Creative Class top ten by place of work that were not located in the central part of GTA was the Tsukuba Science City which is located in northeastern part of the GTA.

The major difference from the Super Creative analysis by place of work is that place of residence (See Table 5 and Table 7) ranks none of the Tokyo Core in the top 10. Instead, the Tokyo Suburbs along the Chuo Train Line (Musashino-shi, Kokubunji-shi and Koganei-shi) appeared in the top 10 (Fig. 3). The only sub-area in the Super Creative Class by place of residence top ten that is not located in the central part of GTA is once again Tsukuba Science City, which is located in the northeastern part of the GTA. Tsukuba-shi is ranked second after Nakahara-ku for the Super Creative ranking by place of residence and is the only sub-area located on the periphery of the central GTA. Tsukuba was ranked first for the Super Creative Class by place of residence in 2000 and 2005 (Table 8) with a very strong share of researchers (6.19%) and teachers (4.31%) (Table 8).

4.2. Kawasaki-shi: the center of the super creative class

Kawasaki-shi (city) has the highest concentration of the Super Creative Class by place of work and place of residence in the GTA and is located in the northeast of Kanagawa Prefecture, adjoining the Tokyo. Kawasaki features good traffic access from the central GTA. It provides many business opportunities with its the concentration of global enterprises, leading-edge research and development institutes, advanced technologies and technology skill creative workers. Kawasaki-shi includes seven smaller subareas or ku (wards) and has a large share of the labor force composed of the Super Creative Class (Table 9). Kawasaki-shi hosts several leading international research institutes and businesses including Shin-Kawasaki Science Park Saiwai. Some of the key companies driving the Kawasaki cluster of engineering include several factories that are Global Fortune 500 Companies such as Fujitsu, NEC (Nippon Electric Company) and Toshiba.

Nakahara-ku ranked first for the Super Creative Class by place of work and by place of residence and is located in the center of Kawasaki-shi. The Musashi-Kosugi railway station in Nakahara-ku is a major travel node for the Creative Class. From this station, it takes less than a half hour to get to the central part of the GTA (i.e., Shibuya-Ku). New residential and industrial parks continue to expand around the station as a part of several urban redevelopment projects. Saiwai-ku is ranked second for the percentage of the population employed in the Super Creative Class by place of work in the central GTA with 22.5 percent of the workforce (Table 6). The economy of Saiwai-ku is dominated by high-tech industry and head offices of major corporations (i.e., Toshiba, Canon and Dell Japan). Major research institutions (i.e., Shin-Kawasaki Science Park) are also located in Saiwai-ku and the development of new products in collaboration with several major universities, as well as with

Table 4
Descriptive statistics for the greater Tokyo Area Dependent and Independent Variables, 2010.

	Mean	sd	Min	Max
Dependent Variable				
Super Creative Class by Place of Work	10.40%	3.98	4.65%	24.41%
Super Creative Class by Place of Residence	11.70%	2.89	4.99%	19.45%
Independent Variable				
Population Characteristics	Mean	sd	Min	Max
Total Population	457304	2680106	47115	31895747
% of Employed Population	46.56%	2.24	41.61%	55.03%
Population Density Per Sq. Kilometer	7684.3	5042.4	550.8	21881.5
Average Age	43.53	1.52	38.33	47.56
Median Age	42.84	2.02	37.7	48.2
% Productive Age (15–64)	66.41%	2.53	58.88%	73.57%
% Age 65+	20.03%	2.48	11.70%	27.60%
% Unmarried Individual 15 years or older	26.03%	3.38	19.14%	38.32%
% Foreign Population	1.65%	1.2	5.07%	7.89%
% Single parent head of household	3.83%	2.3	13.62%	13.35%
Sex Ratio = male per 100 females	99.84%	4.14	87.88%	114.05%
% Unemployed Population	29.39%	0.47	16.61%	4.04%
DayNight	113.47	147.88	72.43%	1738.82%
Annual Household Income ($10–50K)	48.36%	6.01	32.35%	63.47%
Annual Household Income ($50–100K)	32.48%	4.47	19.08%	46.11%
Annual Household Income ($100K and Above)	9.74%	3.16	4.92%	22.81%
Education				
Completed University (4 years) and/or graduate school	38.81%	10.57	17.51%	65.40%
% Employment by Major Industry				
Construction	6.47%	1.63	1.59%	10.35%
Education and Learning Support	4.52%	1.02	1.84%	7.71%
Finance, Insurance and Real Estate (FIRE)	6.19%	2.02	0.86%	15.31%
Information and Communication	5.66%	2.43	0.86%	13.10%
Living related and personal services and Amusement services	3.65%	0.45	1.93%	6.32%
Medical, health care and welfare	8.60%	1.38	4.31%	13.16%
Science research, professional and technical services	4.68%	1.79	1.82%	15.17%
Public and Governmental Affairs	3.11%	1.2	1.42%	10.10%
Primary economic sector employment	1.36%	1.46	0.26%	10.41%
Secondary economic sector employment	22.24%	7.01	8.50%	38.63%
Tertiary Economic Sector employment	76.39%	7.74	54.69%	91.34%

Note 1: The source for each variable is also from Japan's Population Census by the Japanese Ministry of Internal Affairs and Communications (MIC) in 2010.
Note 2: However, household income is from housing and land survey in 2008.

supporting entrepreneurs and start-up businesses.

Kawasaki is, however, a good case of a relatively undiversified sub-area that heavily relied on engineering workers. Nakahara-ku was top ranked among the central GTA for the Super Creative Class but it dropped to 77th for the Super Creative Class model when engineering related occupations were removed from the equation. Saiwai-ku also experienced a significant drop in the Creative rankings. Saiwai-ku was ranked 2nd among the central GTA when engineering workers were included. However, it dropped to 116th (N = 138) when engineering related occupations were removed.

