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The Role of Justice in Sport Facilities Distribution Using AHP Methodology (Case Study: Shahrekord City)

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Abstract

Creating sport venues and their availability for the city residents is an important factor in the physical health of citizens. The availability indicator to city services appropriate to population features is one of the most important indicators of achieving social justice. Accordingly, the present research investigates justice in the distribution of sport venues in Shahrekord. The present study, is based on the practical objective and descriptive and analytical nature of this case study.

The data collection procedure of the present study is the library method (documentary method) and the information has been assessed using AHP statistical data. The findings of this research illustrate that there is a great difference between the neighborhoods of Shahrekord regarding access to sport places and Kuy-e police neighborhood (0.312), Goudal Cheshme (0.223) were found to be the most densely populated neighborhoods and Sarcheshmeha (0.019) and Borom pahne (0.025) were found to be the least densely populated neighborhoods. Goudal Cheshmeh (0.312) and Farhangian (0.223) were recognized as the best neighborhoods in terms of access radius and Chahr Mahal (0.019) and Borom pahne (0.019) were recognized as the worst neighborhoods in this regard. In fact some neighborhoods were ranked higher than standard level while the more recent neighborhoods suffered from a shortage of sport facilities. Therefore, more attention must be paid to new urban planning so that simpler access and more equitable distribution of sport venues will be possible in the future.

Keywords: AHP, Shahrekord, Social justice, Sport facilities distribution, Urban

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Introduction

The most basic purpose of sport and physical education is to sustain and develop sanitation and physical as well as mental health of different strata. No need to discuss the importance of sport places as well as the role of physical activities in people's daily lives and health. For this reason, it is essential to recognize the effective elements on attracting people to sport facilities. Every sport place which has been constructed for sport, physical activities, or recreation is a social place improving public health and welfare. To take the most advantage of sport places and facilities, their availability for all strata is of great importance (Zohrevandin et al., 2014). These places are among the most important service centers in cities taking up considerable area of urban space (Azimi et al., 2015). Considering overpopulation as well as people's need to sport and entertainment, cultural, recreational, sport, and tourism facilities has an increasingly important position in urban space and require huge investment. Therefore, it is evident that establishing these urban elements in the certain spatial-physical locations of a city follows its principles. In the case of following the mentioned principles, the functional efficiency and success of that element in that certain place would be the result. In recent years, due to the rapid growth of population and ignoring access radius as well as population threshold, these places and facilities encounter various problems most of which result from uneven and inappropriate distribution, lack of optimal location, and lack of predicting suitable space for them in the city.

Sport places are the most basic hardware parts in the field of sport and physical education. They are also an important section of human organizations' facilities. So, finding an optimal location for them is one of the functions of urban planners and determiners (Namazi & Hosseini, 2018).

People's increasing tendency toward sport illustrates their understanding and awareness of the role of sport in sustaining and improving human physical and mental health. People's regular participation in sport activities brings about various physical and emotional advantages and provides them with lots of opportunities to enjoy new experiences, to improve skills, social exchanges as well as the purposes related to the person's progress, so that they will be healthier and more active people. As a result, it makes people healthier and more active (Namazi & Hosseini, 2018).

Nowadays professional physical education and public health organizations, as well as recreational and urbanization, reinforce one's capacity to try to understand how district design and sport facilities distribution make it possible for people to experience easier and more joyful activities. The findings of several studies illustrate that people will be willing to do physical activities in case of easy and suitable access to sport - specified places such as parks, sport fields, and stadiums.

Accordingly, Shen et al. (2020) showed strong inequality of sport facilities provision across the city of Nannin and between age groups and suggested that the reduction of inequality and the improvement of equity and social justice should consider the spatial and social matches between demand and supply, through increasing sport facilities investment intensity and road network density. In a study entitled "Characteristics of the Spatial Location of Sport Facilities in the Northern Great Plain Region of Hungary" Kozma (2022) found that settlements being on higher levels of the hierarchy (district centres, county seats) always have better facilities.

