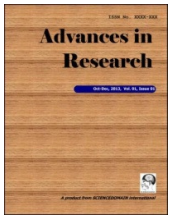

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Evaluating Infrastructures of the 21st Century City: Informational Cities in Japan as Case Studies

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Authors' contributions

This work was carried out in collaboration between all authors. Author WGS designed the study. Field research in Japan was conducted by Authors KJF and SP. All authors contributed to the text and read and approved the final manuscript.

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ABSTRACT

There are many theories and concepts aiming at describing and measuring the modern cities in the 21st century: digital city, smart city, creative city, knowledge city or global city–each of them with different infrastructure and diverse components. In the present case we combine all these aspects, quantify and measure them under the concept of the informational city. We are using methods of the information science approach on urban studies, including the ethnographic field study, grounded theory method and further research-based proceedings. While looking for informational cities we evaluate as case studies the advancement of four Japanese cities in regard to various aspects and conclude which of them mostly conforms to the expectations of the 21st century city.

Keywords: Informational city; infrastructure; japan; tokyo; kyoto; yokohama; osaka.

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1. INTRODUCTION

Digital City, Knowledge City, Creative City, Smart City–there are many concepts of the 21st century modern city. When we speak of modern city we often consider such aspects as digital infrastructure, advanced ICT or the cyberspace. But, where exactly are the boundaries of such cities? Are they individual entities or rather nodes in the global network that, when separated, lose their importance? And finally, who are the people living in these modern cities? Most probably, there are knowledge and creative workers, as well as people active in the Infonomics sector, who continuously rotate between the modern cities looking for better work conditions, new challenges or more attractive sights. The Global or World Cities, defined by Friedmann and Wolf [1] and Sassen [2], may be appealing to this modern world citizen. Global Cities serve as the nodes through which the power, capital and information circulate and where the headquarters of multinational corporations and international financial institutions are concentrated [3]. These worldwide networks "produce an existential nomadism where the human being is fundamentally de-territorialised" [4;5,p.123]. Hence, besides the digital and economic advancement contributing to the flow of money, information and power (space of flows introduced by Castells [6], we have to consider the flow of people, i.e. the human capital and the physical aspects of cities, which make them more attractive to the modern nomads (or cosmopolites).

To investigate this new type of city and quantitatively measure it, we turn to the concept of the so-called Informational City (IC), introduced by Castells [6,7] and further conceptualised by Stock [8]. Relying on this theoretical framework we investigate different kinds of cities' infrastructures that consolidate to the one Informational City. Of course, there are further aspects of 21st century cities such like the mix of companies, the labour markets, the e-governance and the e-government, the citizens' information literacy, etc. [8]. The investigated aspects in this article refer to the concepts of the Digital City and Ubiquitous City with advanced ICT infrastructure [9-11], Knowledge and Creative City [12-14], Smart City [15,16] and Global (or World) City [1,2,17,18]. Finally, we investigate the infrastructure of the soft location factors of the city, which may increase the city's attractiveness and give it the special "magnet effect" [8], which will allure more human capital.

Our approach is based upon concepts and methods of information science [19], which is an interdisciplinary science studying knowledge representation, information retrieval and the environment of knowledge and information such as the information or knowledge society. This article is part of a comprehensive project on cities in the knowledge society. Besides our theoretical considerations on prototypical cities of the 21st century [8,20-22] empirical results are available concerning the characteristics of Informational Cities, e.g. on measuring Informational World Cities' degree of cityness [23], on job polarization in Informational Cities [24], about Singapore as a "prototype" of an Informational City [25], on digital libraries in selected Informational Cities [26], on the role of physical and digital libraries in Informational World Cities [27] and upon the state of e-government in such cities [28,29].Informational cities consist of specific infrastructures, which in turn are widely dependent on the digitalization of the cities. With reference to Ratti and Biderman [30] such digitalization has profound effects on cities:

> "Small and distributed computers have become an integral part of our lives. With the ubiquity of wireless connectivity, they now recombine with our physical environment. Information about urban conditions can be captured in real-time, processed and fed back into cities, enabling new ways to monitor, understand and impact them. These transformations are on their way to revolutionize urban life; from the analysis of traffic and energy consumption to citizen empowerment and participation."

These news infrastructures by no means make for purely digital "cities of bits" [31] or "e-cites" [32]. However, besides the physical infrastructures (like streets, rails or airports) with the digital infrastructures a second set of infrastructures arises. Mitchell, in his "e-topia" [33,p.5], describes the interplays between both types of infrastructures:

> Today, ubiquitously present telecommunications networks, smart machines and intelligent buildings combine with water supply and waste removal, energy distribution and transportation systems to create a wherever, whenever, globally interlinked world. The old social fabric—tied together by

enforced commonalities of location and schedule—no longer coheres.

In this way, digital and physical infrastructures found the "networked city" [34] as the prototypical city of the "network society" [35].

In the present project case we focus on Japanese cities, which appear to be modern, advanced and economically important. We investigate four cities (Tokyo, Kyoto, Osaka, Yokohama) and their different infrastructures and evaluate them in terms of an Informational City. These infrastructures are of dual nature–there are places we can see and visit and there is more ephemeral, not physical space–the space of flows–with flows of money, information and power. We quantify all these aspects and try to conclude which of the investigated cities are most advanced and may be referred to as the modern Informational City.

2. MATERIALS AND METHODS

2.1 Investigated Cities

There are many Japanese cities that have emerged as places of social, technological, institutional and economic networks. According to Karan [36], there are six great metropolitan areas merging into an axis of the greatest urban concentration in Japan, namely: Tokyo, Yokohama, Kyoto, Osaka, Nagoya and Kobe. This Japanese Megalopolis is characterised by strong services sector, labour force sector and the emerging post-industrial informational and transactional area [36].

Furthermore, there is a transformation from an industrial urban society into a society dominated by information, high-tech manufacturing, services and leisure industries, which leads to further changes in the urban labour market and urban socioeconomic dynamics as well [36]. Tokyo, Yokohama, Osaka and such cities like Kobe, Hiroshima, Fukuoka and Nagasaki are emerging as electronic hubs for telecommunications and telematics networks [36]. Knowledge and information are becoming a dominant aspect of the economy in many Japanese cities, which means, they are becoming the post-industrial Informational Cities.

In our research we investigated four cities–Tokyo, Osaka, Kyoto and Yokohama. These are the cities of Japanese Megalopolis, as well as the global cities of first-order (Tokyo), second-order (Osaka) and third-order (Kyoto and Yokohama), according to Hutton [37]. We considered further selection criteria despite the cities' global importance. Tokyo is already defined as a global and world city [1,2] and as Japan's capital it is an indispensable part of our research. There were also further evidences for Tokyo's digital, smart and creative infrastructure [38-40].