4.3. The Tokyo Core and Tsukuba Science City

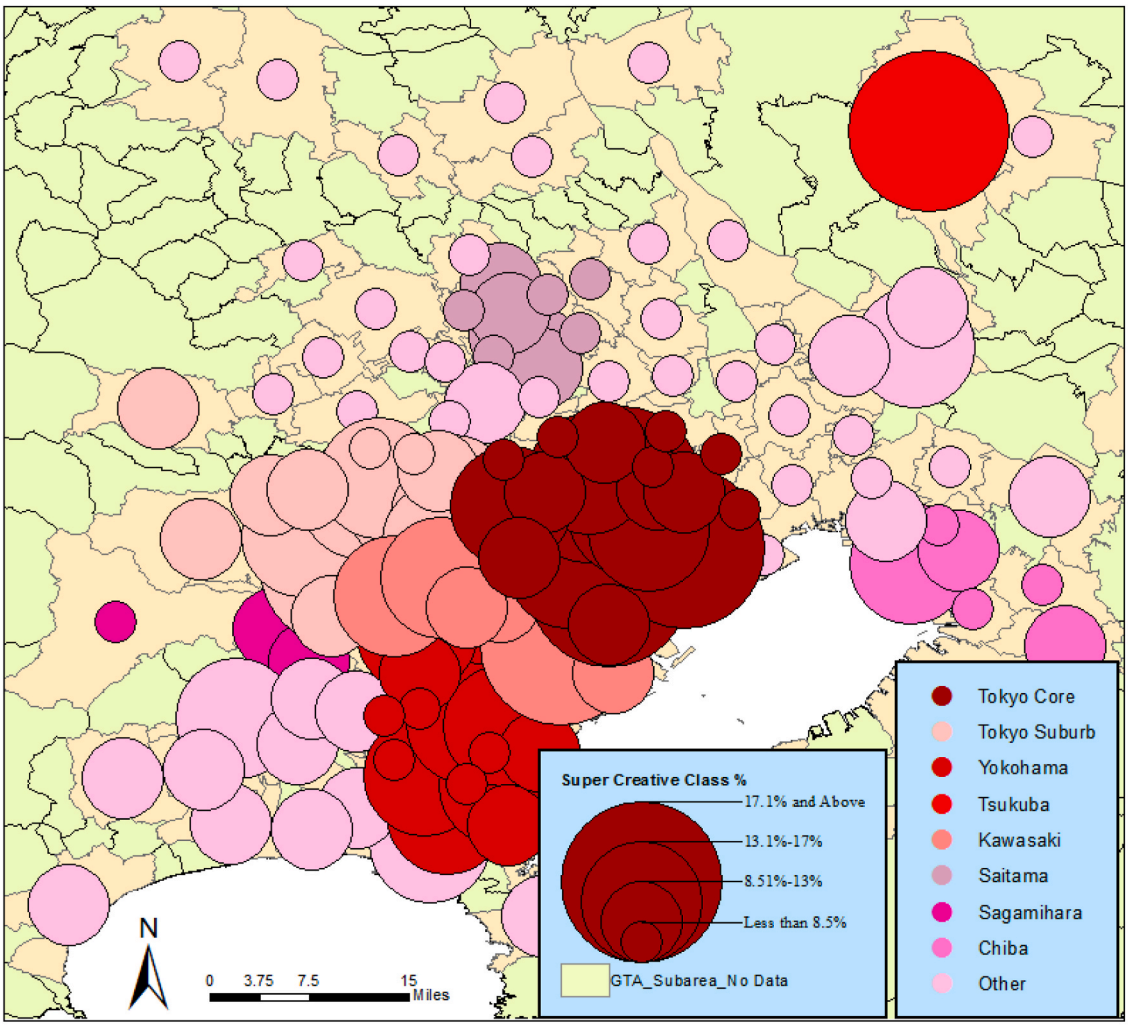
Tokyo is the center of the metropolitan area and features good traffic access and an ideal work and life environment for creative individuals. The Tokyo Core shows a very strong presence of the Super Creative Class. The Tokyo Core, officially known as the 23 Special Municipalities Wards of Tokyo, features prominently in the Creative Class rankings by place of work (Arai et al., 2004; Cybriwsky 1998, 2011, pp. 1–14; Fujita and Hill 2012; Kawabata 2003, 2006; Tajima 2014). Nearly 2.3 million commuters arrive each working day in the CBD of Tokyo.

Shibuya-Ku is well known for being the center of creativity in all of Japan. Many of these creative activities take place around the Shibuya Station, which is the busiest railway station in Japan. Shibuya-Ku is famous as the fashion center of the country. Starting in the 1990s, Shibuya became the core area for IT industries. Shibuya-ku is ranked fourth for the Super Creative Class by place of work. Shibuya-Ku was ranked fourth for the super creative class by place of work in 2000 and third and in 2005 (Table 6). Although nearly half of all the Super Creative Class workers in Shibuya are in engineering, it was only the 19th ranked super creative class sub-area based on its engineering workers. By contrast, it was the highest ranked cluster of artists, designers and photographers (3.68%) and musicians and dancers (1.98%) (Table 8). It seems that Shibuya Super Creative Class cluster is one of the more diverse clusters in the GTA.

Other than the Tokyo Core Ku area, a high percent of Super Creative Class workers is found in several shi (city) in the western part of Tokyo including Musashino-shi and Koganei-shi. These cities are located approximately 12 miles west of the CBD of Tokyo. Those areas such as Musashino-shi, are considered edge communities, have a strong presence of Super Creative workers by place of residence due to great access from/to the central part of Tokyo and Kawasaki-shi. A common characteristic of edge communities (i.e., Fuchu-shi, Koganei-shi) in the GTA is that they have excellent connection to Tokyo's CBD via major commuter railways. Tajima (2014) argued that easy access to public transit is the most important factor influencing people's choice of residential location. One of unique component of the Super Creative Class of Japan, anime and manga company Coamix and Studio Ghibli (known as Disney in Japan) has its headquarters in the Kichijōji neighborhood of Musashino-shi. Several other animation studios are located in Musashino (Musashino City 2021).

