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# Analysis of the Athletic Performance Process in Brazil from the Ranking of the Best Athletes and Their Respective Clubs

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## ABSTRACT

**Caregnato AF, Costa I, Ordonhes MT, Silva C, Sentone R, Gonçalves CE, Cavichiolli FR**. Analysis of the Athletic Performance Process in Brazil from the Ranking of the Best Athletes and Their Respective Clubs. **JEPonline** 2016;19(5):15-29. The aim of this quantitative and qualitative study was to identify the athletic physical structures in Brazil. Data were collected on the Brazilian Athletics Confederation (CBAt) website related to the best athletes ranking for 2014. This study consisted of 1,784 athletes and their respective institutions. There is a higher concentration of institutions (42%) and athletes (73%) devoted to sports initiation and high performance in the Southeast region, which is a wider economic development in the country. But, there is also an interesting geographical distribution of athletics practice in cities in the North, Northeast, and Midwest. It was found that 7 out of the top 20 athletic teams in Brazil with athletes of both sexes in all categories followed the complete path from the talent identification to high performance. In short, the findings of this study should help Brazil to better define the objectives for Brazilian athletics and identify the teams that in fact develop performance in athletes.

**Key Words**: Athletics, Physical Structure, Sports Facilities, Performance

## INTRODUCTION

De Rose et al. (13) defined performance sports as those in which athletes seek to achieve the best performance levels, thereby obtaining impressive results in the discipline practiced. The process of achieving the best sports performance includes factors such as physical, social, tactical, technical (9), and sports facilities (20,24), and that is why not all the athletes are successful (10).

In particular, an insufficient structural factor in terms of specific sports facilities can determine the sporting results. The success of a sport in a country may in fact result from the moment when practitioners develop properly with physical structures and equipment similar to those in international competitions (15,18,19).

In this sense, this study will focus on the physical structure (i.e., clubs and other institutions devoted to practice) that supports and promotes the athletes' discipline in Brazil. This analysis is important for many reasons, but one in particular is that athletics provides the opportunity for Brazil to earn medals at the international level. Yet, during the last two world competitions held in 2013 in Russia and in 2015 in China, Brazil won only one medal in the pole vault competition. This means that the country is not achieving significant results in major international competitions (6,7).

With the 2016 Olympics Games in Rio de Janeiro, Brazil has given more financial support, training center incentives, and visibility to Brazilian sports. Some studies of sports performance in several countries, including Brazil (14,24), China (21), England (17), Canada (18), and Australia (28) show that any nation prominent in sports has a sports physical structure that is well-defined and often directed to the main disciplines. Acknowledging this point, the Ministry of Sport (ME in Portuguese) in Brazil has implemented the National Training Network (RNT in Portuguese) to increase the physical structures (venues) for the development of new sports and new Brazilian talent for future Olympic editions (3).

However, there is a question that needs answering: What is the current physical structure of competitive athletics in Brazil prior to the upcoming 2016 Olympics Games? In addition to this aspect, this study addresses the main institutions that develop the athletes and their sports practice with regard to formation and performance.

## METHODS

### Subjects

This quantitative and qualitative study is based on documentary research and literature review (15). A data survey was conducted on the CBAt website (8) with regard to the ranking of competitive athletes in the Teen, Minor, Adult, and Street Race categories, and to the respective athletic competitions in 2014. This study analyzed the following variables available on the CBAt website: (a) ranking of the top 20 athletes in each competition; (b) institutions linked to the athletes; and (c) States where these institutions are located. A total of 1,784 athletes were analyzed in this study. The search is based on the pilot study by De Bosscher et al. (12) who suggested pillars for the general analysis of the sports in a given country. These aspects involved structure, organization, and sports facilities.

**Procedures**

Athletic institutions with the largest number of athletes present in the CBAt ranking for 2014 were identified. This first step was difficult due to the incomplete names of many institutions on the CBAt website. Many institutions had only acronyms. Also, the CBAt ranking for 2014 did not mention the cities of the institutions. They were identified by the authors on state athletic federation websites or by inserting the athletes' names on the web. Nonetheless, this effort was essential for this research in order to properly map the best athletic teams in Brazil.

**Data Analysis**

After a separate analysis in categories (i.e., best institutions in the Teen, Minor, Adult, and Street Race ones), a general evaluation of the institutions involving all categories was conducted. This resulted in the development of graphs and tables according to: (a) the institutions with larger numbers of athletes in the ranking separated by categories analyzed in this study; (b) the institutions with larger numbers of athletes of both sexes in the ranking among all categories, considering the results of each athlete (for qualitative purposes, a system of points was created valuing the most successful athletes – from 1st to 4th received an amount of 200 points, from 5th to 8th, 160 points; from 9th to 12th, 120 points, and so on until we reached the group comprising from 17th to 20th, who received 40 points); (c) the number of athletes by city and State; (d) the institutions by city and State; and (e) the categories worked by the best institutions and the number of athletes by category.

**RESULTS**

***Top Athletics Institutions in Brazil according to the Ranking on the CBAt Website: From Formation to Performance.***

A data survey was conducted on the CBAt wesite with regard to the 2014 ranking of athletes of different athletic categories in order to know the best competitive institutions in Brazil.

