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Original Article

Government Expenditure and Sports Outcomes: An Empirical Evaluation of Public Sports Investment in India

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Abstract *- Over the past two decades, observing the evolution of the Indian sports ecosystem marked by increasing investment into sports and recognizing the lack of established models to evaluate its effectiveness, this study aimed to investigate the impact of government sports funding on athletic achievements and participation in India. The research employed a quantitative approach by analyzing trends of budget allocations to autonomous sporting bodies like the Sports Authority of India (SAI) between FY 2000-01 and 2022-23, using publicly available data sourced from the Ministry of Youth Affairs and Sports (MYAS) Budget Grants. Further trend analysis was conducted on total SAI achievements and the number of trainees from 2015 to 2022, collated from SAI Annual Reports. Moreover, a correlational analysis was used to assess the relationship between funding, total achievements, and the number of trainees under SAI. The results suggested a strong positive correlation (r = 0.8) between total achievements and number of trainees; however, no statistically significant relationship was found between funding and either achievements or trainee numbers. Thereafter, this paper highlights the inefficiency of India's event-driven sports funding strategy and emphasizes the importance of non-budgetary factors like policy redesigns and government schemes in increasing grassroots participation and driving athletic achievements.*

Keywords *- Government funding, Public investment effectiveness, Sports budget, Athletic achievements, SAI trainees.*

1. Introduction

Nowadays, sports have evolved to resemble not only national identity and pride but also a collaborative bond that surpasses all divides. In a country as richly diverse as India, sports unite people across different cultures, traditions, languages, and social classes. Yet, the very sports that bring the nation together in spirit often reveal a different story for the athletes who represent it on an international stage. Beyond this superficial unity lie significant barriers that Indian athletes face, even at the highest levels, which impact their performance when representing the Tricolour. Comprehensively, these include infrastructure gaps, limited access to world-class coaching and scientific support, weak continuity between grassroots and elite-level programs [1], and funding patterns often influenced by politics [2]. These issues are further added to by the absence of reliable athlete performance databases and real-time progress monitoring systems, an inconsistent long-term funding strategy, and the underrepresentation of rural athletes [3]. While schemes like Khelo India have made efforts towards sports development by identifying and supporting young talent, the transition from school-level to elite competition remains disjointed, with the sports system suffering from inefficiency through the incoherence between talent identification, development, and professional training, often resulting in promising athletes being lost [1]. Therefore, the government's need to intervene through funding becomes pivotal in seeking equal opportunities for all athletes and thus improving India's sports ecosystem.

Considering India's large population, its history with sports has always fallen short in terms of participation and achievements. Across seven editions of the Summer Olympics between 1968 and 1992, the contingent brought home a mere 4 medals, of which only 1 was Gold and 3 were Bronze [4]. However, in more recent times, Indian sports have begun to show optimistic signs, bagging 13 medals at the 2020 and 2024 editions of the Olympics alone. Subsequently, the number of athletes representing at the Olympics has grown from a mere 25 competitors in the 1968 to 110 competitors in the 2024 Paris games. These growing trends have not only been evident in the Olympics but also at other global competitions, such as the Commonwealth Games, where India went from tallying 10 medals in 1966 to 101 medals in 2010 [5]. Overall, this reflects India's growing sporting vision, driven by the government's support.

Amongst this progress, the government has heavily depended on its autonomous bodies under the Ministry of Youth Affairs and Sports (MYAS), which aim to provide the necessary structure and resources for athletes, including training centres, coaching, grassroots competitions, and more. This reliance coincides with a consistent rise in funds allocated towards major bodies like the Sports Authority of India (SAI), that went from receiving ₹78.14 crores in 2001 to ₹653 crores in 2023 and the Nehru Yuva Kendra Sangathan (NYKS) going from receiving ₹36.9 crores in 2001 to ₹325 crores in 2023, as per the MYAS budget, net of recoveries [6] [7]. Similarly, a substantial portion of India's increasing performances is courtesy of its National Sports Federations (NSFs), the governing bodies of different sports responsible for the overall administration, regulation, promotion, and direction of the sport for which they are accredited [8]. The government reinforces these authorities through the scheme for Assistance to NSFs, for which the funding has risen from only ₹17 crores in 2001 to ₹280 crores in 2023, according to the budget allocations. Likewise, the Indian government divides its funding into other schemes, bodies, and programs like the National Service Scheme and Incentives to Sportspersons, amongst others [7]. This paper aims to investigate the impact of this expenditure, forming a statistical relationship with India's success at international levels. The analysis is grounded in the avenue of sports economics literature, exploring the influence of financial and economic factors while considering other political and demographic factors.

