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Tehran Advanced Producer Services Analysis of Spatial and Functional Characteristics

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ABSTRACT

This paper examined the spatial and functional structure of Advanced Producer Services (APS) within Tehran metropolitan area from a geographical point of view. The main purpose of this research was to examine the determinants of location pattern and site selection of APS firms, as well as their functions in world cities network. Analysis of data collected via questionnaires, interviews, and published documents from 200 firms out of 2000 firms revealed the following: First, Tehran is a national command and control centre of the APS sector in Iran. Second, Tehran has a very weak status in the world cities network in terms of APS functions and it is yet to be a world city. Third, APS firms have formed a new geography of APS in the last two decades in Tehran (i.e., "Tehran Corporate Services District") which is different from the conventional Central Business District (CBD) of Tehran. The results of this research and literature review revealed that Tehran has high capabilities to attain trans-national functions in the APS sector in the Middle East and North Africa (MENA) region. In this regard, a set of policies have been proposed.

1. INTRODUCTION

Contemporary economic globalization formed world and global cities as hubs, nodes, and centres of the global economy [1]. In this process, “World Cities Network” is shaped through the formation and growth of Advanced Producer Services “APS” in space of flows [2], [3]. Sassen (1991) identified APS as key contributors to the success of world cities in the world economy as well as connectors of cities together [4], [5], [6]. As stated by Taylor (2011), APS are very important for understanding contemporary cities in globalization [7]. APS accelerate the globalization of firms, companies and cities, enabling the production of goods and services on a global scale [8], [9]. As revealed by Sassen (1991), global city through APS plays a key role in national development [1]. In two past decades, APS has been utilized as a major sector in ranking and classifying cities as world or global cities. For instance, GaWc classified world cities from year 2000 to 2012 based on APS sector. In this ranking, some cities are on top while some are in below [10] and others are absent, as pointed out by Robinson (2002) [11].

Tehran is one of the world's twenty largest cities with 8.5 million inhabitants [12]. It is the first political, administrative, economic, and demographic centre of Iran’s urban network [13]. Its share in Gross National Product (GNP) was 26% in 2006. Without taking into consideration the oil revenue, this share was approximately 30%, which was mainly related to the services sector [14]. With the nationalization of the oil industry in the 1950's, Tehran turned into the economic centre of Iran with rapid population and economic growth, as a result, services and especially APS sector were created from 1960 decade in the geography of city [15]. Currently, Service sector with over 78% of the GDP is the dominant economic sector of Tehran economy. By 2013, this share rose to more than 80%, leading to the services-based economy of Tehran metropolis. Moreover, Tehran has been the first city in the country

in attracting foreign capitals that can aid the formation of APS firms' and activity of foreign corporations in the metropolis. Nonetheless, most of the investment were attracted in the consumption services [16]. During the past two decades (1991-2010), Tehran metropolis has been restructured in terms of eco-spatial forms and APS firms have grown more rapidly than before, appearing in the spatial structure of the city. Nevertheless, until 2014, none of the services-providing companies in Tehran had a considerable position in the world rankings of top corporations [17]. For instance, the Industrial Management Organization [18] of Iran ranked Iranian companies utilizing 25 indicators. This ranking showed that Tehran is the main centre and location of several national companies in Iran. Banking, finance and credit, insurance, and ICT companies are the top producer services providers in the IMO ranking [18]. Nevertheless, none of these companies and firms had a position in Fortune 500 ranking [19].

Notwithstanding the formation of advanced services economy from the 1960s onwards in Tehran metropolis [13], [20], according to "The World According to GaWC 2000 to 2012", it was not considered as a world city. A key question is that, why are some cities not included in "The World According to GaWC 2000 to 2012" classifications as a world city? Therefore, it is necessary to study all dimensions of world or the global city formation process in order to answer this question, classification methods and approaches. Nevertheless, we know that GaWc group researchers had no access to internal characteristics of developing countries cities APS sector.

This study has three questions as follows: what are the spatial characteristics and patterns of Tehran APS firms? Which factors determines the spatial behavior of APS in the metropolitan area? What are Tehran APS firms' functional characteristics in relation to city connection to the world cities network?

Thus, identifying spatial and functional characteristics of APS is necessary to understand the absence of some cities in the world or global cities class. Moreover, we know that APS are economic as well as geographic features that occur in space. Therefore, the main goal of this study is to identify the current situation of Tehran's APS via analysis of APS spatial and functional characteristics. This paper comprised five main sections as follows: Introduction, theoretical background, method and data, result and discussion and conclusion.

2.2. THEORETICAL BACKGROUND

2.1. World and global city debate

The term World city was used for the first time in 1915 by Patrick Geddes. Hall (1966) defined world city as the centre of political power, national and international business, banking, warehousing of global goods and services, insurance, financial services, professional and advanced service of medical, legal, education, services, ICT, the mass media, luxury goods consumption, art, culture and entertainment services [21].

Hymer (1972) introduced world cities as appropriate locations for multinational and international firms and companies, as a result of their advanced infrastructures and high corporate profits [22], [23].

Freidmann (1986) defined global city as a centre of multinational corporations, international financial institutions and centre for managing global capital and high-level business services [24], [25].

