



Sport and Smart Communities. Assessing the Sporting Attractiveness and Community Perceptions of Cagliari (Sardinia, Italy)

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Abstract. Sport has always played a very important role in civil society, becoming a clear expression of different cultures and lifestyles throughout history. Nowadays, it is considered an essential enabler in pursuing sustainable development of our cities and regions. A prerequisite for improvement of sporting attractiveness of our contemporary cities is to integrate sport into broader urban transformation and regeneration processes. As a matter of fact, more and more people prefer to play sport in different places and at different times, understanding the city as an ideal palimpsest for sports activities. In this regard, the Smart Community has gradually become an extraordinary source of information useful for policy makers. A wide range of ICT tools allows to develop Community Maps which reveal needs and aspirations of people, thus informing sports policies and a community-based participatory planning. The study aims to assess the sporting attraction of Cagliari through the analysis of different evidences drawn from the community perception of sports activities and initiatives. It focused on material and immaterial actions carried out to promote sport in the city, smart community sport behaviours, community perceptions on benefits that sport provides for human well-being and for city development through the administration of a questionnaire. The outcome highlights the role of Smart community in understanding sport behaviours of local people and in defining shared strategies to strengthen the sport-city link in the sustainable development of Cagliari.

Keywords: Smart Communities · Sport governance · Sustainable development

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1 Introduction

Sport has always played a very important role in civil society, becoming a clear expression of different cultures and communities' lifestyles throughout history.

It has been conceived as a strategic means to exploit the nature of political ideologies and aspirations since ancient times [1]. Sometimes, it proved to be useful for achieving positive and negative political goals. As a matter of fact, sport has been assumed as an educational and population control practice, but also as a vehicle for propaganda and amplification of differences between ethnic groups [2]. Several dictatorships have often promoted and sustained the realization of sports facilities and the organization of sporting events for their self-celebration [3], reaching the maximum epilogue during the Fascist era, up until the Cold War [4].

Nowadays, sport is a fundamental element of the health and well-being of people, a trigger for economic and social regeneration of our cities and regions [5] and, more generally, an essential enabler in pursuing sustainable development. The 2030 Agenda for Sustainable Development [6], which represents the primary reference point for guiding the human use of our planet, states that: «37. *Sport is also an important enabler of sustainable development. We recognize the growing contribution of sport to the realization of development and peace in its promotion of tolerance and respect and the contributions it makes to the empowerment of women and of young people, individuals and communities as well as to health, education and social inclusion objectives*».

This is a crucial principle which requires to integrate sport into society and peace [7], economic and environmental urban policies, as well as into urban governance and planning.

Most cultural principles and approaches reached at the international level to strengthen the relationship between Sport and the City and to highlight the role of sport in pursuing sustainable development of our cities and regions have been introduced in Italy to inform the political agenda. Over the past years, the Italian Government and the CONI (*Italian National Olympic Committee*) have promoted policies to sustain a comprehensive regeneration of existing sports facilities in peripheral areas establishing a special fund ("*Sport and peripheries*" Fund - Law No 9 of 22 January 2016). Their aim is to face the economic and social imbalances as well as the urban security issues in deprived areas through specific material and immaterial actions capable of increasing sports activities and spreading a healthy lifestyle in the urban environment.

Anyway, a condition for improving the sporting attractiveness of our contemporary cities is to consider a field of investigation that no longer corresponds only with the system of existing sports facilities but rather with the broader - and sometimes fragmented - network of open spaces and green areas that characterizes each urban context [8]. As a matter of fact, nowadays more and more people prefer playing sport according to their personal needs and interests, in different places and at different times, understanding the city as an ideal palimpsest for sports activities [9].

In Italy as well, in addition to the traditional competitive sport - based on the cultural models of Olympic sports - it is certainly on the rise sport activity intended as a loisir and as a search for physical well-being in close relationship with nature [10].

The contemporary ways of using urban spaces constitute a real challenge for urban governance and planning because demand to integrate sport into comprehensive urban regeneration and sustainable development strategies [11]. More specifically, urban transformation and regeneration programs, from those required by the Mega Events to those needed at local and neighbourhood scale, should guarantee a network of spaces and sport facilities able to embrace the new phenomenon called “street sport” [12], which stimulates virtuous behaviours and healthy lifestyles [13] thus generating a widespread sense of belonging, cohesion and social inclusion [14].

