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Measuring the Creativity of a City: A Proposal and an Application

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ABSTRACT Cities are considered to be the major drivers of the global economy for many reasons, including their creative and innovative potential in generating sustainable economic growth. Istanbul is one of the global cities searching for a long-term growth strategy. This paper starts with a modest effort of composing an index to be used in the evaluation of the creative potential of cities. Our proposed index, "global creative index", consists of five main criteria: (1) creativeness, (2) innovativeness, (3) intellectual development, (4) global network connectivity and (5) world cityness emphasizing multinational corporate economy, international division of labour and high intensity of producer and financial services. The use of the index is illustrated through the comparison of nine cities: Hong Kong, Istanbul, London, Los Angeles, Moscow, New York, Shanghai, Singapore and Toronto. The analysis of these nine cities shows that Istanbul is building an innovation environment, but it still lacks research and development infrastructure, technical support and investment in higher education. This comparison offers guidelines for policy-makers to sketch the growth of Istanbul along the lines of creativity and innovativeness.

1. Introduction

The differences in economic growth across countries can be explained to a large extent by countries’ innovation capacity (WEF, 2009). Innovation is driven by multi-dimensional creativity consisting of artistic and literary creativity, design innovation, business entrepreneurship and technological innovation (Florida, 2002). Considering that creativity is a limitless resource, countries are searching for creativity-led economic development and enterprise strategies (Foord, 2008).

Innovative activities are mostly concentrated in big and globally linked cities (Crescenzi, 2005; Yusuf & Nabeshima, 2005). Establishing innovative infrastructures and creative clusters as well as a creative class in cities becomes one of the main tasks for...
governments in transforming their economies (Scott et al., 2001). In line with this task, recently there has been much academic interest in clusters, regions and especially big cities (Faulconbridge, 2007).

It is a challenge to evaluate the creativity of a city, since there is no single index available in the literature but a number of indices measuring different aspects of creativity and innovativeness (Evans, 2009; Hui et al., 2004; Pinnegar et al., 2008; Powell, 2006). Thus, this paper aims to identify the factors that are vital for a city to be classified as a creative one, so that these factors can be put together to compose an index. The number of studies investigating the creative industries in developing countries are limited, if any (Galloway & Dunlop, 2007); therefore, this paper aims to fill the gap by measuring the creativity of a few exemplar cities from developing and developed countries in a comparative manner. By doing so, the index facilitates an explorative analysis of these exemplar cities in order to illustrate the use of the index and show how policy suggestions can be driven utilizing such an index.

This paper has five sections. Section 2 lays the theoretical background. Section 3 offers an index system, which could serve as a criterion to assess the global creative city potential of Istanbul. Then, Section 4 presents an application of the index in order to make a reference point for overall policy-making and decision-making for innovativeness and creativeness of Istanbul on the basis of this international comparison. Section 5 consists of a short overview.

2. Cities: Theoretical Overview

Cities have always been important since the beginning of civilization. Even though Adam Smith’s book was entitled “The Wealth of Nations”, he included a long discussion called “the rise and progress of cities and towns since the fall of the Roman Empire” (Freeman, 2002). Globalization has been a very effective factor in underlining the importance of cities. The process of economic transformation resulting in the global world opened up new opportunities as well as created new problems, particularly for cities (Dowall & Treffeisen, 1991).

The concept of global cities (Sassen, 2001) can be traced back to the “world cities” idea of Hall (1966). The most conventional conception of the global city enumerates two major characteristics: being the centre of finance and being the centre of high-level production and professional services (Currid, 2006). Özdemir (2002) observed the technology-based transformation in cities where production becomes more science based, resulting in the realization that advantages such as developed research infrastructure, a highly qualified workforce and an innovative culture are becoming more important than natural resources. This means that a supportive environment for innovative companies can be created deliberately, and it should be created through targeted policies (Cooke, 2001).