Global cities are important in terms of economic, cultural, political, and not in terms of population or size [26]. World cities are places for reproduction, redistribution and re-management of global capitals circulations, centres of the global economy, places for headquarters of financial companies ([27], [28], as well as key functional nodes of global economy [29]. Sassen uses the term Global City for naming cities such as London, New York and Tokyo as centres of global, high level and specialized services like managerial, financial, producer, innovative and business [1]. In her opinion, the pulse of global economy beats in global and world cities that connect national economies into the international economies. In her idea, "World cities of developing economies before then entering into the Global City ranking, must be regarded as World City" [30]. Olds, defines three categories of world cities including Hyper- world cities, Emerging world cities and World City-State [31].

Freidmann (1986) classified world cities into two main categories, including cities in capitalist and central economies with semi-peripheral economies [24], [29].

Castells (1996) defines world cities as nodes of flow space via advanced producer services as internal nodes [3]. GaWc group from 1999 onwards defined world cities as "post-industrial production sites" and classified them into five major categories including Alpha, Beta and Gamma world cities such that Global cities are on top of these categories [28], [30]. According to most researchers as previously mentioned, world cities are nodes within globalized economy that connect the cities together through networked connection using advanced producer services that are provided by APS firms [30].

Factors like political, social, economic and physical structure of countries and cities are important in the formation of world cities. Nonetheless, in this paper, we focused on APS as one of the main multi attribute factors in world cities formation and connect them to the other world cities in the world cities network.

2.2. Advanced Producer Services "APS"

Some researchers, including Sassen (1991), Daniels (1995), Taylor (2004b), and Beaverstock et al. (2006), believe that APSs are the major characteristics of the world cities economy in the globalization era. Some examples of APS include banking, financial, insurance, auditing, legal, management, and advertising services [32], [33], [5]. Sassen believes that cities are strategic places of producer services and these services determine a city's rank in the global cities network [34]. Castells argues that producer services are functions that provide geography of flows [3]. Taylor (2004a) introduces APS as connectors of cities and regions in the global networked economy. They increase the quality and efficiency of economic activity and the value of the inputs during the production process [35], [2]. These services are mainly provided for companies, manufacturers, and service providers, not for consumers [1]. Marshal and Wood (1986) classified producer services into three main categories: 1) services provided by firms for their own use, 2) services provided by firms for sale, and 3) services provided by firms by the order of other companies [36], [1]. These services are responsible for organization, management, distribution, and security of the production system in the world [37]. Greenfield believes that they are intermediate products [1]. They are not the final products that will get to the consumers' hands [38]. APS provides conditions for attracting Foreign Direct Investment (FDI) in the production sector [36].

2.3. Spatial behaviour of Advanced Producer Services

As mentioned by Sassen, APSs are very important for understanding contemporary cities in the globalization era (1991, 2001). In explaining the main reasons for the growth of these services within the cities, researchers have pointed to reasons such as growth of APS in all sectors of economic activities [39] including market demand, the growth of service providers, outsourcing, and the specialization of the services [40], [41]. These services constitute an important spatial structure of cities in the globalization era.

In classic location theories, in order to determine the patterns of spatial behavior of economic activities, the relationship between large scale industries and location [42], the role of the goods and services supplied by firms and producers [43], transportation, space, clustering, and the economy of scale were considered [44]. Nevertheless, in the case of services, the condition is different and more complex. In the macro-scale, access to international markets in small-scale and access to local and national markets are among the most important factors which bring about the local concentration of APS firms in national and international metropolises [45]. APSs follow the urban hierarchy, access to clients and markets, the centrality of markets, and the specialties as well as skills of the staff in making decisions about their location [35]. To these factors, the price of land, access to market (for customers), and laws should also be included [46]. Largely, the location of APS depends on the combination of their internal and external relations [47]. It also depends on the nature of the APS, spatial and partial dynamics of the customer markets, the national or regional status of the APS, and some other factors [48]. The existence of infrastructures (such as public transport facilities) has an important role in the spatial behavior of APS [49]. In addition, access to other APS firms, [50], reduction of the costs of workforce by getting closer to CBD [42], and the closeness of the company to other APS firms in increasing productivity have been found to play a major role in the location selection of APS firms [42], [50]access to clients via face-to-face relationships, attractiveness of suburbs, residential areas [42], and the main corridors of the outer rings of cities [37], use of ICT [51], [43], the economy of accumulation, and access to local clients, labor markets, as well as location of clients, [52] were found to be of great importance in the spatial behavior and location selection of APS in cities and urban regions.

Closeness to, and relation with, the places where production and export of goods and services are carried out [53], [9], reduction of the costs and the speed of providing services [54], and earning more profit as a result of closeness to [55], and being situated in, important metropolitan areas [55], [45] are among the important factors affecting the location and spatial behavior of APS firms. Daniels (1985) believes that in "polycentric model", APS extends towards the outer margins and edges of cities. Nevertheless, their main offices remain in the main centers and the "CBD" of the city. Illeris maintains that with the extension of ICT, there are no limitations in the options of location selection for APS firms (1996).

Other scholars have mentioned reasons like life cycle of companies, building characters, subcontracts, and economic, historical, and cultural conditions of places that can have an effect on the site selection and establishment of APS firms [58]. Moreover, the accumulation of ICT networks and infrastructures in metropolises provides access to services for clients in the scattered geographical areas [59].

In terms of functional view, globalized APS firms, follow global cities hierarchy. Over 80% of the global cities are situated in developed countries [60]. Nevertheless, it does not mean that these services are not produced in non-global cities. Not all of the world cities enjoy APS equally; the geography of their

presence is different from city to city [2]. Finally, the spatial behavior of APS firms has a strong relationship with planning, policy-making, urban laws, and strategies of spatial economy of cities.