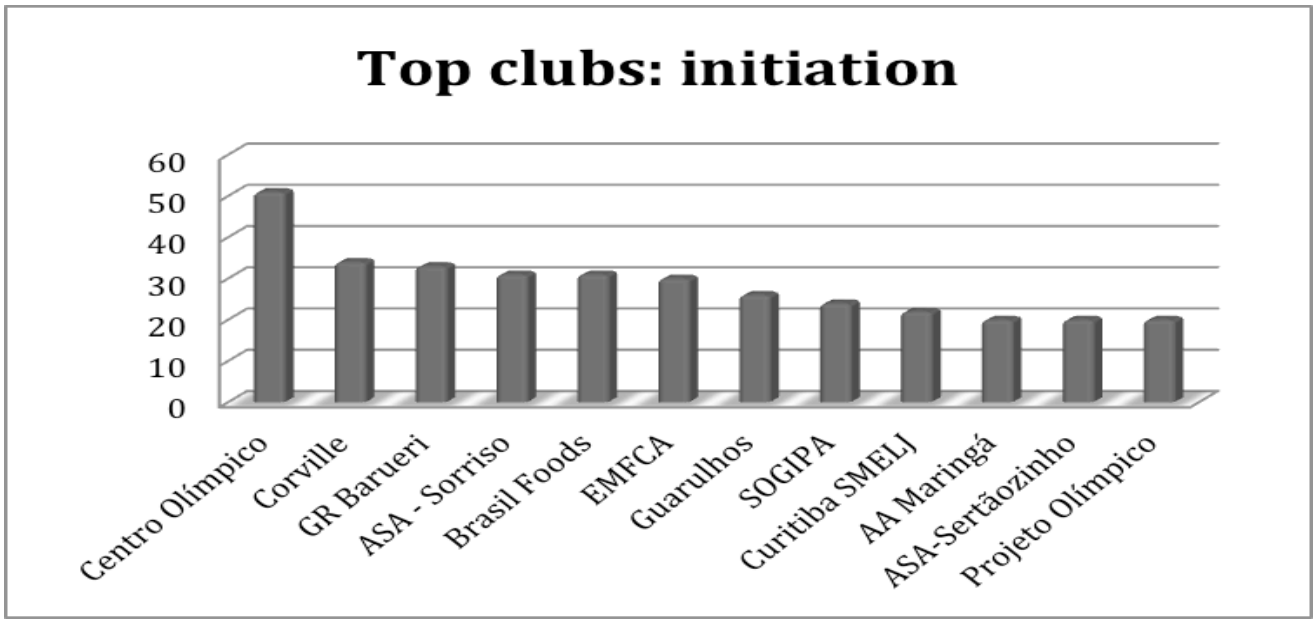


**Figure 1. Twelve Main Athletics Institutions in Brazil in the Teen Category.**

The 12 main teams in Figure 1 in the Teen category comprised 342 athletes. The three clubs in this category that have more athletes in the top 20 are Associação Desportiva Centro Olímpico (AD Centro Olímpico) in São Paulo, which holds training sessions at the ícaro Castro Stadium (Ibirapuera Compound), with 51 athletes (14.91% of the total of athletes analyzed), Corville in Joinville (Associação Corville de Atletismo) with 34 athletes, and Grêmio Recreativo Barueri in the State of São Paulo, with 33 athletes. Brasil Foods/ILF-BRF – Instituto Lançar-se para o Futuro in the city of Rio de Janeiro and Associação Sorriso de Atletismo (ASA) in the town of Sorriso (SP) are represented with 31 athletes each.

The State of Paraná has two teams among the top 12 in this category. They are Associação de Atletismo in Maringá, and SMELJ (City Department of Sports, Leisure and Youth) in Curitiba with a total of 42 athletes. The State of Rio de Janeiro has two teams among the best. They are Brasil Foods/ILF, and EMFCA (Associação das Escolas Municipais Afiliadas ao Clube de Atletismo), both are in the city of Rio de Janeiro. The State of Rio Grande do Sul is represented among the best by the SOGIPA team (Sociedade de Ginástica de Porto Alegre) with 24 athletes. The State of São Paulo has six teams. They are AD Centro Olímpico, Grêmio Barueri, Guarulhos (FUMGUARU – Fundo Municipal de Esporte e Lazer), Projeto Olímpico de Atletismo in the town of Franca, ASA in the town of Sorriso, and ASA (Associação Sertanezina de Atletismo) in the town of Sertãozinho with a total of 181 athletes (52.92%).