Tsukuba Science City was the only other major area to appear in the Super Creative Class ranking by place of work and place of residence outside Kawasaki-shi and Tokyo. It is a state planned research and science park developed in the 1960s, as a national research center for Japan. The logic was that Tsukuba would feed the high-growth economy of Japan and develop a competitive advantage similar to the logic behind the Research Triangle Park area in North Carolina (Cybriwsky 1998; Hamley 1984; Jacobs 2006; Miao 2018). Over sixty national research institutes and two national universities, including the University of Tsukuba, are located in this city. Tsukuba Science City has an international flair with 7500 foreign students and researchers from over 130 countries. According to Miao (2018), Tsukuba is a very unique Japanese city. The majority of researchers living in Tsukuba are from another country or they are Japanese who relocated. Those researchers argued that Tsukuba is more like Europe within Japan.

The city is located in the northern part of the GTA, in the Ibaraki Prefecture, 38 miles from the central Tokyo to avoid the high cost of urban land in Tokyo. Tsukuba has a great connectivity from central Tokyo. By using a railway of Tsukuba Express, an urban express railway, inaugurated in 2005, has reduced the time required for the trip from the central Tokyo to Tsukuba from 90 min to 50 min. Tsukuba was ranked eighth in the percent of the Super Creative Class by place of work (Table 6). Although it has the smallest share of engineering workers (4.66%) in the top ten, it has the highest concentration of research workers (6.19%) and teachers (4.31%) in the top ten (Table 7). It seems that Tsukuba's Super Creative Class cluster is very diverse. Additionally,



Notes:
1. Standard Occupational Classification (SOC) data are only available for sub-areas of 100,000 or above in the GTA.
2. The Tokyo Core includes the 23 Special Municipal Wards of Tokyo formally known as the city of Tokyo
3. The Tokyo Suburbs include the Shi areas or cities within the Tokyo prefecture that are not a part of the Tokyo Core

Fig. 2. Spatial distribution of the super creative class (%) by place of work by central GTA Sub-area, 2010.
Notes:
1. Standard Occupational Classification (SOC) data are only available for sub-areas of 100,000 or above in the GTA.
2. The Tokyo Core includes the 23 Special Municipal Wards of Tokyo formally known as the city of Tokyo.
3. The Tokyo Suburbs include the Shi areas or cities within the Tokyo prefecture that are not a part of the Tokyo Core.

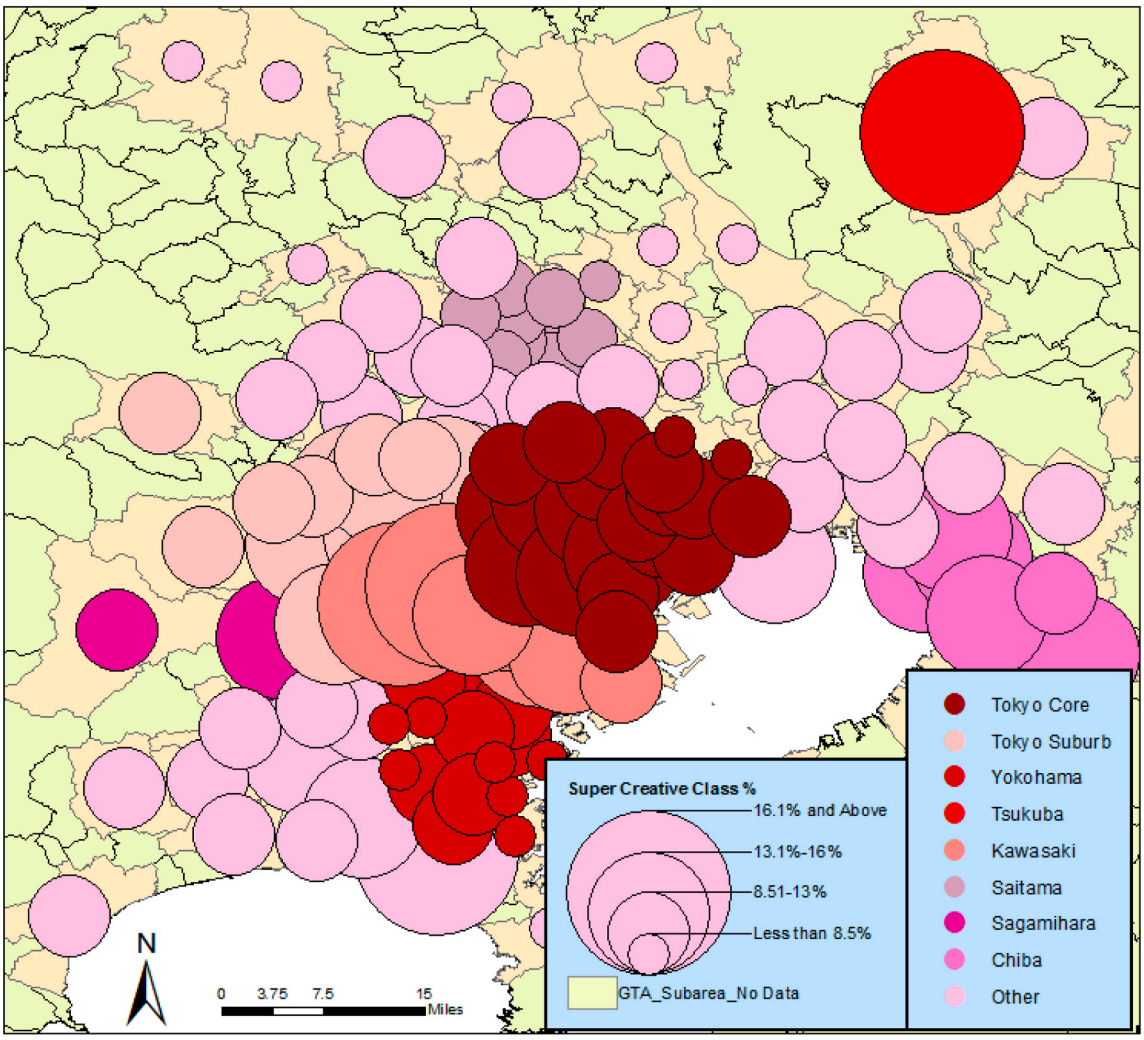
Tsukuba's overall unemployment rate of 2.09% was the fifth lowest among the GTA's subareas in 2010.