2.4. Tehran's position in the global cities network: literature review

There are three main categories of research with respect to the world cities. The first category is related to the studies of Hall (1966), Hymer (1972), Friedmann and Wolf (1982) [61], Sassen (1991), and other researchers. However, in their studies, Tehran was not the subject of study. The second category is related to studies of the "GaWc" group from 1999 to 2016. Works of Taylor (2001, 2004b), Beaverstock et al. (1999), Short (2004), and other researchers fall into this category. Beaverstock, Smith, and Taylor (1999) and Taylor (2001, 2004) claim that Tehran is not yet a world city and there is little evidence for its entrance to the world cities network. Taylor, in the evaluation of global cities connectivity, obtained the value of 0.121 from 1 for the GNC (Global Network Connectivity) of Tehran via APS, which ranked it203rd. It was 149 ranks lower than Dubai which ranked 54th in the same year [2], [62]. Short believes that Tehran is a large non-world city, which is excluded from the global cities network. Short (2004) has categorized Tehran as a non-world city. He believes that fundamentalists, with their religious and political beliefs, have sought to resist the encroachment of global capitalism due to their fear from the secular beliefs in the case of Iran [63]. Nevertheless, the globality of Tehran is an iffy issue that we cannot say that Tehran is a world city or not and Tehran global status are very fluidity in historical periods [64].

The third category of research is related to the works of Bassens et al. (2010, 2011), Stanley (2003), and Devriendt et al. (2009) [65], [66], [67], [68]. Stanley (2003) pointed out that Tehran demonstrates minimal evidence of a world city formation, though it has high capabilities with a strategic position in MENA countries to connect to the regional network via APS, especially through the use of financial services. Bassens et al. (2010), analyzing the geography of Islamic Financial Services (IFS), indicated that 8 out of the 20 biggest firms in banking and insurance sector are located in Tehran. Generally, the Tehran-based firms have an extensive network both in Iran and abroad, with offices in the Middle East and Europe. This suggests that although the Iranian IFS are originally embedded in a strong national context, contemporary Tehran-based firms have extensive networked activities overseas, particularly in London and Dubai. So, Tehran as a high global connectivity, is the command centre of financial services (Banking), and well connected in MENA region and Islamic cities network. Tehran's network connectivity degree is 0.84 from 1. Tehran, in terms of connectivity to the Islamic and European area, has been ranked 2nd after Manama among the cities of MENA region. It is mainly connected with the cities of London, Dubai, Manama, Istanbul, Abu Dhabi, and Muscat [66].

Other studies have revealed that Tehran has been one of the eight most important financial centers of the MENA region and has been the least damaged during financial crises [68]. Nevertheless, the difference between Iran and Arab countries in their banking and financial systems, prevents Tehran from having networked and inter-firm linkages with the other world cities of the MENA region, which indicates that Shiite Iran is developing its IFS sector along a different path [66]. According to the latest study of the Globalization and World Cities Research Network (GaWC) in 2010, regardless of the fact that many Asian cities are in the category of global cities in terms of connectivity by APS, Tehran has no position in this classification [60]. Based on Tehran's 2007 strategic plan, this city has high economic potentials in the APS sector that can convert it into an important actor and a main world city in the MENA as well as the central Asia region [69].

At least, A.T. Kearney's (2015) latest in depth analysis of global cities, examines that Tehran appeared in world cities rank for the first time due to its population size and international presence. Although Tehran needs to have a better status in the world economic network, and this issue is inevitable for its economic stability [59], it has not taken the advantage of the economic opportunities of globalization and has not gone out of its oil-based economy manacles. Also at this time, there is an insufficient and dishonest understanding of the role of Tehran in its global background [20]. Tehran does not have transnational strategic policies to play global roles and to have global functions in the world cities network. From 1933 to 2012, numerous plans were provided to develop Tehran's spatial, economic, and social status. Some of these plans included Tehran's City Agenda prepared in 2002, Tehran's 1404 Vision prepared in 2006, and Tehran's Structural and Strategic Plan "TSSP" prepared in 2012. In these documents, some suggestions and recommendations were made to enhance Tehran's role and position in the global economy. Another important program for Tehran was the "five-year program of Tehran municipality" prepared in 2012. In this program, Tehran's global mission and roles from 2008 to 2014 were addressed [17]. Nonetheless, in the economic and spatial vision, no important action has been taken until 2016.

3. METHODS AND DATA

This study is based on documents and field studies. The geographical area of this study is Tehran

metropolitan area and its 22 municipality regions, and about 2000 firms in five clusters of APS were the subject matter of the study area.

In the first step, the relevant and complete spatial data of 2000 five cluster APS firms were extracted from March 2015 to April 2015 from the official sources or web addresses that has been described in the following. Data of International Law firms extracted from Iranian Bar Associations Union reports [71]. Data of Auditing and Finance firms extracted from Iranian Association of Certified Public Accountants website [72].

Data of Information and Communication Technology firms extracted from the Directory of Iranian ICT Companies website [73]. Data of international transportation firms (ITFs) extracted from Association of Iran Transportation Companies website [74] and data of insurance firms extracted from Central Insurance of Iran "CIIRI" (2015) [75]. Thereafter, their addresses were located on the map 1: 2000 in Arc GIS 10.3 from May to June 2015. Subsequently, through the use of Cochran technique (Equation 1) when the D value is 0.05%, 322 samples were (16.1% of 2000 firms) selected for the study (Table 1).