There are numerous studies showing how cities outperform their counterparts in terms of growth. Eraydn (2008) asserted that territorial cities have grown faster and have been able to increase their relative share in the world economy than non-territorial cities. Niosi and Banik (2005) showed that companies located in three largest provinces (Toronto, Montreal and Vancouver) of Canada definitely perform better than those located in smaller provinces. Cooke (2001) discussed the successful regions of Massachusetts and California in creating their biotechnology and ICT clusters as well as Hollywood, Los Angeles and “Silicon Alley” in New York in developing new media.
The grouping of individuals, occupations and industries in proximity provides an environment in which ideas flow quickly from one person to another. These interactions between people in cities help them to get ideas and innovate (Gleaser et al., 1992). That is why Faulconbridge (2007) categorized New York and London as “learning- and knowledge-intensive cities”. Considering the importance of innovativeness and creativeness, Currid (2006) defined a new concept called “global creative city”, which prioritizes globalness, innovativeness and creativeness of a city over centres of both finance and high-level producer and professional services of cities.

The “global creative city” takes its roots from the importance of creativity. Stemming from early arguments by Schumpeter (1942) and Jacobs (1961), this line of thinking considers the importance of ideas, innovation and artistic and cultural production in the generation of economic growth and new divisions of labour. Most notably, Florida (2002) argued that creativity or the ability to generate “meaningful new forms” (p. 68) is the central tenet to the global economic system.

Creativity is essential to human activity. As a core ability of human beings, it has been and continues to be the intangible asset to create something new, innovative and valuable (Nelson & Winter, 2002). There is a growing interest among economists in the research of creativity, and the body of literature in which creativity is viewed as a generator of innovation and a source of entrepreneurship is increasing (Boden, 2004).

Creativity has been considered as an economic driver for generating wealth and employment, sustainable development of world cities, technological changes, business innovation and enhancement of competitiveness (Howkins, 2001). Global cities are considered to be the ones to possess a high concentration of people who engage in creativity, also known as the creative class (Currid, 2006). In other words, creative industries and creative class play a major role for a city to be globally creative. As a consequence, many countries, regions and cities adopted plans and strategies to attract and/or develop creative industries in their territories in the hope of fostering local economic development (DCMS, 2004; Landry, 2000).

This study starts by investigating the potential dimensions of a city that are necessary for it to be called a “global creative city”. As these dimensions are defined and combined into an index, it is used to measure a set of exemplar cities. The following section is an effort made to develop the index.

3. A Proposal: Composing an Index to Measure the Creativity of Cities

What components and characteristics should be considered when evaluating the potential of a city as a global creative centre? This is a great challenge both for academicians and for politicians because of the lack of a widely accepted global creativeness index as well as city-level data.

The first “creativity index” was developed by Florida (2002) and applied to the American cities. Florida’s index is a mix of four equally weighted factors: (1) the creative class share of the workforce; (2) high-tech industry, using the Milken Institute’s widely accepted Tech Pole Index; (3) innovation, measured as patents per capita; and (4) diversity, measured by the Gay Index, suggested as a reasonable proxy for an area’s openness to different kinds of people and ideas. The creativity index is no doubt an important one to be used as the initial pillar for a global creative city index; however, it has three limitations that need to be overcome.
The first limitation of Florida’s index is that it considers creativity as an occupation. This is a static view, although creativity is in fact based on learning and is a dynamic process. As “learning regions” (Florida, 1995) and “innovative milieu” models (Camagni, 1991) suggest, geographical proximity and informal relationships between firms facilitate the information and knowledge exchange. Therefore, collective learning may be a cause of enhanced innovative behaviour by firms. Furthermore, learning is not limited to the region per se; learning regions benefit from global knowledge flows via different types of networks and value chains (Collinson, 2000). The new index should tackle the dynamic nature of creativity.

The second limitation of Florida’s index is that it overemphasizes the role of technology by evaluating high technology as a separate dimension. Creativity is the driving force behind a wide variety of innovations such as service and marketing innovations as well as technological ones; therefore, having innovation as a dimension of creativity is sufficient. It is also important to note that the definition of creative occupations includes engineering and all other high-tech-related occupations.

The third limitation of Florida’s index is that it is intended to measure diversity of cities in one country, the US. Global cities, by definition, come from different cultural settings and are inherently diversified. However, the level of globalization of each city will show variance, and this is a critical indicator while listing cities in a global creative city index. Thus, the diversity dimension becomes the degree of globalization of a city for a global comparison.

