The Importance of Sports Infrastructure for Residential Neighbourhoods’ Centres

Eman Hadi Nassr1*, Khansaa Ghazi Al-Neaimi2
1,2Department of architectural Engineering, University of Technology, Baghdad, Iraq
*Email: eng.eman.alobaidy2020@gmail.com

Abstract. Sports infrastructure is considered to be the fundamental, physical, and design unit required to facilitate performing sport activities, and had become one of the important requirements in residential neighbourhoods’ centres and a complementary part of infrastructure that aims to serve all community groups. It’s also an important complementary part for residential neighbourhoods’ centres as it creates areas for the different activities, in addition to its great social and economic impact in the contemporary community. It’s also linked to the provision and type of sport institutes of a community (for example: gardens and recreation centres being utilized for sport uses). That’s why it’s important to search in the concepts that determine this structure in residential neighbourhoods’ centres, which represent the issue of this research that states: there is no clear perception about the importance of the sports infrastructure in the integration of residential neighbourhood centres, which make them suffer from shortage or neglect. This research aims to build a comprehensive theoretical framework that includes presenting the theoretical concepts and influencing variables of the sports infrastructure and its possible values and clarifying its role in the integration of residential neighbourhood centres. In addition to the sustainable vision for these centres where the research assumes that sports infrastructure is part of the integration of the growing residential neighbourhoods’ integrated centres.

Keywords: Residential Neighbourhoods’ centres, Infrastructure, Sports Infrastructure, The Sustainable Vision, and The Growing Residential Neighbourhoods’ integrated

1. Introduction
Sports infrastructure is one of the important requirements of most communities because of increase the need for it in a large and wide way. This infrastructure has received attention from most of the countries and institutions because its development reflects the ability and capability of cities and countries to access for development in all its forms and its contribution to building contemporary society. These structures and infrastructure coexist with the urban fabric, and it is a complement to it that creates spaces for different activities and contributes to the development of the urban space. Often, the sports and leisure infrastructure are formed under the influence of local initiatives and neighboring communities expressing the real needs of the population, which enhances the level and quality of urban life.

The sport infrastructure and its components are the material and organizational basis necessary to facilitate the carrying out of sporting activities and includes sports clubs, playgrounds and swimming pools, distributed at the level of the residential neighborhood, sector or city in the form of a progressive configuration depending on the size of the units and the level of services. These levels are related to the number of people that use this infrastructure. Sports infrastructure is one of the complementary elements of residential neighborhood centers by creating spaces for various activities as well as its great social and economic impact and its related to the availability and type of sports
facilities within society. Therefore, it was necessary to research the concepts that define this infrastructure in residential neighborhood centers. So, the research methodology was represented in theoretical presentation of residential neighborhood centers, the concept of sports infrastructure, and the extraction of the theoretical framework. Which contains a set of concepts and indicators related to sports infrastructure, on which elected examples were measured and that led to the conclusion.

Therefore, a descriptive and analytical method will be adopted for several previous urban studies and literature according to the following:
1. Provide comprehensive knowledge of residential neighborhood centers, their components and related aspects.
2. Building the conceptual framework for research.
3. Apply the properties of the theoretical framework to selected samples of residential neighborhoods.
4. Achieve conclusions.

2. The general concept of residential neighborhood centers and their components
The residential neighborhood is the basis of the city and its nucleus, and through which the entire city is formed. It is the cornerstone for building the community, and if is taken into consideration all factors that establish a valid residential environment in which the urban pattern of these neighbourhoods with their environmental characteristics and achieve their living needs during the planning process, a city is will form appropriate for life, without it, the city becomes desolation Invalid for life [1]. It can be said that it is a complex set of function, relationships, and accurate links to the place and people. These residential neighbourhoods require more than just geographical boundaries as they involve basic functional needs for people where the location (boundaries, urban form, and outer space environment) must be taken into account and the people who fill the place (including density, Income, education and culture) [2].

Ebenezer Howard and Clarence Perry have booked central neighbourhood sites for public buildings, uses, and commercial and retail restrictions and offices at the periphery. In fact, local conditions will determine the appropriate or necessary locations for such centres [3]. In (1942) Clarence stein developed the Perry idea to establish a residential neighbourhood and redefined the neighbourhood by grouping three residential neighbourhood served by a high school and a centre or two centres with a walking distance (800 meters) towards the centre [4]. Figures 1 and 2 shows Perry and Stein’s ideas.

![Figure 1. Perry ideas](36)

![Figure 2. Stein ideas](37)

In the eighties of the twentieth century, Duany & pla’ter-zyberk developed the idea of the traditional Perry neighborhood by proposing five principles of urban design that aim to improve residential life through the physical form of the neighborhood’s environment, namely [5]:
1. The neighborhood has a center and edge
2. The optimum size for a neighborhood is a quarter of a mile from the center to the edge.
3. It contains a balanced mix of residential activities, shopping, work, education, worship and entertainment.
4. Building residential neighborhood sites and traffic on a good network of interconnected streets.
5. The neighborhood gives priority to public space and the appropriate location for civil buildings. This Centre should be tangible and clear from its edge and within a distance that can be walked [6]. These centers, as the heart of the residential neighborhood, are considered a Centre for services, events and commercial activities that residents use daily or at least weekly. The characteristics of these centers are formed under the influence of many factors such as Climatic and geographical characteristics and the physical Potential of the population, include the main indicators of the centers, commercial places, enough space for places of worship, schools, kindergartens, neighborhood parks, children's playgrounds and sports fields for adolescents [7].