Equation (1):

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N}\left[\frac{z^2 pq}{d^2} - 1\right]}$$

where:

n - sample size;

N - universal population;

z - confidence level of acceptable error percentage (1/96);

p - proportion of the universal population that lacks certain attribute (0/50);

q - 1-p;

d - reliability or potential efficiency (0/05).

In the next stage, most samples were distributed to each cluster according to the number of firms in each cluster. In the next step, the self-structured questionnaires were randomly completed from 22 regions. For spatial analysis of APS, full data of about 2000 firms were utilized (Table 1). Nevertheless, for functional analysis of APS, only questionnaire data were used. As a result of the heterogeneous distribution of APS in municipal regions, samples were chosen with attention to the proportion of each region in the share of APS. For instance, seven & six regions have a greater number of APS and also include more samples. Lack of appropriate data, most especially about the relations, size and functions of firms, largeness of the metropolis, dispersed pattern of samples and failure of firms to respond to the questionnaires were the important limitations of this study. However, the distinction and innovation of this study is that, this study was carried out for the first time with regards to Tehran's APS sector and offers information about Tehran APS with the spatial point of view.

Table 1. Distribution APS samples in 5 clusters in Tehran Metropolis.

APS cluster	Number of APS in each cluster	Samples from each cluster
International Transportation Firms	800	90
ICT engineering Services Firms	698	85
Auditing and Accounting Firms	235	65
Insurance Broker Firms (Parsian or Persian Insurance Company)	157	53
International Law Firms	110	39
Total	**2000**	**322**

Techniques such as Kernel Density (to show the density of firms), Ripleys K Function and Average Nearest Neighborhood (ANN) and Standard Deviational Ellipse (SDE) method in to show the spatial distribution pattern of APS firms were used in Arc GIS 10.3.

This study had two main parts. In the first part, the spatial characteristics and patterns of the APS firms studied. Then, in the second part, functional characteristics and global connectivity of APS firms analyzed. Table 2 shows the main factors on which this study focused.

Table 2. Some factors of study.

Functional	Spatial
Period of firm establishment	Building type
Size, subdivision and branch of firms	Spatial distribution in regions
Main clients	Location decision making reasons
International connections situation	Location /spatial behavior
Connection methods with foreign firms and world cities	Limits for relocation
Foreign and transnational connections reasons	
Reasons for use of ICT	
Main restrictions to the global network connectivity	

The use of other criteria such as turnover, employment size etc because of no tendency of firms to give data were not usable.

4. RESULTS AND DISCUSSION

4.1. The spatial characteristics of Tehran APS

In this section, factors related to the spatial behavior of firms, were analyzed. Results of questionnaire and spatial data analysis revealed that on average, 80% of the firms are located in the new commercial and administrative complexes and buildings in the north of the city where environmental conditions are better than other areas. Moreover, data analysis results show that regions 1, 2, 3, 6, 7, respectively have been the densest centers of APS firm's distribution in metropolitan area. On average, 58% of the firms are sited within a distance of 5 km radius of the city C.B.D. It is important for firms to be sited close to the C.B.D, but it is not the determinant factor alone. Result of K function and ANN method revealed that spatial pattern of Tehran's APS are clustered in most of APS clusters (Fig. 2).

Result of Kernel Density analysis shows that the intensity of concentration and the closeness of firms to each other in regions 6, 7, and 3 have attained the highest level in 22 municipalities of the city (Fig. 1).