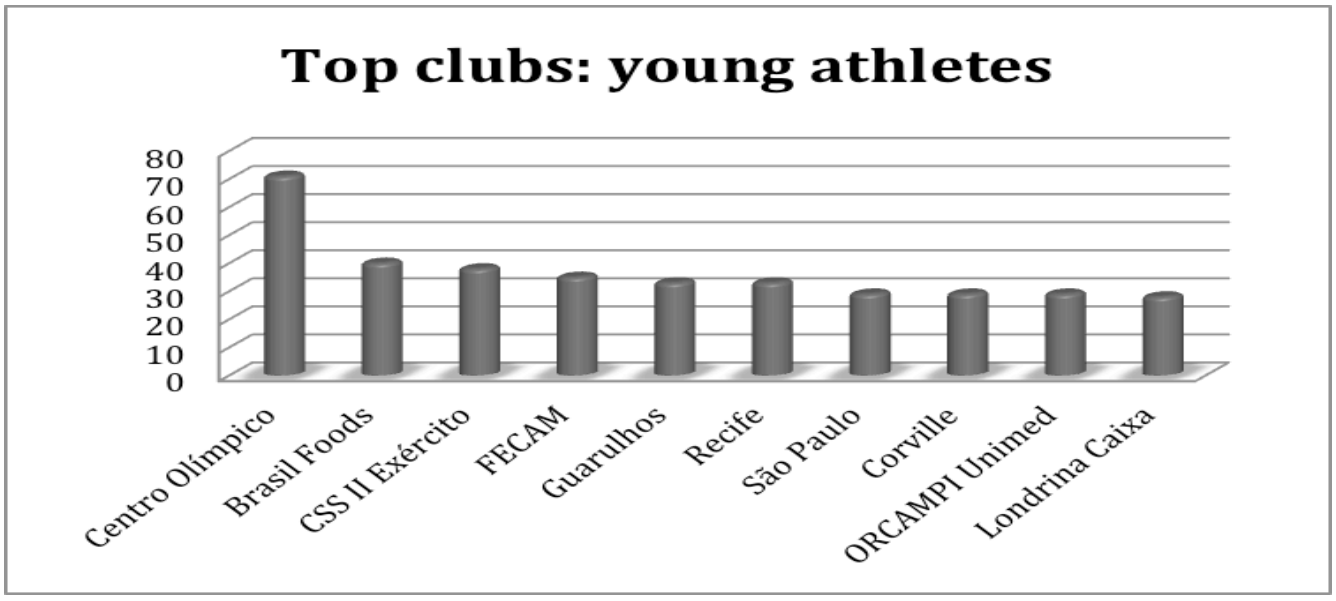


**Figure 2. Ten Main Athletics Institutions in Brazil in the Minor Category.**

These main 10 teams in the Minor category comprised 365 athletes. As Figure 2 shows, the two clubs in this category that have more athletes in the top 20 of each athletic competition are Associação Desportiva Centro Olímpico in São Paulo with 71 athletes (19.45%), and Brasil Foods/ILF with 40 athletes. The State of São Paulo has five (5) teams in the top 10: Associação Desportiva Centro Olímpico, São Paulo (Ibirapuera Compound); CSS II Exército in the town of Osasco (Clube de Subtenentes e Sargentos do Exército); Guarulhos and Orcampi/Unimed (Organização Funilense de Atletismo) in Campinas with a total of 227 athletes (62.19%). The State of Paraná with two teams: FECAM (Fundação de Esportes in

the town of Campo Mourão) and Londrina/CAIXA (Brazilian state bank). The State of Pernambuco was represented by the Recife team, and the State of Rio de Janeiro (RJ) by the Brasil Foods/ILF team.

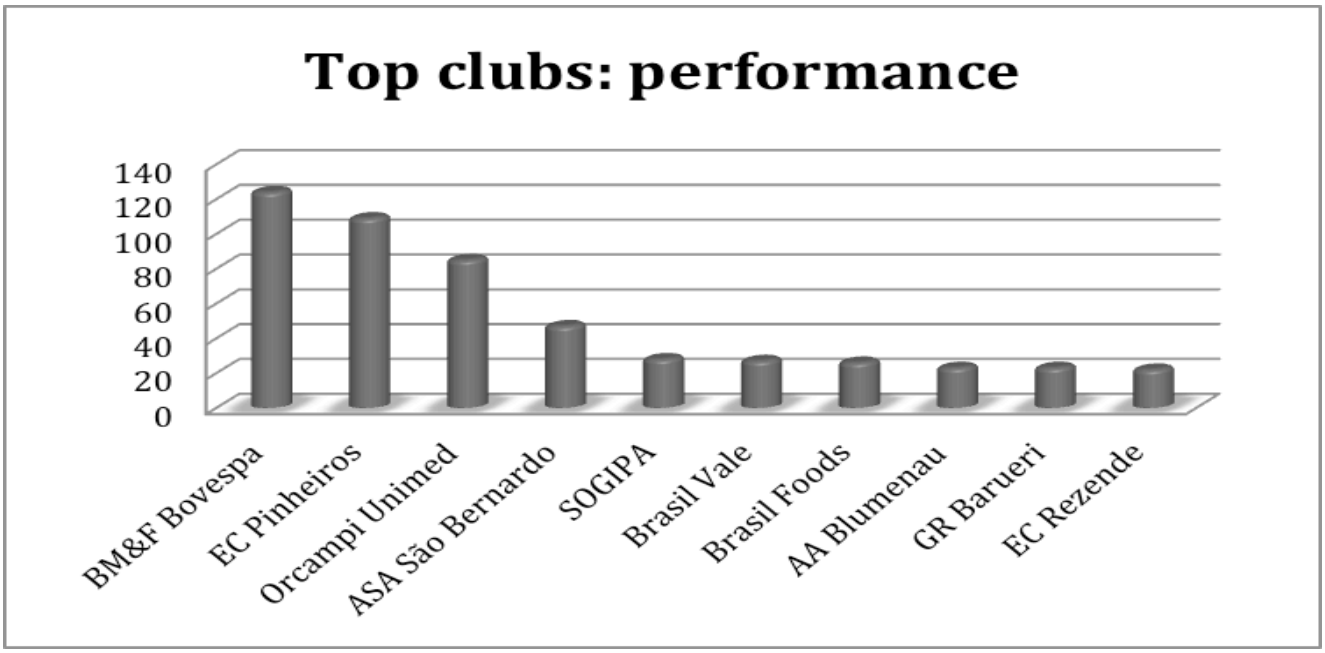


**Figure 3. Ten Main Athletics Institutions in Brazil in the Adult Category.**

Figure 3 shows the main 10 teams that comprised 514 athletes. The three best clubs in the Adult category with more athletes in the top 20 of each athletic competition are Clube BM&FBovespa in the town of São Caetano do Sul with 124 athletes (24.12%), Esporte Clube Pinheiros with 109 athletes, and Orcampi/Unimed in Campinas (SP) with 85 athletes.

