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INFORMATIONAL CITY IDENTITY AND ENTREPRENEURSHIP: JAPANESE MAJOR CITIES AS CASE STUDIES

Andreas Meier, Kaja J. Fietkiewicz

Abstract

Japan, once a synonym for economic success and innovation, struggles economically since the bursting of the speculative bubble in the 1990s. Even if recent stimulus packages seem to slowly bear fruit, the country probably won't be anywhere near its old strength anytime soon. One of the reasons for Japans lasting struggle may be the lack of entrepreneurial activity, well documented by the Global Entrepreneurship Monitor (GEM), which regularly ranks the nation that spawned Toyota, Sony and Mitsubishi in the lower part of its Global Report Rankings. When it comes to starting an own business, Japanese Culture, so the argument goes, nowadays fosters fear of failure rather than entrepreneurial spirit. However, not only countries, but also cities have their own cultural identity—be that an industrial metropolis, a harbour town or a religious place of pilgrimage. The aim of this study is to find out, whether there is a correlation between the identity of a city (emerged during its development as an informational city) and the entrepreneurial activity in this region. For this purpose we investigated 10 of Japans major emerging informational cities by collecting data on four different infrastructures: the ubiquitous (digital) infrastructure, the smart infrastructure, the knowledge infrastructure and the creative infrastructure. We correlated these factors with the entrepreneurial activity in the cities in order to answer the following questions: does the identity of a city have any influence on the level of entrepreneurship within it? And, is there a correlation between the entrepreneurial activity and one of the four infrastructures of an informational city?

Keywords: *Entrepreneurship, Informational City, Cities of the Knowledge Society, City Identity*

JEL Classification: *M10, M21, O1, R3*

Introduction

Since entrepreneurial activity is widely regarded as one of the key factors for the overall economic prosperity of a country, the question if certain cultures foster entrepreneurship more than others is of special interest, not only in the field of entrepreneurship research, but also for policy makers who wish to design effective government programs which promote economic growth. When it comes to Japan, there are many who argue that cultural barriers are the reason for its lack of entrepreneurial spirit. And indeed, the results of the annually published Global Entrepreneurship Monitor (GEM) Reports seem to substantiate this theory. In these Reports which aim "to measure differences in the level of entrepreneurial activity between economies" (Amorós et al. 2014, p. 11) Japan is regularly ranked in the lower regions of the worldwide comparison. In the latest report of 2013 Japans TEA (Total early-stage Entrepreneurial Activity) rate is the second lowest of all countries (Amorós et al. 2014, p. 12), while it has the second highest 'fear of failure'-rate together with Italy and Greece (Amorós et al. 2014, p. 26). The fact that the average 'fear of failure'-rate is higher in the Asia Pacific and South Asia region than in any other region of the world could very well indicate the existence of the above-mentioned cultural barrier to entrepreneurship. But if we assume this to be true, another question arises: If Japanese culture really impedes entrepreneurial spirit, why didn't it before? The nation that spawned the likes of Toyota, Sony and Mitsubishi obviously did not have these problems when it rose to an economic superpower. One explanation for a shift in the economic culture of Japan could be the institution of lifetime employment, which seems to, contrary to popular belief, withstand economic crises and endures even in the 21st century (Kato 2001; Matanle et al., 2011). In a comparative study of entrepreneurs in Japan and Silicon Valley Suzuki et al. describe the phenomenon that the highly educated people in Japan tend to prefer jobs in a large corporation instead of building their own businesses so that the Silicon Valley entrepreneurs which took part in the study were higher educated than their Japanese counterparts (Suzuki et al., 2002). The theory: in order to institutionalize lifetime employment a few success stories had to be written, but since the possibility is given, potential Japanese entrepreneurs are settling for a secure job instead of taking any risks by starting a business on their own. This assumption goes along with the very high 'fear-of-failure'-rate reported by GEM.