To overcome these limitations, this study proposes five major dimensions to assess the global creativeness of global cities, namely (1) creativeness (Currid, 2006; Florida, 2002), (2) innovativeness (Currid, 2006; Florida, 2002), (3) world cityness (Beaverstock et al., 1999), (4) intellectual development (Pricewaterhousecoopers, 2007) and (5) global network connectivity (GNC) (Derruder et al., 2009; Taylor, 2001). This section includes explanations for each of these dimensions and concludes with the definition of the composite index.

3.1 Creativeness

Florida & Tingali (2004) denoted “creative class” or “creative industries” as occupations and industries that are closely related to creativeness and innovativeness. The creative industries include the publishing industry, film industry, multimedia and electronic publishing, design and advertising, etc. (Florida & Tingali, 2004; Primorac, 2007). However, the scope of creative occupations is also considered to be wider than that of the creative industries. Employees in these occupations can be working outside the narrowly defined creative industries. Similarly, not all the employees in the creative industries are required to produce creative content or work creatively. This occupational approach was fuelled by Florida’s identification of talent as a key component of his creativity index.

Florida & Tingali (2004) stated that the creative class includes scientists, engineers, university professors, poets, novelists, entertainers, artists, actors, designers, architects, non-fiction writers, editors, cultural figures, think-tank researchers, analysts and other opinion-makers. The creative class comprises young, highly educated and talented people and is especially good at multiplying, serving and inventing new jobs (Greene, 2007).

Florida’s “talent index” was utilized to rank the cities across North America and Europe and was a popular reference for policy practitioners in some countries such as Australia, Singapore and China (Florida & Tingali, 2004). In line with previous work, creative class
and creative industries should be considered while evaluating the innovative and creative potential of a city (Clark, 2004; Cortright, 2005; Lloyd, 2005; Markusen et al., 2006). This study adopts the creative occupations as the major dimensions of the global creative city index.

3.2 Innovativeness

Innovativeness is measured with either input-based indicators such as research and development (R&D) investments and R&D employment or output-based indicators such as patent data. Attempts have been made to combine them like the European Innovation Scoreboard. However, many of these indicators do not exist at the city level in many countries, particularly in developing countries such as Turkey. So, there is a need to have assessable data which can reflect the innovativeness of a city. Since patent data are used as the sole indicators to compare the innovativeness of countries in many international studies, such as the European Competitiveness Index developed by the Centre for International Competitiveness (2005, 2008), and are also the only criteria in Florida’s index, this study also uses patent data to measure the innovativeness of cities. Studies show that there is a high correlation between input-based and output-based indicators, so using patent data does not become a limitation of this study. For example, Pavitt (1983) examined the relationship between investment in R&D and the number of patents at the national level and found a significant relationship between them.

Patent data can be regarded as a portrait of an economy’s inventive activity as well as its rate and direction of technical change. Patent-based statistics reflect the inventive performance of countries, regions and firms, as well as other aspects of the dynamics of the innovation process (Watanabe et al., 2001).

3.3 World Cityness

Florida considered diversity for an area’s openness to different kinds of people and ideas as a key feature for creativeness. Since his study (2004) compared cities within one country, it used a proxy according to the availability of the US statistics that could capture such diversity. However, this study aims to compare global cities, each of which is located in a different country. Thus, diversity should represent a measurement that can help scale the level of globalization of a city.

A reasonable proxy is what Beaverstock et al.’s (1999) study offers: a well-established index showing a city’s capacity of being a global one through the existence of multinational corporate economy, international division of labour and high intensity of both producer and financial services. Beaverstock et al.’s (1999) study used a three-step approach to form the world city list, starting with finding the global competence of service firms (accounting, advertising, banking and law firms) in terms of the geographical location of the city they operate in. Then, the study found the global service centres for a given sector by aggregating the results with respect to the cities. Finally, aggregating the service centre results by city, the study identified world cities of different degrees of overall corporate service provision. Eventually, the world cityness index values ranged from 1 to 12.
3.4 Intellectual Development

Innovation is one of the key determinants of economic growth (Crescenzi, 2005; Jolly, 2008). That is why in 2000 the European Council established the goal of making the European Union (EU) the “most innovative and dynamic knowledge-based economy in the world”, known as the “Lisbon strategy” (Crescenzi, 2007). In this strategy, human capital/intellectual capital is the core (Eraydın & Körügolu, 2005; Storper & Scott, 2009).