Bands et al. (2018), concluded that optimal location and access to sport places through appropriate assessment methods and indexes are essential in sustainable urban development. Brown et al. (2014), have used the geographical information system to analyze recreational-sport parks. In this research, the recreational-sport spaces were studied based on appropriate standards and according to the requirements of the investigated area. Eventually, they concluded that the higher standardized the sport places are, the more sport participation people have. Namazi et al. (2022), in their research entitled "the assessment of service range of sport centers and providing optimal pattern in order to locate sport centers (case study: Kashan), show that almost 4% of the area of Kashan is completely suitable for sport centers. They also declare that about 60 percent of this area is not suitable for sport purposes. This shows the lack of planning and management in the field of sport services, which requires attention to proper planning in sport centers. Lotfi Lotfieydooyeh and Khanizadeh (2021), in their research entitled "the estimation of athletic land use site location with the emphasis on social justice and space balance (case study: Shiraz city)", show that there are

more and highly qualified sport places in Northern and West Northern prosperous areas, while in Southern areas where poor live enjoy less qualified as well as less such places. Anet et al. (2021), have conducted research entitled "Local optimizing sport places along the local-spatial analysis and preparation of place" (studied sample: Karaj); they investigated the situation of swimming pools in Karaj and reported that local-spatial distribution of most of the swimming pools in this city is suitable. Saraei et al. (2021), conducted another research on the spatial distribution of sport services in sport districts in Esfahan and demonstrated the social inequality as well as injustice in sport services distribution in different districts of Isfahan. Niknam (2020) in his research entitled "evaluation of the distribution of sport facilities in the city of Bonab" studied sport places in Bonab and illustrated that there is no proportionality between sport places in the five districts of Bonab and population density in terms of spatial area, per capita as well as spatial distribution. However, 3 and 4 districts have much more unpleasant situation compared to other districts.

Hemmati et al. (2019), conducted researched on studying the geographical location of sport places using geographical information system (GIS) (the studied sample: Rasht) and concluded that, regarding population density, the distribution of large sport places has not been appropriately compared to small and medium ones. Ma'rouf Nejad et al. (2021) studied the situation of sport facilities in Izeh as well as the lack or inappropriate distribution of these facilities in this city. Abtahiniya et al. (2020), conducted research on the assessment of the geographical distribution situation in Iranshahr in line with improving women's physical health. After optimal establishing and distribution of sport places in Iranshahr, they presented a suitable pattern. Khajou et al. (2019), studied the assessment and analysis of social justice in usage distribution and sport services in Garmsar and illustrated that there has been no social justice in sport facilities distribution in this town. Namazi & hosseini (2018), spatially analyzed sport places and assessed the way of access to these centers regarding their spatial distribution pattern in the Esfahan communication network. They reported that sport per capita in Esfahan is 1.63 square meters less than the minimum per capita suggested by the Ministry of Housing and Urban Development. Salimi (2017), presented a model to determine and analyze sport facilities per capita according to Tisni network distribution in level. This way, understanding the problem will be simpler and the decisions will be made more easily. The GIS environment and indicated that the 5th, 6th, and 13th districts in Esfahan are classified in three ranges of privileged, semi-privileged, and deprived according to indoor swimming pool per capita.

Urban social justice means just spatial distribution of facilities and resources among different urban districts as well as citizens' equal access to them. Inequality in accessing services increases social inequality as citizens' equal access to them. Inequality in accessing services increases social inequality within society. At present time, the inappropriate establishment of sport places is one of the most important problems in cities, so lots of citizens cannot use these places properly because they don't access them. Lack of paying enough attention to standards of sport facilities distribution leads to a waste of time, energy, and budget and affects negatively citizens' health as well as social justice. Problem-solving requires planning and management in locating and organizing these places, on the other hand, just and appropriate distribution of these facilities increases authority and choice as well as using them, and consequently the quality of life increases in the city. So, to justly access sport facilities, just distribution of these facilities must be one of the most important purposes of sport managers. Accordingly, the present research attempts to assess the distribution as well as access to sport places in different districts of Shahrekord as well as to find out if the distribution and access to sport places in different districts of Shahrekord is based on social justice.