Osaka, for a long time the centre of Japanese economy, is still referred to as a global city [2,20]. It also tries to revive its previous economic power and improve its position in the city hierarchy by different projects, e.g. enhancing the role as a global city and the knowledge or creative infrastructure [41-44].

Kyoto is the former capital as well as former centre of Japanese economic development. It is interesting to investigate if it still keeps up in the modern globalized world. Kyoto, the centre of Japanese heritage and culture is a city of the Japanese Megalopolis. It can be considered as a Creative City or because of the great number of universities and research institutes located there, a Knowledge City. Also, there are some initiatives towards a Digital City development [45].

Yokohama is the second largest city in Japan and it is interesting to examine if its size actually fosters globalization and transformation into an Informational City. Furthermore, Yokohama is located near to Tokyo, which may either enhance or limit its potential for becoming an Informational City. We also found evidence, that the city of Yokohama is conducting diverse projects in order to strengthen its Smart City and Creative City infrastructures [43,46].

We defined measures that may be quantified and examined diverse infrastructures of the four cities in order to estimate, which of them are most developed and may be considered as the Informational Cities. Our choice of the cities is based on the references of global (or economically significant) cities, as well as some other, possibly further developed infrastructures of Informational Cities (like knowledge, digital, smart or creative one).

2.2 Ethnographic Field Study

To investigate the Informational Cities' infrastructures we had to define which data is interesting for us. We also had to use general

methods of ethnographic and other empirical studies in order to gather and analyse the needed information.

According to Brewer [47,p.56], ethnography studies "fields" in the sense of "naturally occurring settings" which have to be personally observed by the researcher on site. Our research team visited the cities each for three to four days. They collected data and documented them (pictures, videos, memos). For this purpose, a catalog of "typical" targets (about creative infrastructure, science parks, "green" infrastructure, etc.) has been prepared, which was worked off in the city. The researchers, however, were also free to expand the catalog as desired in order to respond to the specifics of each city. In particular, the interviews led to the expansion of standard catalog.

The ethnographic field study emerged in the sociological studies from ethnology and cultural anthropology and it aims at a diversified analysis of specific fields and cultural scenes. It enabled us to personally experience the everyday life in the investigated cities and better understand the people living there. We conducted the ethnographic field study in every of the four investigated cities. During our stays, we conducted semi-standardized interviews. Moreover, we collected self-made data (photos, videos and voice recordings), helping us to visualize and broaden available evidence and facts. After the field study in Japan, we worked on further literature and Internet research, which we partially based on the outcomes of our interviews and personal experience gained in the field.

2.3 Interviews

Interviews contribute to the empirical social studies. There is a combination of techniques that enables the systematic production of sociological knowledge based on empirical data, like the interpretative and statistical methods. In our research we combined the qualitative and quantitative methods of the empirical social research. During the interviews we used a questionnaire, which consisted of closed questions (standardised technique) to enable a quantification of the outcomes and statistical analysis. We also analysed the qualitative aspects, i.e. during the interview, the interviewee was being involved into a discussion and was free to take up further aspects of the topic. During our research the amount of the interviews was rather low and therefore, statistically not significant and cannot lead to conclusions about the main unit (e.g. whole population). However, it is possible to identify some tendencies in the interviewees' answers and to gain first impressions.

During selection of potential interviewees, we emphasized the importance of diversity. Hence, we have preferably chosen interviewees active in different sectors. Our preconditions were English speaking male/female, employed and living in the specific city for at least a year. There were no requirements towards the expert knowledge about information science or our project. The interviews were organised in the cities, either at the interviewees' offices or in a public place. The interviews were conducted by two interviewers and with 1-3 interviewees. Firstly, the interviewers introduced themselves and the research, after that they proceeded with the inquiry. One interviewer guided the discussion based on the formulated inquiries as well as asked further questions. The other interviewer transcribed the discussion and if possible, also asked questions. We prepared two types of questions: (1) the interviewees expectations how a creative/knowledge/digital city should be or if the given aspects of such a city are indeed important for the citizens and (2) the interviewees experience about the given aspects in the city he lives in. Examples of questions about the interviewees' expectations are: Is it important for an informational city that there is a free flow of all kinds of information (incl. mass media information)? Or: Does an informational city have to have capital-intensive companies, e.g. banks and insurance companies? Corresponding questions about the experience are: Does Tokyo have a free flow of all kinds of information? Or: Does Tokyo have capital-intensive companies, e.g. banks and insurance companies? Despite the detailed answer and discussion, the interviewees marked their estimation for each aspect on a 7-ary scale (with 1 for "fully disagree" and with 7 for "fully agree").

The interviews were conducted between 27 March and 03 April 2013 in Tokyo, Osaka and Kyoto. All in all, we interviewed thirteen interviewees during eight interviews. In Tokyo, we had four interviews with altogether five interviewees, including the German ambassador, employees of Goethe Institute or of the German Chambers of Commerce–Worldwide Network (AHKs). In Osaka, we conducted one interview with representatives of Osaka's metropolitan

government. In Kyoto we had three interviews with overall six interviewees, including Professors and Associate Professors at the Kyoto University. Unfortunately, we did not have any interviews in Yokohama (what will be complemented in the further research).

2.4 Grounded Theory

The basic notion of the Grounded Theory (GT) Method, introduced by Glaser and Strauss [48], is to discover a theory from data (like literature, statistics, ethnographic field research or interviews), which are systematically obtained and analysed in social research. The goal of the Grounded Theory is "to construct theories in order to understand the phenomenon/phenomena under study" [49]. The GT is currently used in many fields, like education, psychology, business management, social work, as well as library and information science (LIS) [49,50]. The application of Grounded Theory Method in LIS research started around early 1980s and many studies contributed to its spread [50,51].

The generation of a theory is a process that combines the operations of collecting data, analysing (coding) and constructing a theory. However, the Grounded Theory Method is not only a bundle of research methods and it is certainly not a traditional, sequential process, where each task has to be completed in order to proceed to the next one. It is a constant shifting between acting (data collection) and reflexion (data analysis and theory generation). Data collection and its analysis are complex processes, therefore, Glaser and Strauss [48] emphasize the importance of writing memos.

A big part of our empirical procedure were interviews we conducted in particular cities, as well as personal impressions gained during the field research. We have chosen Grounded Theory Method because of its great flexibility and because it is necessary to create new theories, due to new issues, new problems and new challenges that arise with the time. Globalization, changes in the world economy and society are significant and partly unpredictable. Therefore, the classical theories are not sufficient enough to explain these changes, as they do not suit current circumstances. Apart from that, worldwide research on different cities cannot be based on one rigid theory. The theory has to evolve in the process so that it is not divorced from the reality.