In this regard, the introduction of electronic technologies and digital data capture supports decision-makers in understanding needs and aspirations of local communities and, as a consequence, in implementing effective urban policies.

Indeed, although the citizens participation has long been declared as a fundamental component in political decision-making processes to guarantee the environmental and social quality of urban governance and planning [15], this cultural assumption can be effectively implemented in the era of ICT. A wide range of innovative tools and applications are available to save and share the data requested to build a deep knowledge of different lifestyles existing in our contemporary society [16].

In this sense, the Smart Communities movement, developed over the 1990 s to increase the number of users involved in IT [17], has become essential to understand sport experiences and behaviours, as well as to build smart, inclusive [18] and sustainable [19] cities.

2 Smart Community and Sport Urban Planning

In the information age, the Smart Community represents a significant part of our contemporary society that makes use or extensive use of available technological tools, services and devices to promote organization and efficiency, to improve the quality of life but also to share personal knowledge, opinions and interests [20].

California Institute for Smart Communities states that a Smart Community is «a community in which government, business, and residents understand the potential of information technology, and make a conscious decision to use that technology to transform life and work in their region in significant and positive ways» [21].

With reference to the present research objective, it is necessary to recognize that the Smart community has gradually become an extraordinary source of data for policy makers. Thanks to the rapid progress of information and communication technologies (ICT), the Smart Community shares different types of geo-referenced information on the territory, to reveal the daily life styles and sports behavior and in the events of people in the city [22].

The most innovative sport-health apps that track our mobility such as Strava, Runtastic and Endomondo - just to mention some of the most popular ones - allow people to upload data referred to personal sport trainings and performances into specific web services [23]. De facto, the numerous users involved contribute to develop interesting “Community Maps” which describes a still unknown image of the city consisting of different nodes and networks, with places marked by high crossing densities. All the signs and traces impressed in these operating systems make the

Community Map a strategic knowledge tool useful in interpreting social phenomena and in recognizing future trends, thus informing visions undertaken through sport city planning [24].

For this reason, the information provided by the Smart Community contribute to establish a new community-based model of governance [25], while collaborative mapping may be assumed as a strategic means for community-based participatory planning [26]. A smart community initiative is an integrated communication approach between communities: local governments, schools, businesses, citizens and health and social services useful for identifying shared governance strategies.

Nowadays, public authorities can directly consult citizens, through the administration of specific questionnaires aimed at assessing their needs and aspirations with greater efficiency due to the community maps, which constitute the first element of territorial representation of the behavior of the smart community [27].

In this sense, managing the heterogeneous information provided by the smart community allow policy makers to define measures for more inclusive and livable urban environments, in line with the greater attention that people give to health and well-being from a young age.

3 Data and Methods

In line with the above-mentioned theoretical aspects and following the target of paper, we addressed the issues concerned with sport and smart participation following different approaches. Three main methods have been followed, responding to different focuses on the sport aspects of the city.

- A first set of research involved the analysis of the material and immaterial actions carried on to promote the city at national and international level, this resulting into the inserting into Cagliari into the European City of Sport competition. So, a first set of analysis was based on a desk research of all the documents relevant for understanding such framework. The two candidature dossiers drawn up respectively for the European City of Sport 2017 competition [28] and for hosting the sailing regattas of the 2024 Olympic Games in Rome [29] were fundamental to understanding the political approach adopted by the local administration for sports government, as well as the most significant material and immaterial actions carried on over the past years (urban renewal and redevelopment schemes; public events and bottom-up initiatives).
- Geographical analysis of the ‘bottom up’ approach towards sport, by the analysis of the ‘Community Maps’ deriving from sport amateurs and professionals using sport apps, which results can be visually and geographically represented. That was possible using the Strava Heat Maps showing the concentration of lines where sport activities concentrate in the world, and with a particular reference to the city of Cagliari. This was possible by using such maps and integrating them into a desktop GIS in order to integrate it with other data sources relevant for understanding the geographical location and spatial distribution of sport facilities, locations and areas of interest. The outcome is the result of an overlapping of the sport facilities -

shapefile provided by the Sardinia Region, while the main urban parks in Cagliari have been selected and geo-referenced by the authors.