2. Literature Review and Gap

2.1. Literature Review

As established, government spending may play a crucial role in shaping a country's sporting ecosystem, influencing both elite-level performance and nationwide participation. In the past, extensive research has been conducted across disciplines, examining how sports funding strategies, policies, and institutional frameworks affect this performance and participation. This section covers a review of a range of studies that assess these patterns and the impact of public investment in sports, to identify a gap in the literature, as further addressed by this study.

To begin with, a study [9] conducted in 2013 was focused on outlining the role of policies in influencing sports participation in India. The study uses budget allocations from the MYAS to examine how government spending has benefited sports across various socio-economic groups, highlighting major disparities in participation rates between developed and marginalised communities. This indicates the potentially regressive nature of the government's policies and spending on sports in India, therefore advocating for targeted inclusion policies towards rural areas to expand participation. The findings revealed major inequalities in access to sports across economic and geographic backgrounds, with urban localities benefiting disproportionately from policy implementation. It emphasized the lack of funding for grassroots initiatives in marginalized areas and recommended stronger integration of sports with educational and rural programs. While this study provides valuable insights on Indian sports policy over time and how it has influenced participation across socio-economic communities, it does not extend its focus on evaluating how effective these policies or funds have actually been through measurable changes in athletic performance and participation metrics, an avenue this research addresses.

In continuity, T.R. Nandakumar published a study in 2014 [1] that expanded exploration into government policy by exploring its impact on India's international sporting successes. Secondary data, like parliamentary standing committee reports, Ministry of Sports reports, and the National Sports Development Code (NSDC), were utilized to identify critical gaps in the government's strategy. Particularly, this included insufficient funding to leverage sports science, a fragmented pathway between development stages and elite sports, and a lack of attention towards top-class coaching. Thereafter, Nandakumar's findings concluded that India's global sporting performance would remain limited without certain institutional reforms, as of 2014. While these are deemed valuable in determining limiting factors towards India's international success despite rising funds, it doesn't offer a longitudinal assessment of whether the sports budget has translated into improved elite-level outcomes and grassroots-level participation rates, an area this study investigates.

In addition, a paper, in the context of a specific program [3], aimed to explore the details of the Khelo India program, including its breakdown, infrastructure, logistics, finances, and impact. They employed secondary research through information extracted from the Ministry of Finance and reliable newspapers to conclude that the Khelo India scheme has been instrumental in increasing the spread of sports tournaments in India, pumping investments of 1,756 crores from 2018 to 2020. The research suggested that this funding was the leading factor in the Khelo India scheme, which significantly broadened national sports competition and infrastructure while empowering over 5000 young athletes to receive sports scholarships. However, it also pointed out the need for a clearer linkage between these investments and elite performance outcomes to statistically associate Khelo India with the country's overall sports development. Although the short-term impact of Khelo India is analysed in detail, an evaluation of its effectiveness, together with that of other similar schemes overlooked by the MYAS autonomous bodies in long-term improvements in India's sports ecosystem, remains limited, hence forming a core focus of this study.

Another study conducted in the realm of Australia [10] aimed to investigate the funding of the Australian Institute of

Sport (AIS) and how it impacted sports performance and participation, quantifying it by putting a value on the price of each medal won. They analysed data of annual budgets and report expenditures of relevant government departments, with findings suggesting that AIS prioritized funds towards sports excellence rather than widespread participation. They further matched funding patterns leading up to the Olympics with the actual performance in that edition, concluding the $918 million investment between 1980 to 1996, that yielded a total of 119 medals of which 25 were Gold, meant that the equivalent *cost* for each medal was $8 million, while each Gold medal was $37 million.