2.5 Desktop Research

In order to make founded statements about the investigated indicators, it is necessary to make use of statistical data. Above all, official ministerial statistics are concerned. An official statistic is based on the respondents' obligation to give information, truthfully and exhaustively, and therefore, one can trust in the validity and credibility of it. If the available statistical data enables it, the development of indicators was examined in time series of 10 years.

Through application of the classic methods for online content analysis, it is possible to include the municipal websites in the research and use them as an additional source of information. An important aspect of online content analysis during our research was to estimate the library index developed by Orszullok et al. [52] and Mainka et al. [27] for the main public libraries in the investigated cities. This aspect indicates the advancement of the knowledge infrastructure in the city and is a very important component of an IC. We investigated the offers of digital and the physical spaces in public libraries. The services of digital library we were interested in are e.g. the website (in Japanese and English), Web-OPAC (in Japanese and English), e-resources, digital references services or social media. In terms of physical library, we focused on the spaces available for learning/working, on the architectural attractiveness, dining-area, Wi-Fi, and library marketing.

3. RESULTS AND DISCUSSION

The proceeding part of the paper includes a brief introduction of each infrastructure and investigated indicators as well as the results for the four cities. The investigated infrastructures are the Digital, Knowledge, Creative, Smart and Global City, as well as the infrastructure of soft location factors.

3.1 Digital City Infrastructure

Even though at first sight the digital infrastructure may appear ungraspable, we were able to examine aspects, which enabled us to quantitatively evaluate it. The digital infrastructure of an Informational City is based on technologies applied in private households, in business, as well as in the national institutions, like e.g. telephone connections or the Internet. This infrastructure, sponsored by national and international investments, fosters the economic

growth and social progress [53,54]. Since the development of ICT on regional level became important, many national and international institutions and organisations, like e.g. OECD, World Bank or UN, developed ICT-strategies, plans and methods in order to improve the exploitation of the new technologies [55]. There are also further studies being conducted to measure the quality of ICT infrastructures of different cities and to create an international ranking. The most important factors are the amount of technical devices and services, as well as the amount of the mobile devices and mobile telephony contracts with and without an access to the Internet [22].

In terms of digital infrastructure we analysed the ICT-Infrastructure of the cities and the ICT affordability. The first group consists of indicators such as the number of landline phones, mobile phone contracts (with and without the Internet), Internet connections and broadband connections per 100 inhabitants, as well as the number of telecommunication providers and Wi-Fi hotspots in the city. The second group (ICT affordability) concerns the expenditure on Internet connection (for landlines and mobile devices) and annual expenditure on ICT as the percentage of GDP per capita.

In all investigated cities there was an increasing number of broadband connections (relative to all internet connections) over the years. Osaka has the most broadband connections and mobile phone contracts per 100 inhabitants in 2011 (112.45 and 329 respectively). Regarding these aspects, Yokohama took the second place with 81.62 broadband connections and 233.11 mobile phone contracts. Tokyo has more mobile phone contracts (176.52) than Kyoto (160), but Kyoto exceeded the capital in terms of the broadband connections (51.4 for Kyoto and 38.72 for Tokyo). The expenditures on ICT (as a percentage of GDP per capita) were the lowest in Osaka (0.61%), followed by Tokyo (0.74%) and Kyoto (1.1%). Annual expenditure in Yokohama accounts to 1.42% of GDP per capita. All in all, the investigated cities succeeded in some aspects and there is a recognizable tendency of development towards a Digital City. The cities alternated with each other among the different indicators. However, considering the analysed factors, Osaka appears to be the mostly developed Digital City among the four investigated metropolises.

3.2 Knowledge City Infrastructure

More physically recognizable infrastructure is the knowledge infrastructure, as it includes knowledge intensive institutions, as well as the easily measurable knowledge output in form of scientific publications or patent applications. Knowledge is the “key source of competitiveness and innovation” [56]. The first group of indicators we investigated in terms of this infrastructure was oscillating around the knowledge intensive institutions (tertiary institutions, science parks and public libraries). The second investigated group concerned the usage of these knowledge intensive institutions, revealed by such aspects as the number of students, graduates, and employees at universities and colleges. The last aspect is the knowledge intensive output measured by the number of publications and of the patent applications.

As a result, Osaka has the most universities measured relatively to the amount of all students (0.000676). Tokyo has the second most universities (0.000373) and is followed by Kyoto (0.000281) and Yokohama (0.000218). Furthermore, there are science parks in Tokyo, Kyoto and Osaka. Regarding the library index by Orszullok et al. [52] and Mainka et al. [27], Osaka’s Municipal Library scored the highest (95 of 150 points) and was followed by the Kyoto City Library (83 points). Tokyo Metropolitan Central Library was third (78 points) and the Yokohama City Library the last (60 points) of the four cities. However, regarding the total amount of libraries per 10,000 inhabitants the outcomes were different, as the most public libraries are placed in Tokyo (0.29) followed by Kyoto (0.15), Osaka (0.094) and Yokohama (0.049). The most students (relatively to all inhabitants of the city) are in Kyoto (9.17%), followed by Tokyo (3.76%), Yokohama (2.23%) and Osaka (1.054%). However, the amount of employees at the universities leads to a somehow different ranking, as the most employees (per 100 students) are in Osaka (7.3), followed by Tokyo (7.2), Kyoto (5.02) and Yokohama (3.93). Regarding the knowledge intensive output, according to Web of Science, the most publications in 2012 came from Tokyo (24,882), followed by Kyoto (7,805), Osaka (4,930) and Yokohama (4,656). In the meantime, the most patents were applied in Tokyo (2,323), followed by Kyoto (574), Yokohama (17) and Osaka (16). The results show that Tokyo succeeds in many investigated aspects; hence, it has a highly developed knowledge infrastructure.

Furthermore, Kyoto stayed close behind Tokyo in many aspects and can also be seen as a good example for a typical Knowledge City. Osaka's knowledge infrastructure is not as developed as the one in Tokyo and Kyoto, but it is more advanced than Yokohama's.

3.3 Creative City Infrastructure

We can easily recognize and evaluate the output of human creativeness. According to Stock [8], aspects relevant for the Creative City infrastructure are, e.g. the amount of museums, theatres, opera houses, concert halls or galleries. In order to investigate the actual use of the creative infrastructure, we analysed the amount of visitors to these facilities as well.