But although some interesting insights can be gathered by studies aiming to reveal the identity of a country, we chose a different approach to this topic. Since culture even within country boundaries is never truly homogeneous, but differs from region to region and from city to city, this paper looks at it on a smaller level. We aim to examine the relationship between the identity of a city and its entrepreneurial activity. High level of entrepreneurship significantly contributes to regional economic vitality, hence, it is crucial for the economic development to understand factors promoting the creation of new firms (Lee, Florida & Acs, 2004, p. 879). Lee, Florida and Acs (2004, p. 881) argue, that the entrepreneurial activity does not only require a productive and supportive business climate together with educated population, but also a climate where

„creativity, diversity and innovation are encouraged and valued“. Therefore, they based their research on factors nourishing the new firm formation in the U.S.A. on indicators like the Bohemian, Diversity or Human Capital Index, and explored potential connections between regional social characteristics and the entrepreneurship level (within a city). Another research based on an approach similar to ours, investigated the theory that creativity generates new ideas and enhances entrepreneurship level in a city, and was based on a cased study of 31 Informational World Cities (Murugadas et al., 2014). The basis of our research are the (emerging) Informational Cities in Japan.

Informational Cities are the prototypical cities of the knowledge society and the new centers of power, (Castells, 1989; Stock, 2011). These cities are characterized by advanced knowledge, digital, creative, and smart (or green) infrastructures as well as specific labor market form (Stock, 2011; Fietkiewicz & Pyka, 2014; Fietkiewicz, Pyka, & Stock, 2015). Not all of these aspects (knowledge, digital or creative infrastructure) have to reach an equal level of advancement within one city (see, for example, the different levels of development for four informational Japanese cites investigated by Fietkiewicz and Pyka (2014), or Fietkiewicz and Stock (2015)). Therefore, in some of the cities the focus may lie on the digital city development, whereas in the others it is set on knowledge or creative city creation. With the time, cities with different „identities“ may emerge—creative, digital, smart, or knowledge ones. This notion is also the base for the present case study and main research question: what is the relation between city's identity and its entrepreneurship level?

To answer this question, we quantified the identity of 10 of Japans major cities by collecting data on four different infrastructures: the ubiquitous (digital) infrastructure, the smart infrastructure, the knowledge infrastructure and the creative infrastructure. We examined the correlation between them and the entrepreneurial activity in order to find out if there are any positive correlations between an infrastructure and the level of entrepreneurship in a city. This approach displays some parallels to Florida's (2003; 2004) as well as Lee, Florida and Acs' (2004) assumption that creativity (along with aspects like diversity or human capital) may correlate with entrepreneurial activity and/or economic growth in the city. It is important to note, that they use a very broad understanding of the term „creativity,“ encompassing the technological (or innovation), economic, and cultural creativity (Florida, 2003, p. 40). In the present case study, these creativity types as well as some of the indices applied by Florida (2004) or Lee, Florida and Acs (2004), are distributed over the investigated infrastructures, for example the Bohemian Index and cultural creativity falling under the creative city infrastructure, or the innovation creativity under the knowledge city infrastructure. Before a more comprehensive explanation of the investigated indicators is given, we will continue with a short overview of related works, which examine the relationship between culture and entrepreneurship.

1 Related Works

As entrepreneurship is a highly individualized process, it is not obvious at first to assume a relationship to the culture of a country or region. Shane et al. define it as the "discovery and exploitation of profitable opportunities" by some people with certain character traits, which differentiate them from others who don't have the potential in becoming entrepreneurs (Shane et al. 2000, p. 217 – 218). The emphasis on the discovery and exploitation of opportunities implies the innovative character of the entrepreneurial process, so this definition not only separates the entrepreneur from the common employee, but also from the self-employed whose work lacks the innovative aspect. In other words: in comparison there are only a few people who can call themselves entrepreneurs. That is why there have been some attempts to identify the personal features that make certain persons successful entrepreneurs and others not (Hornaday et al. 1971; McClelland 1987). Hence, given that culture is a "collective phenomenon, because it is at least partly shared with people who live or lived within the same social environment" (Hofstede 1991, p. 6) and therefore contradicts the individualistic character of entrepreneurship, it of course only makes sense to compare the level of entrepreneurial activity between and not within different cultures.