The study found a strong correlation between rising investment and improved Olympic medal tallies, which was used to estimate the number of medals won in the future edition of the Olympics. However, the conclusions also critiqued the narrow focus of AIS on elite success, plausibly at the expense of broader participation. Though these findings help establish a positive correlation between funding and achievements, their empirical nature means they aren't applicable outside Australian sports. Meanwhile, the model utilized has limitations as well since it doesn't address the potential for funding strategies to prioritise participation rather than performance, a gap bridged by the model utilized in this paper.

Further, for South Africa, a research [11] aimed to look into the role of the South African government in promoting sports development through mass participation in schools and at the grassroots level. The study used a quantitative approach, wherein, through document analysis, it examined strategies depicted through the Sport and Recreation South Africa (SRSA) Strategic Plan, annual performance plans, and annual reports. The findings suggest significant concerns in budgetary allocations through inefficiencies in government spending, imminent in the low investments into the grassroots level relative to the exceedingly high administrative expenses. It is suggested that without the SRSA restructuring their funding priorities and strategy, developmental objectives would remain unmet. While this analysis provides valuable insights into South African sports funding, its generalizability to other countries like India remains limited, as this paper contextualizes the impact of funding on participation metrics in the unique Indian sports landscape.

Moreover, a 2012 study [2] investigates the motivations behind investment trends in sports worldwide. By using statistical models to compare project versus actual medals in various Olympic-participating countries, the 2012 paper argues that governments are often driven by political motives while allocating sports funds. The findings conclude that sports budgets across the world are frequently influenced by short-term political gain rather than long-term, strategic developmental goals. The study warned that such funding patterns may prove unsustainable, indicating the dangers of corrupt sports bodies, especially when broader participation and equity in sports are neglected. Therefore, it emphasized the need for transparent investment logs into sports that are focused solely on yielding effective athletic results and participation rates in the long term. While this study exposes the political motives entangled within sports funding worldwide, it leaves the question of how such patterns may be imminent in India unanswered and how this inefficiency may have influenced athletic achievements and participation through empirical research.

2.2. Literature Gap and Rationale of the Study

Comprehensively, while there has been extensive research investigating the impact of government funding on sports performance and participation in various countries across the world, there is limited research focused on the Indian demographic correlating these variables with the budget. All the existing research tends to focus more on specific policies or schemes and their direct impact, with a lack of comparative, longitudinal analysis considering the effectiveness of funding on both athletic achievements and participation, therefore establishing a gap in the literature.

This paper will fill that gap by developing a holistic analysis of the Indian government's funding over time and its impact on both elite-level performance and widespread participation in sports. Research into this field is relevant in evaluating the effectiveness of government expenditure, specifically in the context of the Indian demographic. By observing trends and further determining the correlation between athletic funding, achievements at national and international levels, and nationwide participation, this study provides essential insights on whether governmental sports investments are yielding meaningful results or not.

3. Materials and Methods

3.1. Research Aim and Objectives

The aim of the study is to critically evaluate the impact of governmental sports funding allocations on athletic performance and participation in India through data from SAI achievements and trainees from SAI Annual Reports, as well as sports budget allocations from MYAS Budget Grants.

3.1.1. Objective 1

To analyse trends of government funding across key autonomous bodies from 2000 to 2023.

3.1.2. Objective 2

To evaluate the correlation between sports budget allocations, the number of SAI trainees, and their total achievements.

3.1.3. Objective 3

To determine whether increased funding has consistently resulted in more achievements and participation metrics.

3.1.4. Objective 4

To identify non-budgetary factors that influenced the trends in total achievements and the number of trainees.

3.2. Research Hypotheses

3.2.1. Null Hypothesis 1

There is no statistical correlation between the total achievements and the budget.

3.2.2. Null Hypothesis 2

There is no statistical correlation between the number of trainees and budget.

