RESEARCH ON MEN'S 100M PERFORMANCE AT THE OLYMPIC GAMES (2004 - 2021)

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Abstract: The Olympic Games are considered the biggest sporting event in the world. They gather hundreds of the best athletes in the world. The men's 100m event in athletics is one of the most thrilling and fiercely contested competitions at the Summer Olympic Games. In this study, we analyze the sports achievements in this discipline across the last five Olympic Games from 2004 to 2021. In sports practice, speed reflects the ability to move through space at the highest possible speed. In this sense, it manifests itself most clearly in the sprint disciplines. Running 100 meters is not only a sports discipline, but also a way to assess the individual speed of each athlete. The 100m sprint is a short but incredibly intense race. Elite athletes use all their skill, speed, agility and strength to run at top speed for around 10 seconds. Added to this, athletes must also demonstrate precise technique, balance and timing to ensure they get the fastest possible time while also avoiding disqualification. Athletes achieve a balance between speed and stride length. At this point of the race, they hit their maximum speed. The focus is then on maintaining this speed for as long as possible and attempting to ignore any feelings of pain, discomfort or fatigue. Our objective is to trace the state of the sporting results in the men's 100m. The tasks we have set ourselves are to study the change in sports results for the period 2004-2021, as well as to analyze the main schools by nations developing sprinting. Our findings indicate a high level of performance consistency among the top six finishers. The champions' times range from 9.63 seconds to 9.85 seconds, with a range of 0.22 seconds and an average of 9.75 seconds. The sprinters from the USA performed the best in the finals of the Olympic Games. The analysis of these results supports the conclusion that the men's 100m event is the most spectacular and competitive, confirmed by the high sporting standards of the results presented.
Keywords: Olympic Games, 100 m, men, achievements, results

1. INTRODUCTION

The origin and development of the modern Olympic movement are rooted in the spirit and culture of Antiquity, which inspired Baron Pierre de Coubertin to adopt not only the form but also the main value of ancient religion – the sacred significance of sporting effort and competition as a powerful means of ennobling the personality, promoting harmonious development, and achieving perfection. Unlike modern athletic competitions, the ancient Olympic Games included no more than ten disciplines. The competition opened with athletics races on the distance of a "small stage" and was watched by a large audience. Sprint disciplines have traditionally attracted immense spectator interest at the Olympic Games, with the men's 100m sprint occupying a leading position at all Olympic Games.

The men's 100m sprint is the most anticipated event at the Olympic Forum. The first 100m race took place at the inaugural modern Olympic Games in Athens, Greece, in 1896. The Olympics 100m finals are among the most popular sports events in athletics, with more than 35 million people worldwide having watched Usain Bolt winning the 100m final at the 2008, 2012, 2016 Olympics It quickly became the star event of the Olympic Games, with the winner designated as "the fastest human being n the world."

Historically, Americans have dominated this discipline, but in recent years, Jamaican sprinters have prevailed, winning the 100m at three consecutive Olympics. The crowning of the 100m sprint champion is one of the most significant events of the Olympic track and field tournament at each Olympiad.

The intense competition in the 100m sprint in recent years has led to increased performance consistency and more opportunities for improving sports results. Prior analysis of the Olympic Games' results shows that for a successful performance in the 100m final, times between 9.82 and 10.11 seconds are sufficient.

Scientific publications of a similar nature but with different focuses have been developed by Ognyan Miladinov (2007), Grigor Gutev (2020), and Iva Dimova (2020).

2. PURPOSE AND OBJECTIVES

The purpose of our study is to investigate the state of sports performance in the men's 100m sprint from the last five Olympic Games (2004-2021). Our objectives are:

- To study the change in sports results for the period 2004-2021.
- To research the state of sports results compared to the Olympic record.
- To analyze the main sprint schools by nation.

3. METHODOLOGY

To address the objectives, we used data published online regarding the rankings of competitors up to eighth place at the Olympic Games (Athens 2004, Beijing 2008, London 2012, Rio de Janeiro 2016, Tokyo 2021). We subjected the data to variation analysis.