4.4. Super creative class regression analysis

The purpose of this regression analysis is to specify and test the functional relationships that exist between the percent of the workforce that is classified as part of the Super Creative Class and various independent variables. The descriptive statistics for the sub-areas in the central GTA are reported in Table 3. The 138 sub-areas have different averages, standard deviations, minimum and maximums for the Super Creative Class dependent variables by place of work and the Super Creative Class by place of residence. The Super Creative Class by place of work average is 10.4 percent and the Super Creative Class by place of residence average is 11.7 percent. The minimum and maximum range of Super Creative Class by place of work is 4.65%–24.41%. The minimum and maximum range Super Creative Class by place of residence is 4.99%–19.45% (Table 3).

Based on a stepwise regression analysis (Table 10), 60% of the spatial variation in the Super Creative Class by place of work in the GTA was explained by the share of the labor force in just two key industries. These two industries included professional, engineering, and technical services and also information and communication industries.

The implication is that the spatial distribution of the Super Creative Class in the GTA is best explained by labor pools with technical skills in engineering and related fields, and also, high levels of connectivity as measured by employment in the information and communication industries. By contrast, human capital variables such as the percent of the population with a bachelor's degree or higher played a less significant role in shaping in the geography of the Creative Class. The spatial



Notes:
1. Standard Occupational Classification (SOC) data are only available for sub-areas of 100,000 or above in the GTA.
2. The Tokyo Core includes the 23 Special Municipal Wards of Tokyo formally known as the city of Tokyo
3. The Tokyo Suburbs include the Shi areas or cities within the Tokyo prefecture that are not a part of the Tokyo Core

Fig. 3. Spatial distribution of the super creative class (%) by place of residence by central GTA Sub-area, 2010.
Notes:
1. Standard Occupational Classification (SOC) data are only available for sub-areas of 100,000 or above in the GTA.
2. The Tokyo Core includes the 23 Special Municipal Wards of Tokyo formally known as the city of Tokyo
3. The Tokyo Suburbs include the Shi areas or cities within the Tokyo prefecture that are not a part of the Tokyo Core.

distribution of the Super Creative Class may be first determined by the type of propulsive industry rather than by individual characteristics.

Overall, the final model (Model 2, Table 10) suggested that for every percentage point increase in the percent of science research, professional and technical service industry employment, the percentage of the Super Creative Class by place of work would increase by 1.074 percent. On the other hand, every percentage point increase in the percent of telecommunication industry employment, the percentage of the Super Creative Class by place of work in the central GTA will increase by 0.611 percent.

The standardized estimate (standard coefficient, Beta or β) is used to determine which predictor variable was most dominance. The percent of science research, professional and technical service industry employment variable was the dominant variable with a standard estimate of 0.49 compared with the percent of information and communication industry employment predictor variable's standard estimate of 0.38. A one standard deviation (1.79 percent) increases in percent of science research, professional and technical service industry employment leads to a 0.49 standard deviation in predicted Super Creative Class by place of work. Moreover, a one standard deviation or 2.43 percent increase in percent of information and communication industry employment, in turn, leads to an increase of 0.38 standard deviation in the Super Creative Class by place of work with the other variables in the model held constant.

The final regression model for the percent of the workforce in the Super Creative Class occupations by place of residence explained 81.1 percent of the variation based on two predictor variables: the percentage of completed university (4 years) and/or graduate school and sex ratio (Model 2, Table 11). Overall, the final model suggested that for every

Table 5
Greater Tokyo sub-areas ranked by super creative class (%) top 10 By place of work: 2000–2010.

	2000		2005		2010	
	Top Ten		**Top Ten**		**Top Ten**	
1	Kanagawa Kawasaki-shi, Saiwai-ku	24.59%	Kanagawa Kawasaki-shi, Saiwai-ku	22.24%	Kanagawa Kawasaki-shi Nakahara-ku	24.42%
2	Kanagawa Kawasaki-shi, Nakahara-ku	22.18%	Kanagawa Kawasaki-shi, Nakahara-ku	22.18%	Kawasaki-shi, Saiwai-ku	22.46%
3	Ibaraki Tsukuba-shi	21.22%	Tokyo Shibuya-ku	18.80%	Tokyo Minato-ku	20.81%
4	Tokyo Shibuya-ku	20.16%	Tokyo Minato-ku	18.40%	Tokyo Shibuya-ku	20.11%
5	Chiba Abiko-shi	19.60%	Tokyo Meguro-ku	18.05%	Tokyo Shinagawa-ku	19.53%
6	Tokyo Bunkyo-ku	19.46%	Tokyo Bunkyo-ku	17.99%	Tokyo Bunkyo-ku	18.64%
7	Chiba Chiba-shi, Mihama-ku	19.25%	Ibaraki Tsukuba-shi	17.84%	Tokyo Fuchu-shi	18.37%
8	Tokyo Minato-ku	19.17%	Tokyo Shinagawa-ku	17.81%	Ibaraki Tsukuba-shi	17.37%
9	Tokyo Tama-shi	19.09%	Tokyo Kokubunji-shi	17.26%	Tokyo Tama-shi	17.37%
10	Tokyo Meguro-ku	18.84%	Chiba Chiba-shi, Mihama-ku	16.89%	Tokyo Koto-ku	17.01%
	Top Ten Average	20.36%	Top Ten Average	18.75%	Top Ten Average	19.61%
%	Overall Average (n = 119)	11.87%	Overall Average (n = 131)	10.62%	Overall Average (n = 138)	10.40%
#	Overall Average (n = 119)	1887692	Overall Average (n = 131)	1769215	Overall Average (n = 138)	1811930

Note 1: Ku = Ward, Shi = City; Ku in Tokyo is quasi-independent. ku (with small k) in other cities are sub-components of the designated cities; Note 2: Bold indicates those sub-areas featured in all three years.

percent point increase in the percent of completed university and/or graduate degree, the percent of the Super Creative workforce by the place of residence will increase by 0.276 percent. By contrast, for every percent sex ratio (males per 100 females) increase in sub-areas in the GTA, the Super Creative Class will increase by 0.002 percent. Model 2 is the best model to select for the regression model for the Super Creative Class by place of residence since the third independent variable of ration of daytime population and nighttime population has decrease of 0.0035 percent.