The State of São Paulo has six teams in the top 10. They are BM&FBovespa, Orcampi/Unimed, Esporte Clube Pinheiros, Grêmio Recreativo Barueri, ASA (Associação Sambernardense de Atletismo) in São Bernardo do Campo, and Esporte Clube Rezende (Unimep Selan) in the town of Piracicaba with a total of 410 athletes (79.76%). The State of Rio de Janeiro is represented by two teams. They are Brasil Foods/ILF - BRF (Instituto Lançar-se para o Futuro) and Brasil Vale Ouro (Núcleo de Desenvolvimento Humano e Econômico da Vila Militar, branch Engenhão), totaling 53 athletes among the best in the country. The States of Santa Catarina (SC) and Rio Grande do Sul (RS) have one team each: Associação de Atletismo in Blumenau (AABLU) and SOGIPA in Porto Alegre.

It is worth mentioning that the Brasil Foods/ILF (RJ) team is the only one that stands out and remains on the national scene among the top 10 in all three categories analyzed. It is also noteworthy that the AD Centro Olímpico, Corville and Guarulhos teams are among the top 10 in the Teen and Minor categories. The SOGIPA and Grêmio Barueri teams are some of the best in the Teen and Adult categories, while the Orcampi/Unimed team stands out in Brazilian athletics in the Minor and Adult categories.

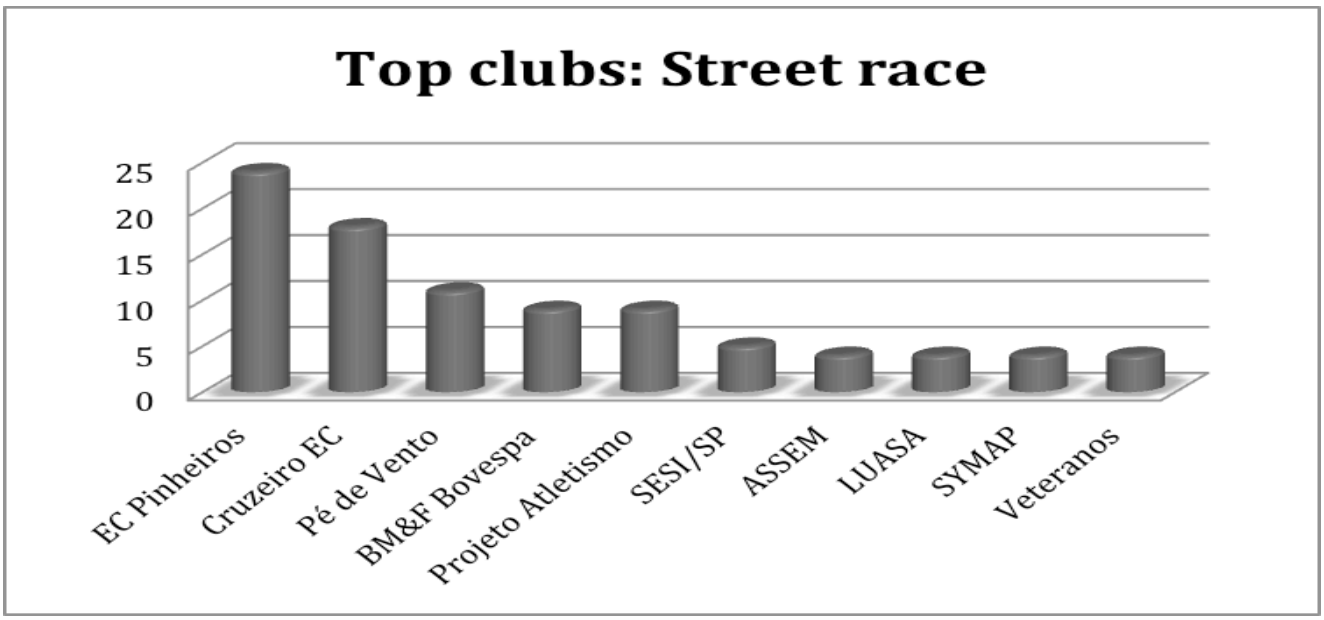


**Figure 4. Ten Main Athletic Institutions in Brazil in the Street Race Discipline.**

These teams comprise 92 athletes. We opted to mention separately the main teams of street race, a specific athletic discipline. The CBAt formulated a specific ranking for this sport which has grown in Brazil in terms of competitions and participants, among whom amateurs are in the majority (8).

The main teams in Brazil with athletes in the top 20 of each kind of competition (5-, 10-, 15- and 20-km street races, marathons, and half marathons) are present in Figure 4 as follows:

- Esporte Clube Pinheiros in the city of São Paulo with 24 athletes (26%);
- Cruzeiro Esporte Clube in the city of Belo Horizonte;
- Pé de Vento in the town of Petrópolis (Associação Atlética Pé de Vento - Petrópolis); BM&FBovespa;
- Projeto Atletismo in Recife;
- SESI in São Paulo;
- ASSEM in the town of São José dos Campos (SP);
- Luasa in Taubaté (SP);
- Veteranos in the city of Salvador (BA); and
- SYMAP (Sylvio Magalhães de Paula) in the city of São Paulo.

Six or 60% of the best teams presented are located in the State of São Paulo.