In terms of the creative infrastructure the cities' performances were much differentiated. As a result, Tokyo has the most museums (195), concert halls (36), opera houses or music halls (10) and theatres (220). Osaka has the second most concert halls (9) and theatres (42). In Kyoto are the second most museums (64). All in all, Yokohama stayed behind regarding all aspects, and the most facilities are based in Tokyo. The most film and television companies per 10,000 inhabitants are located in Tokyo (7.16), followed by Osaka (6.61), Kyoto (2.15) and Yokohama (1.22). In terms of publishing companies, Osaka overtakes Tokyo with total amount of 11.78 companies per 10,000 inhabitants. Tokyo stays behind with 7.24 and is followed by Kyoto (6.47) and Yokohama (1.63). However, the most museums' visitors (per 10,000 inhabitants) come yearly to Kyoto (10,615). By far fewer visitors come to museums in Tokyo (4,469), Osaka (4,364) and Yokohama (3,189). All in all, the most creative cities are Tokyo and Osaka, followed by Kyoto. In this aspect Yokohama stayed way behind.

3.4 Smart City Infrastructure

According to Chourabi et al. [57], it is possible to conceptualize a smart city "as an icon of a sustainable and livable city." In the "vision of a smart city", Hall et al. [58] introduce urban centers of the future, which "secure environmentally green." Here, a smart city is "forward-looking on the environmental front" [57]. This narrow concept of "smartness" is strongly linked to natural resources and energy, transport and mobility, buildings and living conditions, in short, to the green, sustainable and livable city. You can find in the literature some approaches to measure the "smartness" of a city. E.g., Branchi, Fernández-Valdivielso and Matias [59,p.61] developed a tool "to score the different technologies on the basis of their usefulness and consequences."

The so-called green infrastructure and the site development may indicate the degree of city's development in terms of the Smart City. The definition of "Smart City" is very broad and not definite, but in the present case we focus on the city's "smart environment" [60]. We measured the green infrastructure of each city, based on the indicators developed by Khveshchanka, Mainka and Peters [25] and Stock [8]. The first group of indicators was relating to the smart and sustainable mobility, e.g. the congestion charge in the city, the amount of licensed cars per 10,000 inhabitants, the number of train stations, travel times and the train use per 10,000 inhabitants. The second group regarded the smart projects and investments, e.g. the use of renewable energies in the city, use of environmentally friendly vehicles for local transportation, as well as plans and initiatives aiming at changing the city into a Smart City.

The mostly green city can be indicated by a smaller automotive traffic. Tokyo has the fewest licensed cars (2,444) per 10,000 inhabitants, and is followed by Kyoto (2,711) and Yokohama (3,022). The most licensed cars are in Osaka (3,125). In order to decrease the traffic, it is important to enhance the public means of transportation. Here again, Tokyo has the longest rail lines (as a percentage of all streets in the city)–3.78% and is followed by Osaka (3.45%). Kyoto and Yokohama stayed behind with 0.87% and 0.68% respectively. These results indicate that Tokyo is the most advanced (emerging) Smart City. The other cities performed worse than the capital, but in case of Kyoto and Osaka there is a positive tendency towards the development of green infrastructure. However, these indicators focus mainly on the public transportation and decreasing car traffic. Other important aspects are political initiatives and scientific programs conducted in the city. In this manner Yokohama is worth mentioning, as it takes part in the nationwide Smart City Project and encourages sustainable lifestyle, as well as the use of renewable energy resources by the citizens.

3.4 Global City

Friedmann and Wolf [1] were first to propose the concept of the World Cities. This hypothesis was

further developed by Friedmann [17] and by Sassen [2], who defined London, New York and Tokyo as the leading Global Cities [61]. The World Cities research by Friedman [17] concerns the placement of a city in the world economy. The core idea is that such global processes like an increased integration of world commodities, finished goods and financial markets as well as growing interconnection through communication networks, result in a convergence of economic structure and have some spatial as well as social impacts on the cities [61]. Friedman and Wolf [1] give examples of some "world-cities-in-the-making" at that time, like Tokyo, New York, London, Paris, or Frankfurt. Even though all of them are relatively big-sized cities, the determining characteristic for a world city is not its population size. On the contrary, the population size is rather a consequence of the economic and political role of the city [1] and the consequently increased migration [1]. World cities control the global economy and are major points for accumulation of capital, as well as luxury and splendour. However, there is also much poverty, since rich and poor define each other [1]. The internal spatial structure of the world city is characterised by inequality and class domination and can be divided into "citadel" and the "ghetto". The first one serves the elites ruling the city's economic life, the second one is for the underclass [1]. Therefore, we focused on the process of gentrification as possible negative social consequence of the current developments.

Furthermore, we can define the placement of a city in the world cities' hierarchy through its placement in the space of flows [8]. The measure for the economic significance of a city, i.e. the flow of capital, is the turnover of nearby stock exchanges and for the flow of power, the profit of companies having their headquarters in the city. We focus on companies from the Fortune-500 list, which is an annual ranking issued by the American Fortune magazine with the most successful companies worldwide [23]. The international flow of information can be measured in different ways, e.g. the information connectivity related to business as well as to science, technology and medicine (STM). The connectivity of business information can be created through the connectivity between different branches and offices of the same company. This idea of "shared presence" comes from Beaverstock, Smith and Taylor [62], who created a ranking of such cities, with London, New York, Singapore and Tokyo on the top [23]. The same approach to measure the business information connectivity is provided by GaWC, the Globalization and World Cities Research Network, which publishes studies on connectivity between World Cities and their companies. The STM related information connectivity could be measured via scientific cooperation between scientists from different cities, e.g. the co-authorship [23]. In our study we focus on the business information and revert to the GaWC research. We also analyse further indicators, like barriers for information flows (censorship), information exchange through international conferences or the amount of international non-profit organizations. The further investigated indicator is the clustering of the city, i.e. the short distances measured by the travel distances and travel times from the respective city centre to the nearest airport. Afterwards, we analyse the flow of people, for example, by number of direct flights to other cities (especially to the World Cities defined by Friedmann), the amount of tourists visiting the city per day and the migration rates.

Regarding the population size, Tokyo has the most residents and is followed by Yokohama, Osaka and Kyoto. Even though the population size itself is not necessarily an attribute of a global city, it can be seen as a consequence of city's attractiveness. A significant indicator for city's attractiveness and globality is definitely the amount of foreigners living in the city. Quantitatively, the most foreigners live in Tokyo, whereas the highest percentage relative to the whole population is given in Osaka, followed by Tokyo, Kyoto and Yokohama. We analysed the prosperity of the cities or of the prefectures, by comparing their Gross Prefectural Product (GPP). The highest GPP is given for Tokyo Metropolitan Area, followed by Osaka Prefecture and Kanagawa Prefecture (Yokohama). Kyoto Prefecture has by far lower GPP. We also investigated the phenomenon of gentrification as a negative consequence of globalization. Indeed, in Tokyo and Osaka the most expensive rents were for apartments located in the city centre (for Tokyo over 70% of the mean monthly nominal GPP per capita and for Osaka between 17% and 35%), whereas apartments in the suburbs were cheaper (9-19% in Tokyo and 11-22% in Osaka). In Yokohama the tendency was smaller, but recognizable; still, the apartment rents appear relatively high as the cheapest rents accounted to 17-24% of the mean monthly nominal GPP per capita. In Kyoto, the small central districts were one of the most expensive regions in the city, but there are also other non-central districts with the

same apartment prices; hence, the gentrification is not recognizable.