- Community perceptions on benefits that sport provides for human well-being and for city development through the distribution of a specific questionnaire¹ for analysing the mood of citizens on sport activities and opportunities. The questionnaire has been targeted towards more than 300 people and organizations involved in sport activities, both as professionals and amateurs, as well as public administrators.

The specific case of the metropolitan city of Cagliari, with its complex system of nodes of various ranks and specializations, connected to the networks of urban parks, squares, boulevard and promenade [30], appears particularly attractive to the “street sport” [4]. This is a favourable condition where the values of sport are disseminated throughout the city and sport itself becomes a “common good” [31].

In this context, the Municipality of Cagliari recognized the role of sport on the political agenda, promoting and supporting policies with numerous initiatives, materials (sports facilities, urban trail and environmental paths) and intangible (events), in order to improve its sporting attractiveness.

4 Material and Immaterial Actions for Cagliari-Street Sport

Over the last years, Cagliari City Council have promoted a significant program of interventions and initiatives to establish sport as an essential enabler in pursuing sustainable development goals. The political agenda has been defined according to the cultural awareness that sport, played in all its forms and modalities, encourages healthy habits and spreads civic values, thus becoming an essential activity for the personal growth of people. Moreover, the local government strategy is based on a deep acknowledgement of the peculiar environmental, geographical and climatic features of the City, which make it an attractive place to play different types of sport and outdoor activities for more than 300 days a year [28].

Thanks to these favourable conditions, Cagliari has been designated European City of Sport 2017 by ACES Europe (European Capitals and Cities of Sport Federation). In addition, Cagliari was a candidate for hosting the sailing regattas of the 2024 Olympic Games in Rome - candidature resumed [29].

However, it should be acknowledged that Cagliari has been elected “European City of Sport” also by virtue of the several measures and interventions carried out by the Local Administration, together with private investors, voluntary sports organizations and other associations and sports clubs. Cagliari offers a rich and widespread system of outdoor and indoor sports facilities (over 150), from the centre to the periphery, where people can play a variety of activities, including team sports, gymnastics, popular sports such as football, volleyball, basketball, up to niche sports [28]. About half (74) of the aforementioned sports facilities are owned by the Municipality, which still today represents the main public institution involved in the local sports governance.

¹ Proposed by the two authors G. Balletto and G. Borruso (April 2018).

The growing awareness of the key role played by public authorities in stimulating healthy lifestyles, also promoting a sustainable urban planning and governance, has led the City to integrate sport into important urban transformation and regeneration processes, both at a local and territorial scale [32]. The following are the main strategic strategies implemented or in progress (see Fig. 1):

- (a) The recent seafront (LungomarePoetto), which gave a renewed meaning to the coastal landscape, through the dunes and green layout with new ways of using the space (walk, run and bicycle).
- (b) The important operation - on going - of refurbishment and reconstruction of the new Stadium of Cagliari, which will have approximately 30,000 seat capacity. This great investment will provide the City with a smart sports arena close to the sea and well-connected with the existing system of urban centralities and networks of different ranks and specializations (green and blue network)
- (c) The redevelopment scheme of a large green space in the Sant'Elia district, which has recently become a new urban park (Parco degliAnelli). It includes areas for sports and leisure activities, equipped green spaces, pedestrian and cycle paths.
- (d) Redevelopment project of the pedestrian promenade from historic port (d1) to SuSiccu zone (d2), connected to the new promenade on the seafront (near the new stadium and Parco degliAnelli), connecting the city to its environmental system
- (e) The installation of the Luna Rossa' headquarter in the historic port (Molo Ich-nusa). Luna Rossa crew, in preparation for the 36th edition of the America's Cup, has selected Cagliari by virtue of their exceptional weather conditions for sailing sports, which allow to sail more than 200 days a year.

Among the intangible shares promoted by the Municipality of Cagliari there are sports events that have progressively involved more and more people. We can mention:

- “*AteneiKa*”, the event that every year involves most of the university students in sports competitions, seminars, games and musical entertainments for ten days in the university campus “Sa Duchessa”;
- “*Cagliari respira*”, the half marathon (about 20 km) organized by the Asd Cagliari Marathon Club to involve people in a day dedicated to sport, health, ecology and fun;
- “*SoloWomenRun*”, the event with which Cagliari has joined the national women's race circuit, encouraging more than 13,000 women to take part in the 5th edition (10 March 2019). It consists of two routes, the Open (about 4 km) and the Challenge (about 9 km) route.