**Table 1. Twenty Main Athletics Institutions in Brazil in All Categories.**

| Quantitative | Athletes | Qualitative | Points |
|---|---|---|---|
| Orcampi/Unimed | 150 | BM & FBovespa | 9,650 |
| AD Centro Olímpico | 133 | Orcampi/Unimed | 8,965 |
| BM & FBovespa | 131 | E.C. Pinheiros | 8,525 |
| E.C. Pinheiros | 130 | AD Centro Olímpico | 6,630 |
| Grêmio Barueri | 180 | Brasil Foods | 5,800 |
| Brasil Foods | 102 | Grêmio Barueri | 4,340 |
| FECAM/Campo Mourão | 85 | FECAM/Campo Mourão | 3,990 |
| ASA São Bernardo | 77 | ASA São Bernardo | 3,710 |
| CORVILLE/Joinville | 75 | SOGIPA/Procempa | 3,595 |
| SOGIPA/Procempa | 74 | FCTE | 3,265 |
| Instituto Atletismo | 71 | Guarulhos | 3,225 |
| AA Maringá | 68 | Instituto Atletismo | 3,110 |
| Guarulhos | 66 | ASEMPAR/Paranavaí | 2,925 |
| ASEMPAR/Paranavaí | 65 | AA Blumenau | 2,915 |
| FCTE | 61 | IEMA | 2,875 |
| IEMA | 58 | AA Maringá | 2,780 |
| Londrina/CAIXA | 57 | CSS II Exército | 2,590 |
| AA Blumenau | 56 | EMFCA | 2,315 |
| São Paulo | 55 | SESI – SP | 2,255 |
| ASSEM | 53 | ASA - Sorriso | 2,235 |

Table 1 refers to an analysis involving all categories researched and shows by means of a quantitative approach the institutions with the largest number of athletes of both sexes in the ranking. It also shows institutions that have athletes with the best scores in the competitions (qualitative approach), which means that being in the top 20 is not enough. By comparing the qualitative and quantitative approaches, we see homogeneous variations among institutions and little changes in the position in the table. So, the feature remains and some institutions also stand out as national training venues.

Based on the charts above (analysis in categories), some institutions in Brazil have athletes with a significant ranking in more than one category. Such numbers suggest that there may be a concern with a more continuous formation of sportsmen and sportswomen in the athletic discipline.

**Table 2. Distribution of Athletes of the Top 20 Institutions in All Athletics Categories.**

| Category / Sex | Teen | | Minor | | Junior | | Adult | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | F | M | F | M | F | M | F | M | |
| **Orcampi/Unimed** | 5 | 5 | 13 | 20 | 1 | 13 | 43 | 50 | 150 |
| **AD Centro Oímpico** | 25 | 26 | 40 | 35 | 1 | 1 | 3 | 2 | 133 |
| **BM & FBOVESPA** | | 1 | 2 | | | | 60 | 68 | 131 |
| **E.C. Pinheiros** | | | | 2 | | 1 | 87 | 40 | 130 |
| **Grêmio Barueri** | 22 | 11 | 13 | 13 | 8 | 14 | 17 | 17 | 180 |
| **Brasil Foods/RJ** | 19 | 12 | 29 | 14 | | 2 | 6 | 20 | 102 |
| **FECAM Campo Mourão** | | 10 | 16 | 24 | 13 | 15 | 4 | 3 | 85 |
| **ASA São Bernardo** | 1 | 2 | 14 | 5 | 1 | | 35 | 19 | 77 |
| **Corville/Joinville** | 21 | 13 | 18 | 12 | | | 7 | 4 | 75 |
| **Sogipa/Procempa** | 7 | 17 | 11 | 10 | 1 | | 9 | 19 | 74 |
| **Instituto Atletismo** | 5 | 5 | 20 | 7 | 6 | 12 | 4 | 12 | 71 |
| **AA Maringá** | 17 | 3 | 16 | 3 | 17 | 8 | | 4 | 68 |
| **Guarulhos /SP** | 21 | 5 | 26 | 8 | | | 1 | 5 | 66 |
| **Asempar/Paranavaí** | 3 | 12 | 4 | 20 | 16 | 8 | 2 | | 65 |
| **FCTE** | 3 | | | 28 | | 10 | 2 | 18 | 61 |
| **IEMA** | 3 | 14 | 8 | 10 | 10 | 6 | 2 | 5 | 58 |
| **Londrina CAIXA** | 8 | 5 | 9 | 29 | 1 | 1 | 2 | 2 | 57 |
| **AA Blumenau / SC** | 3 | 8 | 9 | 10 | 1 | 1 | 16 | 8 | 56 |
| **São Paulo** | 3 | 4 | 31 | 10 | 3 | 1 | | 3 | 55 |
| **ASSEM** | 12 | | 12 | 4 | | 31 | 13 | 12 | 53 |

As to Table 2, note that the full name and location of some teams were previously mentioned. It was observed that seven teams (35%) have athletes of both sexes in all categories. They followed the full path from the talent identification to high performance. It is interesting to note that the Orcampi/Unimed team from Campinas (SP) is not in the top 10 in the Teen category, but as seen in Table 2 it has athletes competing in that category. Thus, this institution places considerable emphasis on performance because it is among the best in Brazil in the Adult category (as shown in Figure 4).