The result is a variable model (i.e., Model 2, Table 11) with an R-square of 0.81, meaning the two predictors explained over 91 percent of the variance in the Super Creative Class by place of residence, higher than the R-Square of two predictor model for the Super Creative Class by place of work. The larger R-Square for the Super Creative Class by place of residence is likely explained by the narrower and more specific locational analysis of two Super Creative Classes. The b coefficients for Model 2 (Table 11) indicate that a sub-area of the GTA would generate a 0.27 percent increase in the Super Creative Class (%) for every one percent increase in the proportion of the completed university (4 years) and/or graduate school. This suggested that the distribution of the Super Creative Class by place of residence in the central GTA is best explained by labor pools with a human capital of attainment of higher degree.

5. Discussion

This paper investigated spatial distribution of the Super Creative Class in the Greater Tokyo Area and aimed to verify explanation of the distribution. The Super Creative Class by place of work in the GTA is unevenly spread and some sub-areas have disproportionate shares of the Creative Class including Tsukuba-shi (17.37%), Kawasaki-shi (15.1%) and the Tokyo-Core (12.4%). On the other hand, the distribution of Super Creative Class by place of residence in the GTA indicated that Tsukuba-shi (17.95%), Kawasaki-shi (15.6%) and the Tokyo-Suburbs (13.85) had the highest share of the Super Creative individuals. The findings based on multiple regression models suggest that the parameters related to the Creative Class theory have a great impact on the locational choices of Creative Occupations in the GTA. For this study, the Super Creative Class occupations were subdivided into scientific creative class (e.g., researchers), technological creative class (e.g., engineers) and artistical creative class (cultural oriented occupations). The logic for differentiating the Super Creative Class into three major subgroups was that it helped to disentangle creativity based on different skill and talent levels (Asheim and Hansen 2009; Vitalisova et al., 2020; Zhao et al., 2020). Additionally, these three types of Super Creative Class are, in turn, analyzed by place of work and by place of residence since a large majority of GTA's workforce both lives and works within the region.

The implication is that the geography of the Super Creative Class in the central GTA is best explained by labor pools with technical skills in engineering and related field and high levels of connectivity as measured by information and communication. By contrast, human capital variable like percent BA is a less major factor in shaping in the geography of the Creative Class. In the GTA, different creative occupations seem to have different preferences. By reviewing the distinctions in preferences among creative workers and pointed out that suburbs and periphery are more likely to attract research-oriented creative occupation and engineering-based creative workers rather than those with symbolic jobs. That said, the geography and the key predictors of talent were different by each Creative Class group.

GTA has one of the most transit-oriented system in the world. The railways in the region account for 53% of all trips, which is twice as high as Japanese national average of 29%. Chorus and Bertolini argued (2016) that each train station area consists of a node and a place value, which attracts the intensity and diversity of activities in a certain location. Mansury et al. (2012) suggested that relative centers appear to share a common feature of the key built environment for innovative creators, especially around efficient and heavily rail systems. They argued that creative individuals gravitate toward train stations where offering certain amenities of schools, shopping malls, parks or industrial facilities. For these reasons, Kawasaki-shi, the Tokyo Suburb and Tsukuba became attracted by creative occupations (Sanders 2015).

Many industries in Kawasaki-shi are located along major railways' stations (Hall 1966; Kawabata 2003, 2006; Koizumi and Wakabayashi 2014, 2015; Konno and Itoh 2017; Mori 2016; Tajima 2014; Watanabe 2014). Tajima (2014) argued that easy access to public transit is the most important factor influencing peoples' choice of residential location. A common characteristic of those communities located by major railways' stations is the great access to Tokyo's CBD. For example, the major railway company in the GTA, "Tokyu" operates several railway lines to the southwest of the region has been called the "white--collar-belt" (Koizumi and Wakabayashi 2015; Chorus and Bertolini 2016; Mori 2016; Kanno and Itoh 2017). Train stations, such as Musashi Kosugi in Nakahara-ku, have huge impact on economic activity in GTA. Florida (2002) asserted that center of the creative activities appears in efficient and heavily trafficked subway and light-rail system (Koizumi and Wakabayashi 2014, 2015; Mansury et al., 2012; Sadayuki 2018). In other words, it seems that the Creative Class thesis is feasible under certain circumstances and it may be realistic that conventional factors such as income, job opportunities and geographical advantage (i.e., transportation network) can still determine the Creative Class's

Table 6
Greater Tokyo Sub-Areas Ranked by Super Creative Class (%) Top 10 and its Occupational Sub-Components by Place of Work, 2010.

		Super Creative Class Total	Researchers		Engineering		Teacher		Other Specialist		Authors, jounalist, editors		Artist, designer, photographer		Musician, dancers		Office appliance operators	
1	Kanagawa Kawasaki-shi Nakahara-ku	24.42%	0.44%	30	19.24%	1	1.84%	108	1.57%	71	0.10%	97	0.74%	29	0.11%	64	0.40%	64
2	Kawasaki-shi, Saiwai-ku	22.46%	0.81%	14	18.27%	2	1.11%	129	1.05%	126	0.14%	75	0.37%	88	0.20%	35	0.50%	45
3	Tokyo Minato-ku	20.81%	0.20%	64	12.78%	4	0.58%	137	2.25%	24	0.86%	8	1.92%	3	1.26%	2	0.95%	7
4	Tokyo Shibuya-ku	20.11%	0.07%	111	8.16%	19	1.19%	128	2.88%	4	1.13%	4	3.68%	1	1.98%	1	1.01%	4
5	Tokyo Shinagawa-ku	19.53%	0.32%	43	14.39%	3	0.88%	135	1.35%	90	0.49%	18	1.13%	17	0.24%	29	0.73%	17
6	Tokyo Bunkyo-ku	18.64%	0.90%	8	7.96%	20	3.65%	10	1.83%	52	1.90%	1	1.36%	10	0.21%	33	0.85%	12
7	Tokyo Fuchu-shi	18.37%	0.23%	54	12.73%	5	2.26%	76	1.41%	81	0.16%	65	0.62%	47	0.10%	70	0.85%	11
8	Ibaraki Tsukuba-shi	17.37%	7.33%	1	4.66%	53	2.88%	32	1.97%	42	0.08%	113	0.16%	132	0.02%	123	0.51%	43
9	Tokyo Tama-shi	17.37%	0.08%	107	9.43%	9	2.46%	56	2.35%	19	0.87%	7	0.57%	51	0.32%	21	1.42%	2
10	Tokyo Koto-ku	17.01%	0.20%	63	12.25%	6	0.96%	133	1.31%	96	0.33%	30	0.76%	27	0.18%	38	1.01%	6
	Top Ten Average	19.61%	1.06%		11.99%		1.78%		1.80%		0.61%		1.13%		0.46%		0.82%	

Note 1: Ku = Ward, Shi = City; Note 2: Ku (with large K) in Tokyo is quasi-independent. Ku (with small k) in other cities are sub-components of designated cities.

locational preferences.