The significant program of material and immaterial actions carried out by the Local Administration, together with private investors, voluntary sports organizations and other associations and sports clubs, led ACES to designate Cagliari as the “Best European City of Sport 2017” [33].



Fig. 1. AThe system of sports facilities in Cagliari and the main strategic projects. Source: Elaboration of the authors G. Balletto and G Borruso (2018).

The selection has been made with reference to a set of specific indicators concerning popular and competitive sports activities, as well as inclusive sports initiatives and innovative proposals, taking into account their media and economic impact, especially with regard to the investments made by the City to promote sports activities.

This constant commitment has been recently confirmed by the *Il Sole 24 Ore* survey - *Sportiness index 2018* [34] - aimed to assign a Sportiness index to each of the 107 Italian provinces. Cagliari has reached the third place in the top 20 ranking.

According to the criteria established by the survey, which consists of different categories and sub-categories, Cagliari is:

- the 2nd in the Category “*Sports performance index*” (Indice di sportività) by virtue of the high number of people which are members of sports bodies, clubs and associations.
- the 1st in the Category “*Team Sport*” (Sport di squadra), especially with regard to the sub-categories of Professional Football, Basketball, Amateur, Sport Clubs and the territory;
- only the 24th in the Category “*Individual Sports*” (Sport individuali), even if should be acknowledged that the City proves to be more attractive to play swimming, tennis, water sports and other indoor sports;
- the 5th in the Category “*Sport and Society*” (Sport e Società), reaching good performances in the sub-categories of sports and children, sports media and women’s

sports, while could do something more to improve its position for sport and nature and sport and tourism.

In summary the material and immaterial actions related to sport offer multiple benefits to the city of Cagliari, from health to new forms of tourism, between local and global [32].

5 Cagliari: Sport and Smart Community

To evaluate the sport attractiveness of the City of Cagliari, authors chose to analyze also the ways in which citizens use urban space. The growing interest from local communities towards individual and non-structured sport activities implies inviting local decision and policy makers to configure the overall city as an ideal framework for sport and defining policies aimed at enhancing the street sport phenomenon.

In the city of Cagliari, such a phenomenon is ongoing long since and developing between land and sea. It interests the open spaces of the consolidated city, parks and gardens, walks along the historical waterfront and the seaside, beaches, sea, capes, humid zones and those having a high naturalistic and environmental value, to be extended to the borders of the municipality, to reach a metropolitan dimension.

Observing carefully the Strava Global Heatmap, based on the traces of open-air activities, a different Cagliari appears, made of networks stepped and lived in different ways and with different frequencies by a Smart Community willing – more or less knowingly – to share its personal sport experience by mean of fitted for purpose apps. The Strava Global Heatmaps allow to evaluate the spatial distribution of traces marked on space by the Smart Community, particularly those related to the three open-air sport activities, as running, biking and swimming. (see Fig. 2a, b, c).

Running is particularly practiced in all the parts of the city. It is practiced at margins of the street and road lines in the flat space, along the tree-lined streets walks and the pedestrian pathways in the historical city, the public gardens, the promenade of the historical waterfront and the Poetto seaside, around and inside the main urban parks (Monte Urpinu, Monte Claro, San Michele, Terramaini, Molentargius – Salt flats).

Furthermore, traces are highly visible also in the retail high streets and in the neighborhoods, in areas with higher residential density, intersecting squares, places and intersections.

With reference to biking, the traces coincide with the main road axis, with those fitted with dedicated pedestrian/bike pathways, and with streets around hills and neighborhoods of the city. Differently from running, biking is practiced also in the street and urban networks at sovra-local and metropolitan level, at the margins of urban centres.

Swimming – as the third open-air sport – concentrates in the initial part of the coast, where best meteo-marine conditions are present and, in general, higher levels of security and safety. Furthermore, this part of the beach is fitted with direct and indirect services for sport activities, and it is well connected with the rest of the city by means of local public transport and the bike network.