2.1 Centers of modern and contemporary residential neighborhoods
It is important to note that neighborhoods with centers are an idea that has spread in light of modernity as the centers are located close to residential places, allowing residents to choose transportation options, especially the walking option [3]. In the early stages, these centers were used as a service center, and the neighborhood center emerged as a basic nucleus of effective and basic services for the community and a very important urban place that was created to foster a sense of social cohesion [8]. This center creates a social and operational focus for the residential neighborhood. The permanence of the center is determined by the degree of reliability formulated between the uses in the center and the residents of the neighborhood, so that access to that center is on foot [9]. Where residential neighborhoods have retained their characteristics and urban components since their inception. Also have achieved for long periods the goals that were designed for them, but with the rapid development of economic, social and technological conditions, the objectives of the proximity of housing to the workplace and the provision of public facilities and services in the center of the residential neighborhood and determining the walking distance are no the ruling elements in planning Residential areas. We find that the areas that were designed on the basis of the neighborhood unit or residential neighborhood have had a major change in land uses and these centers have been abandoned and commercial services have taken the extended strip shape and the element of time and ease of access are no longer ruling elements in determining services due to the appearance of the car [10]. The centers of residential neighborhoods occurred at the intersection of important and local arterial streets. Which reflect their economic value in the movement of the modern economy [11]. The physical aspects of our time have prevailed over the spiritual aspects, as these aspects were reflected in the urban environment, which led to a change in the concept of the place in contemporary neighborhoods. Through the victory of the physical side (the mass) on the moral side (space), as modern technologies have taken on a prominent position, being one of the basic characteristics of modern time [12].

The research distinguished three models of residential neighborhood centers, namely:

1. Growing residential neighborhood centers:
The success of the residential plan for any residential locality or residential neighborhood depends on:
1. Understand the needs of the population, their social and economic background, and their physical capabilities, and make determinations according to that [13].
2. Understanding the neighborhood as a unit of growth requires great attention to the quality of life rather than the amount of physical improvement that negatively impacts on the urban growth of the whole city.
3. The lack of understanding of the neighborhood community as an independent unit in itself and that it is inflexible is a fundamental failure in the implementation of long-term planning within the rapidly growing neighborhoods where the unit of resilience and natural growth is one of the main features of successful neighborhoods in the twenty-first century [14]. Some previous studies of a social nature have been able to observe the characteristics of some residential neighborhood centers and their activities and the obstacles they encounter in trying to offer solutions to eliminate their problems and develop their performance. These studies have reached the following results:
• The most important of these obstacles in these centers is that their components do not meet the requirements and aspirations of the population [15].

The separation of land use and the creation of homogeneous housing development have led to the existence of residential neighborhoods that lack a Centre with clear features.

• The lack of a comprehensive physical unit, as the use of residential land constitutes a high proportion of land use in the city [16].

• The uses of urban land are constantly growing and it is known that cities previously depended on one Centre and this Centre has the largest population density in the city over time. Several other centers that were secondary grew and over time became a competition for the main Centre and then equal to it and in many of the Zones. These centers are more important than the old ones. Figure 3 also shows the relationship between centers and the regulation of densities around centers and nodes.

![Figure 3. Shows the organization of densities around centers and nodes [35]](image)

The housing needs increased due to the population growth, the cleavage of families and the development of society, which resulted in many problems, the most important of which are:

1. High occupancy rate
2. Population density and housing have become higher than planned and these high population densities have put pressure on infrastructure services and the low level of services provided in residential neighborhoods, as the increase in density in any residential area has a major impact on housing spaces and comfort requirements [13].
3. The change in the ratio of building density also affects the adequacy of the services available in residential neighborhood centers, especially that each residential area has its own absorptive capacity of the infrastructure services designed for it, and that the high rate of building density leads to raising the population density within residential neighborhoods [17].

We conclude from the above that the growing residential neighborhood centers are flexible centers that are subject to change and modernization according to the changing requirements of the residential neighborhood. In reality and with time, adjustments are accommodated whenever they need to make these adjustments and according to the needs of the residents.

2. Integrated residential neighborhood centers:
Integrated neighborhoods deal with proximity, easy walking and provide building space for the purpose of multiple uses in residential neighborhood centers. Integrated neighbourhoods include:
1. Ideas for multi-use neighborhood centers.
2. The edges of the neighbourhoods are clearly identifiable.
3. Provides access to all users and the right of passage regardless of age, ability or transportation mode, like proximity to daily needs is an integral part of integrated neighbourhoods that host a mix of uses to provide daily needs to live, work, play, worship, eat, shop and talk to each other. And that each neighborhood has a Centre, a general area and an edge [3].
4. The integrated residential neighbourhoods have a focus point (Centre or Main Street) where this area has various activities and services that meet the needs of the residents.
5. The use of mixed lands implies an increase in variety within the urban fabric by encouraging a compatible mix of uses that generates integration and does not create conflict. These areas contain more diverse uses are characterized by mixing a variety of land uses together in one region and these areas include variety in residential patterns and variety in activities of retail stores, restaurants and services.