Unlike New York City or London, where market-centered policies prevail, Tokyo is a different type of world city. Hill and Fujita argued (2003, 213) that "urban life cannot be deducted from any structural or market deterministic logic". Rather, city and region have continued to follow its own unique development models within its own particular state (government), societal (historical, cultural and socio-demographic) and geo-spatial context (i.e., regional, national) (Jacobs 2006, 2016). The Nested Cities theorists, led by Hill and Fujita (2003), Hill and Kim (2000) and Jacobs (2003, 2005, 2006, 2008, 2011, pp. 1–14) contested that despite the impacts of globalization, Tokyo's growth path has remained tightly embedded within its national and subnational contexts. For example, Japanese manufacturing processes, the *just-in-time* (JIT) flexible production system of Japanese automakers, with its heavy reliance upon local content and long-term commitments to suppliers, were credited with contributing to these outcomes (Fujita and Hill 2005). As Jacobs (2004, 496) wrote: Since the JIT system has required the tight synchronization of parts and final assembly, it has produced closely-knit relations among assemblers, suppliers and labor (Jacobs 2014, 762).

Miao (2018) took Tsukuba as an example and demonstrated how Japanese work-culture have played their part in the context of what remains a relatively closed national economy. One example is that there is very hierarchical organization of research environment compared to Europe or U.S., which needs to cultivate relationships within the workplace in order to get things done. Therefore, Tsukuba Science City has gained international prestige for what it is best known, but Tsukuba remains more of a regional role rather than a global one. According to Miao (2018), among the 1,781 foreign researchers in Tsukuba, Chinese forms the largest group (33.7%), and the majority were from East and Southeast Asia such as Taiwan, South Korea, Vietnam and Thailand (53.5%). Researchers from the UK and USA accounted for only 4.8%. Moreover, foreign researchers tended to network with peers from their home countries, and rarely blended into the Japanese community.

Considering the Florida hypothesis, it has often been argued that Japan is in shortage of some essential features of the knowledge society, primarily creativity and individualism. Being a society considerably more culturally and ethnically homogeneous than its North American and European counterparts, the Florida hypothesis would suggest severe problems for the high-tech industries in Japan (Hoyman and Faricy 2009). However, Zhang (1998) emphasized the importance of the Japanese group culture and that Japan seems to have had a capacity for adapting it to societal changes (Bradley 2017; Miao 2018). The Japanese civil society is still less studied than the European and the American and there are no inquiries on its connections to economic growth (Hoyman and Faricy 2009; Trip and Romein 2010; Zhang 1998). Florida (2002, 2012, 2019) referred to some disadvantages of the growing Creative Class that "exhibit a strong preference for individuality and self--expression", which is a weakening of strong social relations (Florida 2012, 2019, 56). ***Overall, the theory of the Creative Class is not totally suited, however, still needs modification in Japanese context*** (Vitalisova et al., 2020; Zhao et al., 2020).

Public policy plays a critical role in nurturing a creative individuals and places (Boren and Young 2013; Richards 2020; Sokół 2019). Those policies aimed at supporting the creative economy require to emphasize investments in place and human capital. Being a creative magnet requires interconnected policies, plans, programs and established practices and therefore, a collaboration among government departments, across levels of government and also the private sector and community organizations. Public and private actions at the local level can be a key force for creating creative cities, however, the policies and regulatory decisions taken at higher level are equally important. For instance, immigration and settlement policy may have an impact on creative places, especially since many immigrants settle in the same lower-income urban areas as artists. Regional policy can also provide the connective tissues between regions, in areas such as land use, green

Table 7
Greater Tokyo sub-areas ranked by super creative class (%) top 10 by place of residence: 2000–2010.

	2000		2005		2010	
	Top Ten		Top Ten		Top Ten	
1	Ibaraki Tsukuba-shi	21.40%	Kanagawa Kawasaki-shi Nakahara-ku	19.45%	Ibaraki Tsukuba-shi	18.15%
2	Kanagawa Kawasaki-shi, Tama-ku	20.30%	Ibaraki Tsukuba-shi	17.95%	Tokyo Musashino-shi	17.74%
3	Tokyo Kokubunji-shi	18.70%	Kanagawa Kawasaki-shi Asao-ku	17.93%	Tokyo Kokubunji-shi	17.55%
4	Tokyo Musashino-shi	18.64%	Tokyo Musashino-shi	17.85%	Tokyo Shibuya-ku	17.29%
5	Kanagawa Kawasaki-shi, Nakahara-ku	18.58%	Kanagawa Kawasaki-shi Tama-ku	17.42%	Kanagwa Kawasaki-shi, Nakahara-ku	17.23%
6	Kanagawa Kawasaki-shi, Asao-ku	18.37%	Kanagawa Yokohama-shi Kohoku-ku	17.30%	Kanagawa Kamakura-shi	16.76%
7	Kanagawa Yokohama-shi, Aoba-ku	18.30%	Kanagawa Yokohama-shi Aoba-ku	16.64%	Kanagawa Kawasaki-shi, Tama-ku	16.71%
8	Tokyo Tama-shi	17.91%	Tokyo Kokubunji-shi	16.60%	Kanagawa Yokohama-shi, Aoba-ku	16.49%
9	Tokyo Koganei-shi	17.84%	Kanagawa Kamakura-shi	16.42%	Tokyo Koganei-shi	16.49%
10	Kanagawa Yokohama-shi, Kohoku-ku	17.75%	Tokyo Koganei-shi	16.22%	Tokyo Suginami-ku	16.34%
	Top Ten Average	18.78%	Top Ten Average	17.38%	Top Ten Average	17.07%

Note 1: Ku = Ward, Shi = City; Note 2: Ku (with large K) in Tokyo is quasi-independent. Ku (with small k) in other cities are sub-components of designated cities; Note 3: Bold indicates that those sub-areas featured in all three years.

space production and public transit. On the other hand, local policy has a significant role in city land use and development, in order to preserve the rich or mixed-use nature of creative neighborhoods (Pratt 2010; Girard 2011; Boren and Young 2013). These policies not only provide the core funding and regulatory support for cultural activities and organizations but can also shape the broad background and context that lay the foundations for a socially inclusive and cohesive path to a creative environment (Girard 2011; Landry 2008; Okano 2010; Pratt 2010; Richards 2020; Sokół 2019; Taylor 2015).