The Associação Desportiva Centro Olímpico from São Paulo (Ibirapuera Compound) shows an opposite process because Table 2 shows that in 2014 this institution had 128 athletes (96.24%) by adding the initial categories and only five athletes (3.76%) in the Adult category. While this team is among the best in Brazil in the initial athletic categories, it does not apply to the Adult category. Another curious case refers to the Esporte Clube Pinheiros in which 97.69% of the athletes only compete in the Adult category. According to the analysis of quantity and quality in all categories, this fact makes this team one of the leading teams in Brazil in athletics. Its focus is primarily on athletes who are in the intermediate and advanced levels of sporting performance.

The number of athletes in Table 3 is derived from the 20 best teams in Brazil, which indicates a balanced male-female ratio among the participants of the athletic disciplines.

**Table 3. Distribution of Athletes by Sex in the Categories in the Athletics Ranking.**

| Category | Female | % | Male | % | Total |
|---|---|---|---|---|---|
| **Teen** | 195 | 53.86 | 167 | 46.14 | 362 |
| **Minor** | 315 | 51.21 | 300 | 48.79 | 615 |
| **Junior** | 80 | 46.51 | 92 | 53.49 | 172 |
| **Adult** | 321 | 50.55 | 314 | 49.45 | 635 |
| **Total** | 911 | 51.06 | 873 | 48.94 | 1,784 |

Figure 5 shows 13 cities that have more athletes in the top 20 in each athletic competition involving all categories researched. São Paulo was the city that had the largest number of athletes (19.91%), which was followed by Rio de Janeiro (15.82%), São Caetano do Sul (11.65%), and Campinas (9.63%). Each of the four cities is located in the Southeast with most of them in the State of São Paulo, then, Barueri, São Bernardo do Campo, Campo Mourão, Joinville, Porto Alegre, Bauru, Recife, Maringá, and Paranavaí. Four of them are state capitals and nine are towns in the hinterland of the country.

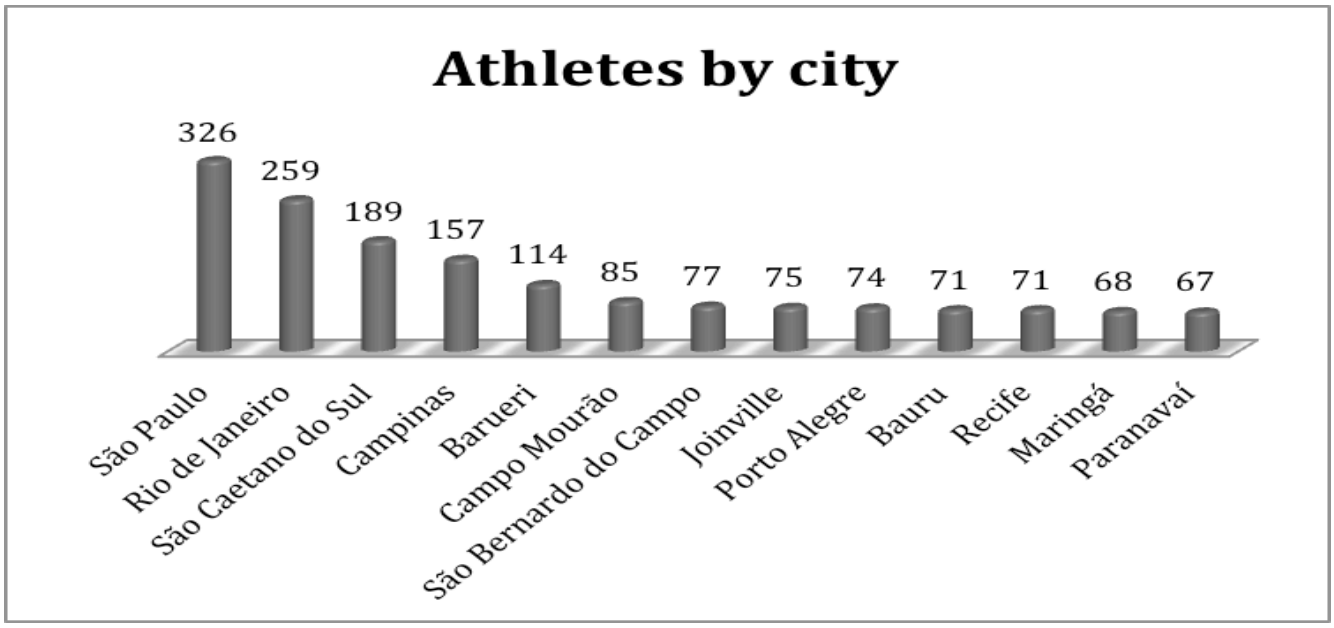


**Figure 5. Distribution of Athletes by City.**

Figure 6 and Figure 7 show that athletics is distributed throughout the national territory. It is present in all regions of the country because there are institutions that develop the sport in cities like Fortaleza, Natal (Northeast: CE, RN, MA), Manaus, Belém (North: AM, PA), Brasília and Campo Grande (Midwest: DF, MS, MT), although these cities do not have institutions rated among the best in Brazil. Most institutions are located in the State of São Paulo (SP), which is followed by Santa Catarina (SC), Rio de Janeiro (RJ), Ceará (CE), and Paraná (PR).