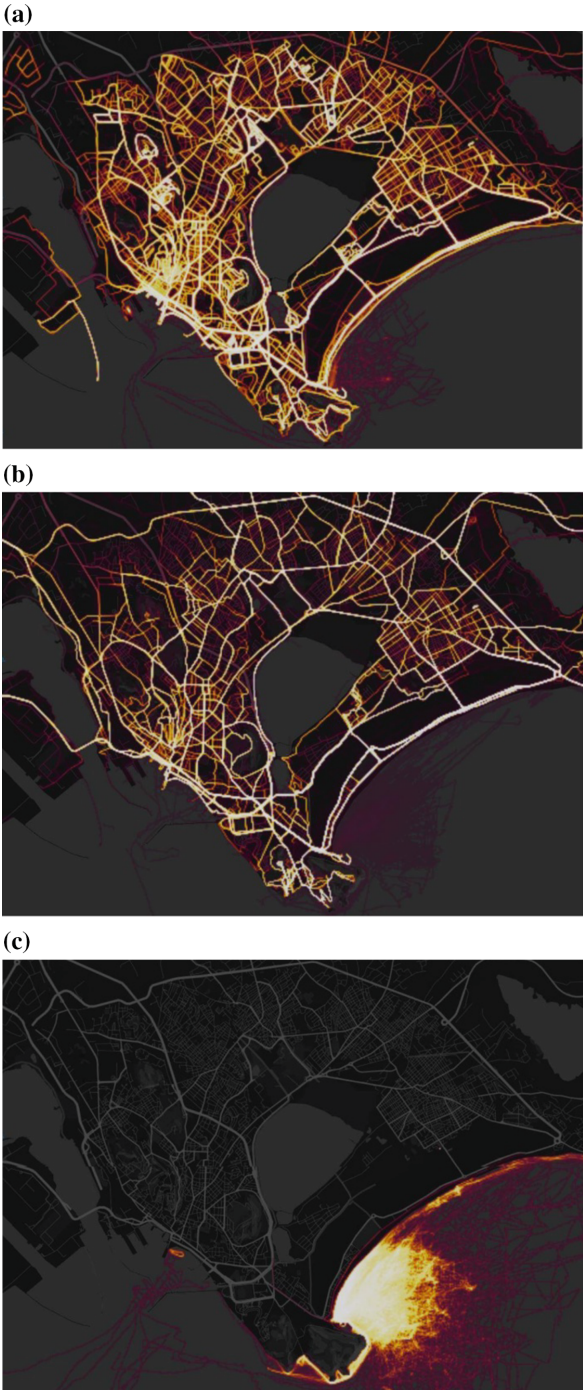


Fig. 2. a, b, c. The three heatmap show respectively the density of running and cycling routes of users, as well as their swimming activity. Source: Strava Global Heatmap, 2019 [35].

With the Fig. 3 the authors have evidenced how the street sport of Cagliari has a territorial metropolitan distribution. This metropolitan layout gives the sports theme a strategic importance especially for the management of parks, squares and waterfronts, places that are by definition suitable for the practice of street sport.

Moreover, thanks to street sport it is possible to identify new itineraries useful for pedestrian cycle mobility far from vehicular traffic flows.

In other words, the sports smart community has highlighted the dimension of the street sport theme, offering useful insights for subsequent in-depth research on the public city, from wellness to pedestrian cycle transport.