The new growth theory highlights that innovation is the key to economic development and growth and that it can be achieved by a learning process that is facilitated by intra-regional or local networks among firms and institutions in proximity (Collinson, 2000; Koschatzky, 1999; Maillat, 1995; Sternberg, 2000; Torre & Gilly, 2000). So, human capital and knowledge spillovers that play a role in inducing innovations become the critical assets for cities. Accordingly, intellectual development and networking activities in a city might help to observe the potential of a city’s creativeness.

The highly skilled labour may be appearing in large cities since they are more productive when surrounded by their peers (Niosi & Banik, 2005). “Cities exist in part to facilitate learning between individuals who come into contact with one another”, leading, in turn, to innovations (Storper & Scott, 2009). A high intellectual level in a city will attract other creative people into the city (Florida, 2004). Thus, intellectual development might help to observe the potential of a city’s creativeness. Development also reflects the dynamic nature of skills and occupations in a city, since education is a lifelong activity and it evolves.

The multinational consultancy company called Pricewaterhousecoopers uses two measures to evaluate the intellectual capital of a city in its report “cities of opportunity”: the number of universities in the top 500 university list and the number of Nobel Prize winners living in the city. Moreover, in accordance with the European Competitiveness Index, this study considers public expenditures on higher education as another crucial criterion for evaluating intellectual development in cities, since it shows the long-term commitment to and investment in human resource. Thus, this study proposes intellectual development as the fourth dimension of the index to measure the creativity of a city and operationalizes its measurement with the following factor data giving each factor an equal (i.e. one-third) weight: top 500 universities, public expenditures for higher education per city inhabitant and Nobel Prize winners.

3.5 Global Network Connectivity

As a collective learning and socially embedded process, innovation is crucially dependent on tacit knowledge and untraded interdependencies (Crescenzi, 2005). Successful innovation requires not only brilliant scientists but also everyone from top management to employees in its R&D, finance, production and marketing divisions. It involves high-quality decision-making, long-range planning, motivation and management techniques and coordination. Accordingly, the innovation performance of a firm is determined not only by “hard” factors such as R&D manpower and R&D investment, but also by certain “soft” factors such as management practices and governance structures (Fu, 2008). Therefore, as stated in the Lisbon strategy, innovations are generated not solely by their actors (i.e. individuals, organizations or institutions), but also by complex patterns of interactions between these actors. Actors and interactions among them form the basis of
innovation systems that generate, adopt and transform innovations into the context (Almeida et al., 2008). Innovation systems are sources of learning and innovation for nations and regions (Berger & Diez, 2006).

Taylor (2001) collected data from 100 global service (finance and law, etc.) firms across 316 cities worldwide in order to study the global city networks. In a recent article, Taylor and his colleagues (Derruder et al., 2009) have described their data capturing information and knowledge flows from the city office networks of large professional, financial and creative service firms. Global service firms are defined as having offices in at least 15 different cities with at least one in Northern America, Western Europe and Pacific Asia. Service values are allocated to cities in the range of 0–5, where “0” indicates no presence of a firm in that city and “5” indicates the city to be the most important location for that firm (i.e. its headquarters). From these data, the GNC of a city is computed from the products of its service value for each firm with that of the firm’s service value for each other city. Summing these products over all firms in a city produces a gross value of its GNC.

To entitle a city as creative, one should consider the connectivity of that city at the global level. Even though Derruder et al.’s (2009) study intended to focus only on service industries, it can be used as a proxy of measurement to assess the global connectivity of a city. That is why the global creative city index constitutes the fifth dimension.