Research Methods

Analysis Hierarchical Process Technique

One of the most efficient techniques in determining the process level is the analysis hierarchical process or AHP which was first presented by Thomas L. Saaty in the 1970s. This technique is one of the best and the most exact ranking and decision- making methods according to some indicators. (Akbari et al., 2009).

Analysis Hierarchical Process Phases

Analysis Hierarchical process, AHP, is a method through which correct decisions are made regarding quality and quantity criteria as well as the combination of both. APH implementation in decision- making includes 4 phases.

Phase 1: form of hierarchical tree (simplification): the first step in the analysis hierarchical process is to graphically display the problem in which the purpose, the criteria, and the options and alternatives are illustrated. Hierarchy is a graphic display of a really complicated problem whose most important part is its general purpose. Criteria, options, and alternatives are at the next exactly.

AHP hierarchical diagram is as follows:

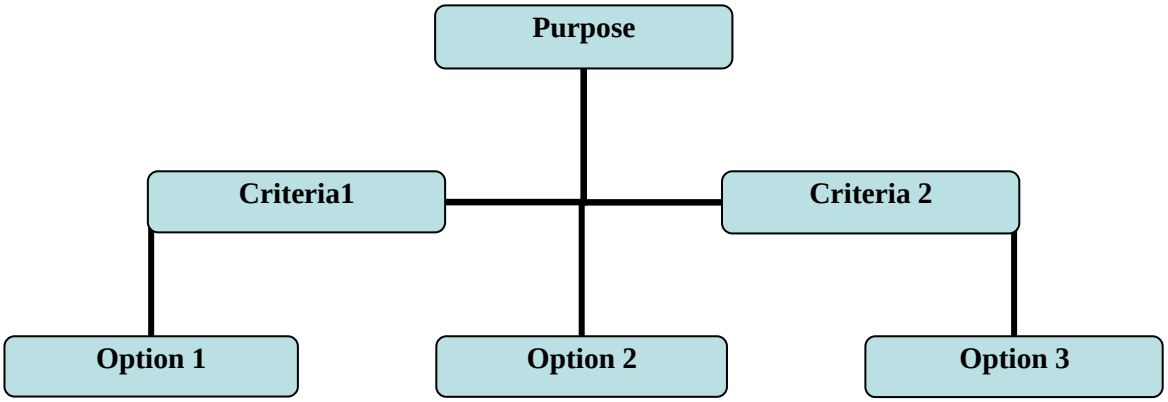

Figure 1. AHP hierarchical Diagram

Phase 2: Pairwise comparison:

The AHP method is based on pairwise comparison or binary options as well as on decision-making criteria. In AHP, the elements of each level are paired wisely compared with the related element at higher level and their weight is calculated. These weights are called relative weights. They are combined and the final weight is determined. In these comparisons, the determiner will say that the importance of I over j is one of the following cases Table 1.

Table 1- The Importance Amounts for Pairwise Comparison

Preferences	Numerical value
The same	1
Slightly preferred	3
Strongly preferred	5
Perfectly very strong	7
Perfectly preferred	9
Preferences between intervals	2 and 4 and 6 and 8

Phase 3: weight extraction from decision matrix: there are four main methods in weight calculation of pairwise comparison matrix including: least square methods, logarithmic least square method, special vector method, and approximate methods (row sum, column sum, arithmetic mean, and geometric mean). In the first three methods, primarily weights are exactly calculated and approximate methods are not as exact as the previous ones, however, they are widely used because of their ease and the volume of calculations. These methods include row sum, column sum, arithmetic mean, and geometric mean. One of the simplest methods to calculate the relative weights is the arithmetic mean.