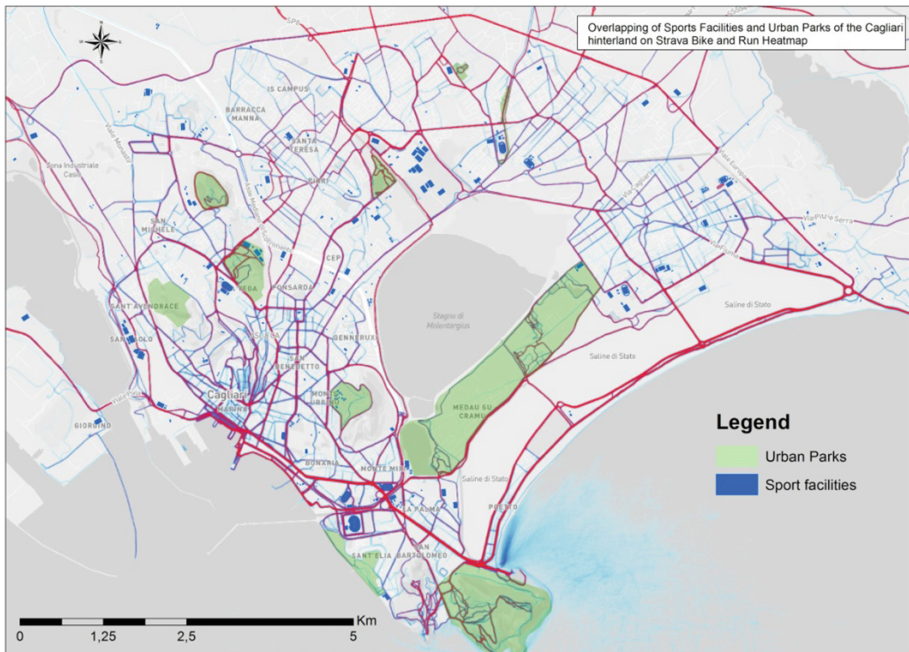


Fig. 3. A first recognition of the existing urban facilities and the most important urban parks in the city to develop future policies aimed to reinforce their relationship with running and cycling routes traced by the Smart Community. Source: Elaboration of the authors (2019) on Strava Global Heatmap [35] and on Gis data from OpendataSardegna [36].

6 Cagliari Is a Sports City? A Questionnaire to Measure Community Perceptions

A research has been carried on by means of a questionnaire, targeted towards people and organizations involved in sport activities, both as professionals and amateurs, as well as public administrators. This has been done in order to better understand the role

played by sport in the City of Cagliari, both referred to the lifestyles of the population and to the awareness that the population itself developed about the importance of playing sport and having an active attitude to improve the quality of life and at the same time boost economic and social development of a territory.

The choice of developing a questionnaire (April 2018) on a theme as 'city and sport', aimed at understanding the relationship between city and sport in the perception of big events - as well as ordinary ones - as possible means of urban transformation and regeneration.

The research has been developed following a parallel approach, preparing two questionnaires for the two cities of Cagliari and Trieste. The two questionnaires share a common, general section, and then have been developed with different sections adapted to better fit the peculiarities of two different urban contexts: the sailing race 'Barcolana' in the case of Trieste, an event that characterizes the city as a major event, and the possible other events to be implemented in the city; the city of Cagliari as 'The City of Wind', with its potential of becoming an attractor for sailing activities, following the fact it hosts the Luna Rossa Team as a main hub for training and developing new sailing solutions.

The questionnaire has been developed by means of a Google Form and distributed over a community of selected users, identified among people active in sport, both as amateur and professionals, and as managers of sporting activities. People were therefore motivated in filling in the questionnaires, and other 300 forms have been collected in the period of time between 9 May 2018 and 30 October 2018.

The majority of respondents are male (more than 60%), born in the City of Cagliari and its hinterland, of an age between 26 and 60 years.

Around 80% started practicing sport activities regularly, mainly individually (67,6%) and as amateurs (48,4%). Team sports and activities practiced by people registered in sport associations follow as preferred way of practicing.

It is interesting to observe the preference of people for individual sport activities, demonstrating a growing trend in contemporary society of managing and organizing its own physical, sport activities in an autonomous way, according to particular needs and personal interests, and also, as a possible consequence of the good supply of urban spaces and natural areas - as humid areas and coast areas - suitable for practicing these activities: all elements that the city of Cagliari seem to be quite fitted with. That seems to be confirmed by analysing the main sports practiced (see Fig. 4), as Sailing// Windsurf/Kitesurf, Running and similar, following by Bike (road and mountain), Swimming and Soccer. Low percentages have been registered for Body building, Tennis, other water sports, martial arts and Beach tennis.

The questionnaire reveals also the weight that sport has in the life of people in terms of time and costs. The time dedicated to sport during the week is on average 2 to 3 h (31,4%) and among 4 and 5 (34,2%), to reach a timeframe bigger than 6 h (22,6%). Only 11,8% of interviewees dedicate less than 1 h per week to sport.