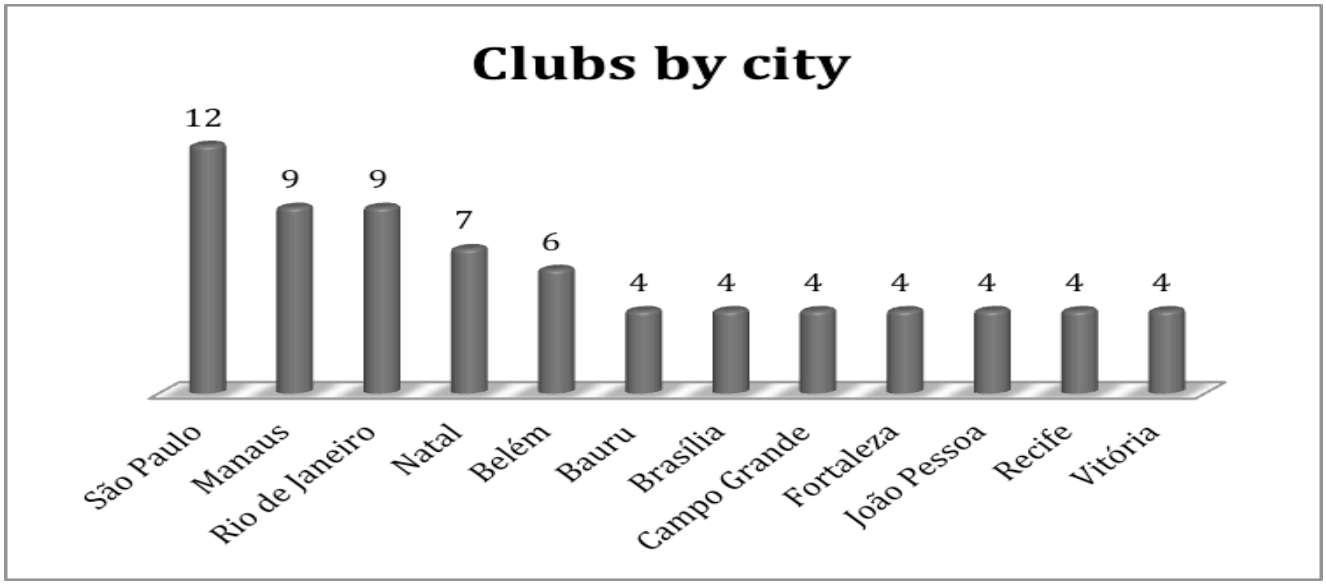


**Figure 6. Distribution of Institutions in All Categories by City.**

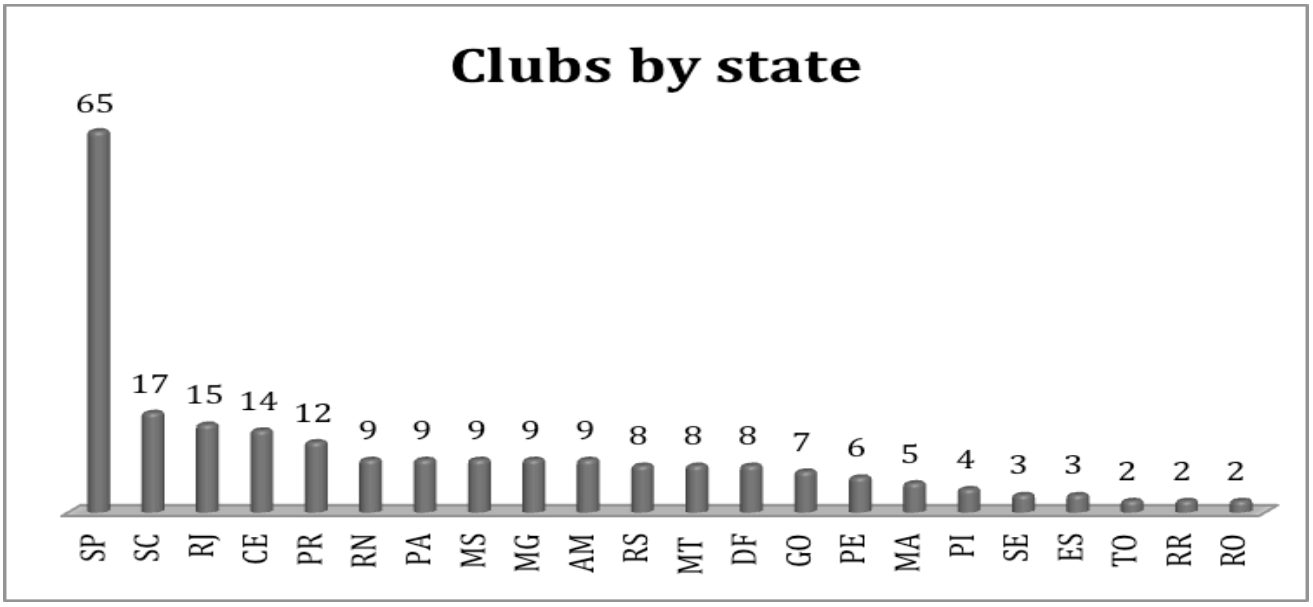


**Figure 7. Distribution of Institutions by State.**

## DISCUSSION

Based on the analysis of the physical structures, it is evident that athletic teams in Brazil are constituted by means of joint initiatives that involve the federal government, states, municipalities, and universities. Sports institutions, such as associations, institutes, foundations, and clubs, help to make up the so-called "National Athletics Training Network". The practice of the athletic teams takes place in various cities and states in Brazil. However, this distribution is highly concentrated in a few municipalities and certain states. In fact, it is evident from the findings that 73% of the athletes are from the State of São Paulo, the region with the widest economic development in Brazil. Then, with much lower percentages, comes Rio de Janeiro, followed by the southern states of Paraná, Santa Catarina, and Rio Grande do Sul, which is in agreement with Melo et al. (25) and Dantas et al. (11). They point out in their studies that in Brazil quality of life and the practice of physical activity and specific sports are factors related to the economic issues in certain regions, as well as to the capacity of these regions to offer the youth opportunities for sports activities.