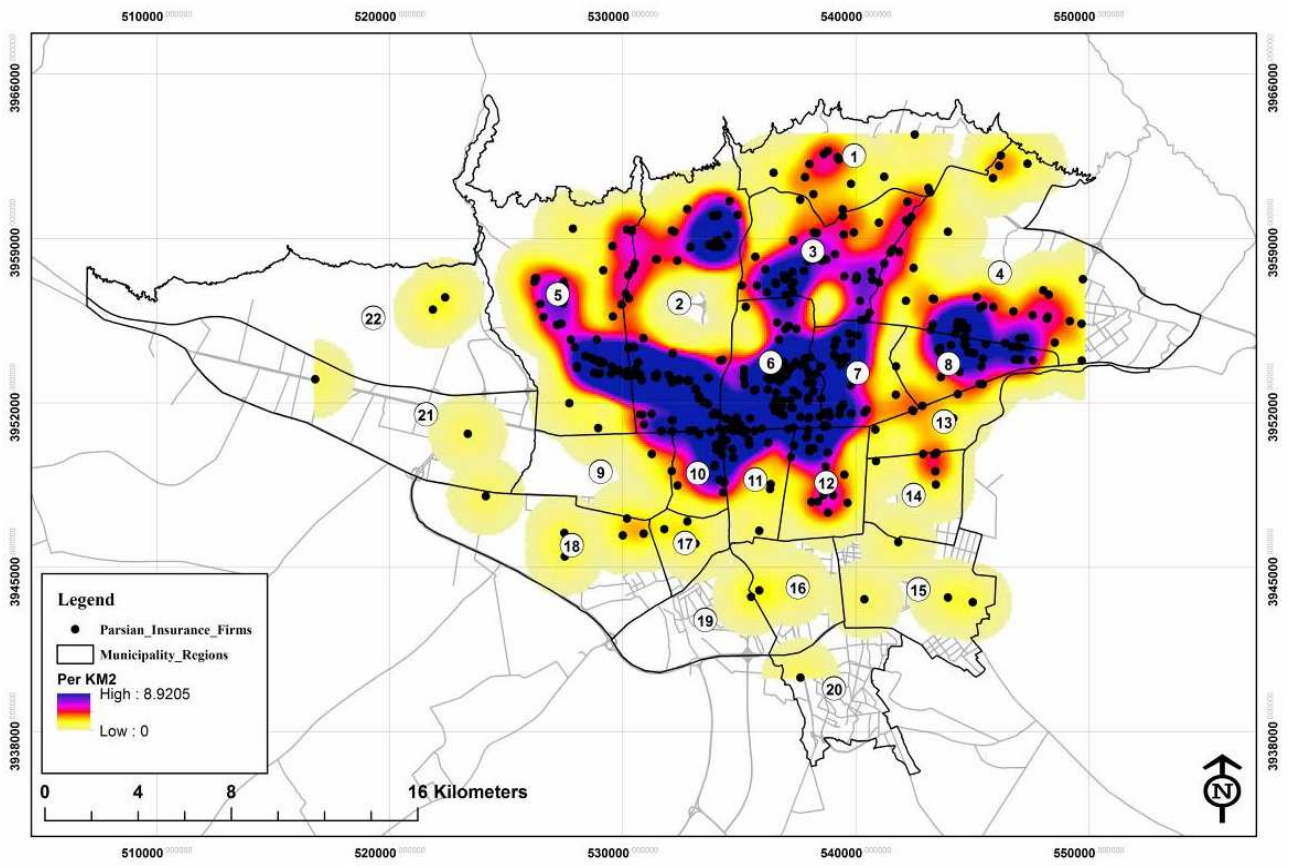

Fig. 1. Density map of Parsian insurance firms.

Table 3. Result of Average Nearest Neighborhood method for each APS firms.

Function APS firms	Observed mean distance (m)	Expected mean distance (m)	Nearest neighbor ratio	z-score	p-value	Spatial pattern
ICTs	127.9813	284.3499	0.450084	-28.810970	0	high clustered
Transportation	191.7872	530.6067	0.361449	-26.567896	0	high clustered
Insurance	322.0091	590.9706	0.544882	-19.253494	0	high clustered
Auditing	341.3128	493.5858	0.691496	-8.135194	0	high clustered
Law	854.7365	991.5579	0.862014	-2.176813	0	low clustered

Results of ANN method show that, each selected APS firms have clustered spatial pattern (Fig. 2). Some APS firms such as ICTs and ITFs high clustered (Table 3).

Results of using the ANN method are as follows:

Law Firms: Given the z-score of -2.17681320211, there is less than 5% likelihood that this clustered pattern could be the result of random chance (Table 3; Fig. 2, a3).

Insurance Firms: Given the z-score of -19.253493879, there is less than 1% likelihood that this clustered pattern could be the result of random chance (Table 3; Fig. 2).

Transportation Firms: Given the z-score of -26.5678961414, there is less than 1% likelihood that this clustered pattern could be the result of random chance (Table 3; Fig. 2, a4).

ICTs Firms: Given the z-score of -28.8109703625, there is less than 1% likelihood that this clustered pattern could be the result of random chance (Table 3; Fig. 2, a1).

Accountancy and Auditing Firms: Given the z-score of -8.13519370611, there is less than 1% likelihood that this clustered pattern could be the result of random chance (Table 3; Fig. 2, a2).