About costs, 37,4% spends more than 500 euro per year, nonetheless a certain number of people seem spending less than 100 euros per year (21,3%).

Again, another suggestion to confirm the capacity offered by the city to practice open air sports - namely street sports - and not necessarily in dedicated infrastructures.

If you practice sport activities regularly, sign the modality and the main sports practiced (multiple answers are possible).

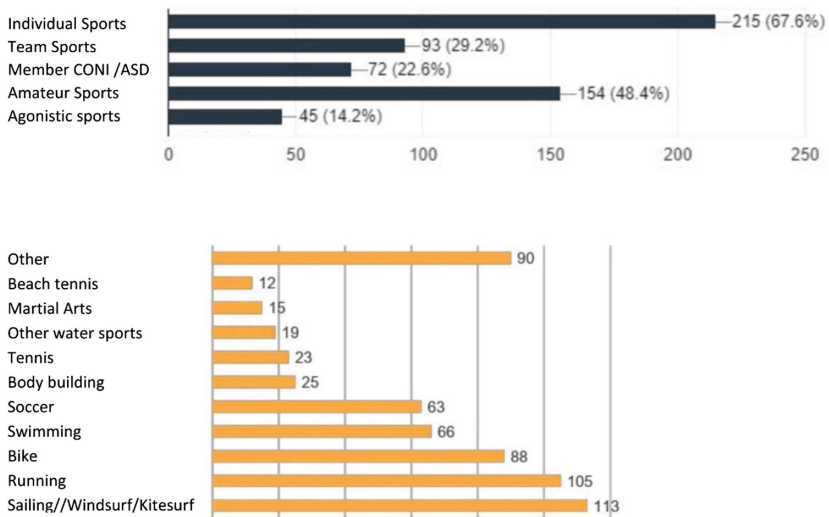


Fig. 4. People's sporting behaviours and personal interests. The main sports practiced in Cagliari.

The parts of the city more directly interested by sport activities and by the related ones have been identified in the Poetto area, in the urban seaside promenade and in the parks (Molentargius, Monte Urpinu, etc.).

A part from the stress on the favourable conditions of the city, due to the environmental, geographical and climate characters and to the good set of facilities, infrastructure, services and sport functions, the questionnaire highlighted also the widespread awareness of the benefits coming from sport events at different scales. The 96% of interviewees declares that sport events are particularly important for the well-being of people and for enhancing the image of the city. Furthermore, more than 80% agrees on the fact that sport plays a relevant role for the economic development of the city.

Many respondents agree on the need to extend sport events in time, involving also other parts of the city, other than those favoured and already widely used (see Fig. 5).

The interviews highlight the A-League football championship as the main sport event in the city (42,3%), followed by the sailing race and other water sports (32,2%) and, to a minor extent, the Marathon and Half Marathon (9%) (see Fig. 6).

Over 90% of the interviewees agrees on the fact that it would be preferable to develop an international sport event. Most of the respondents think the city should develop sail events (49%), and particularly water sports (10%), run & triathlon (9%), as well as university/olympic games (8%) (see Fig. 7).

To what extent do you agree or disagree with the following statements?

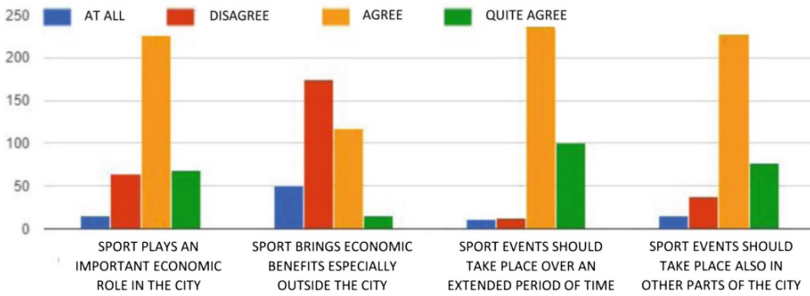


Fig. 5. Perception of interviewees about the economic importance of sport and sport events.

Which is the main sport event that characterize Cagliari as a Sports City?