4. RESULTS ANALYSIS

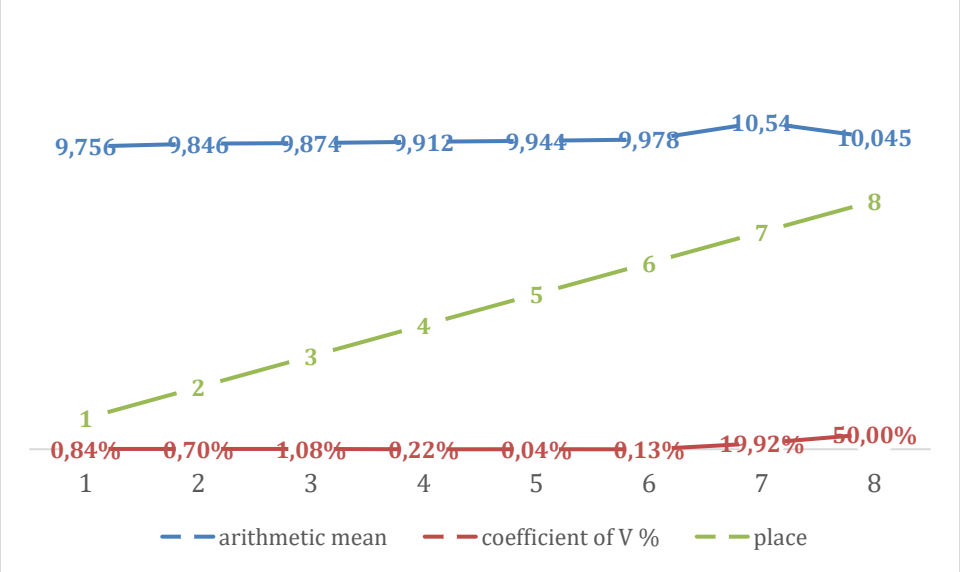
Table 1: Variation Analysis of Achievements of Competitors Ranked Up to 8th Place at the 2004-2021 Olympic Games

Place	n	X min	X max	R	$\bar{X}$	S	V%	As	Ex
1	5	9,63	9,85	0,22	9,756	0,082	0,84 %	-0,6481	-1,7187
2	5	9,75	9,86	0,11	9,846	0,069	0,70 %	-1,5434	2,4237
3	5	9,79	9,91	0,12	9,874	0,107	1,08 %	-1,6712	2,8147
4	5	9,88	9,93	0,05	9,912	0,022	0,22 %	-0,6995	-2,8043
5	5	9,94	9,95	0,01	9,944	0,004	0,04 %	0,6085	-3,3333
6	5	9,96	10,00	0,04	9,978	0,013	0,13 %	0,5516	0,8677
7	5	10,01	11,99	1,98	10,54	2,10	19,92 %	-2,0550	4,4554
8	5	10,03	10,06	0,03	10,045	5,022	50,00 %	2,3173	-5,9998

Source: The data presented is from http://www.olympedia.org/event_names/40

The data in Table 1 present the results of the variation analysis in the 100m discipline from the Olympic Games between 2004 and 2021. This period includes five Olympic athletics competitions. Notable strong results were recorded in this discipline during this period. For the champions, times ranged from 9.63 seconds to 9.85 seconds, with a range of 0.22 seconds and an average of 9.75 seconds. Competitors placing second and third showed high result density with ranges of 0.11 and 0.12 seconds, and average times of 9.84 and 9.87 seconds, respectively. A notable discrepancy is observed in the results of competitors ranked seventh. A time above 11.00 seconds was recorded, with a range of 1.98 seconds (min 10.01 sec. - max 11.99 sec.) and an average time of 10.54 seconds.

Figure 1: Mean Values of Results and Coefficient of Variation of Finalists from the 2004-2021 Olympic Games