Phase 4: calculating incompatibility rate: one of the advantages of the analysis hierarchical process is to control the decision compatibility. In other words, the amount of decision incompatibility is constantly calculated in the analysis hierarchical process. Then it is being good or bad as well as its acceptability or unacceptability has been judged. But practically, people's decisions and judgments are not always compatible and there is a kind of incompatibility among people's preferences (Ghodsipour, 2001).

GIS Functions

1- Buffering and Proximity Operations

Buffering is used to determine a relatively suitable zone around a given or group of geographical features. When a location is buffered a circle is created around that location. Buffering lines and areas actually give rise to new zones. Using this function, one can easily create margins and strips of desirable width around geographical features. Most GS systems are characterized by features that are distinguished by buffers of variable widths. Buffer is a zone that is generated at a specific distance of a point, line or polygon.

2- Poly-To-Point Operation

This operation is used to determine the central points in the hierarchy of physical distribution of urban areas including neighborhood units, neighborhoods, zones and districts. Once the data related to each physical distribution operation are introduced and the analysis is carried out, the characteristic data of the above-mentioned polygons will be transferred to point features which could in turn be used to determine the distance of a given land plot to the center of physical distribution scheme (Ghodsipour, 2001).

Research variables

A. Utilized in calculation and estimation of lands and their distribution Per capita: per capita is one of the instruments among different activities and uses. By definition, urban per capita is the amount of land which is on average devoted to each of the urban uses for every person in the population. In this paper, the researcher has studied the available sport facilities per capita in different districts and has identified sport places distribution based on population indicators and urban standard per capita in different districts of Shahrekord city.

B. Availability: this principle is very important at all local, urban, district, national, and transnational levels. In urbanization, availability is related to distance and time. An increase in these two factors (distance and time) means inappropriate access and their decrease shows appropriate access.

Stages of Conducting Research by AHP Method

First stage: according to the research, social justice in sport facilities distribution in Shahrekord is discussed. Second stage: in this stage, sport use is evaluated by two indicators of population and access radius. Third stage: in this stage, all of the city districts are inserted so that the indicators in the second stage are assessed at the level of each district, and expertized weights are presented according to the current situation of the city. The fourth stage is calculating the final score of the criteria. In this stage (final calculation) the purpose of this research (the role of social justice in sport facilities distribution) which was explained in the first stage, is assessed in the second practical stage, and the third stage, the indicators are compared with each other and finally, in the fourth stage, the options are evaluated and altogether the final score of each stage is calculated.

Findings

The study of sport facilities distribution in Shahrekord using the AHP method had different stages. These stages are mentioned as below.

The Stages of Hierarchy Formation

The first step in the analytic hierarchical process, is to form a graphic display of the issue indicating purpose, criteria, and options. For this purpose and considering the aim of this purpose, the study of sport facilities distribution in the city shows level one. On the second level, it has been considered that sport facilities distribution has been always brought up, regarding social justice issues. This use has been discussed according to two important criteria namely: the location of the center of districts, and the covered population and eventually the options were analyzed in the third level (figure 2).