3.6 The Global Creative City Index

The global creative city index combines five dimensions mentioned in Sections 3.1–3.5; however, a methodology is needed to transform these dimensions into a unit-free value. To do so, this study uses a methodology the same as that of Human Development Index with the formula promulgated by the United Nations Development Program (UNDP, 2008). To transform a raw variable $x$, such as patent diversity or public expenditure for higher education per capita, into a unit-free index value between 0 and 1 (which allows different indices to be added together), the following formula is used:

$$x \text{ index value} = \frac{x - \min(x)}{\max(x) - \min(x)}.$$ 

4. Cities in the Global Map: An Application to Assess Istanbul in a Context

Even though the existing city rankings do not include global creativeness and innovativeness, some cities are well known for their innovativeness. The literature review by Beaverstock et al. (1999) concluded that studies with a focus on cities have been limited to at most five cities identified in the global urban hierarchy except for Hall’s (1966) study, which focused on seven cities. The majority of the studies about cities have focused on one or two cities and presented an analysis for that/those specific city/cities (Currid, 2006). This study selects nine exemplar cities: Hong Kong, Istanbul, London, Los Angeles, Moscow, New York, Shanghai, Singapore and Toronto. There are three main reasons for the selection of the sample cities. First, they have been analysed in many studies and their innovation capacity has been reported earlier (Andersson, 2000; Ni & Kresl, 2008; Taylor, 2001). Second, comparing only large cities such as Istanbul (with
a population of more than 10 million) could bias the results. So, the list of exemplar cities has both small-sized (with a population of less than 5 million) cities such as Los Angeles and Toronto and medium-sized (with a population between 5 and 10 million) cities, namely Hong Kong and Singapore. Third, this study aims to balance cities by choosing them from both developed and developing countries; five cities belong to developing countries, while four of them belong to advanced countries. These successful global cities might be useful to make a policy analysis to increase the creativity capacity of a city like Istanbul. But more importantly, this set of cities is a good starting point to test the validity of the index.

In the following section, the general properties of these exemplar cities are briefly described. Then, based on the global creative city index model, ranking of all selected cities is presented in Section 4.2.

4.1 Introducing Global Cities in the Index

4.1.1 Hong Kong. Hong Kong is a Chinese city with a population of 7 million (Taylor & Walker, 2001). It is an international financial centre that enjoys the world’s sixth highest gross domestic product (GDP) per capita, supporting 33% of the foreign capital flows into China (Wikipedia, 2010). Hong Kong has a highly developed capitalist economy, and it was ranked as the freest in the world by the Index of Economic Freedom for 15 consecutive years (Preston & Haacke, 2002; The Heritage Foundation, 2011; Yeung, 2008). Economy is mainly dominated by the service sector, which accounts for over 90% of its GDP, while industry now constitutes just 9% (IMF, 2009).

4.1.2 Istanbul. With a population of 12.7 million in 2008, Istanbul is the most populous city in Turkey (TÜİK, 2009). Istanbul is the economic power of Turkey (Berkoz & Eyüboğlu, 2007; KOSGEB, 2006). It generates 27.5% of total Turkish value added, creates 15% of total employment and exports 43.2% of Turkish manufacturing industry exports, while imports 45.8% of total imports.

Istanbul is the biggest city in Turkey in terms of economic development and urban population growth. It has always been the centre of the national economy and an important international node within a large hinterland extending from Eastern Europe to the Middle East and from the Black Sea region to Central Asia (Berkoz & Eyüboğlu, 2007).

4.1.3 London. London is a global city (Taylor & Walker, 2001); it is the most populous city (7.5 million) and metropolitan area of the EU (12.3 million in 2009). London generates approximately one-fifth of the UK’s GDP ($446 billion in 2005). More than half of the UK’s top 100 listed companies (the FTSE 100) and over 100 of Europe’s 500 largest companies are headquartered in central London. Moreover, 75% of Fortune 500 companies have offices in London (London Stock Exchange, 2008).