While there are many opportunities to develop creative magnet, there are equally many barriers, such as lack of awareness among policy and planning communities and the general public, poor collaboration within and between governments and an undervaluing of the contribution of the arts and culture. Several barriers include: the lack of clarity on the meaning of creativity and its relevance in an urban setting and lack of awareness in policy and planning circles about the creative place process, as well as the exclusion or marginalization of some people and culture (Girard 2011; Grodach 2012; Boren and Young 2013; Sokół 2019). However, these barriers indicate that there are ways to transform the barriers into opportunities. Girard (2011) suggested that mixing creative and business disciplines, developing new boundary-crossing collaborations, and capitalizing on the uncommon ground of core general education and industry-specific skills can be leveraged and engage local citizens that will increase the level of creative capacity (Girard 2011; Florea 2015).

6. Conclusion

This paper aimed to provide contributions to the literature of the Creative Class and regional economy. The Creative Class includes wide-ranges of occupations and its definition was a vague concept that represents the common characteristics of a particular sub-groups. The use of the Japanese Ministry of Internal Affairs and Communication data helped to explore the differential preferences of Creative Class sub-groups. A lack of clarity existed in determining how socio-economic factors affect the distribution of the Creative Class. For this study, both the popular indicators that the existing research employed and the indicators that represent the quality of local institution were incorporated, expanding the research scope from focusing on building up selected amenities to broader social development. Economic clusters and transportation networks have shaped the competitive character of the GTA by enhancing both its innovative capacity and the quality of place, which is crucial to attracting the Super Creative Class. A large majority of GTA's Super Creative Class both lives and works within the region. However, as daily commuting within the region occurs, two subtly different workforces can be recognized by an imbalance of which occupations these commuters work in. The composition of the workforce by place of work compared to the workforce by place of residence reveals different concentrations of certain occupational groups. Descriptive findings suggest that the Super Creative Class in the GTA is unevenly spread and some sub-areas have disproportionate shares including Kawasaki-shi, the Tokyo-Core and the Tokyo-Suburbs. Another important finding was that roughly half of the Super Creative Class in the GTA were engaged in engineering and related occupations. When removing engineering and related occupations, the most affected sub-areas included Kawasaki-shi where an undiversified creative workforce had a high disproportionate share of engineering workers. As a result, the sub-areas with high percentages of engineering workers dropped in the rankings. Conversely, sub-areas with low percentages of engineering workers increased in the creative rankings. However, the spatial distribution of the Super Creative Class in the GTA is not just about the Tokyo-Core and Kawasaki-shi or specific type of occupations. For example, Tsukuba Science City is also a distinctive cluster of Super Creative Class workers even though it is located on the GTA periphery.

The reconstruction of the theory of Creative Class was reexamined, and a more pragmatic approach, which enable policy makers to consider how to offset the negative effects of Creative Class urbanism while maximizing the capacity of the creative economy was also contrasted. In Japan, the State (i.e., the Japanese central government or the TMG) control industrial policy, finance and development plans including the establishment of the Tsukuba Science City and major railways. In some respects, because of the cultural differences, Florida's theories of creativity may be less applicable since the neo-liberal focus of many Western economies is less present in Tokyo. Much of Japan and Tokyo's economy represents a more directed or developmental state economy that lies somewhere between the West and China. Perhaps the best comparative is with the developmental state in South Korea and Seoul, which are a unique mix of public and private sectors where the national economy is part entrepreneurial and part directed economy. Additionally, unlike in the Western application of Florida's Creative Class the role of the gay community and foreign-born appears to be relatively mute in Tokyo, although additional research is warranted. However, is the state oriented governmental structure the only reason that the Creative Class theory may not be as applicable in the GTA (only 19 percent of the workforce)? Other reasons may include unique time-historic factors in Japan and Tokyo, the natural environment and geographic features in the area, and/or various other socio-cultural factors. Fujita and Hill (2012) argued that the team approach or group orientalism remain much stronger than individualism in Japan. These factors need to be considered in any further Creative Class analysis in the GTA.

During the completion of this paper, a number of additional avenues of investigation were identified regarding the Creative Class and the various socio-economic predictor variables. For example, additional analysis of each Super Creative Class subcomponent (e.g., artists, musician, authors) would enable a better understanding of the Creative Class and its spatial distribution in the GTA. What predictor variables best explain the distribution of each detailed subcomponent of