Regarding the capital and power flows we looked at the stock exchange turnovers as well as the revenues of the international firms with headquarters located in the cities. There are stock exchanges in Tokyo and Osaka, and the first one has by far the highest turnover in Japan (and one of the highest in the world). However, there is a steady fall-down recognisable and there are frequent stock market plunges since 2008, which are most probably caused by the world financial crisis in 2008, followed by Japan's earthquake, tsunami and nuclear crisis in 2011 (all having negative influence on the country's economy). Regarding the headquarters of the firms listed in the Global Fortune 500, the most headquarters (and the highest revenues) over the years were in Tokyo (56 companies in 2005, and 45 in 2013). The second most headquarters are located in Osaka (8 in 2013). Both Yokohama and Kyoto have only one headquarter, whereas the revenues of the company with headquarter located in Yokohama are higher.

In order to analyse the information flow, we looked at the total number of international meetings, incentives, conventions and conferences (MICE) held in each city. In this regard, the most MICE were hosted in Tokyo (55 in 2011), followed by Yokohama (32) and Kyoto (28). The fewest MICE considering the four cities were held in Osaka (13). Another important factor is the number of non-profit organizations (NPOs) located in the cities. Here, the ranking of the cities is very similar, as the most international organisations are located in Tokyo. Second most organizations are in Kyoto, whereas Yokohama and Osaka are behind.

In terms of short distances, measured by the distance between the city centre and the airport, the shortest distance and travelling time is given between Osaka and its nearest airports (in average 32km). Second shortest distances are between Tokyo (47km) and its airports, followed by Yokohama (59km) and Kyoto (69km). The flow of people was measured by the number of passengers attending international flights, as well as the total number of international flights. In this regard, the most international flights and passengers attending these were from/to Narita airport (Tokyo and Yokohama)–in the year 2012 total 29,719,560 passengers and 148,265 flights. Far behind was the Kansai airport, in Osaka and Kyoto area–11,253,210 passengers, and 68, 733 flights. The most flight connections to other Informational World Cities were from the Narita airport (Tokyo and Yokohama) as well. Far behind were Haneda and Kansai airport.

Another important factor of people flow is the number of visitors. In this manner, Tokyo was on the top, with 5.56 million (foreign) visitors in 2012. Behind were Yokohama (4.7 million in 2011), Osaka (2.1 million) and Kyoto (1.69 million). The attractiveness of the city can be further measured by the number of foreign students willing to study in the city. Even though the most universities are in Tokyo and Kyoto, the most foreign students (relatively to the total amount of students) are in Tokyo Prefecture (6.02% in 2011), followed by Osaka Prefecture (4.53%), Kyoto Prefecture (3.87%) and Kanagawa Prefecture (2.26%). In terms of openness and tolerance towards different religions Japan seems to be very tolerant as there are many religious entities represented in each city. The most of them (in 2011) were located in Tokyo–total 4,267 (including 2,205 Buddhist temples, 962 Shinto shrines, 333 Christian entities and 767 entities of other religions) and Kyoto–total 2,416 (1,674 Buddhist, 404 Shinto, 88 Christian and 250 others), even though the second one has the smallest population of the investigated cities, followed by Osaka with 2,084 entities (1,149 Buddhist, 295 Shinto, 105 Christian and 535 others) and Yokohama with 1,101 (528 Buddhist, 313 Shinto, 100 Christian and 160 others). So far, the Global City aspect involves the most features and therefor, we contained an overview of the investigated indicators in Table 1. The table also shows the points' allocation for the four cities, further evaluated in the conclusion section.

These measures do not indicate definite conclusion regarding the cities' advancement as a Global City, as they rotate in the rankings in different aspects. However, the one that can be definitely called a Global City (and already is in literature) is Tokyo. It succeeded in almost all aspects of our analysis. It is a big metropolis, with–declining–flows of power and capital (but still one of the biggest in the world), as well as with the flow of information (through connections between companies, high amount of MICE and NPOs).

Table 1.The indicators for Global City and quantified performances of Tokyo (T), Yokohama (Y), Osaka (O) and Kyoto (K)

Category	Indicators	T	Y	O	K
A. Key figures	A1. Number of inhabitants	1	.75	.5	.25
	A2. Number of foreigners living in the city	.75	.25	1	.5
	A3. GDP	1	.5	.75	.25
B. Gentrification	B1. Cost of living in the city	n/a	n/a	n/a	n/a
	B2. Gini Coefficient	n/a	n/a	n/a	n/a
	B3. Housing costs in the city relative to GDP PPP	1	.5	.75	.25
C. Space of flows	C1. Capital: stock market turnover	1	0	.75	0
	C2. Power:				
	a. Companies with headquarter in the city (FortuneGlobal 500)	1	.25	.75	.25
	b. Total sales of companies in C2.a	1	.5	.75	.25
	C3. Information:				
	a. Connectivity between companies	1	.5	.75	.25
	b. Offices of international non-profit organizations.	1	.5	.5	.75
	c. Number of international conferences per annum	1	.75	.25	.5
	d. Freedom of information	1	1	1	1
D. Short distances	D1. Travel distance between city centre and airport in km	.75	.5	1	.25
	D2. Travel time from city centre to airport in minutes	1	.5	.75	.25
E. Flow of people	E1. Number of international direct flights	1	1	.75	.75
	E2. Number of direct flights to world cities	1	1	.5	.5
	E3. Number of tourists per day	1	.75	.5	.25
	E4. Number of direct flights to other Informational Cities	1	1	.75	.75
	E5. Migration: international immigrants	.75	.25	1	.5
	E6. Number of foreign students	1	.25	.75	.5
F. Openness	F1. Number of issued visas for asylum seekers	n/a	n/a	n/a	n/a
	F2. Number of registered partnerships	n/a	n/a	n/a	n/a
	F3. Number of cult places of different religions	1	.25	.5	.75

Nonetheless, the other cities succeeded in some aspects as well, which indicates they are also Global Cities or, at least, on their way to become one. Osaka can also be regarded as a Global City (and it is advocated in literature as well). Even though the flow of information is not as good as in other cities (less MICE and NPOs), there is still bigger flow of power and capital than in Yokohama or Kyoto.