4.1.4 Los Angeles. Los Angeles has an estimated population of 3.8 million (US Census Bureau, 2008b). In 2008, Los Angeles was ranked as the world’s eighth economically most powerful city by Forbes.com. Los Angeles is one of the world’s centres of business, international trade, entertainment, culture, media, fashion (i.e. Hollywood), science, technology and education (Zumbrun, 2008).
4.1.5 New York. New York is a leading global city (Taylor & Walker, 2001) and the most populous city in the US with 8.3 million people in 2008 (US Census Bureau, 2008a). The city is a major centre for finance, insurance, real estate, media and arts in the US (Currid, 2006).

New York has a strong competitive advantage in creative industries such as new media, advertising, fashion, design and architecture (Cooke, 2001). The city’s television and film industry is the second largest in the US after Hollywood (NYC Film Statistics, 2008). In addition to this, high-tech industries such as biotechnology, software development, game design and internet services are also growing (Gertler et al., 2006).

4.1.6 Moscow. Moscow is a major political, economical, cultural, religious, financial, educational and transport centre of Russia and the world (Taylor & Walker, 2001). It is the capital and the largest city of Russia. It is also the largest metropolitan area in Europe and ranks among the largest urban areas in the world (The Moscow City Government, 2009).

The population of Moscow as of 1 June 2009 was 10.5 million (The Moscow City Government, 2009), and it comprises approximately 20% of Russian GDP (IMF, 2010).

4.1.7 Shanghai. Shanghai is a minor Pacific Asian world city (Taylor & Walker, 2001). The 2000 census estimates the population of Shanghai Municipality to be 16.7 million (City Weekend Guide). It is the centre of finance and trade in mainland China. Shanghai has a stronger base in manufacturing and technology. In 2008, Shanghai’s nominal GDP reported a 9.7% growth to 1.37 trillion yuan (Hong Kong Trade Development Council, 2008). There are 28 technological and economical development zones in Shanghai (Wu, 2007).

4.1.8 Singapore. Singapore is an Asian gateway city-state (Taylor & Walker, 2001). It has a highly developed market-based economy. The population of Singapore as of 2009 was 5 million. The per capita GDP (PPP) in 2009 was US$50,522 (IMF, 2010).

Along with Hong Kong, South Korea and Taiwan, Singapore is one of the Four Asian Tigers. It is the world’s fourth largest foreign exchange trading centre after London, New York City and Tokyo (The World Bank Group, 2009).

4.1.9 Toronto. Toronto is a minor North Atlantic world city (Taylor & Walker, 2001). With over 2.5 million residents, Toronto is also the fifth most populous municipality in North America (Canada’s National Statistical Agency, 2007).

The Toronto region’s economy is highly diversified, with a strong representation across a number of export-oriented clusters. It comprises 11% of Canada’s GDP (Mahroum & Paier, 2006). It is the financial capital of Canada and one of the top financial centres in the world (Zumbrun, 2008). Moreover, Toronto appears to be an important centre for the media, publishing, telecommunications, information technologies and film production industries; it is home to Thomson Corporation, CTV globemedia, Rogers Communications and Celestica.
4.2 The Rankings of the Nine Cities in the Global Creative City Index

Table 1 presents the rankings of the nine cities according to the global creative city index. The results show that New York is the most creative city, followed by London, Hong Kong, Shanghai, Los Angeles, Singapore, Toronto, Moscow and Istanbul. All the values presented in this section are unit free (see Table A2 for details). Since the global creative city index consists of five dimensions, each dimension is discussed separately in the following sections.

4.2.1 Creativeness. With regard to creativeness, Los Angeles is ranked as the first city within the index as shown in Table 1. Istanbul is ranked as the third city with the contributions of creative occupations. This result shows that even though Istanbul is not so innovative from a technological perspective, it is good at creativity and has a huge creative potential.

4.2.2 Innovativeness. Of the nine cities, Istanbul has the lowest patent performance, thus its index value is 0 as shown in Table 1. The potential exists in the city since creative occupations have an important share in the population, but it seems as though the creativity potential is not transferred into the innovative output.

4.2.3 Intellectual development. Table 1 presents the rankings of the intellectual development dimension of the global creative city index. Accordingly, New York has the highest score and is ranked as the first city; London and Los Angeles are right behind New York. Unfortunately, Istanbul has the lowest score when it comes to intellectual development. From the detailed analysis of the sub-dimensions of the intellectual development, as shown in Table A1, the insufficiency of Istanbul with regard to intellectual development is related to its lack of universities on the “top 500 university list” as well as having the smallest amount of public expenditure on higher education per capita compared with other eight cities in the index.