3.2.3. Null Hypothesis 3

There is no statistical correlation between the total achievements and the number of trainees.

3.3. Data - Variables

In order to assess the effectiveness of sports government expenditure in India, it becomes essential to observe the relationship between funding allocations, athletic performance, and participation levels. To ground the same in a quantitative framework, key variables have been identified, each representing a critical aspect of sports development within the country, as unpacked in this section.

3.3.1. Net Budget

The *Net Budget* refers to the total amount of financial resources allocated by the Ministry of Youth Affairs and Sports (MYAS) [6], each Year from 2000-01 to 2022-23, net of all recoveries. It includes all funds channeled across autonomous bodies, schemes, programs, and other organizational expenses.

3.3.2. Autonomous Bodies

The most prominent organizations funded by the MYAS, responsible for regulating and monitoring different segments of Indian sports, are the autonomous bodies. Data for the same has also been collected from the MYAS Annual Budget Expenditures from 2000-01 to 2022-23, for the following four bodies:

- *Nehru Yuva Kendra Sangathan (NYKS)* was established with the objective of inspiring the youth through sports and development programs [12]. It advocates for widespread participation to promote leadership, fitness, and overall wellness through constructive grassroots sporting activities, especially in rural areas. Thus, its focus expenditures include investments into grassroots-level infrastructure, training programs, and regional tournaments.
- *Rajeev Gandhi National Institute of Youth Development (RGNIYD***)** works to provide training programs focused on vocational learning and physical education [13]. The goal is to set a future for rural children to grow into skilled professionals, equipped with leadership and fitness. Therefore, the focus expenditures are largely allocated towards research and development (R&D) and training centres.
- *Laxmi Bai National Institute of Physical Education (LNIPE)* offers physical education in sports science, management, and fitness, with the aim of educating young athletes to be pumped into the sports ecosystem in India [14]. Most of its expenditures are allocated towards R&D, academic programs, and faculty, and they are thus able to provide extensive education for sports science and professional coaching.
- *Sports Authority of India (SAI)* is the primary body overseeing all professional athlete training, infrastructural development, and R&D for performance enhancement of Indian athletes at national and international stages [15]. Essentially designed to regulate the Indian sporting environment, facilitate international exposure, and drive sports excellence, a significant portion of the MYAS budget is allocated to SAI and spent across all avenues in the professional sports atmosphere of India.

3.3.3. Trainees and Achievements

To capture the on-ground impact of funding on sports, the number of SAI trainees and their total achievements have been taken as a representation to quantitatively measure performance and participation.

- *SAI Achievements:* Quantifiable data on the performance of Indian athletes at national and international levels have been collected through medals won by SAI Trainees each Year from 2015 to 2022, as adapted from SAI's annual reports [16]. This includes the sum of Gold, Silver, and Bronze medals on both the national and international stages, won by athletes who have undergone SAI training in any sport.
- *SAI Trainees:* The widespread participation of sports in India has been quantified based on the patterns of total SAI trainees for each Year, with the athletes actively receiving government-supported training facilities and coaching under SAI. This includes the total summation of trainees under all SAI programs and schemes, with data from 2015 to 2022, also sourced from SAI's Annual Reports [16].

3.4. Data Analysis Method

The data analysis method begins with a quantitative approach via trend analysis, a statistical method to identify patterns or changes in data over time [17], to explicitly examine patterns in government funding to various autonomous bodies between 2000-01 and 2022-23. Data has been collated from official MYAS government budgets [18] and inputted into MS Excel, which thereafter outputs a time-series graph of the funding into a specific autonomous body, by Year [19]. By identifying patterns and shifts in funding, these graphs allow for a long-term understanding of budgetary allocations by the Indian government into sports development.