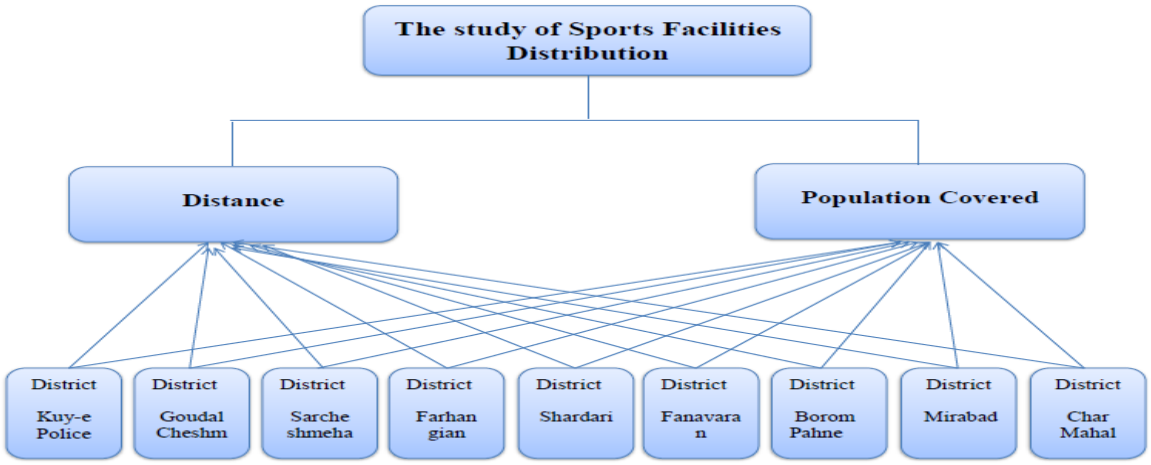

Figure 2. The Hierarchy of Studied Indicators in City Districts.

Source: The Researcher's Calculations

The Study of the Present Situation of Sport Use and Per Capita in Ten Mahalle District of Shahrekord

Regarding table 2, it is understood that the area of sport fields in Borom Pahne District equals zero in 1395. The population of the mentioned district is 12436 people and accordingly, the current per capita is zero, while the standard per capita is 4. Consequently, we encounter a shortage of above- mentioned use in this district. Given that this district is one of the modern urban districts, generally uses location is ignored in the partitioning planning of this district. The area of sport space in Kuy-e-Police District is 53515 square meters and its population is 7548 people. So, the current per capita is 7.1, while the standard per capita is 4. It must be noted that this district has 3 sport places. The sport area in this district is larger than the area needed by the residents showing that little attention has been paid to sport use and distribution appropriate to urban standards. The area of sport space in Shahrdari District is 97074 square meters and its population is 9325 people. So, the available per capita is 10.4 while the standard one is 4. Therefore, in this district, we see the area higher than standard illustrating unfair location and distribution in Shahrdari District. The area of sport place in Fanavaran District equals 91 square meters and its population is 12436 people and the current per capita is .007. As the result, people in this district encounter sport facilities shortage as well as inappropriate distribution. The area of sport space in West Mir Abad District is 33110 square meters and its population is 17242 people, consequently, the current per capita is 1.9 demonstrating that suitable location and distribution are ignored in this district compared to standard per capita. The area of sport space in East Mir Abad District is zero, while its population is 17772 people. Therefore, the current per capita is zero indicating the unfair distribution of sport places in this district. The area of sport space in Chahr Mahal District is zero, while its population is 13099 people. Therefore, the current per capita is zero, showing the unfair distribution of sport places in this district, too. The area of sport places in Goudah Cheshme District equals 28973 and its population is 18956 people. Therefore, the current per capita is 1.5. Although to some extent it can be said that justice has been observed in this area of the city, it is still far from urban standards. The area of sport space in Farhangian District was 1832 in 1395, while its population is 13275 people. Therefore, the current per capita is .1. In this city, a small part of sport use has been established but is still far from urban standards. The area of sport space in Sar Cheshmeha District is 939 square meters, and its population is 20208 people. Therefore, the current per capita is .04 indicating its great distance from the standard per capita.

Table 2- Current Situation of Sport Use in Shahrekord Districts

District	Population	Sport		Current	Standard
		Number	Area	Per capita	Per capita
Borom Pahne	13193	0	0	0	4
Kuy-e- Police	7548	2	53515	7.1	4
Shahrdari	9325	1	97074	10.4	4
Fanavaran	12436	1	91	.007	4
West Mir Abad	17242	3	33110	1.9	4
East Mir Abad	17772	0	0	0	4
Chahr Mahal	13099	0	0	0	4
Goudal Cheshme	18959	6	28973	1.5	4
Farhangian	13275	2	1832	.1	4
Sarchechmeha	20208	1	939	.04	4