With the globalization it is only natural that the boundaries of entrepreneurship research in the last two decades slowly expanded from the U.S.A. and Western Europe (Thomas et al., p. 289) to the whole world. So today, besides the Global Entrepreneurship Monitor Reports, there are quite a few works available which examine the relationship between culture and entrepreneurship by comparing different countries in respect of their cultural differences (Hayton 2002; Lee 2001; Mueller et al. 2001; Shane 1992; Stephan et al. 2010; Suzuki et al. 2002; Thomas et al. 2000; Uhlaner et al. 2007). Among these works the cross-national studies of Mueller and Thomas gained particular attention. In "A Case for Comparative Entrepreneurship: Assessing the Relevance of Culture" (2000) the authors ask the question if entrepreneurial traits are universal or if they vary across cultures (Thomas et al 2000, p. 290). In an attempt to answer this question, they define four different character traits which, according to Thomas and Mueller, are commonly associated with entrepreneurs in the relevant literature and investigate to what extent international business and economics students in nine different countries share these traits. The findings show indeed that three of the four defined character traits vary across the nine different countries, but the authors also point out that this result raises more questions than it answers. The central problem: it is unclear if our perception and conception of the entrepreneur is not too strongly influenced by the American archetype to really identify and track entrepreneurs in other cultures. In contrast, the results of the study "Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness" (2001) seem to be far more conclusive in the eyes of Mueller and Thomas. This study raises the same questions as the before-mentioned, but this time focuses on only two of the earlier defined character traits, because an internal locus of control, the belief that one has considerable influence on the outcome of one owns destiny (Rotter, 1966), and

innovativeness are obviously seen as the most important entrepreneurial traits. According to the authors, the results support their hypothesis that individualistic cultures have a higher propensity towards entrepreneurship than collectivistic cultures. The conclusion: "Culture, it appears, may condition potential for entrepreneurship, generating differences across national and regional boundaries." (Mueller 2001, p. 52). While this statement is still somewhat cautious, Lee et al. take it one step further in "Culture, entrepreneurial orientation, and global competitiveness" (2001). They criticize a missing paradigm which could explain the differences in entrepreneurial activity in societies around the world and suggest a "cultural model of entrepreneurship to fill the need" (Lee et al. 2001, p. 402). With this framework Lee and Peterson aim to reveal the level of entrepreneurial orientation in a society. As entrepreneurial orientation isn't equivalent to the term entrepreneurship itself, but consists of the attributes (as it is defined by Lumpkin (1996)) "autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness" (Lee et al. 2001, p. 405), the authors are able to link it to the six cultural dimensions of Hofstede (1984). According to Lee and Peterson, a conductive entrepreneurial culture can prosper in a society with the following characteristics: weak uncertainty avoidance, small power distance, masculine, individualistic, achievement-oriented and universalistic (Lee et al. 2001). To support their hypothesis the authors compare five different countries respectively cultural areas (U.S.A., Japan, China, Former Soviet Economies and Mexico) with regard to their entrepreneurial culture. Interestingly the cultural dimensions of the U.S.A. match every aspect of the most conducive entrepreneurial culture. So it seems that Lee and Peterson have fewer reservations to apply the Protestant work ethic to other countries than Thomas and Mueller did.