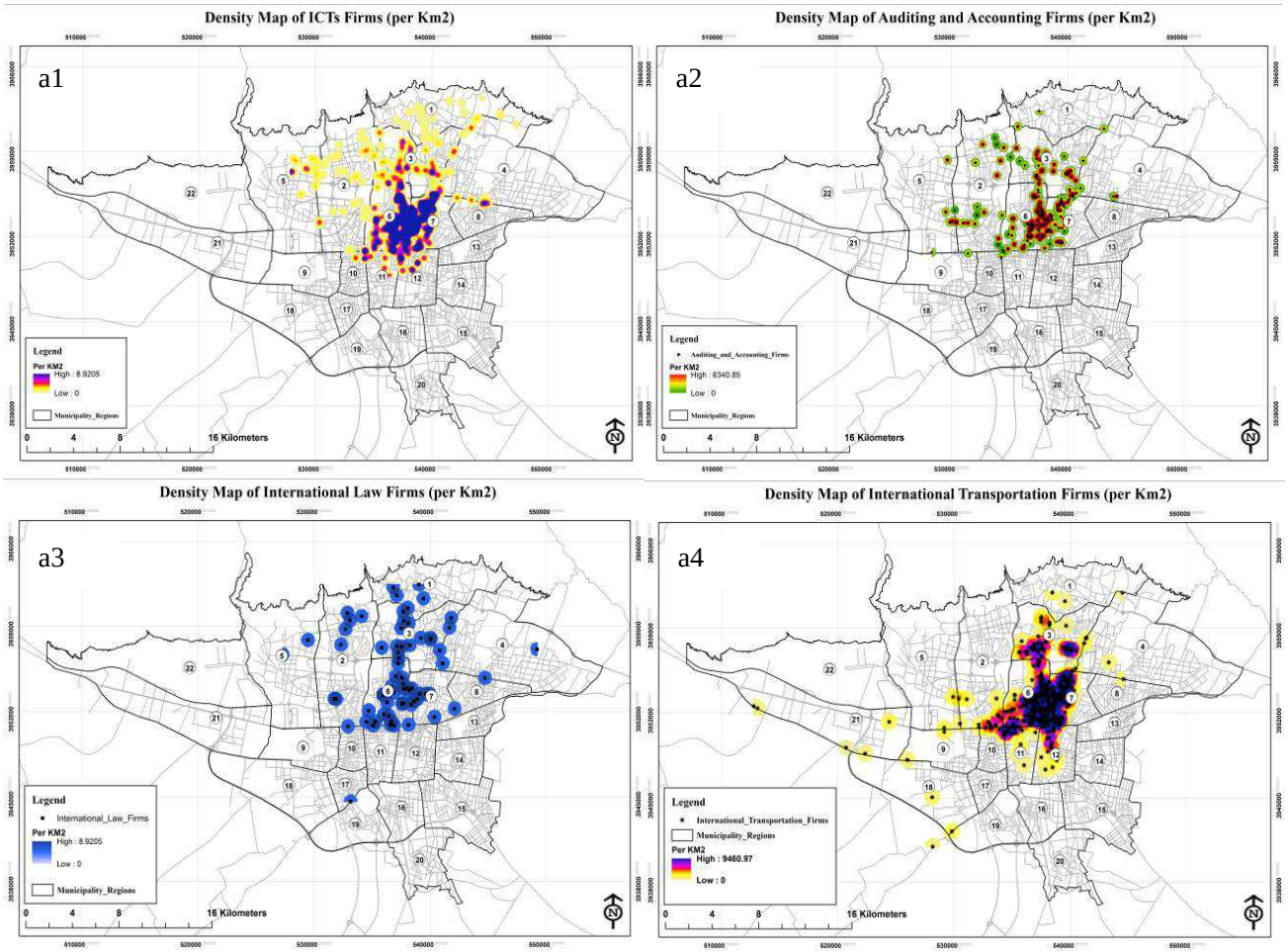

Fig. 2. Density maps of ICTs (a1), Law (a3), Accountancy (a2), Transportation (a4) firms.

Results of data analysis demonstrated that on average, about 80% of the international legal, insurance, auditing, and ICT firms have been established during 1990 to 2015, and 60% of the international transport firms have been initiated between 1980 and 2000. During this period, Iran was at imposed war and thereafter entered into the period of economic recovery and urban restructuring. More than 70% of the clients of these firms are located in Tehran and its periphery cities. This concentration is especially high for law and insurance firms, but low for transportation firms. Only 50% of their clients are located in Tehran and other cities around it. Thus, national and local clients have the greatest impact on APS firms' positioning, spatial behavior, and spatial patterns.

This demonstrates the importance of the economy of agglomeration, economy of scale, and

upgrading competitive advantage between the city regions via the comparative regional advantages. Results of data analysis show that:

- quick and easy access to transportation;
- proximity to the city C.B.D.;
- cost of renting properties;
- proximity to city's economic and social organizations and institutions;
- access to ICT facilities, and Customer proximity, are some important factors that have been influential on Tehran APS firm's site selection and their spatial behavior.

As the questionnaire data show that APS firms tend to remain in regions 6, 7, 3, and then spread to regions 1 to 5, the results of the SDE analysis, confirms this. While all APS services have the tendency to move to the regions of 1 to 5, there is no tendency among APS firms to move towards regions of 8 to 22 (Fig. 3). Nevertheless, high cost of rent, lack of adequate and appropriate public transportation, as well as being away from markets and customers, public and private agencies and institutions, in addition to ICT service providers are considered the most important obstacles and limitations of firms to move or relocate within the city.

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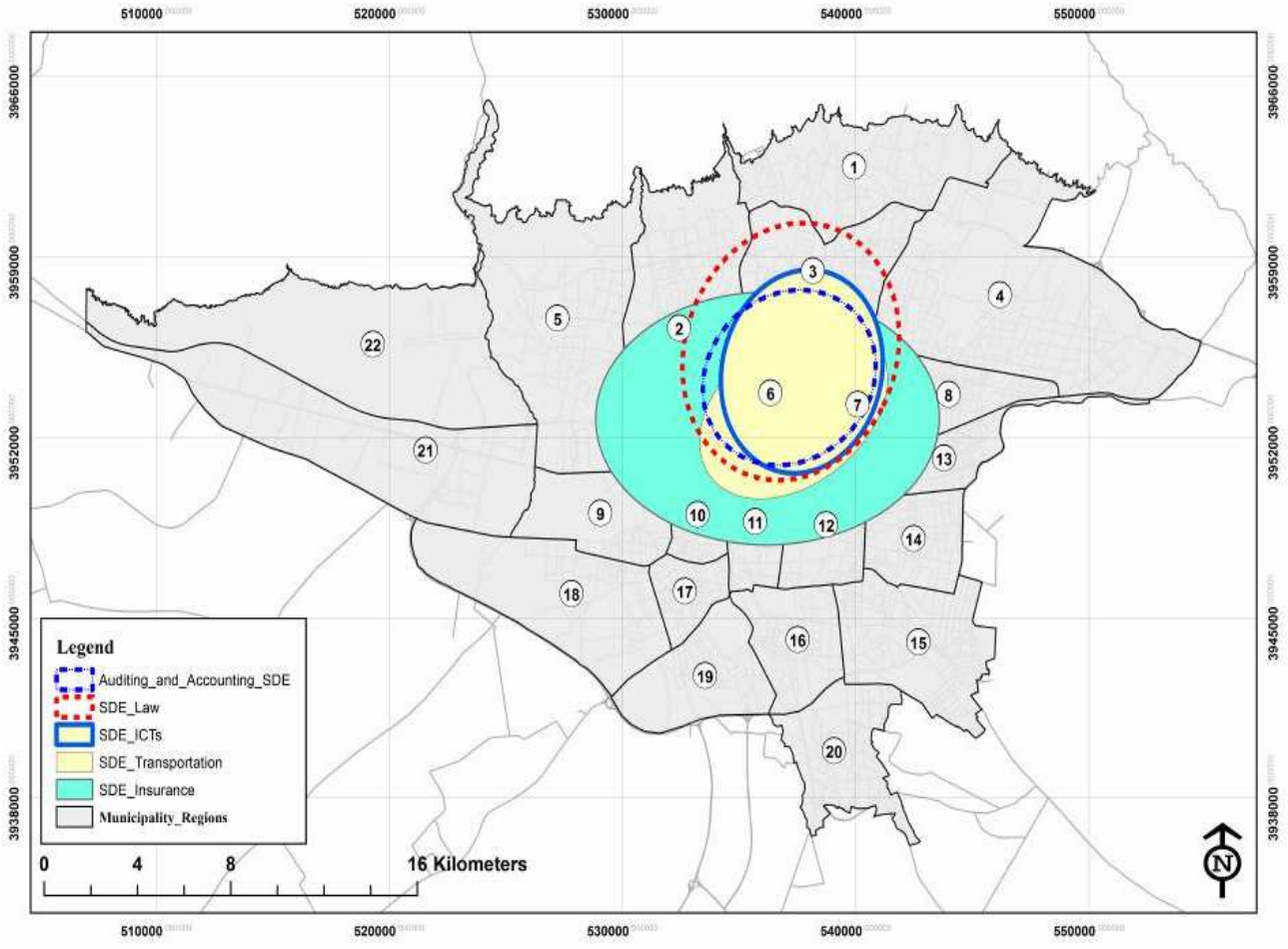