Source: Shahrekord comprehensive plan- writer's calculations

The Study of the Functional Radius of District Centers and Sport Facilities in Shahrekord

According to table 3, there are 16 sport fields in this city which are located relatively far from district centers. In the physical partitioning of this city, users have a functional radius providing required services to the population whit in this radius. In the field of facilities distribution, there are various radiuses in physical partitioning. For example, on a district scale, a sport field must be located in the center of the district, so that it can cover the population of that district. In district scale, a sport field must have a functional radius of 4000 to 6000 meters. In the present research, we have studied the sport fields on an area scale according to the study criteria (district). In the research conducted, local sport fields in Shahrekord are fairly distant from the centers of districts, and the sport field's location is not compatible with centrality criteria. As illustrated in figure 3, the district center's radius is not the same as the district functional radius. The Inappropriate distribution of district sport fields make these fields of the city conflict with each other in city centers and cover the population of other districts instead of the population of their districts. For instance, although Chahr Mahal District lacks sport centers, the number of these centers in Goudal Cheshme and the conflict of their functional radius in this district makes them cover some parts of the population of Char Mahal District, as illustrated in figure 3.

Table 3- Sport Facilities Distribution, Distance, and Covered Population

District Name	Number of Sport Centers	Distance from the District center	Population of District	Covered Population	Covered Percentage
Kuy-e- Police	2	600 m - 800 m	7548	7548	100.00
Borom Pahne	0	-	13193	2356	27.71
Goudal Cheshme	5	750 m-750 m-900 m-800 m-1100m	18956	18540	97.81
West Mir Abad	3	300 m-550 m-165 m	17242	16417	95.22
East Mir Abad	-	-	17772	5570	31.34
Shahrdari	1	1400 m	9235	2471	26.76
Sarchaeshmeha	1	620 m	20208	14108	69.81
Chahr Mahal	-	-	13275	10305	77.63
Fanavaran	1	420 m	12436	11380	91.51
Farhangian	3	350 m-450 m-1200 m	13275	9620	72.47

Source: writer's calculation

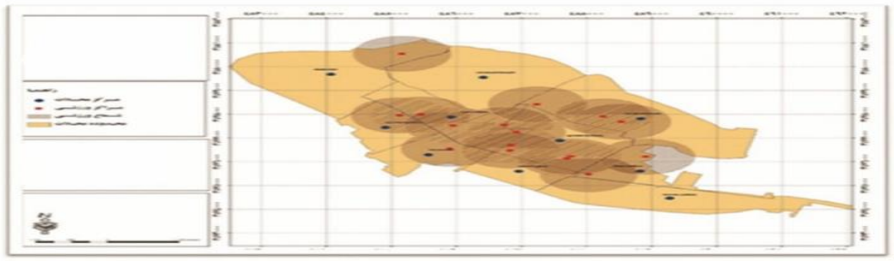

Figure 3. Sport Facilities Distribution, Distance, and Covered Population

Source: writer

In the end, regarding considered indicators (population and distance) sport facilities in the city are assessed, and considered weight is calculated based on the obtained results in previous sections which are inserted in software (Expert choice), as follows:

1- Population (per capita)

As illustrated in the output of the AHP model (figure 4), Kuy-e-Police and Goudal Cheshme Districts, considering the point that most of the population of the districts are covered, obtain the highest weight, while Borom Pahne and Shahrdari Districts obtain the lowest weight since they are among the most modern districts in the city.