6. The presence of civil and cultural activities, events and facilities within close proximity to each other [16].

7. Integrated societies provide resilient neighbourhoods that include the needs of daily life, in which access to destinations must be within a short walking distance and people are able to walk from home to work, from school to store, shopping, entertainment, and participation in their daily activities. Figures 4 and 5 show the neighborhood of Riyadh Al-Khuzama, where the conditions of the residential neighborhood are Available, which are clear borders, distinct Centre, residential use control, and a network of humanitarian roads. It was planned based on [18]:
   - Predominate residential use.
   - There are clear boundaries to the neighborhood.
   - Presence of clear and specific entrances to the neighborhood.
   - Having a Centre serving the neighborhood.
   - Presence of a network of human roads that serve the vehicle and the human but make walking easy.

The project consists of four residential neighbourhoods in the Centre of the project, which is a mosque, garden and sports club, and the clear and specific entrances to the neighborhood play a big role in defining these neighbourhoods. The neighborhood’s four corners are dedicated to non-residential uses, which are always preferred to be commercial, office and service.

**Figures 4 and 5.** The neighborhood of Riyadh Al-Khuzama (Al-Rehab) Plan and perspective[18]

The Riyadh Al-Khuzama neighborhood Centre was designed to provide real food for humans, agreed upon by the sages throughout the ages, namely:
Soul food, the mind food, the body food, and the social relationships food to nurture the soul. The Centre of the neighborhood is:
- A garden including a collected mosque, because this is necessary for the right life.
- It also includes a library to food the mind and raises the level of awareness of the residents, especially children.
- The Centre also includes a gym, which represents the body food because the body grows in sports and gets rid of negative energy in sports as well.
The gathering of people in this center reinforces the social need for acquaintance and increases social relations between the population, and this is very necessary for the integrated growth of the human being.

If the idea of an integrated center mentioned above, which means the soul food, mind, body and social relations, is available in the neighborhood. It is natural that this center attracts the residents and enhances the belonging to the residents [18].

3. The growing and integrated residential neighborhoods’ centers.

Many researchers see that the residential neighborhood center constitutes a major axis in the development and development of residential neighbourhoods and is an integral component of other public facilities as well as its motivational role to the spirit of belonging and the ability to deal with problems directly and quickly and achieve the needs of the neighborhood and thus reduce social problems [15]. Municipalities face great challenges in dealing with the city center because of its permanent change and paired up with large and varied numbers of users. This architectural element faces many variables and motivation that come from the innate nature of human with a love of exploration and getting acquainted with everything new [19]. It can be said that the centers of residential neighbourhoods growing integrated. It combines the characteristics of the growing neighborhood centers and integrated neighbourhoods, where the largest percentage of land uses are due to residential uses, and there is a high population density, especially in the city centre. Which led to Appearance of other centers of similar density. These centers also witness great pressure on services and the needs of the population, which exceeds their capacity, and thus generate more pressure on infrastructure. Because of the high population density and the multiplicity of centers of the residential neighborhood, all services are available within walking distance of the housing units [20]. Therefore, they meet with integrated neighbourhoods as they contain many different and mixed uses in one place, including variety in housing forms, service activities and sales stores. Retail, restaurants, services. As well as cultural and religious activities within walking distance of each other due to the high population density and the multiplicity of centers. It also includes the needs of daily life so that it is accessible on foot and that people can walk between the house and all the activities that they do including access to work [21].

Accordingly, the centers of growing residential neighbourhoods integrated can be defined as centers that combine the characteristics of growing residential neighbourhoods and integrated residential neighbourhoods characterized that contained many infrastructure services and commensurate with the population expansion i.e. they are typical and integrated when they achieve social, cultural and sporting efficiency, and include variety in forms Housing, activities and various services that achieve the daily requirements of living, working, worshipping, eating and shopping, as well as religious and cultural activities, which are accessible on foot.

We conclude from the above that it is required in the residential growing neighbourhoods integrated centers to include many infrastructure services. Which are commensurate with the high population density, but for the time being the proliferation of such centers to engage in some recreational and sports activities. It became limited with limited service buildings and less space, which led to a great deficiency in this important aspect. As a result of not taking it to a certain size and not being proportional to the size of the population. Which affects its efficiency and given the expansion of the concept of infrastructure services and their applications. In the following paragraphs, sports infrastructure services in residential neighborhood centers will be studied as they are part of the urban fabric side by side Along with other services, an essential and positive component of civil life and part of public infrastructure.

Figures 6 and 7 show the FRANK MCKECHNIE neighborhood centre in Mississauga, Canada. Frank McKinney Center is located in a central location of the Canadian city of Mississauga. Which is located (30) kilometers east of Toronto and near the Toronto International Airport (Pearson International). This centre is one of the most recent neighborhood centers that were established in that region, the facilities included a swimming pool Recreational, gym, fitness centre, meeting rooms, library as well as a full range of outdoor recreation facilities, 4 tennis courts, playground, and natural trails [22].
4. Infrastructure

The infrastructure is one of the important components of the city’s prosperity and development, and it is possible to determine the appropriate size for the city, and when this infrastructure is good and is characterized by high technology and connected to modern information systems, then the city enjoys a high position and is able to compete with other cities. The infrastructure is associated with the city system and works together to provide a life of high value to the person with a high economic and social ability, as the city can protect itself from what it faces [23].