Since a few might question the applicability of Western values to a culture like the Japanese society, it is not really surprising that Japan has only one of six possible matches in regard to the most conducive entrepreneurial culture. According to the authors, it is the conservative Japanese culture that impedes the entrepreneurial spirit in Japan; e.g. the unwillingness to risk failures, the hierarchical structure and the institution of lifetime employment (Lee et al. 2001, p. 411). But although this point of view is not an uncommon one, there are some who argue against it. Contrary to the before-mentioned authors, Tiessen (1997) does not seem to have an ethnocentric view of entrepreneurship which closely links it to Protestant work ethic and, therefore, idealizes it the way Western countries (in particular the U.S.A) conceptualize it. In "Individualism, collectivism, and entrepreneurship: A framework for international comparative research" Tiessen does not constrain the entrepreneurial process to the innovative act, but emphasizes the importance of resource leverage as well. Those "who generate variety" (Tiessen 1997, p. 367) depend on an individualistic and creative environment while the function of leveraging resources depends on "efficient relationships that thrive under collectivism" (Tiessen 1997, p. 368). Thiessen comes to the following conclusion: "I conceive of individualism and collectivism as two characteristic orientations distributed in varying proportions within and between cultures and individuals. These characteristics are not polar ends

of a continuum, as commonly described." (Tiessen 1997, p. 367).

1.1 Another view on the relationship between entrepreneurship and culture

As we can see, in entrepreneurship research many assume a relationship between the culture of a country and the entrepreneurial activity and orientation of its people. But we have also seen that although some interesting insights can be gathered by such a cultural framework, we have to be cautious not to let an ethnocentric bias cloud our perception of other cultures (Thomas et al. 2000; Tiessen 1997). Therefore we suggest that a cross-cultural analysis does not necessarily have to be a cross-national one. For most nations a cultural homogeneity is merely a myth as even within country boundaries, cultural diversity is the rule rather than the exception. Though especially Japan is often referred to as a very homogenous culture, this assumption does not hold if we really take a good look. Just to state one example: it is somewhat questionable how much culture Okinawans and the people of Tokyo really share. In her study "Entrepreneurship and Regional Culture: The Case of Hamamatsu and Kyoto, Japan" (2009) Yuko Aoyama compares two cities which are not as obviously different, but still offer an interesting perspective on regional varieties. As the title already suggests, the paper examines the way entrepreneurship unfolds under different regional circumstances and how entrepreneurs have to adapt to these specific regional cultures. To do so, Aoyama conducted qualitative interviews with local information technology entrepreneurs, because Hamamatsu as well as Kyoto are successful in this area and the fact that information technology is a completely new sector ensures the lack of traditional ties, which in turn means that entrepreneurs in both cities had to face the same conditions when starting a new business. In her paper Aoyama shows the distinctive differences between the two cities: while the culture in Hamamatsu is "characterized by its openness to outsiders" (Aoyama 2009, p. 505), Kyoto is described as "aloof, indirect, closed, and secretive" (Aoyama 2009, p. 505). Interestingly they both managed to get a foothold in the sector of information technology with totally different strategies. But more importantly, since the two cities are essentially depicted as the opposite of each other, it shows how much the entrepreneurial culture can vary in different regions, even in between country boundaries. Therefore we believe it is more insightful to investigate the relationship between culture and entrepreneurship on a smaller level—in our case the culture of 10 of the biggest Japanese cities. In the following we will describe our methodology and present our findings.

2 Methodology

Four of the Japanese cities we investigated are the (emerging) Informational Cities—Tokyo, Osaka, Yokohama and Kyoto (Fietkiewicz & Pyka 2014; Fietkiewicz, Pyka & Stock 2015). The other selected cities—Hiroshima, Nagasaki, Nagoya, Sapporo, Fukuoka and Kobe—are either part of the so-called Japanese Megalopolis, which concentrates a big population, industrial and commercial facilities as well as financial wealth (Karan 2009, p. 250), or are seen as emerging hubs for telecommunications and telematics (Karan 2009, p. 252).