Following the trend analysis, the study employs a Pearson correlation analysis, a statistical model used to measure linear relationships between two variables [20], to numerically evaluate the associations between three key variables under SAI: budget allocations, number of trainees, and total sports achievements. This method was selected to determine the strength, direction, and statistical significance of the associations between participation, performance, and funding, basis metrics compiled from SAI Annual Reports spanning 2015 to 2022. The Pearson test provides a correlation coefficient (r) that indicates both the direction and strength of the relationship, wherein a positive value suggests a direct relationship between two variables, while a negative value implies an inverse relationship. Meanwhile, the closer the absolute value of r to 1, the stronger the correlation. However, to assess whether this relationship is statistically significant, the test also yields a p-value that, if below 0.05, typically indicates statistical significance. By applying this method, the study moves beyond visual trend observations to examine whether consistent and quantifiable relationships exist between budgetary inputs and outcomes through sports achievements and widespread participation.

4. Results and Discussion

4.1. Trend Analysis

Table 1. Budgets for Autonomous Bodies and Net Budget under MYAS from FY 2000-01 to 2022-23

Year	Net Budget (crore ₹)	Nehru Yuva Kendra Sangathan (crore ₹)	Rajiv Gandhi National Institute of Youth Development (crore ₹)	Laxmi Bai National Institute of Physical Education (crore ₹)	Sports Authority of India (crore ₹)
2000-01	260	36.9	2.2	6.75	78.14
2001-02	315	40.41	1.3	7	98.74
2002-03	339.39	43.97	2.27	5.7	104.2
2003-04	440.3	46.77	2.27	7.45	126.47
2004-05	466	44.51	2.45	10.5	144.89
2005-06	506.99	52	4.25	13.1	157.35
2006-07	669	63.02	4.25	15	173.7
2007-08	780	78.77	8.65	21	181.57
2008-09	1,111.81	90	9.65	28	181
2009-10	3,073	102	10	30	176
2010-11	3,565	111.5	9.9	33.3	324
2011-12	1,121	123.4	2	39.63	287.8
2012-13	1,152	123.5	1.5	23.87	302.39
2013-14	1,219	127.48	19.7	31.7	326
2014-15	1,219	142.79	19.7	31.46	325.1
2015-16	1,541.13	154.67	21	35	369.39
2016-17	1,592	205.1	36	66.6	416.3
2017-18	1,943.21	215	36	45.02	481
2018-19	2,196.35	255	23	45	429.56
2019-20	2,216.92	256.92	30	50	450
2020-21	2,826.92	300	35	55	500
2021-22	2,596.14	326.5	32	55	660.41
2022-23	3,062.60	325	24	56	653

Table 1 presents data regarding the Net Budget allocated by the MYAS from 2000–01 to 2022–23, together with its breakdown between three key autonomous bodies: NYKS, RGNIYD, and LNIPE, institutions that represent the core pillars of both elite development and grassroots expansion in Indian sports. Most recently, in 2022–23, the highest allocation among the three was towards NYKS at ₹325 crores, while RGNIYD received the lowest at ₹24 crores [7]. The following section will offer a detailed trend analysis of these allocations towards each body individually, identifying key policy shifts, peaks, and structural changes that shaped their growth trajectories.