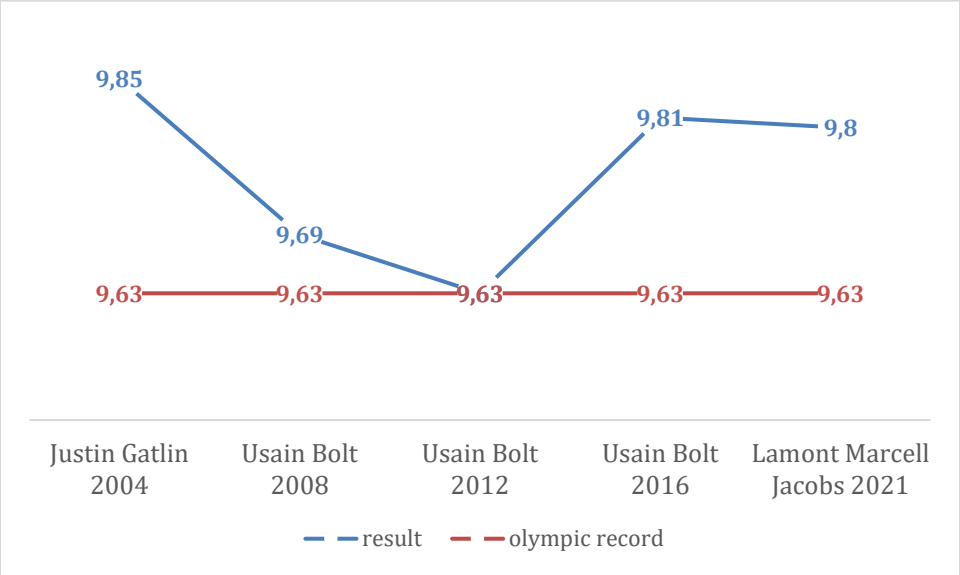


Source: The data presented is from http://www.olympedia.org/event_names/40

Figure 1 visually presents the mean values (x̄) of achievements for competitors ranked from first to eighth place, along with the coefficient of variation (V%) for the same places in the final runs. We observe a high compactness of results for competitors ranked up to sixth place. The high coefficient of variation (V%) for those ranked seventh and eighth compared to the rest is due to athletes not fully realizing their potential in the final run, such as Asafa Powell's 11.99 seconds (2012). Incomplete final runs were noted for Abdul Aziz Zakari (GHA) (2004) and Enoch

Adegoke (NGR) (2021). Official statistics for the 2012 London Olympics ranked only 7 competitors, with Tyson Gay (USA) finishing fourth but later disqualified for anti-doping violations.

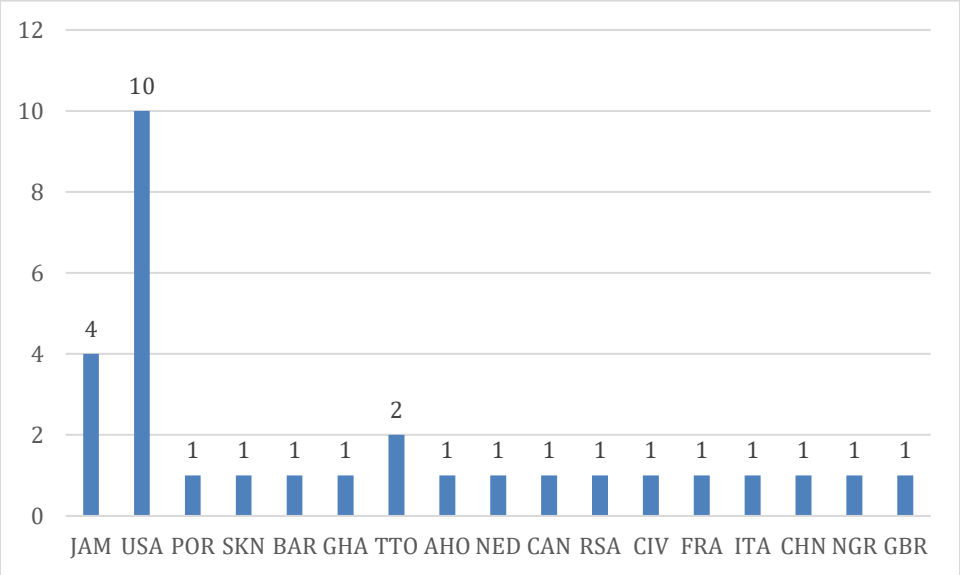
Figure 2: The Men's 100m Olympic Champions Against the Olympic Record



Source: The data presented is from http://www.olympedia.org/event_names/40

Usain Bolt, also known as "The Lightning," from Jamaica competed in his first Olympic 100m final in 2008. He won it with a time of 9.69 seconds, bettering his own world record, which was also an Olympic record. At the Olympic final in London 2012, Usain Bolt won the gold medal in the 100m with a new Olympic record. Bolt bettered his previous record by 0.06 seconds, running 100m in 9.63 seconds. Usain Bolt also triumphed in the 100m at the Beijing and London Olympic Games. In his next Olympic race, he entered the 100m final as the favorite, seeking his third 100m title. The Jamaican sprinter finished in 9.81 seconds, his slowest Olympic final time. By winning three consecutive gold medals in the 100m from 2008 to 2016, Usain Bolt is considered the greatest sprinter of all time.

Figure 3: Participants in the 100m Final at the Olympics, Presented by Nation



Source: The data presented is from http://www.olympedia.org/event_names/40

Figure 3 graphically presents the number of countries whose competitors placed in the final eight of the Olympic Games during the studied period. We observe dominance by sprinters from the USA, with 10 competitors reaching the finals and one Olympic title won by Justin Gatlin in 2004. Four Jamaican sprinters reached the finals, winning three Olympic gold medals, all by Usain Bolt. Trinidad and Tobago had two representatives in the finals, while 14 other countries had one sprinter each. The European school was represented by five competitors, with the strongest performance by Italian sprinter Lamont Marcell Jacobs, who won the gold medal in Tokyo 2021.

5. CONCLUSIONS

Based on the results and analysis, we conclude that the men's 100m is the most spectacular and contested event, confirmed by the high sporting level of the presented results.

Our survey results reveal a strong dominance of competitors from the USA, with the largest number of finalists during the studied period. This indicates that the USA is one of the most successful nations in developing male sprinters. However, in terms of medals won, Jamaican sprinters, particularly Usain Bolt, have dominated.

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