The term infrastructure refers to a set of services and facilities built over and underground that support human development in settlements and form an infrastructure network [24]. Social organizations have defined Infrastructure as:

The invisible background to support the natural, cultural and technological environment necessary for the city’s development.

The appropriate infrastructure and services are the backbone of growth and are necessary for the health, safety and quality of society, and the availability of goods and services (for example, the use of various lands) within neighbourhoods enables residents to participate better in society and this contributes to achieving socio-economic sustainability locally [25].
4.1. Infrastructure Services Classification
There are multiple approaches to classifying infrastructure in terms of facilities and related services needed to achieve the basic requirements of the population. Theses indicated (Al-Dulaimi, 2015) mentioned the classification of infrastructure in terms of services provided and according to the spatial dimension and classified them into two main types according to their planning method and the place they occupy, namely:
First: - Community or social services (surveying)
It means education, health and recreation services that take a specific area of the city’s land and obtaining them requires an effort on the part of people to move towards them.
Second: - Infrastructure services (linear)
These include water, electricity, sewage, solid waste collection, telephone and road services, and they are characterized by a linear situation and are services that move towards the human being [26].

While (Hassan) study pointed out the classification of The Free Dictionary's Encyclopedia of Infrastructure, which is a broad classification, this study classified the infrastructure into a solid and flexible infrastructure in terms of systems, networks, facilities, and physical assets [27]. He gave a general classification of the infrastructure is based on the functional approach, i.e. uses and services provided on the one hand, and the developmental, economic, social and administrative dimensions on the other hand, as shown in Figure 8.

We conclude from a review of the general infrastructure classifications above, the expansion of these classifications, and because the subject of the research pertains to sports infrastructure, in the following paragraphs it will be studied, as this sports infrastructure is classified within the flexible physical structures that are an important and required element to preserve economic, social, cultural and health standards. As well as were considered as a secondary classification among the entertainment services and an integral part of the infrastructure and complementary to other structures.

Figure 8. Shows the infrastructure categories [27].

5. Sports infrastructure
The term sports infrastructure refers to the construction or renovation of spaces in which people participate in sports [28]. It can be defined as the physical and organizational infrastructure needed to facilitate sporting activities and here the term sports infrastructure is also related to the availability and
type of sporting facilities within a community (for example parks or recreational centres used for sporting uses) [29].

5.1. Sports infrastructure levels

5.1.1 At the city level (clubs and sports fields)

Sports activities of various types considered as of important recreational services that most young people of different ages go to pursue their hobbies and there are several sports activities, including:

A. Sports clubs

Cities include sports clubs that include most sporting activities and events, such as football, volleyball, basketball, Athletics and table, etc. That are intended for young people ages 10 and over, and often The purpose of these centres is training.

B. Sports stadiums

Most cities provide sports courts in an organized or disorganized manner, in which many games are held between sports teams of various types of sports that young people tend to spend their spare time in normal times.

C. Swimming pools

There are some swimming pools in cities that are used by the population in most cases, either male or female, or joint depending on the nature of life in the city, used more intensively on summer days, especially hot ones [26].

5.1.2 At the sector level

It is the level above the residential neighbourhoods and its size is linked to economic factors, as the sector provides the services necessary for its work to a larger area of the residential neighbourhood and economically. As well as the sector contains social facilities that provide a level of service needs for the population of those in the residential neighbourhoods and replace youth centres with sports clubs, swimming pools and squares External toys [30].

5.1.3 At the level of the residential neighbourhood

It is the level above the level of residential neighbourhoods that is determined by (3-5) residential neighbourhoods centred around the centres of residential neighbourhoods, and the latter can be determined by the places where administrative, cultural, social, recreational and sports services are gathered [30].

With regard to sports facilities in the centre, it may include the following functions:

- Youth playgrounds, adult playgrounds, weight loss hall, bodybuilding exercise hall (for men), light exercise hall (for women), multi-purpose indoor exercise hall, children's pool, indoor pool and outdoor pool [22]. As in Table 1.

Table 1. Shows the sports infrastructure levels according to the above. Source (researchers)

| Sports infrastructure levels | Secondary classification |
|------------------------------|--------------------------|
| 1. At the city level          | - Sports clubs include all or most activities of football, volleyball, basketball, athletics, table and other games played by young people. |
|                              | - Sports stadiums may be organized or not organized in which the sports teams match football, volleyball or basketball. |
|                              | - Swimming pools may be designated for a specific gender, male or female, or joint, depending on the nature of life prevailing in the city. |
| 2. At the level of the        | It includes social facilities such as: |
| residential sector           | - Sports clubs |
|                              | - Swimming pool |
|                              | - external playgrounds |
| 3. At the level of the        | Includes: |
| residential                   | - Youth playgrounds, adult playgrounds |
|                              | - Weight loss hall, body training hall (for men), light exercise hall |
5. 2. Considerations affecting sports infrastructure planning
Planning design decisions for sports infrastructure are made based on a set of considerations that achieve the desired goals, and these considerations include population, environmental, social, health, and cultural considerations mentioned in the study (Al-Jazzar et al., 2014) as follows:

- **Population considerations:** This includes identifying the population component of the area and the actual needs of the population based on their age. The average population density in the region to identify the places of concentration to achieve equitable distribution. The presence of a future vision of the effect of overpopulation and proposing mechanisms to enhance the ability of these services to respond to and absorb future changes.