We also included the city Kawasaki, which was considered as "one of the most advanced informational cities in Japan" (Fujioka et al. 1990, p. 109) as early as in 1990. Hence, all investigated cities are emerging and/or potential informational cities, which are the prototypical cities of the knowledge society in the 21st century (Yigitcanlar, 2010; Stock, 2011). Such cities are based on advanced technology, knowledge and culture, information flow as well as the interaction between these aspects (Castells 1989; 1991). Our main source for data was the Statistics Portal Site of the City of Yokohama[1] which comprises a lot of information related to these cities and relevant for our research. Unfortunately, due to the fact that Nagasaki was not included in those statistics and comparable data could not be retrieved at this stage of the research, we restrained from investigating this city.

For each of the investigated cities we collected data in order to establish expressive representations of the four infrastructures of an informational city (Stock 2011; Fietkiewicz & Pyka 2014)—the ubiquitous (digital) infrastructure, the smart infrastructure, the knowledge infrastructure and the creative infrastructure. The digital infrastructure includes the number of ICT companies (information and communications technology) and the number of hotspots in each city. The statistic on hotspots was not covered by the Statistics Portal Site of the city of Yokohama but we were able to retrieve suitable numbers from another source[2]. The number of parks, the total amount of cars and the area of parking space (in hectare) in each city represent the infrastructure of a smart or green city (also defined as the smart city in narrow sense, see Fietkiewicz and Stock (2015)). In this case, the fewer cars and the fewer parking spaces are in the city, the better are the metrics of the smart infrastructure. The knowledge infrastructure is depicted through the number of universities and libraries, the count of students as well as the scientific output—quantity of patents (as researched in the WIPO database) and scientific publications (as researched in Web of Science) per year. The number of establishments designated for artistic, cultural or entertaining purposes shape the creative infrastructure of a city. Among those facilities are museums, theatres, movie theatres, establishments for big events (stadiums, concert halls and race tracks) and establishments for entertainment (namely bowling alleys and game centres).

A simple addition of the numbers for each infrastructure would not show a representative image of the cities, since Tokyo as the biggest one would probably lead in every category. Therefore, we calculated relative values for each category (per 1,000 inhabitants in each city). Furthermore, we normalized the gathered numbers, as it would not be accurate to add different types of data like the amount of students and the number of patents per 1,000 inhabitants. We used the corresponding percentage numbers of each factor, which where the outcomes of a relativization process. For example, Kyoto has the highest amount of students per 1,000 inhabitants (91.744) while Osaka has the lowest relative number (10.454). Therefore this factor is marked with 100% for Kyoto as the "top city" while Osaka's statistics is put in relation to it, where it only achieves 11.39%. The average percentage number of the factors within an infrastructure is representative for each infrastructure and is collected in Table 2. For this

normalization technique in Informational City research see also Murugadas et al. (2015).

For the exploration of the employment and the entrepreneurial status of each city we collected data concerning the per capita income, the total amount of workers as well as the ratio of entrepreneurs.

In order to estimate the correlations between each investigated infrastructure and the entrepreneurial activity, we applied the Pearson correlation coefficient, as it is "the most commonly used type of correlation in statistics" (Schumacker 2014, p. 344). A calculated correlation in an interval from -1.0 and +1.0 is possible while a coefficient of 0.0 reveals that there is absolutely no correlation, a result of 0.2 (or -0.2) indicates that there is a weak relationship and 0.9 (or -0.9) demonstrates a strong connection. In this sense the Pearson correlation coefficient "serves as a measure of association" which "reflects the strength of the relationship between variables" (O'Rourke et al. 2005, p. 120). For example, let us assume we would like to know if there is a correlation between the number of inhabitants and the number of cars in the investigated cities. This method shows if the relationship between the results from Tokyo is similar to those from the other nine cities, and, whether the amount of cars relative to the size of the city's population is indeed related. A result of 0.0 would indicate that there is no pattern or correlation, and the number of inhabitants has no influence on the quantity of vehicles, while a coefficient of 0.9 would reveal a strong affiliation. For our results we will calculate the coefficients up until the third decimal place in order to highlight the weakness or significance of a result. Besides, this way the impact of results with equal first or second decimal places can be differentiated.