Fig. 3. Standard Deviational Ellipse of Parsian Insurance Firms, 2015.

4.2. The functional characteristics of Tehran APS

Results of data analysis showed that, on average, 98.5% of Tehran's APS firms (except insurance firms) are the main and headquarters in their own specialty. On average, 98% of the insurance firms are a broker or an agency of the headquarters. Except for international transportation and insurance services, other services do not have internal or foreign branches and local offices, or their branches are limited to the cities of the Persian Gulf countries. As a result, their influence is limited to the internal and local markets. It is estimated that the APS sector has directly created over 100,000 job opportunities in the city. Almost all of the sample APS firms are small-sized. Each law and accountancy firm has an average of 1-5 employees, and each international firm has an average of 13 employees. Nevertheless, ICT firms have grown rapidly having an average of 16 employees in each firm and can thus be

categorized as a medium-sized enterprise. A large number of the clients of Tehran international law firms are domestic firms, individuals, and entities. If they have foreign relations, it is often for receiving services and consultation from them, which is carried out by commercial intermediaries or through the use of ICT.

In insurance, legal, and auditing firms, face-to-face relationships are dominant. However, in the case of transportation firms, they are less. Although the use of ICT has helped decrease the face-to-face relationships, it has led to the growth of client numbers and services. In fact, in terms of the relationships between Tehran APS firms and those clients, face-to-face contacts are more common than other alternatives. International transport, insurance, legal, and auditing firms make the most use of ICT in their works, respectively. On average, 16% of all contacts take place through ICT.

This study demonstrates that on average, 70% of the APS firms do not have direct connections with other global and non-global firms in other cities in the world. Nevertheless, on average, 95% of the sample international transport firms have international relations through commerce and transport services. They do not have branches in global cities, but some of them are agencies of foreign companies in Tehran (very limited). An average of 30% of the remaining firms with which Tehran APS firms have more relations are, Asia and Pacific, Europe, North America, Africa, and Australia, respectively. Nevertheless, these relations do not imply that they have inter-firm relationships; they are just utilized to support the transfer of goods and services.

Currently, Tehran's international transport firms can be considered the most international APS firms of Iran. Nevertheless, they are not in top globalized firm's categories because they have no power to sell services to other cities, firms, or countries and are only agents for the import and export of goods between Iran and other countries. Some of the ITFs have branches in countries such as Iraq, UAE, Bahrain, Turkey, and Azerbaijan. They are also connected to other cities, most of which are world cities.

In law services, London, Paris, Dubai, Seoul, Toronto, Montreal, Istanbul, and Baku; in auditing services, London, Dubai, Paris, Seoul, Madrid, Shanghai, and Dubai; in ICT services, Hong Kong, Seoul, Beijing, Singapore, London, New York, and Milan; in ITFs services, Shanghai, Milan, Paris, Hamburg, Madrid, Seoul, Istanbul, Hong Kong, Tokyo, London, Singapore, Beijing, Moscow, Dubai, Beirut, Rome, New York, Hamburg, Sydney, Latakia, Tbilisi, Brussels, Stockholm, and Vienna; and in insurance services, London, Shanghai, and Beijing are the cities which have connection with Tehran metropolis. Tokyo and the cities of Central Asia, Africa, Eastern Europe, and South America have the lowest share in the firm's connectivity with Tehran APS firms. It is interesting to note that Tokyo as a global city (Friedmann, 1982, 1986, 1995, Sassen, 1991, Beaverstok et al., 1999, Taylor, 2001 and 2004b, GaWc, 2011) has the lowest connection with Tehran APS firms in 2015.