4.2.4 Global Network Connectivity. Table 1 presents the GNC of each city. Considering the fact that GNC was used to measure 132 cities earlier (Derruder et al., 2009), we used the index scores of our exemplar cities from the original study. New York rises as the most
connected city, while surprisingly Los Angeles is the least connected one. Istanbul is ranked as the eight, but it would be a great mistake to interpret this as Istanbul having a low degree of GNC. Indeed, Istanbul is ranked as the 29th city behind Los Angeles within 132 cities, and Istanbul has made a progress in the last decade (its ranking moved from 35th in 2000 to 29th in 2008 where 316 cities were compared) (Derruder et al., 2009; Taylor, 2001). Having a central position between Europe, Asia and Africa contributes to the global connectivity of Istanbul.

4.2.5 World Cityness. Using the world city categorization of GaWC (2008), the index values for the exemplar cities were estimated. The results (Table 1) show that while New York and London share the first place, Istanbul stands second to the last city in the index. In the 1999 study of Beaverstock et al., Istanbul was found to be a world city with four points, along with other international cities of Atlanta, Barcelona, Berlin, Buenos Aires, Budapest, Copenhagen and Hamburg. In the updated index of GaWC (2008), Istanbul jumped from four points to a “higher class” of nine points. Although Istanbul still has to go a long way to reach the ranking of global cities such as London and New York, it has already been positioned above many others.

Istanbul is ranked at the end (ninth) of the total index overall, the third city considering creativeness, the last (ninth) and the eighth (second to the last) in both GNC and world cityness dimensions.

Even though Istanbul shows a great potential in creative occupations, there seem to be two key deficiencies. First, there is no production of innovative outputs in Istanbul. Patent data are indicators of R&D interests and outputs. Both government and industry should increase R&D activities and generate new funds for this purpose. Second, Istanbul’s education and intellectual development system is insufficient.

The results of the global creative city index clarify that Istanbul has a chance of becoming a part of the global innovation league. If the local government develops strategies and invests strategically in developing technologies and educating its youth, Istanbul can increase its position in the hierarchy of global cities. Moreover, all actors of Istanbul’s innovation system such as government, industry and research institutions should try to establish a well-functioning system in order to develop and use new technologies. Istanbul might become a city where innovation and creativeness will be the core of economic and social growth.

5. Conclusion

Cities play a critical role in knowledge- and innovation-based economies. In recent years, there has been an increasing concern over the formation and outcomes of cities as global innovation centres. However, it is a challenge to evaluate the innovative and creative potential of cities. In the search of a measurement, this paper has tried to develop a new index and to benchmark Istanbul from the point of globalness and creativeness.

Based on the literature review and combining various indexes, our index seems to have a modest chance of being used in the assessment of cities at the global level. Indeed, this research is one of the first to offer a comprehensive index to explore the global creative and innovative potential of cities in general. We hope that this paper can serve as a guide for policy-makers.
The global creative city index is composed of five criteria aiming to measure both the stock and the flow of creativity. In other words, three criteria from Florida’s original index were adapted to measure the level of creative occupations, innovativeness and diversity, which rather had a new meaning in this study by referring to the measurement of the level of globalness. Then, two additional criteria, namely human development and knowledge flow through networking, were developed as original contributions of this study in order to explore the dynamic nature of creativity in a city.

As a first test, the global creative city index was used to compare nine global cities (Hong Kong, Istanbul, London, Los Angeles, Moscow, New York, Shanghai, Singapore and Toronto). The index results provide evidence supporting the New York City’s position at the top of the global urban hierarchy as a leading player. Cities that are known to be creative rank at the top, thus the validity of the new index is by large justified. The diversified sample of cities included small and large populated ones, but the analysis did not indicate any relationship between the city size and its creativity performance. Furthermore, this paper has presented a policy discussion for Istanbul for illustrative purposes. The analysis of nine cities showed that Istanbul has gained a substantial lead in developing an innovation environment, but it still lacks R&D, infrastructure, technical support and investment in higher education.