4.1.1. Net Budget

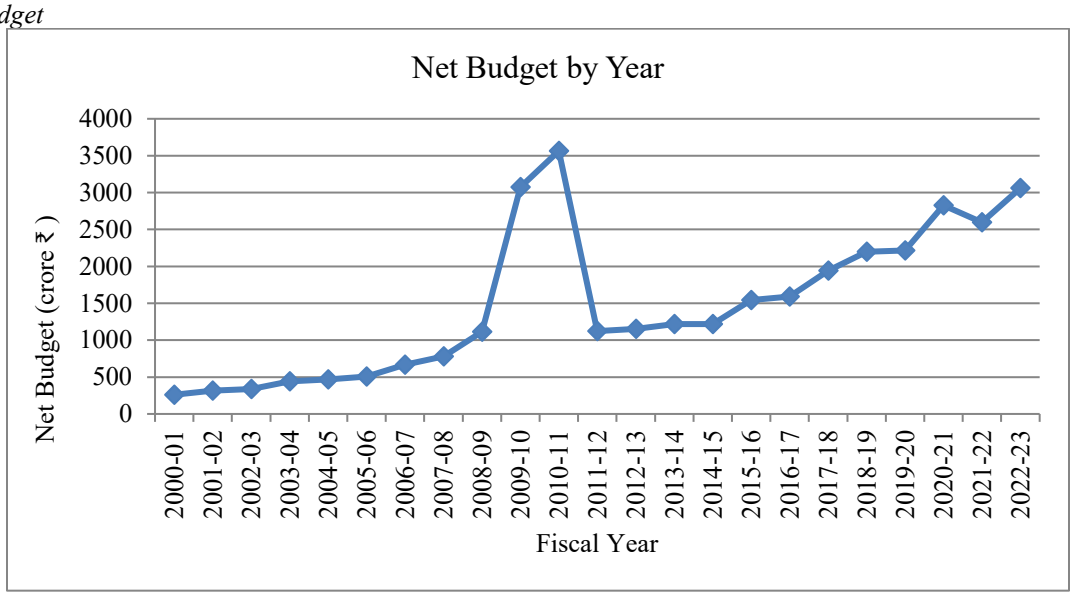

Fig. 1 Trend analysis of Net Budget of the Ministry of Youth Affairs and Sports (crore ₹) for FY (2000-01 to 2022-23)

As showcased in Figure 1, the net budget steadily increased early on from around ₹260 crores in FY 2000-01 to ₹506.99 crores in 2006-07. This gradual and slow rise reflects the preliminary stages of centralized sports governance in India, wherein the 2001 MYAS National Sports Policy explicitly stated that its primary focus of funds was placed on mass participation schemes [22]. However, 2007-08 saw the beginning of a steady rise in the sports budget as India began prioritizing elite performance, which necessitated funding for world-class facilities and quality coaching. The most substantial spike in the budget was imminent from 2008-09 to 2010-11, which saw funding exploding from ₹1,111.81 crores to ₹3,565 crores. This was largely due to India's preparation for hosting the 2010 Commonwealth Games in Delhi, which was the first major sporting spectacle hosted in India in the 21st century. These preparations required extensive infrastructure development, renovation of stadiums, athlete village construction, and elite training camps, thus calling for a massive jump in funds [23] [24].

This spike, however, was temporary and heavily event-driven, focused on showcasing India's sporting capacity. As a result, immediately after the conclusion of the Commonwealth Games, the net budget dramatically dropped back down to ₹1,121 crores in 2011-12, reflecting the one-time nature of the government's expenditure into tournament-specific capital expenses. Once the event was over, recurring investment patterns resumed, aligning with only operational costs and not covering the specialized expansion into elite athlete development anymore. The following three years also saw a relatively stagnant budget ranging from ₹1,100 to ₹1,300 crores, coinciding with the growing public discontent with India's performance (6 medals) at the 2012 London Olympics. To address this discontent, as a preemptive measure for the Rio 2016 Olympics [25], the budget crossed ₹1,500 crores in FY 2015-16, supporting international exposure and top-quality coaching.

However, this proved rather ineffective as India bagged only 2 medals at the 2016 Olympics, thus resulting in a structural expansion under SAI, which launched the Khelo India scheme and reinforced the Target Olympic Podium (TOP) scheme [26]. As a result of this policy shift, funding further increased to ₹1,943.21 in 2017-18. Further, India's focus was split between elite development through the TOP scheme, in anticipation of the 2020 Tokyo Olympics, and grassroots expansion under the Khelo India School Games and State Centres of Excellence (KISCEs), resulting in increased funding to ₹2,216.92 in 2019-20 [27]. Counterintuitively and rather remarkably, in the COVID-hit year of 2020-21, the government's commitment to maintaining Olympic preparation saw the budget rise sharply to over ₹2,800 crores [28].

This was spent largely between bio-bubbles, quarantined training, and SOP-regulated camps, with guidelines like reduced batch sizes, across sports despite pandemic-induced limitations. Furthermore, in 2021-22, embodying the common post-Olympic slowdown in capital expenditure in the Indian sports budgeting cycle, funds slightly declined [29], before surging again and reaching their highest since the 2010 Commonwealth Games period. This aligned with the expansion of KISCEs into new regions, increased attention to women's sports and para-athletes, and strategic preparations for the 2024 Paris Olympics by focused investments into sports with identified medal objectives [30] [31], resulting in the new peak in FY 2022-23, at ₹3,062.60 crores [7].