The collected data is shown in Table 1 (population, per capita income, employees and entrepreneurs in each city) and Table 2 (aggregated data for the four investigated infrastructures in each city). We were able to estimate if there are any correlations between our measures of the four infrastructures (as the distinct identity of a given city) and the entrepreneurial activity by using the before mentioned method. Every possible Pearson correlation coefficient between the categories is presented in Table 3.

Table 1: ***Population (2012), per capita income (2012, in Euros, currency exchange rate from July 15, 2014) and entrepreneurial activities in each city (2012)***

City	Population	Per capita income	Workers	Entrepreneurs	Rate of Entrepreneurs
Tokyo	8,966,679	29,260.18	5,120,700	425,300	8.31%
Osaka	2,670,579	23,583.15	1,371,600	135,200	9.86%
Kyoto	1,473,416	21,536.53	727,800	80,200	11.02%
Hiroshima	1,177,711	22,845.5	592,200	50,800	8.58%
Kawasaki	1,430,773	27,560.69	781,800	55,900	7.15%

Nagoya	2,266,517	23,850.73	1,194,100	79,500	6.66%
Sapporo	1,921,935	18,036.3	934,600	57,600	6.16%
Fukuoka	1,479,433	22,541.76	765,300	61,500	8.04%
Yokohama	3,691,693	22,035.53	1,915,800	106,900	5.58%
Kobe	1,544,496	21,326.81	719,200	55,600	7.73%

Source: http://www.city.yokohama.lg.jp/ex/stat/index2.html
Note: we used the Google Translator in order to be able to navigate through this website

Table 2: ***The average percentage numbers of the four infrastructures (2012, per 1000 inhabitants)***

City	Knowledge	Creative	Digital	Smart
Tokyo	67.259%	73.758%	72.524%	53.530%
Osaka	43.492%	65.968%	54.238%	42.791%
Kyoto	79.067%	57.573%	66.090%	46.247%
Hiroshima	36.958%	61.407%	72.633%	49.223%
Kawasaki	20.877%	37.812%	43.662%	53.456%
Nagoya	36.882%	51.905%	70.186%	41.975%
Sapporo	40.576%	56.131%	65.198%	84.891%
Fukuoka	38.932%	58.673%	71.764%	55.579%
Yokohama	18.546%	35.542%	47.534%	45.760%
Kobe	38.736%	40.577%	85.223%	66.390%

Source: http://www.city.yokohama.lg.jp/ex/stat/index2.html
Note: we used the Google Translator in order to be able to navigate through this website

3 Results and Discussion

In this section we outline the outcomes of the applied correlations. Firstly, we present all the resulting correlations, and secondly, we analyze the correlations with respect to the entrepreneurial activity in the city.

Table 3*: Collection of all Pearson Correlation Coefficients Key: DI, SI, KI and CI = Digital, Smart, Knowledge and Creative Infrastructure (per 1000 inhabitants PCI = Per capita income*

	Popul.	DI	SI	KI	CI	PCI	Workers	Rate o. Entrepr
Popul.		0.038	-0.103	0.346	0.451	0.605	0.999	-0.052
DI	0.038		0.288	0.433	0.345	-0.206	0.041	0.198
SI	-0.103	0.288		-0.053	-0.077	-0.473	-0.110	-0.363
KI	0.346	0.433	-0.053		0.682	0.077	0.352	0.741
CI	0.451	0.345	-0.077	0.682		0.213	0.461	0.558
PCI	0.605	-0.206	-0.473	0.077	0.213		0.630	0.118
Workers	0.999	0.041	-0.110	0.352	0.461	0.630		-0.041
Rate o. Entrepr.	-0.052	0.198	-0.363	0.741	0.558	0.118	-0.041	

Source: own calculations

3.1 Overall results

For each measure of the four infrastructures we calculated the average percentage number relative to the population size of each city (per 1000 inhabitants). While the creative and the knowledge infrastructure have a mediocre correlation with the population number (0.451 and 0.346), the digital (0.038) and the smart infrastructure (-0.103) reveal almost nonexistent correlations. These numbers demonstrate that the population size associates more with the creative and the knowledge infrastructures than with the digital and the smart ones. The coefficients for the associations with the per capita income also give us a mixed insight on the various correlations: only the number for the smart infrastructure shows a hint of having a correlation (-0.473) while the other three infrastructures do not seem to correlate or show a very low association (creative: 0.213, digital: -0.206 and knowledge: 0.077).