3.4 Soft Location Factors

Cities have always been centres of cultural activities and in the post-industrial period, the cultural and leisure activities have been growing at even faster pace. The globalisation and shifting from traditional industries to creative or culture industries is significant for this growth. The focus is on the production and consumption of culture and leisure, e.g. arts, fashion, music, tourism etc. [63]. Because of the shift from industrial economy, focusing on mass production of standardized goods, to service-led systems, characterized by flexible forms of production and individualized consumption, cities are increasingly transforming and recombining their meaning [64]. A global city has to attract many foreign visitors, students, tourists or businessmen and therefore it should include appropriate institutions arousing interests of these groups, like e.g. museums, galleries, theatres or host big events (e.g. large sports events like Formula One) [8]. Important issues are e.g. waterfront developments, parks and pedestrian amenities [9]. The new architectural and design trends beautify the city and present it with interesting buildings in contrast to the cold forms of modernism [65].

Considering the amount of leisure time facilities relative to the population, Osaka and Tokyo have the biggest offer. In this context Kyoto focuses

partially more on cultural objectives, like museums instead of simple and non-sophisticated leisure places, like game centres. Tokyo, Yokohama and Osaka have redeveloped their waterfronts to business, leisure and cultural centres. For Yokohama, its futuristic waterfront "Minato Mirai" is a specific landmark characterising the city and it is known all over the world. Osaka offers also many attractive facilities, like e.g. the Universal Studios Japan, whereas some parts of the waterfront (re-)development project were not successful at all (like e.g. World Trade Center). Kyoto has to offer other kinds of attractions, namely a big variety of Japanese heritage buildings, temples and shrines. It is also adequate to the demand of visitors, who preferably do sightseeing and enjoy the unchanged landscape and atmosphere of traditional Japanese culture. The cities also have a diverse offer on shopping facilities, which usually increase with the city's size. It is as well correlated to the city's main objectives regarding the infrastructure. Tokyo and Osaka, competing as Global and World Cities, attend to provide the residents and visitors with all kinds of facilities–business, cultural, leisure or shopping. Yokohama, as a futuristic city, cares about its image as a modern, open and green city. Hence, despite business and convention spots, it offers a lot of green space and open-air leisure facilities. However, it does not ignore other important aspects, like culture and shopping. Kyoto has its focus on maintaining the historical and traditional appearance and provides a lot of cultural and touristic attractions. It does not fully deny modern accents, as e.g. the Kyoto Station. The leisure and shopping facilities are limited to the minimum, which, however, meets the residents and visitors' needs.

4. CONCLUSION

We quantified and analysed many different indicators of different types of infrastructures creating the concept of a modern city of the 21st century–the Informational City. Infrastructures we were interested in were the ones of the Digital, Knowledge, Creative, Smart and Global City, as well as of the soft location factors. In order to compare the four cities, we quantified all indicators of investigated categories. For each indicator (like e.g. number/existence of science parks) we created a rank-list of the cities and valued each one with points between 0 and 1 (0; 0.25; 0.5; 0.75; 1), where 1 means the best city (i.e. best performance or simply the presence of an important aspect) and 0.25 means the worst performance (i.e. the worst performance compared to other investigated cities and 0 points in case of non-existence of an important aspect). If there were no data available for all the cities or the data was incomplete, we did not assign any points. An example of this procedure for the Global City indicators can be seen in Table 1 (section 3.3). For each group of indicators and for all indicators we calculated the mean value. The values are illustrated in Fig. 1. Furthermore, we calculated the mean value for all categories in Fig. 2. Even though the different infrastructures were analysed based on different amount of indicators (e.g. the high amount of global city aspects vs. rather law amount of digital city or soft location factors indicators), we did not weight these infrastructures in different ways. At this point of our research, all indicators, as well as all infrastructures, are equally important. However, this is not an optimal solution and we will work on an appropriate weighting system in the next stage of our research.

As we can see in Fig. 1, Tokyo was the top city in almost all categories. In some aspects Tokyo performed (almost) perfectly–Smart City (1), Global City (0.963), Soft Location Factors (0.95), or Creative City (0.930). The score for Knowledge City (0.833) was very good, whereas for the Digital City (0.65) rather alarming. Osaka's best performance was in terms of the Digital City (0.95). It also performed well in the category of Global City (0.713). The values of Creative City (0.68), Knowledge City (0.639) and Soft Location Factors (0.65) infrastructures were somewhat lower. Yokohama stayed way behind Tokyo and Osaka, as its best performances in the category of Smart City accounted only to 0.625. In terms of the Global City (0.55) Yokohama had a suboptimal result. In the remaining categories it scored even worse–Soft Location Factors (0.45), Digital City (0.45), Knowledge City (0.417) and Creative City (0.4). Kyoto's performance was sub-optimal as well. Kyoto scored the highest values in the categories: Knowledge City (0.833), Smart City (0.688) and Creative City (0.59). In terms of Digital (0.45) and Global City (0.48) it scored in values similar to Yokohama's. The remaining aspect–Soft Location Factors (0.25), was very unsatisfactory. The result of this category may appear confusing, as Kyoto is the main location of Japanese heritage and tradition and therefore a destination for many tourists. However, in this research we did not judge the attractiveness of a city per se, but concrete factors that may indicate

city's attractiveness in terms of an Informational City; hence, a city that is attractive for the modern nomad (a professional) and not for seasonal tourists. Kyoto may have some of the most beautiful temples or shrines and be the centre of handicrafts, but in terms of "magnet effect" for cosmopolites looking for a better place to live and work, it is not enough, as we miss such factors as shopping malls or leisure time facilities.

The mean values of all investigated categories are shown in Fig. 2. The top-ranked city is Tokyo (0.89). Hence, we dare to state that Tokyo is the best example of a modern IC in Japan. Osaka (0.7) took second place and has still potential for improvement. All in all, Kyoto (0.54) performed better than Yokohama (0.48). However, both cities have potential for improvement.

The next step is to include these results in the international comparison of the Informational (World) Cities, as well as to investigate further Japanese Cities. The data for Yokohama will be completed and cities like Kôbe, Nagoya, Fukuoka or Sapporo will be also investigated. Furthermore, there is a "sister project" being conducted on 31 Informational World Cities, as well as another regional case study on 7 cities in the Gulf Region.