With regard to school sport, Figures 1 and 2 (teams in the youth athletic system) indicate that no school is among the best institutions in the country. Januário et al. (22) and Rubio (26) pointed out that schools should develop some discipline of sport initiation with regular, organized activities and, whenever it is possible, participate in organized and formal competitions. Athletics is a discipline that can be easily taught in addition to regular physical education classes because physical space and sporting equipment can be "adapted" in its sports initiation (2,23). Therefore, a recommendation is to approach the schools with the physical structures or the need for such structures to be identified because a proper physical structure contributes to the formation of young athletes in any country (17).

This study found that only seven athletic teams in Brazil (35%) have athletes in all categories analyzed. Some institutions are only concerned with the highest performance levels, neglecting stages that are in the formative stages. After all, most of their athletes are in the

Adult category. The hypothesis for this is that such institutions attract the most prominent athletes in the youth system teams, which only form athletes – but have no continuity – so there are Brazilian athletic institutions that are only devoted to the Adult category (Table 2).

In a study of Portuguese athletes, Brito and colleagues (5) found that obtaining excellent results when someone is young does not guarantee good results when the individual enters the Adult category. In agreement is the study by Gonçalves et al. (16), which focuses on soccer, the most popular sport in Brazil. In this sense, the authors concluded that competitive results should not be the main parameter in the development of young athletes. In this regards, Vasconcelos-Raposo et al. (27) pointed out that a pleasant training environment and competition atmosphere among the individuals involved (coach, athletes, and fans) are important motivators to help encourage young athletes to persevere in the sports. On the other hand, a change in the institution and, consequently, the athletic atmosphere often hinders the development of young athletes. The result is the premature abandonment of athletics and competitions. This point is reinforced by the findings of Gonçalves et al. (16) with young Brazilian athletes.

This study indicates there is a higher concentration of athletic physical structures, institutions, and athletes devoted to sports initiation and high performance in the Southeast region of Brazil. Hastie et al. (19) and other researchers (20,24) stress that it is essential the sports managers know where the main physical structures are located in their countries as well as the main sources of human resources for a particular discipline. This kind of information helps to avoid potential errors in athletic investments, reduces costs, and provides the best opportunities for the athletes. This point of view is also in agreement with the results reported by Barreira and Carvalho (1) on the fitness facilities in Portugal, and the studies by Melo et al. (25) and Dantas et al. (11) on the practice of physical activity in different regions in Brazil.

De Bosscher et al. (12) and Ferreira (14) indicate that proper infrastructures combined with the material resources available have a positive impact on performance in sports, thus helping a country to obtain excellent results in international competitions. In particular, the strategies and actions of a specific sports infrastructure help to secure the right investments in training centers that enables sport development in the medium and long terms in a country. So, it makes sense to say that the new athletic sports facilities in Brazil for the 2016 Olympic Games will be for the new generations of Brazilian athletes. In fact, Hong et al. (21) indicate that such thinking should be part of the strategy for sports development in all countries. Yet, it is unfortunate that in the present study it is hard to find sources that would comment as to the purpose of their physical structures because they are not well informed as to the purposes in relation to athletics.

There are also plans to build 168 Centers for Sports Initiation (CIE in Portuguese) with synthetic athletics track in 25 states. Each center may have multi-sport game courts, athletic tracks, gyms, infirmaries, dressing rooms, pantries, and teachers/coaches rooms. The CIEs will benefit children and young athletes who want to play sports in up to 13 Olympic disciplines. Also, according to the Ministry of Sport of Brazil, the physical infrastructures are one of the main legacies of the 2016 Olympic and Paralympic Games for the future growth and development of Brazilian sports.

Much work needs to be done especially in regards to the difficulty in accessing sources with

regard to the mapping of Brazilian athletics or to what physical structures received investments for sports equipment because the public agencies do not give detailed information about investments in these items. With regard to future research in this area, it is important to interview the athletic managers to determine the specifics of how they encourage the well-recognized sports institutions to be the best in the country and how the athletes in these institutions are detected and selected.

## CONCLUSIONS

Contrary to popular belief, athletics is a sport in Brazil that has a good physical structure. But, it is important to develop many new venues as the CIEs and other tracks. This fact justifies the importance of this study and its analytical method in order to know what institutions are the best in Brazil. Moreover, what is found in documents is not always consonant with reality or with results in the main national competitions.

The athletes' practice, both in youth sports and high performance, is diversified among the state capitals and the hinterland. Towns in the hinterland have a more distinguished presence among the 10 best teams by category in the country. There is a higher concentration of institutions, physical infrastructures (42%) and athletes (73%) in the Southeast, but it is also observed an interesting geographical distribution of athletic practices in cities in the North, Northeast, and Midwest.

There are a growing number of official athletic facilities (Classes 1 and 2) in Brazil. This can motivate different sports agents (coaches, directors, and athletes) to have positive prospects for the sport researched and see that it has the chance to develop among the best in the world scenario. However, as the tracks were evaluated in this study, it was hard to detect their objectives and their implementation in sports equipment. It is noteworthy the emphasis on the construction of most official athletic tracks in various public universities are located in state capitals in Brazil.

Thus, it is essential to consider how to these venues for athletics is best used in ways to develop sports in Brazil (particularly, in terms of more participation and better results). These findings can help to improve the effectiveness of public funds invested in the promotion and development athletics, athletes, and sports performance.

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