5.1. Limitations and Future Research

This paper has two major limitations. First, data collection was not an easy task and hence a few of the data sets used in the index were not up-to-date. For example, we calculated the proportion of the creative occupations over the total workforce for Istanbul based on data from TÜİK collected in 2000 even though it was possible to find data for 2008 for other cities. However, there were no other current data concerning the creative industries in Turkey, in general, and in Istanbul, in particular. Similarly, the patent diversity of Moscow was estimated using the statistics collected in 2002 (Bruno et al., 2008). It was really a challenge to find city-level data. Particularly in developing countries, the statistics are usually reported at a national or a regional level. For instance, OECD (2008) addresses that as a result of such deficiencies, proxy-level data are used to represent Istanbul concerning R&D data. That is why we had to choose the variables in our index very carefully. More variables may provide a more accurate index, demonstrating the global creative potential of Istanbul and other cities. Second, our index was used for the comparison of nine cities only. This number is relatively small. A larger sample may result in a comprehensive index that could offer more insights about creative cities.

Definitions:

Creative occupations: these include the occupation of engineers, educators and scientists as well as of those involved in creative arts and entertainment and professions such as architecture.

Global advertising centre: an index initially developed by Taylor (2001) demonstrating the worldwide ranking of a city in the advertising industry.

Patent diversity: number of registered patents per 1 million habitants. These data were used as outputs for innovativeness in ECI 2006–2007.

Top 500 university: a list of the top 500 universities in the world by rank as determined in a study from the Institute of Higher Education, Shanghai Jiao Tong University, China.
Global network connectivity (GNC): an index developed initially by Taylor (2001) demonstrating the worldwide ranking of a city in network connectivity.

References


Appendix 1

Table A1. Intellectual development dimension

<table>
<thead>
<tr>
<th>City</th>
<th>Top 500 universities</th>
<th>Public expenditure on higher education</th>
<th>Nobel Prize winners</th>
<th>500+PE+NPW</th>
<th>500+PE+NPW/3</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>0.90</td>
<td>1</td>
<td>1</td>
<td>2.90</td>
<td>0.98</td>
<td>First</td>
</tr>
<tr>
<td>London</td>
<td>1</td>
<td>0.29</td>
<td>0.75</td>
<td>2.04</td>
<td>0.68</td>
<td>Second</td>
</tr>
<tr>
<td>Los</td>
<td>0.90</td>
<td>0.95</td>
<td>0</td>
<td>1.85</td>
<td>0.62</td>
<td>Third</td>
</tr>
<tr>
<td>Angeles</td>
<td>0.45</td>
<td>0.74</td>
<td>0.25</td>
<td>1.44</td>
<td>0.48</td>
<td>Fourth</td>
</tr>
<tr>
<td>Hong</td>
<td>0.64</td>
<td>0.78</td>
<td>0</td>
<td>1.42</td>
<td>0.47</td>
<td>Fifth</td>
</tr>
<tr>
<td>Kong</td>
<td>0.09</td>
<td>0.36</td>
<td>0.75</td>
<td>1.2</td>
<td>0.40</td>
<td>Sixth</td>
</tr>
<tr>
<td>Toronto</td>
<td>0.64</td>
<td>0.28</td>
<td>0</td>
<td>0.92</td>
<td>0.31</td>
<td>Seventh</td>
</tr>
<tr>
<td>Moscow</td>
<td>0.18</td>
<td>0.09</td>
<td>0.25</td>
<td>0.52</td>
<td>0.17</td>
<td>Eighth</td>
</tr>
<tr>
<td>Shanghai</td>
<td>0</td>
<td>0</td>
<td>0.25</td>
<td>0.25</td>
<td>0.08</td>
<td>Ninth</td>
</tr>
</tbody>
</table>

Measuring the Creativity of a City 1317
<table>
<thead>
<tr>
<th>City</th>
<th>Creativeness</th>
<th>Innovativeness</th>
<th>Intellectual development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Top 500 universities</td>
</tr>
</tbody>
</table>