- **Environmental considerations:** They are represented in studying the natural environment conditions and what the coordination of the site is. In addition to studying human environmental factors. These facilities must also be designed according to health environmental standards and specifications.

- **Social considerations:** where the social aspects must be taken into consideration when designing these services, which are taking into consideration the level of individuals’ income and livelihoods, and in accordance with their needs for different sports services.

- **Cultural considerations:** by taking into consideration the cultural values that govern the community that will provide him with sports services in order to achieve easy access to these services.

- **Health considerations:** achieving integration between sports services and other service plans, in addition to developing a sports medicine system and specialized centres.

- **Administrative considerations:** By developing sports legislation and laws and enhancing competitiveness among these services at the country level [31].

6. Previous studies (literature review)
Theoretical studies have varied related to the subject of the research (or part of it) and given the paucity of previous studies specialized in the subject of the research, the research will deal with some studies and literature that each has dealt with one of the aspects of the research.

Barghchi and others (Barghchi, Omar, & Aman, 2010) indicated that sports facilities can be used as catalysts for urban growth and development in the surrounding areas as not only an active recreational hobby but also a significant social and economic impact in contemporary society, in addition to stressing that they are contributions.

Kostrzewska & Rembeza (2012) conducted a study to identify the role of sports and leisure infrastructure in contemporary cities and to study one of the elements of contemporary urban culture, namely the Olympic Games. Their study indicated that organizing sporting events is a way to promote brands, just as the host cities of these games do not think about the impact of these facilities in the long run, and the Olympic Games contribute to achieving the principles of sustainable development and improving the living environment and its long-term positive impact on host cities such as Urban renewal of the region. It is possible to use Olympic sports facilities after the end of events, as they become a motivation for the development and development of cities, the organization of major sporting events in many cases may lead to the creation of vital public places. They have become part of the urban public places system, so the Olympic Games facilities are not just a group of sports facilities, but a living multi-functional urban structure of great importance [33].

While Valle & Kompier (2013) focused on the study of sport in the city on the importance of spatial integration of sports facilities and the integration of sports with other functional uses instead of pushing them away due to the large use of sports space. Confirmed that there is a continuous growth in sports participation in many countries, something that has had an impact on urban planning and design by building many sports facilities, with the indication that sport has become more individual not only taking place in
sports complexes but also in fitness studios in city centres and in public places but through continuous urban development. The sports infrastructure is exposed to spatial pressure and thus reduces the spatial quality of many sports facilities, which are often bad. There is no appropriate spatial planning and single-function, unattractive and unidentified, poorly contained in the residential neighbourhood, hidden behind closed green areas and be of little or no relationship with the public space and isolated from the surrounding urban areas [34].

6.1. Discussion
Sports infrastructure can be used as catalysts for urban growth and development in the surrounding areas through the development of vacant lands. The reuse of completely unexploited buildings and the creation of a new image of the region, as it is not only an active leisure hobby but also has a great social and economic impact in contemporary society, in addition to the influence in urban areas, it is based on a set of factors, including the location, the urban context, the use of sporting facilities, and the culture of sport among people, as sports infrastructure has become part of the "public infrastructure" that determines the quality of life for a city to be successful in the twenty-first century and instead of to push this infrastructure in the edges of residential neighborhoods and be hidden. The construction of sports infrastructure is part of the overall planning process as an integral component of the infrastructure and a contribution to the development of urban space, as the spatial integration of sports infrastructure with other functional uses creates effective linkages with life functions such as public services, open social spaces and others. Sports infrastructure contributes to achieving the principles of sustainable development, improving the living environment, and establishing vital places, as it has become part of the public urban spaces system. Sports facilities are a multi-functional living urban structure that has great importance in achieving the social, economic and cultural needs of the population.

7. The theoretical framework for the concept of sports infrastructure in residential neighborhood
Centers based on what was presented by previous studies and literature on the concept of sports infrastructure as an essential part of forming residential neighbourhoods and defining concepts related to the sports infrastructure can be considered one of the elements that contribute to the integration of the residential neighborhood by merging it with other functions and commensurate with the need. Population density can summarize the most important concepts of sports infrastructure in the theoretical framework outlined in Table 2.

| Table 2. The theoretical framework for the concept of sports infrastructure ((Researchers) |
|--------------------------------------|--------------------------------------|--------------------------------------|
| Main Items                           | Secondary Items                     | Possible values                     |
| Considerations affecting             | Population considerations            | -Population component               |
| sports infrastructure planning       | -Actual needs of the population      | -Average population density         |
|                                     | -A futuristic vision of the effect   | -A futuristic vision of the effect   |
|                                     | of overpopulation                    | of overpopulation                    |
|                                     | -central places                      | -central places                      |
|                                     | -Natural environmental conditions    | -Natural environmental conditions    |
|                                     | -the essence of the site layout      | -the essence of the site layout      |
|                                     | -Human environmental factors         | -Human environmental factors         |
|                                     |                                       |                                       |
| Social considerations                |                                       | -Level of people's income            |
| **Cultural Considerations** | - Alignment with the needs of the population for various sports services  
|                           | - Cultural values that govern society |
| **Health considerations**  | - Achieving integration between sports services and other plans  
|                           | - Developing a system of sports medicine and specialized centers |
| **Administrative considerations** | - Developing sports legislation and laws  
|                           | - To enhance competitiveness among these services at the country level |