Table 8
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	Super Creative Class Total		Researchers		Engineering		Teacher		Other Specialist		Authors, jounalist, editors		Artist, designer, photographer		Musician, dancers		Office appliance operators	
1	Kanagawa Kawasaki-shi Nakahara-ku	19.45%	0.36%	46	12.91%	1	1.74%	105	1.94%	39	0.41%	45	1.24%	21	0.35%	35	0.50%	70
2	Ibaraki Tsukuba-shi	17.95%	6.19%	1	4.58%	97	4.31%	1	2.09%	30	0.13%	118	0.27%	126	0.04%	129	0.33%	125
3	Kanagawa Kawasaki-shi Asao-ku	17.93%	0.65%	8	8.18%	11	3.51%	2	2.51%	9	0.65%	22	1.16%	22	0.55%	18	0.71%	13
4	Tokyo Musashino-shi	17.85%	0.45%	27	7.12%	26	3.10%	5	2.52%	8	1.39%	4	1.72%	9	0.95%	5	0.59%	35
5	Kanagawa Kawasaki-shi Tama-ku	17.42%	0.37%	43	9.71%	5	2.35%	39	2.20%	21	0.56%	28	1.10%	24	0.45%	25	0.68%	16
6	Kanagawa Yokohama-shi Kohoku-ku	17.30%	0.37%	42	10.10%	2	2.19%	59	2.10%	28	0.50%	36	0.84%	49	0.37%	30	0.82%	5
7	Kanagawa Yokohama-shi Aoba-ku	16.64%	0.51%	19	7.43%	20	2.42%	36	2.74%	1	0.83%	18	1.43%	15	0.61%	14	0.66%	19
8	Tokyo Kokubunji-shi	16.60%	0.76%	4	6.89%	32	3.24%	3	2.55%	6	0.86%	15	1.31%	18	0.58%	17	0.36%	118
9	Kanagawa Kamakura-shi	16.42%	0.65%	9	7.13%	24	3.05%	8	2.68%	2	0.78%	20	1.54%	11	0.34%	37	0.26%	134
10	Tokyo Koganei-shi	16.22%	0.52%	18	6.60%	38	3.00%	9	2.55%	7	0.98%	9	11.31%	19	0.63%	12	0.63%	26
	Top Ten Average	17.38%	1.08%		8.07%		2.89%		2.39%		0.71%		2.19%		0.49%		0.55%	
	Overall Average (n = 138)	11.70%	0.36%		5.66%		2.10%		1.67%		0.39%		0.77%		0.26%		0.51%	

Note 1: Ku = Ward, Shi = City; Note 2: Ku (with large K) in Tokyo is quasi-independent. Ku (with small k) in other cities are sub-components of designated cities.

Table 9
Super Creative Class (%) by Place of Work and Place of Residence in ku areas in Kawasaki, 2010.

Place of work Top Ten		Place of Residence Top Ten	
Kanagawa Kawasaki-shi Nakahara-ku	24.42%	Kanagawa Kawasaki-shi Nakahara-ku	19.45%
Kawasaki-shi, Saiwai-ku	22.46%	Ibaraki Tsukuba-shi	17.95%
Tokyo Minato-ku	20.81%	Kanagawa Kawasaki-shi Asao-ku	17.93%
Tokyo Shibuya-ku	20.11%	Tokyo Musashino-shi	17.85%
Tokyo Shinagawa-ku	19.53%	Kanagawa Kawasaki-shi Tama-ku	17.42%
Tokyo Bunkyo-ku	18.64%	Kanagawa Yokohama-shi Kohoku-ku	17.30%
Tokyo Fuchu-shi	18.37%	Kanagawa Yokohama-shi Aoba-ku	16.64%
Ibaraki Tsukuba-shi	17.37%	Tokyo Kokubunji-shi	16.60%
Tokyo Tama-shi	17.37%	Kanagawa Kamakura-shi	16.42%
Tokyo Koto-ku	17.01%	Tokyo Koganei-shi	16.22%
Top Ten Average	19.61%	Top Ten Average	17.38%

Table 10
Regression analysis of super creative class (%) by place of work.

Model	Variable	Model R2	b	SE b	β	p-value
1	Constant	0.506	0.031	0.007		0.00
	% Science Research, Professional and Technical Services		1.556	0.134	0.711	0.00
2	Constant	0.6	0.019	0.006		0.04
	% Science Research, Professional and Technical Services		1.074	0.149	0.491	0.00
	% Information and Communication Industry Employment		0.611	0.11	0.378	0.00
3	Constant	0.639	0.031	0.007		0.00
	% Science Research, Professional and Technical Services		1.26	0.15	0.576	0.00
	% Information and Communication Industry Employment		1.004	0.148	0.621	0.00
	% Finance, Insurance and Real Estate Industry Employment		−0.701	0.186	−0.36	0.00

occupations and how are they different by place of work and place of residence? A separate regression model for each subcomponent could augment the Creative Class findings and enable a better overall understanding of the individual predictors. Also, future research should focus on the percent of Creative Professional Class (i.e., health care professions, high-tech). Will the distribution of Creative Professional Class remain similar or different? Another avenue for further investigation in the creativity in the GTA will be contrast between number of creative individual and percent of creative workers. Will the distribution of the Creative Class remain similar or different? A separate measurement (number and percent) for each creative class and examination will make this study even more powerful. Of course, the aggregate of spatial distribution of the Creative Class also varies dramatically by place of work and place of residence. All of this merit's additional attention in future research because it remains unclear if the spatial distribution of the Creative Class in aggregate is most shaped by agglomeration economies, transit networks, affordable housing, cost-of-living, socio-economic status, employment mix, the availability of land and capital, or a host of other factors. The final area of additional research is to identify the spatial distribution of Creative Industry in the Greater Tokyo Area. How will the distribution of the Creative Occupations and the Creative Industries have interfered each other. Applying Florida's concept directly

Table 11
Regression analysis of super creative class (%) by place of residence.

Model	Variable	Model R2	b	SE b	β	p-value
1	Constant	0.758	0.024	0.005		0.00
	% Completed University (4 years) and/or Graduate School		0.239	0.012	0.871	0.00
2	Constant	0.811	0.018	0.004		0.00
	% Completed University (4 years) and/or Graduate School		0.296	0.014	1.077	0.00
	Annual Household Income $ 150,000 and above		−0.617	0.101	−0.31	0.00
3	Constant	0.854	0.017	0.004		0.00
	% Completed University (4 years) and/or Graduate School		0.249	0.014	0.906	0.00
	Annual Household Income $ 150,000 and above		−0.746	0.092	−0.375	0.00
	% Science Research Industry Employment		0.488	0.079	0.302	0.00

in different cultures could create issues. Future research is needed to focus on further explanation of the relationship between Florida's theory, human and social capital in different study areas. Instead of simply accepting or denying the 4Ts theory, creating a threshold of the Creative Class that is suitable on a global level is necessary.

Credit author statement

Makoto Ikegaya contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript. Keith Debbage supervised and advised the project.

Declaration of competing interest

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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