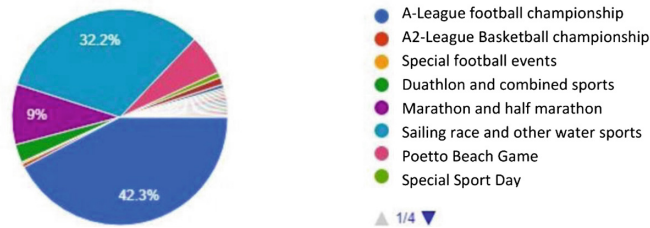


Fig. 6. Perception of interviewees about the main sport event in Cagliari.

95% of interviewees agrees also on the need to promote also other specific activities, as cultural, enogastronomic, traditional events, as well as scientific and divulgative events, other than other sport events.

These first results appear quite significant and should be considered by decision makers, as citizens’ involvement is of major importance to activate processes of urban development responding to real needs and aims of a population. In such sense, the results of the questionnaire could provide an important contribution to confirm Cagliari as the City of Sport also in the future.

Do you think would be important to organize an international event in Cagliari?

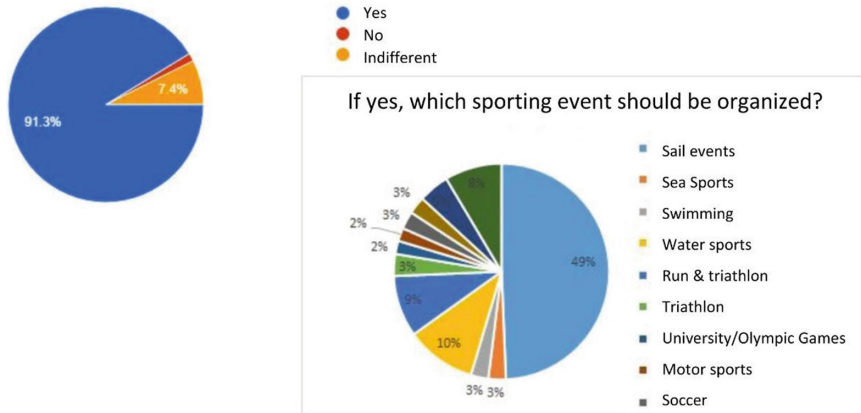


Fig. 7. Perception of interviewees about the importance to develop an international sport event in Cagliari.

7 Conclusions

The present study has assessed the sporting attractiveness of the city of Cagliari.

The authors analyzed urban interventions and popular initiatives for the diffusion of sport. Furthermore, the perception of citizens among sport, quality of life, socio-economic development was evaluated.

The results of the questionnaire have on the whole confirmed the findings of the Il Sole 24 Ore survey - *Sportiness index 2018* of Cagliari, that is a place that is highly suitable for welcoming the phenomenon of street sport. The challenge is to make the city of Cagliari more sustainable and “fit for sport”. Specifically, some interviewees of the questionnaire presented interesting proposals for the future.

First of all, smart community is fully aware of the main geographical, environmental and climatic characteristics of Cagliari, which allow practicing outdoor sports almost all year round. The suggestions made by the interviewed community highlighted possible actions, such as:

- marketing activities at national and international level, to enhance the sports offer in a very favorable urban and landscape context;
- integrate the policies for the promotion of sport with those of areas of natural and environmental interest, as part of a sustainable transport vision.

This is also in line with the national survey of the Sole 24 ore, in particular with the sub-categories Sport and Nature and Sport and Tourism, where Cagliari ranked respectively 10th and 16th.

This confirms the maturity of the sports smart community. It is aware of the context and prepared to make a contribution to future prospects.

Other interviewees have highlighted the need for actions to improve the benefits deriving from the correlation between sport, wellness and social inclusion, such as:

- sports and suburbs
- redevelop before building new sports facilities;
- expanding the local community aware of the importance of sport;
- internationalization of sporting events.

This study shows that new actions are needed for the future starting from the interesting indications coming from the local community, which has shown itself to be attentive and loyal to the city through sport and street sport.

Furthermore, the results offer new and important suggestions for the implementation of the program of material and immaterial actions necessary to confirm Cagliari as a city of sport in the near future, which will be the object of a subsequent research development.

In this sense, it can be concluded that the role of the Smart Community gives this study an important contribution to managing and strengthening the connection between sport and the city and, therefore, in defining a shared model of social, economic and environmental development, as indicated by Agenda 2030.

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