**Factors influencing sports facilities and their contribution to urban development**

| **Site Context** | - Site features  
|                 | - Land costs  
|                 | - Economic development initiatives  
|                 | - Optical and physical links (establishing a link between the capabilities of the facility and the surrounding land)  
|                 | - A catalyst for economic development (locating it in an urban environment, integrating it into the existing infrastructure of the city)  
|                 | Connecting the redevelopment to the new sports facilities  
|                 | Urban generation to overcome isolation  
|                 | - Enhancing the contribution of the sports facility to the local community  

| **The culture** | - Taking into consideration the culture of sport among people because it differs from one country to another |

| **The Use** | - Sustainability of sports facilities depends on the future use  
|             | - The ability to influence the local community  
|             | - Sustainable development |

| **Sports and recreational facilities planning levels** | - Sports and leisure infrastructure for major sporting events |

| **The overall level** | - Sports facilities depending on the actual needs of the population (sports fields, swimming pools and playgrounds)  
|                      | Recreational areas for people of all ages, cycling and walking paths, gardens, school sports areas ... etc.  
| **Partial level** | - Sports facilities depending on the actual needs of the population (sports fields, swimming pools and playgrounds)  
|                    | Recreational areas for people of all ages, cycling and walking paths, gardens, school sports areas ... etc. |
The emergence of sports facilities in the urban environment - Spatial integration of sport with new models for sports facilities and a new type of public space

The space

- The emergence of sports facilities in the urban environment
- Spatial integration of sport with new models for sports facilities and a new type of public space

The importance of urban space for sport

- An urban meeting point for people in the street, neighborhood, city, or region

Urban social place

8. Applied cases
The research depends on formulating its hypothesis on the elements that have been achieved to reveal the sports infrastructure in residential neighborhood centres. The research assumes that the sports infrastructure is part of the integration of the growing residential neighborhood centres integrated. For the purpose of testing this hypothesis, the theoretical framework vocabulary will be adopted and applied to some global residential neighborhood centres that include sports infrastructure to see the extent of verification of the vocabulary in it. Two international models have been chosen for the purpose of clarifying the sports infrastructure in them and their models can be adopted within local experiences, namely:

8.1 Project, 2012, the SUPERKILEN, COPENHAGEN, DENMARK
Superkilen is urban space, it is half a mile long located in one of the most ethnically diverse and socially challenging neighbourhoods in Nørrebro in Denmark. It has one comprehensive idea that it was conceived as a giant exhibition of urban best practices and a kind of set of universal objects that come from 60 different nationalities from the people who inhabit the surrounding area. They range from exercise equipment from Los Angeles Beach, palm trees from China, and neon signs from Qatar and Russia, and are an example of the global urban variety that reflects the true nature of the local neighborhood [39]. As in Figure 9.

Figure 9. Shows a superkilen project on Norrebro, Denmark [39]

Superkilen is the result of creative collaboration between BIG, Topotek1, and SUPERFLEX who have established a rare merger in architecture, landscape, and art from the initial ideas generation stage to the implementation stage. An intense public consultation process took place with neighborhood residents to get suggestions for things representing over 60 nationalities available locally to be placed in the area. The 750-meter long scheme consists of three areas in three colors: red, green and black [40], as shown in Figure 10.

- Red square for sport
To create a better and more transparent infrastructure throughout the neighborhood, and to create new ties connected to the surrounding neighborhoods, as an extension of the sporting and cultural activities in Nørrebrohall, the Red Square is designed as an urban extension of the inner life of the hall. Which includes a group of entertainment shows and a large central square that allows locals to meet each other through physical activity and games, in addition to cultural and sports facilities, the Red Square creates a place for an urban market that attracts visitors every weekend from Copenhagen and the suburbs. The colored surface in terms of colors and materials has been combined with Nørrebrohall and its new main entrance, where the surface has merged. Visitors enjoy basketball courts, parking spaces and an outdoor fitness area, Thai boxing, as well as Nørrebrohall. Where a number of sports facilities have been moved to the Green Park, including the current hockey stadium with an integrated basketball court because it will create a natural gathering place for local youth. From (Mjolnerpark) and the neighboring school [39].

The Nørrebrohallen hall is full of physical and social development opportunities. In the hall and many corners, everything from soccer, handball and basketball to table tennis, climbing and squash is practiced. Cultural and leisure life has moved together in Nørrebrohallen [41]. Nørrebrohallen is located in an old tram depot right next to the famous Red Square in the heart of one of Copenhagen’s most famous neighbourhoods, an unparalleled multicultural sports facility. Known for its privileged location in the culturally diverse Nørrebro neighborhood. A hot spot of choice for locals, it is always bustling with life and activities for young and old alike here. When its stadiums are not used for sports, you can experience a wide range of events, including flea markets, concerts and conferences, due to its size and wide range of sports facilities, Nørrebrohallen is home to many sports federations [42]. Previously, the facilities lacked cohesion and did not interact with the surrounding areas. By highlighting the existing hall activities and creating new ones, the Sports Center now acts as a new meeting point for the local area. Nørrebrohallen strengthened its outreach to society to attract a broader age group and cultural diversity by indicating its function as a new cultural centre for the region [43]. As shown in Figure 11.