From the corporate managers and officials' point of view, lack of international policies, inappropriate domestic and foreign laws and regulations, as well as the lack of need for international relations have been the most important obstacles for Tehran in becoming a global city. In all, the cities of Shanghai, London, Dubai, Beijing, Seoul, and Istanbul are the most important cities with which Tehran APS firms have been connected. Nonetheless, their connections have been different in different areas and world cities. Therefore, cities in Western Europe, Middle East, South-East Asia, and North America have, respectively, the highest importance among the limited number of the world cities with which Tehran's APS firms have had connection. New York, Tokyo, and the cities of Central Asia, South-America, Africa, and Eastern Europe have had much less share in these relations.

Key findings of this research are summarized in the following two parts: (A) present findings related to the spatial dimension and (B), those related to the functional dimension.

A. Spatial Structure of Tehran's APS

1). Most of the selected APS firms have a clustered spatial pattern in Metropolitan area.

2). APSs have had significant growth and have been developed in a large part of the city from 1990 to 2015. This period has coincided with the period of rapid globalization in the global economy.

3). Early firms have selected the centre of the city (in close proximity to the C.B.D) but the newly established firms are located in the northern areas of the city, which has more appropriate environmental conditions and better quality of life than other parts of the city.

4). A set of environmental, economic, social, and infrastructural factors have led to the concentration of services in a newly formed part of the city which was named "Tehran Corporate Services District" in this study. This area which has been gradually separated from the C.B.D of Tehran and in the form of elliptical growth rings has been drawn to the northern areas of the city encompassing regions 1, 2, 3, 6, and 7. The presence of foreign firms, especially globalized ones has been limited in the city, because of the economic sanctions and national laws and regulations.

B. Functional Structure of Tehran's APS

1). Tehran is the command, control, and management centre of all APS firms in Iran. The main offices of over 80% of the APS providers are located in Tehran.

2). More than 90% of the clients of Tehran's APS firms are national and local, not transnational.

Tehran's APS sector mainly serves the national economy and is not a global networked economy.

3). Tehran's APS firms have not been globalized and in competition with global services they are very weak. On average, 70% of the APS firms do not have connection with global cities and globalized firms. Moreover, 98% of the studied firms do not have branches or agencies in the world cities. In total, the global connectivity of Tehran via APS is very poor.

4). In recent years, ICT has become an important infrastructure and indispensable factor for APS providers' development. However, ICT firms have a low (only 16%) share in the connectivity of Tehran's firms with the world cities.

5). International sanctions have had negative effects on Tehran's APS firms and have pushed Tehran out of the global cities network. Since there is a deep link and a cyclic relation between APS firms, when international sanctions affect one of them; the other services are affected as well.

6). In summary, due to the destructive economic and political policies, Tehran APS firms have not been able to move out of their local and national barriers in order to have a global role. On the contrary, cities such as Dubai, Istanbul, and Manama have benefited from the weakness of Tehran in gaining a better position in the global cities network.

7). Totally, because of the destructive economic and political policies, Tehran APS firms have not been able to go out of their local and national barriers to have a global role. In contrast, cities such as Dubai, Istanbul, and Manama have benefited from the weakness of Tehran to gain a better position in the global cities network.

5. CONCLUSION

During the last two decades, especially between 1990 and 2015, Tehran's APS sector has grown and spread rapidly across the city.

For the first time, this study demonstrated that the formation and growth of APS sector has led to the formation of a corporate services area, which is named "Tehran Advanced Producer Services Area" or new C.B.D of Tehran in this study. It can be considered as a new strategic area in Tehran's new economy, which is based on APS. Globalized firms have not been located in this area due to local, national, and international barriers. Geography of Tehran is devoid of foreign, international, and globalized firms in APS sector until 2015.

Therefore, the spatial connections between world cities and Tehran in this section are very weak and insignificant. Tehran's APS firms serve and respond to the national and local demands, and despite having special capabilities, do not have global functions. Moreover, there is no significant connection between Tehran and world cities through globalized APS firms. They do not have sufficient power to compete with globalized cities as a result of the international sanctions.

Their limited relations are mainly for receiving or selling services through mediators. London, Dubai, Shanghai, Seoul, Beijing, and Istanbul are the main world cities with which Tehran has been connected in recent years. In the APS sector, not only that Tehran is not a global city, but it is not even an international city, too. If we accept the premise that cities are open systems, loose connections and the communication deadlocks of Tehran are the main challenges for its sustainability in a global networked economy in the globalization era.

It seems that, from 2016, after the lifting of international sanctions, the globalization of Tehran metropolis will be faster than past decades. Also, the presence of foreign companies and firms will be stronger and prominent in the geography of the metropolis. Then, the following strategies can help Tehran to gain a better position in the world cities network:

1). Improving security and providing political guarantees for foreign investment and activity of international firms via international and national legal guarantees.

2). Trying to improve economic condition of Tehran's firms in order to connect and work with foreign firms and economic bodies via law reforms and reduce bureaucratic barriers.

3). The formulation of Tehran Transnational Eco-spatial Strategic Plan with an emphasis on APS and knowledge based services.

4). Trying to modify city management toward good urban governance and diplomacy in adopting the global logic (globalization).

5). Reforming and rearranging Tehran's urban planning process toward transnational oriented spatial planning.

6). Improving the environmental quality of Tehran via urban regeneration, reduce pollutions and the development of public clean transportation systems.

7). Planning and preparing advanced spaces or improving the present sites in the city by means of high technologies, ICTs, infrastructures, and action plans for the APS activities.

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