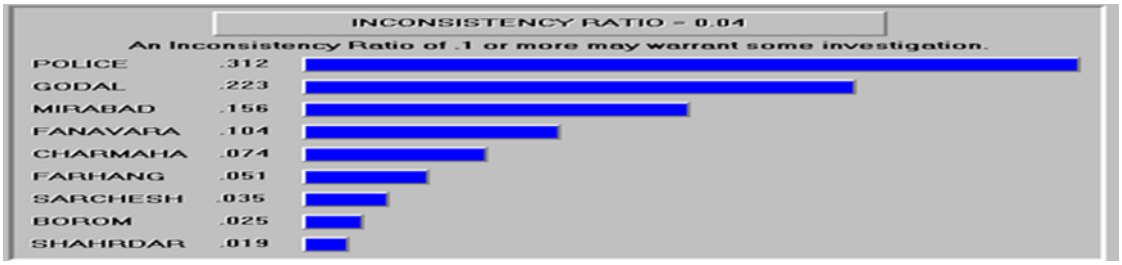

Figure 4. The Output of Indicator Weight (Population) Sport Places in Districts of the City

2- Access Radius

The results of the research on the access radius of sport centers to city districts illustrate that the centers located in Goudal Cheshme and Farhangian Districts obtain the highest weight while Borom Pahne and CHahr Mahal Districts obtain the lowest one (Figure 5).

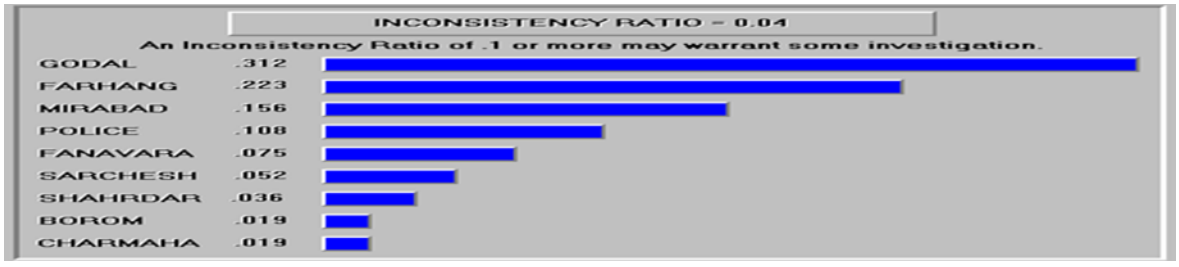

Figure 5. The Output of Indicator Weight (Access Radius) Sport Places in Districts of the City

Discussion

Since one of the sustainable urban development criteria is paying attention to the balanced distribution of urban services and facilities, sport facilities distribution should also be in a way that social justice is established and all social strata can access them easily and it guarantees all citizens' health. People's regular participation in physical activities brings various physical, emotional, and mental advantages and provides

them with many opportunities to enjoy new experiences, increase skills, social interchanges, and related purposes with individual progress; so that they will be physically healthier and more active. The easier people's access to sport - specific places such as sport fields, stadiums, and parks is, the more willing people will be to do physical activities. As a result, people in these areas will be more interested in competitions and sport, and consequently, it leads to their increased freshness and vitality as well as increased sportive and collective cooperation.

Undoubtedly, paying attention to sport facilities distribution is one of the most important duties of sport managers, and ignoring it leads to a lack of efficiency opportunities and threats.

One of the principal elements in sport facilities distribution is considering per capita criteria. When sport facilities density in one district is higher than that of the other district, most of these places will encounter some problems such as low efficiency, lack of appropriate management, in constructed places as well as to waste budget and discrimination in human societies. Whereas we can remove the barriers and start progress by studying the current situation and determining strong and weak points as well as and vacant time. On the other hand, districts have a small number of sport places and these places are not distributed well, face problems such as people's unwillingness to participate in sport activities as well as their dissatisfaction. The present study illustrates that, regarding per capita indicator, among different districts of Shahrekord, the districts of Kuy-e-police (312, 0), Goudal Cheshme (223, 0), and Mir Abad (156, 0) are in good condition. The districts of Fanavaran (104, 0), Chahr Mahal (074, 0), and Farhangian (051, 0) are in average condition and the districts of Sarcheshmeha (035, 0), Borom Pahne (025, 0), and Shahrdari (019, 0) are in poor condition. These findings are compatible with the studies of Saraei et al. (2021); Niknam (2020), Abtahiniya et al. (2020); Ma'rouf nejad et al. (2021); Shen et al. (2020); Namazi et al. (2022); and Namazi & Hosseini (2018). Sport facilities' inappropriate establishment as well as lack of access lead to people's inability in making use of available facilities or cause some urban problems such as traffic and users' high expenses.