Figure 10. Shows the Nørrebrohallen Hall in Superkilen [38], [42]

- **Green garden playground for children.**
  Green garden activities with soft hills and surfaces appeal to children, youth and families. Green landscapes and a playground where families with children can meet for picnics and sunbathing and rest in the grass, as well as hockey tournaments, badminton games and exercise between the hills. Where residents asked for greener so that ended up making the green garden completely green not only preserving the landscape winding and exaggerating but also paint all bicycle and pedestrian paths in green. As shown in Figure 13.

- **A black market as a food market and a picnic area.**
  Mimers Plads is the heart of the Superkilen Master plan. This is where locals meet around the Moroccan fountain, the Turkish seat, as an extension of the area's courtyard. Bike movement is shifted to the east side of the square by partially resolving the height difference issue and enabling a bike
ramp between Hotherplads and the cross-bike path connection. Towards the north is a hill facing the south with the aim and activity of the square. The Super Killen supermarket is mainly located on the site of the hockey stadium. As shown in figure 4.

This project won the Aga Khan Award because it provides everything that the neighborhood requires social and urban integration and adds a beautiful touch to the human variety found in the region [40].

**Figure 11.** A diagram showing the three sections of the superkilen project in the Norrebro neighborhood

**Figure 12.** Shows the red square for sports activities with Nørrebrohallen [39]

**Figure 13.** The Green Garden [39]
Figure 1. Shows the black area of bicycle paths [39]

8.2 Project, 2014, Clareview Community Recreation Center, EDMONTON, CANADA
This large and complex project is a key part of Edmonton's new master plan for Clareview, designed to foster secure interaction and communication within the community while providing the latest in the expanded library, entertainment, and community support services. The new facility processes many urban conditions, including creating secure connections between the developing Clareview neighborhood to public transportation near the LRT and schools. The main facade transparency allows visually accessing the interior activities of the building and inviting pedestrians while moving the outdoor spaces simultaneously with the building's energy. As shown in figure 15.

Figure 15. Clareview Center, EDMONTON, CANADA
The project integrates the region's branch library, entertainment centre, community meeting facilities, childcare centre, and a new secondary school completion centre. The library is designed to accommodate the latest library technology and facilitates a contemporary and proactive service model,
entertainment centre, community meeting facilities, childcare centre and a new centre to complete secondary school. This innovative new school is the first of its kind in Edmonton and empowers older adults and adolescents who complete their education outside of mainstream high school curricula [44].

The sports and leisure centre include competitions, diving, entertainment, fitness facilities and an existing plaza. All areas design focuses on creating beautiful views of the project site as well as many other activities that take place in the centre. By working to provide an integrated and sustainable urban quality of the site, the design ensures that the building works in harmony with the surrounding urban context and green space. The project is constructed according to strict environmental controls [45].

Clareview Community Recreation Center brings people together to enjoy sports, leisure, social and cultural activities. The centre is located on Clareview District Park in Northeast Edmonton. The community centre includes sports fields, park spaces and a multi-purpose entertainment centre. As shown in figure 16.
9. Results

1. Project No. (1) Achieved (85%) of the theoretical framework vocabulary, while Project No. (2) achieved (56%) of the theoretical framework vocabulary. The results showed that both projects emphasized the principle of respecting the site and the surrounding and integrating with it, but with different treatments, as project No. 1 integrated with its surroundings by integrating open spaces and transforming them into parks and adding elements of outer spaces taken from different countries to emphasize global urban diversity. Which reflects the reality of the local neighborhood, in addition to the cycling event and outdoor sporting activities complementing the sporting events inside the Nørrebrohallen hall as well as entertainment for children. As for Project No. 2, worked integrates the centre with the surrounding urban context and green spaces in accordance with environmental controls.

2. The two projects emphasized the principle of respecting the urban context and urban personality of neighbourhoods.

3. Project No. 1 Achieved the principle of organizing the neighborhood around a clearly defined centre where the residential centre represented the public domain and an active nucleus with mixed-use in order to include community life within the residential neighborhood.

4. Project No. 1 Has achieved the principle of integration in the uses and focus of activities within enclosed points with the variety of retail and service activities through the superkilen commercial market in the place of the existing hockey stadium.

5. Project No. (1) Has achieved the economic aspects of development by creating a local economy through business locally, providing job opportunities, and providing a wide range of services.

9.1. conclusion of the theoretical study

1. The sports infrastructure in the service centre for the service of the residential neighborhood is an essential complement to urban services and achieve the high needs of the population. Creating spaces for various activities and contributing to the development of the urban space and one of the basic components according to the approved standards important in the formation of the neighborhood in particular and the urban housing fabric in general.

2. The impact of sports infrastructure and the ability to influence in the surrounding urban areas depends on a wide range of factors including site, context, and use of sports facilities as well as a culture of sports among people.

3. Planning sports and recreational facilities to be at the macro- level to include, in this way, a sporting and recreational infrastructure for major events as well as at the micro-level depending on the actual needs of the population such as sports fields, swimming pools, children's playgrounds etc. In addition to recreational areas for people and for all age groups such as Biking and walking tracks, parks, school sports areas ... etc.

4. Spatial integration of the sports infrastructure with other function in the residential neighborhood, depends on planning this infrastructure in a way that creates effective linkages between the building
and sports services on the one hand and other life functions such as public services, roads, open social spaces and others so that integration between the elements is achieved, which works on increasing the efficiency of service delivery.