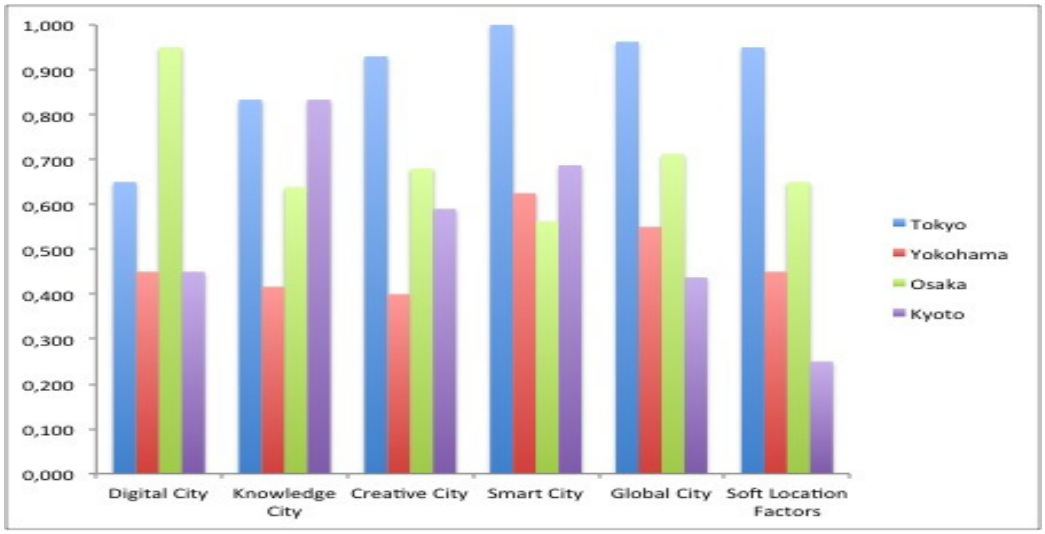

Fig. 1. Mean values of the different Informational City infrastructures for the four investigated metropolises

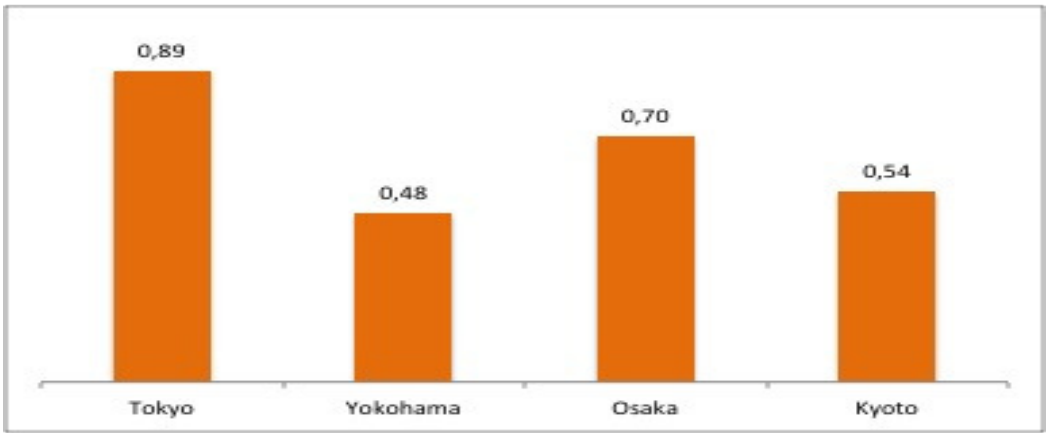

Fig. 2. The mean values of all investigated categories

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Friedmann J, Wolff G. World city formation: An agenda for research and action. International Journal of Urban and Regional Research. 1982;6(3):309-344.
2. Sassen S. The global city: New York, London, Tokyo. 2nd Edition. Princeton University Press, Princeton, NJ; 2001.
3. Shin KH, Timberlake M. World cities in Asia: Cliques, centrality and connectedness. Urban Studies. 2000;37(12):2257-2285.
4. Crang M. Public space, urban space and electronic space: Would the real city please stand up? Urban Studies. 2000;37(2):301-317.
5. Guattari F. Space and corporeity: Nomads, city drawings. In: Zeitlan H, editor. Semiotexte/Architecture. New York, NY: Semiotext (e); 1992.
6. Castells M. The informational city. Information technology, economic restructuring and the urban-regional process. Oxford, United Kingdom, Cambridge, MA: Basil Blackwell; 1989.
7. Castells M. The informational city: A new framework for social change (Research paper 184). Toronto, Canada: University of Toronto; 1991.
8. Stock WG. Informational Cities: Analysis and construction of cities in the Knowledge Society. Journal of the American Society for Information Science and Technology. 2011;62(5):963-986.
9. Droege P. Japan‘s advanced information cities. Places. 1989;5:39-41.
10. Hwang JS. U-City. The next paradigm of urban development. In: Foth M, editor. Handbook of research on urban informatics. The practice and promise of the real-time city. Hershey, PA: Information Science Reference. 2009;367-378.
11. Shin DH. Ubiquitous city. Urban technologies, urban infrastructure and urban informatics. Journal of Information Science. 2009;35:515-526.
12. Landry C. The creative city: A toolkit for urban innovators. London, UK: Earthscan; 2000.
13. Florida R. Cities and the creative class. London, New York, NY: Routledge; 2005.
14. Carillo FJ. Knowledge cities: Approaches, experiences and perspectives. New York, NY: Butterworth-Heinemann; 2006.
15. Hollands RG. Will the real smart city please stand up? City. 2008;12:303-320.
16. Shapiro JM. Smart cities: Quality of life, productivity and the growth effects of human capital. Review of Economics and Statistics. 2006;88:324-335.
17. Friedmann J. The world city hypothesis. Development and Change. 1986;17:69–84.
18. Taylor PJ. World city network. A global urban analysis. London, UK: Routledge; 2004.
19. Stock WG, Stock M. Handbook of information science. Berlin, Germany, Boston, MA: De Gruyter Saur; 2013.
20. Khveshchanka S, Mainka A. Informational cities as urban centers of the knowledge era. In: Marini S, editor. My ideal city. Scenarios for the European city of the 3rd millennium. Venezia, Italy: Universitàluav di Venezia. 2011;117-222.
21. Mainka A, Khveshchanka S, Stock WG. Dimensions of informational city research. In: Digital cities 7–Real world experiences. Brisbane, Australia; 2011.
22. Linde F, Stock WG. Information markets: A strategic guideline for the i-commerce. Berlin, New York, NY: De Gruyter Saur; 2011.
23. Nowag B, Perez M, Stuckmann M. Informationelle Weltstädte. Indikatoren zur Stellung von Städten im “Space of Flow” [Informational World Cities. Indicators of the position of cities in the “space of flow”]. Information–Wissenschaft und Praxis. 2011;62(2):99-106.
24. Dornstädter R, Finkelmeyer S, Shanmuganathan N. Job-Polarisierung in informationellen Städten [Job Polarization in informationalcities]. Information–Wissenschaft und Praxis. 2011;62(2-3):95-102.
25. Khveshchanka S, Mainka A, Peters I. Singapur. Prototype iner informationellen Stadt [Singapore. Prototype of an informationalcity]. Information–Wissenschaft und Praxis. 2011;62(2-3):111-121.
26. Mainka A, Khveshchanka S. Digital libraries as knowledge hubs in informational cities. In: Libraries in the digital age (LIDA) Proceedings, June 18-22, University of Zadar, Zadar, Croatia; 2012.