One of the criteria for fair distribution of sport facilities is easy to access. Sport facilities should be constructed in a place where user groups can access them in the shortest place and time possible. Generally, it can be said that the more suitable these places are and the higher standards are available for people, people will more participate in sport activities. The present research illustrates that among different districts of Shahrekord, Goudal Chesme (312, 0), Fanavaran (223, 0), Mir Abad (052, 0) are in good situation, and Police (108, 0), Fanavaran (074, 0), and Sarcheshmeha (052, 0) is in the average situation and Borom Pahne (019, 0) and Chahr Mahal (019, 0) are in poor conditions, regarding access indicator. These results are compatible with those of Saraei et al. (2021); Lotfieydooyeh & Khanizadeh (2021); Shen et al. (2020), Namazi & Hosseini (2018) and Bunds et al. (2018) while they are incompatible with the findings of Anet et al. (2021). So, the present study demonstrates that new districts including Borom Pahne and Sarcheshmeha where sport facilities are poorly distributed, as well as some of the old districts such as Farhangian and Goudal Cheshme, are in good condition regarding the location of main sport centers. From the point of view of fair distribution of sport facilities, there is a significant difference among different districts of the city.

Conclusion

As a whole, the findings of the research illustrate that sport facilities distribution in the districts of Shahrekord is inappropriate. Therefore, the lack of sport facilities the spatial distribution in different districts of this city leads to a lack of social fulfillment which may result in social and economic inequality, low-paid strata vulnerability, as well as creating a class gap. So, applying an equal distribution mechanism of services and opportunities and removing district inequalities are among the necessary preferences for the sustainable development of Shahrekord, and urban management organizations as well as other organizations involved in sport issues must take necessary actions to organize the fair and efficient distribution of sport places to improve people's health. To attain sustainable development and sport facilities distribution as well as social justice fulfillment in different districts of Shahrekord, the following solutions are suggested:

1- New sport places will be established based on figure 6 in the future.

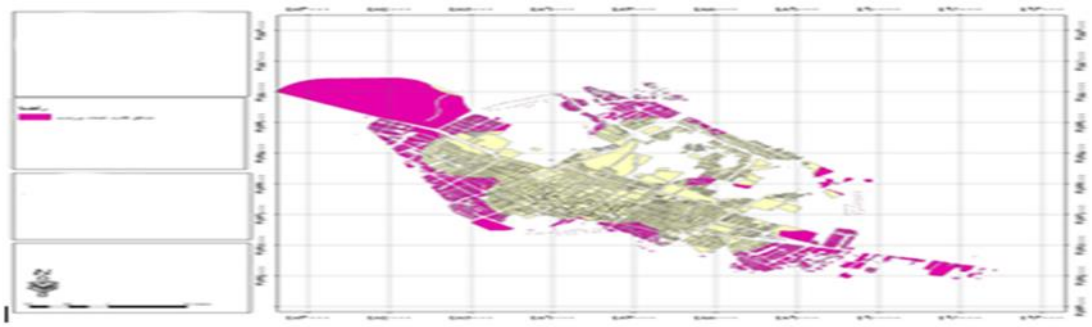

Figure 6. Suggested Areas for Sport Places for the Future of the City
Source: writer's studies

2- Appropriate distribution of sport facilities in all parts of the city according to social justice so that all of the citizens would be satisfied and travel shorter distances to access these places.
3- Special attention must be paid to new places which are in some poorer situations so that district balance would be established.
4- More attention should be paid to urban plans and following necessary standards to improve the quality of districts of the city.

Applying GIS System in locating and distributing sport facilities and more partaking the related experts.

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Conflicts of Interest

No potential conflict of interest was reported by the authors.

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