9.2. The conclusions of the applied study

1. Sports infrastructure design within the residential environment has a role in creating residential neighborhood centers that integrate with their urban contexts by emphasizing diversity, respecting the natural environment, integrating this infrastructure into development and development by maintaining and enhancing it with design, and emphasizing design quality.

2. The centre of the residential neighborhood represents the place of public activity within the residential neighborhood.

3. The merging of sports infrastructure with other uses in the neighborhood’s residential centre achieves integration within the neighborhood, which enhances the principle of multiple activities and uses in order to enhance the vitality of the place.

4. Emphasizing the activation of sports infrastructure within residential neighbourhoods as a place that has a social role that contributes to stimulating social life in the residential neighborhood by making this infrastructure a place where people meet and helps to interact within the concept of spontaneous meetings with an emphasis on civil buildings as community nuclei that contribute to the vitality of the neighborhood.

5. Sports infrastructure enhances the structure of the urban fabric and is not just one-function functional buildings.

10. Recommendations

1. The research recommends emphasizing the importance of integrating sports infrastructure services with other services in the residential neighborhood center, as it creates effective interdependent relationships between sports services and other life functions, which increases the performance of events.

2. The research recommends that special attention should be given to designing clear centers for residential neighborhoods with mixed uses, as well as emphasizing their special character to create an identity and cohesive structure that contribute to the integration of the residential neighborhood and the reinforcement of its structure.

3. The research recommends emphasizing the importance of the planning and design process for sports infrastructure that includes all aspects necessary for developing sports services, with an understanding of the different levels of this infrastructure.

4. The research recommends the highest emphasis on the introduction of sports use as separated land use in addition to other land uses in the master plans of cities.

5. The research recommends emphasizing the sites of differentiated sports services, as well as emphasizing their distinctive character, as they are services that affect the reinforcement of the urban fabric structure and are not just functional buildings.

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Appendices

Table 3. Results of the applied study of the theoretical framework in the chosen models (researchers)

| Main Items                        | Secondary Items | Possible values | Case 1 | Case 2 |
|-----------------------------------|-----------------|-----------------|--------|--------|
| Considering affecting sports       | Population      | -Population component | ⬤     | ⬤     |
| infrastructure planning           | Actual needs of the population | ⬤           | ⬤     |        |
|                                   | Average population density |               | ⬤     |        |
|                                   | A futuristic vision of the effect of |               |        |        |
| Factors influencing sports facilities and their contribution to urban development | Site       | Context                                                                 |
|--------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|
| overpopulation                                                                  |            | -site features                                                         |
| -central places                                                                 |            | -Land costs                                                             |
| Environmental considerations                                                    |            | -Economic development initiatives                                       |
| -Natural environmental conditions                                               |            |                                                                         |
| -the essence of the site layout                                                 |            |                                                                         |
| -Human environmental factors                                                   |            |                                                                         |
| Social considerations                                                           |            |                                                                         |
| -Level of people's income                                                       |            |                                                                         |
| -Alignment with the needs of the population for various sports services        |            |                                                                         |
| Cultural Considerations                                                         |            |                                                                         |
| -Cultural values that govern society                                            |            |                                                                         |
| Health considerations                                                           |            |                                                                         |
| -Achieving integration between sports services and other plans                  |            |                                                                         |
| -Developing a system of sports medicine and specialized centers                  |            |                                                                         |
| Administrative considerations                                                   |            |                                                                         |
| -Developing sports legislation and laws                                           |            |                                                                         |
| -To enhance competitiveness among these services at the country level           |            |                                                                         |
| Factors influencing sustainability and planning of cities (SPSC 2020)           |            |                                                                         |
| Sustainability of sports facilities depends on the future use                    |            |                                                                         |
| -The ability to influence the local community                                   |            |                                                                         |
| -sustainable development                                                        |            |                                                                         |
| Context                                                                         |            |                                                                         |
| -Optical and physical links (establishing a link between the capabilities of the facility and the surrounding land) | | |
| -A catalyst for economic development (locating it in an urban environment, integrating it into the existing infrastructure of the city) | | |
| -Connecting the redevelopment to the new sports facilities                      |            |                                                                         |
| -Urban generation to overcome isolation                                          |            |                                                                         |
| -Enhancing the contribution of the sports facility to the local community       |            |                                                                         |
| The culture                                                                     |            |                                                                         |
| -Taking into consideration the culture of sport among people because it differs from one country to another | | |
| The Use                                                                          |            |                                                                         |
| -Sustainability of sports facilities depends on the future use                   |            |                                                                         |
| -The ability to influence the local community                                   |            |                                                                         |
| -sustainable development                                                        |            |                                                                         |
| Sports and recreational facilities planning levels | The overall level | Sports and leisure infrastructure for major sporting events |
|--------------------------------------------------|-------------------|-------------------------------------------------------------|
| Partial level                                    | - Sports facilities depending on the actual needs of the population (sports fields, swimming pools and playgrounds) |
|                                                  | - Recreational areas for people of all ages, cycling and walking paths, gardens, school sports areas ... etc. |
| Spatial integration of sports infrastructure     | The space          | - The emergence of sports facilities in the urban environment |
|                                                  |                    | - Spatial integration of sport with new models for sports facilities and a new type of public space |
| The importance of urban space for sport          | Urban social place | - An urban meeting point for people in the street, neighbourhood, city, or region |
| Total                                            |                    | 85% 56%                                                     |