27. Mainka A, Hartmann S, Orszullok L, Peters I, Stallmann A, Stock WG. Public libraries in the knowledge society: Core services of libraries in informational world cities. Libri. 2013;63(4):295-319.
28. Mainka A, Fietkiewicz K, Kosior A, Pyka S, Stock WG. Maturity and usability of E-government in informational world cities. In: Ferrari E, Castelnovo W, editors. Proceedings of the 13th European conference on E-government. University of Insubria Varese, Italy, 13-14 June 2013. Reading, UK: Academic Conferences and Publishing International (ACPI). 2013;292-300.
29. Mainka A, Hartmann S, Stock WG, Peters I. Government and social media: A case study of 31 informational world cities. In: Proceedings of the 47th Hawaii international conference on system sciences. 6-9 January 2014, Waikoloa, Hawaii. Washington, DC: IEEE Computer Society. 2014;1715-1724.
30. Ratti C, Biderman A. The digitalization of cities: Sketching a future urban scenario. Huffington Post; 2013.
31. Mitchell WJ. City of bits. Space, place and the infobahn. Cambridge, MA: MIT Press; 1995.
32. Fusero P. E-City: Digital networks and cities of the future. Barcelona, Spain: Actar D List; 2009.
33. Mitchell WJ. E-topia. Urban life, Jim—but not as we know it. Cambridge, MA: MIT Press; 1999.
34. Mitchell WJ. Me++. The cyborg-self and the networked city. Cambridge, MA: MIT Press; 2003.
35. Castells M. The rise of the network society. 2nd edition. Singapore: Wiley-Blackwell; 2010.
36. Karan PP. Japan in the 21st century. Environment, economy and society. Lexington, KY: Univ. Press of Kentucky; 2009.
37. Hutton TA. Service industries, globalization and urban restructuring within the Asia-Pacific: New development trajectories and planning responses. Progress in Planning. 2004;61:1-74.
38. Greve A. Learning from Tokyo urbanism: The urban sanctuaries. Cities. 2013;30:98-104.
39. Nobuoka J. User innovation and creative consumption in Japanese culture industries: The case of Akihabara, Tokyo. Geografiska Annaler: Series B. Human Geography. 2010;92(3):205-218.
40. Taylor PJ, Csomós G. Cities as control and command centres: Analysis and interpretation. Cities. 2012;29:408-411.
41. Edgington DW. City profile Osaka. Cities. 2000;17(4):305-318.
42. Nakagawa S. Socially inclusive cultural policy and arts-based urban community regeneration. Cities. 2010;27:516-524.
43. Sasaki M. Urban regeneration through cultural creativity and social inclusion: Rethinking creative city theory through a Japanese case study. Cities. 2010;27:53-59.
44. Tsukamoto T. Devolution, new regionalism and economic revitalization in Japan: Emerging urban political economy and politics of scale in Osaka-Kansai. Cities. 2011;28:281-289.
45. Ishida T, et al. Digital City Kyoto: Towards a social information infrastructure. In: Klusch M, Shehory OM, Weiss G, editors. CIA' 99, LNCS 1652. Berlin, Heidelberg, Germany: Springer Verlag. 1999;34-46.
46. Sasajima H. From red light district to art district: Creative city projects in Yokohama's Kogane-cho neighbourhood. Cities. 2013;33:77-85.
47. Brewer JD. Ethnography. Buckingham, UK: Open Univ. Press; 2000.
48. Glaser BG, Strauss AL. The discovery of grounded theory: Strategies for qualitative research. Chicago, IL: Aldine; 1967.
49. Mansourian Y. Adoption of grounded theory in LIS research. New Library World. 2006;107:386-402.
50. Tan J. Grounded theory in practice: issues and discussion for new qualitative researchers. Journal of Documentation. 2010;66(1):93-112.
51. Seldén L. On grounded theory–with some malice. Journal of Documentation. 2005;61(1):114-129.
52. Orszullok L, Stallman A, Mainka A, Stock WG. Core service of digital and physical libraries in informational world cities–An empirical investigation. In: Smart City and Library Service. The Proceedings of the Sixth Shanghai International Library Forum. Shanghai: Shanghai Scientific and Technological Literature Publishing House. 2012;288-301.
53. Dewan S, Kraemer K. Information technology and productivity: Evidence from

country-level data. Management Science. 2000;46:548–562.
54. Doong SH, Ho S. The impact of ICT development on the global digital divide. Electronic Commerce Research and Applications. 2012;11:518–533.
55. Chanyagorn P, Kungwannarongkun B. ICT readiness assessment model for public and private organizations in developing country. International Journal of Information and Education Technology. 2011;1:99-106.
56. Daniels PW, Bryson JR. Manufacturing services and servicing manufacturing: Knowledge-based cities and changing forms of production. Urban Studies. 2002;39(5-6):977-991.
57. Chourabi H, Nam T, Walker S, Gil-Garcia JR, Mellouli S, Nahon K, Pardo TA, Scholl HJ. Understanding smart cities: An integrative framework. In Proceedings of the 45th Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society. 2012;2289-2297.
58. Hall RE, Bowerman B, Braverman J, Taylor J, Todosow H, von Wimmersperg T. The vision of a smart city In 2nd International Life Extension Technology Workshop, Paris, France; 2000.
59. Branchi PE, Fernández-Valdivielso C, MatiasI R. Analysis matrix for smart cities. Future Internet. 2014;6:61-75.
60. Vanolo A. Smartmentality: The smart city as disciplinary strategy. Urban Studies. 2013;51(5):883-898.
61. Sorensen A. Building world city Tokyo: Globalization and conflict over urban space. The Annals of Regional Science. 2003;37:519–531.
62. Beaverstock JV, Smith RG, Taylor P. World-City network: A new meta-geography? Annals of the Association of American Geographers. 2000;90:123-134.
63. Gospodini A. The landscapes of cultural and leisure economies in Greek cities. Aeichoros–Papers on Planning and Development. 2009;6(1):10-28.
64. Crewe L, Beaverstock J. Fashioning the city: Cultures of consumption in contemporary urban spaces. Geoforum. 1986;29:287-308.
65. Cybriwsky R. Changing patterns of urban public space. Cities. 1999;16:223-231.

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