In addition, the coefficients between the various infrastructures reveal rather weak associations. Only the correlation between the knowledge and the creative infrastructure shows a proper connection (0.682) while the other combinations of numbers illustrate moderate (0.433 on knowledge infrastructure with digital infrastructure) or poor coefficients (digital/creative: 0.345, smart/digital: 0.288, smart/knowledge: -0.053 and smart/creative: -0.077).

3.2 Correlations with regard to entrepreneurial activity

The rates of entrepreneurs in the investigated cities differ noticeably. Yokohama exhibits the lowest rate with 5.58% and Kyoto surpasses the other cities

with a rate of 11.02% (see Table 1). The correlation coefficients central to our investigation are those concerning the rate of entrepreneurs combined with the other categories.

The correlation between the rate of entrepreneurs and the population number illustrates that there is no connection whatsoever (-0.052). In addition, observing the Pearson coefficient of the entrepreneurial rate with the per capita income, both do not seem to influence each other either (0.118). The lowest coefficient regarding the rate of entrepreneurs combined with the numbers of the four examined infrastructures is calculated with the digital infrastructure (only 0.198) whereas the smart infrastructure reveals a slightly better correlation (-0.363), while still being rather humble. On the other hand, the creative and the knowledge infrastructures seem to correlate with the rate of entrepreneurs in a way: the creative infrastructure shows a better result with a coefficient of 0.558 while the knowledge infrastructure exhibits the highest correlation with the entrepreneurial activity (0.741). This outcome shows that the number of universities, libraries etc. might have an influence on the entrepreneurial activity in the investigated ten Japanese cities.

In result, we can state that the entrepreneurial activity is illustrating a mixed picture of its correlations with the four selected infrastructures of Japan's informational cities. Comparing the rate of entrepreneurs with the numbers of the four infrastructures, the knowledge infrastructure reveals the biggest correlation with 0.741. This indicates that a proper knowledge infrastructure indeed has a certain influence on the entrepreneurial activity in a city. With this in view, a closer look on the data of each city confirms this hypothesis: while the city with the highest rate of entrepreneurs (Kyoto with 11.02%) also has the highest rate concerning the knowledge infrastructure per 1000 inhabitants (over 99), the city with the lowest rate of entrepreneurs (Yokohama with 5.58%) shows a much lower number with respect to the rate of the knowledge infrastructure (only ~24).

4 Conclusion and future work

The first challenge during our research was to quantify the culture of a city. By collecting numbers of institutions, entertainment facilities, knowledge output etc. we were able to compare the different cities based on the calculated values for each infrastructure (which in turn characterize the distinct "culture" of the city—digital, smart, and knowledge- or culture-driven). The second challenge was to find a correlation between these two aspects – the culture (or identity) of a city and the entrepreneurial activity. Indeed, there are a few interconnections between the different infrastructures as well as between the infrastructures and the entrepreneurship. Nevertheless, our focus was on the research of the entrepreneurial activity where the rate of entrepreneurs correlates mediocre at best. Only the coefficient between the relative numbers of the amount of entrepreneurs and the knowledge infrastructure reveals a proper correlation and therefore it indicates that the number of universities, libraries etc. might indeed have an influence on the entrepreneurial activity in the cities.

In order to obtain more exact and more profound results, in our future work we will extend the applied categories in order to describe the cities' identities more precisely as well as increase the amount of investigated cities within Japan and worldwide in order to provide more clarity in terms of entrepreneurial activity in Japan.

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