4.1.2. Nehru Yuva Kendra Sangathan (NYKS)

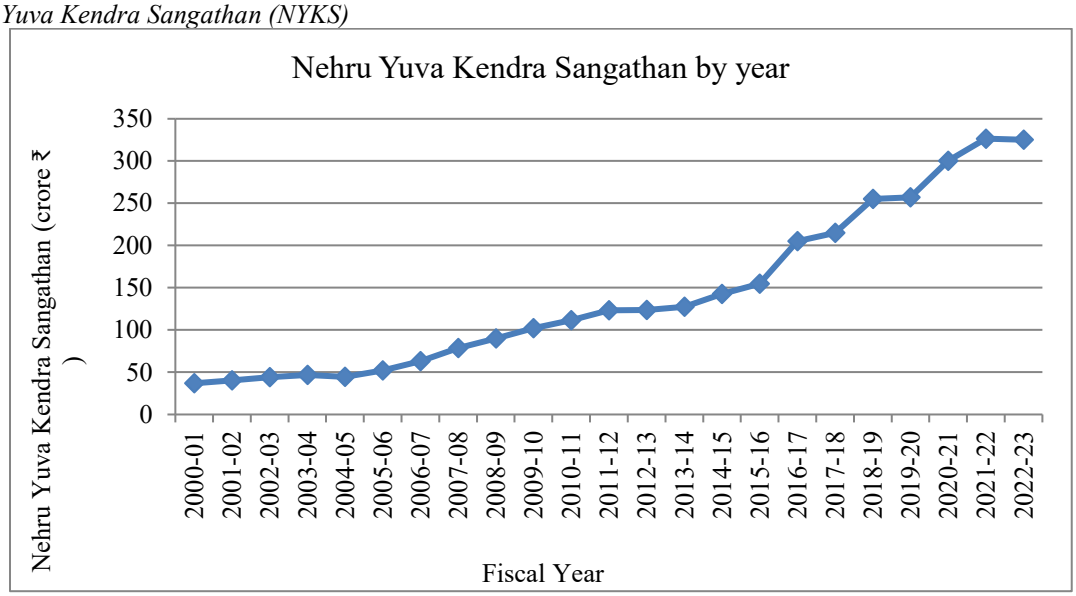

Fig. 2 Trend analysis of Budget of Nehru Yuva Kendra Sangathan (crore ₹) for FY (2000-01 to 2022-23)

According to the NYKS trends visible in Figure 2, there was a slow increase from the Year 2000 to 2010, followed by accelerated growth from 2010 onward. Key surges occur around 2016-17, 2019-20, and 2022-23, likely due to government initiatives, pandemic-related mobilization, and post-COVID recovery programs. Overall, the trend reflects rising investment in youth empowerment and policy-driven expansions over time.

A slow, constant growth is visible from 2008-09 up to 2011-12. This period saw the implementation of programs designed to engage the youth in nation-building activities, with the 2010-11 NYKS Annual Report [32] indicating a focus on youth development and empowerment, which may have been the primary driver of the increased funding. Moreover, the 2016-17 Annual Report suggests the body's efforts in scaling up to boost its impact and outreach [33]: plausibly, the leading factors for its accelerated growth from 2016-17 to 2019-20. However, as COVID-19 became prevalent, 2019-20 saw the attention of NYKS divert towards public health awareness and community support initiatives, likely resulting in the remarkable rise in NYKS numbers from 2019-20 to 2020-21 [34]. Post-pandemic recovery efforts saw COVID-19 mobilization funds drop as focus shifted back towards youth engagement programs, prioritizing youth participation and skill development [35] and leading to the stagnant funding received by NYKS from 2021-22 to 2022-23.

4.1.3. Rajiv Gandhi National Institute of Youth Development (RGNIYD)

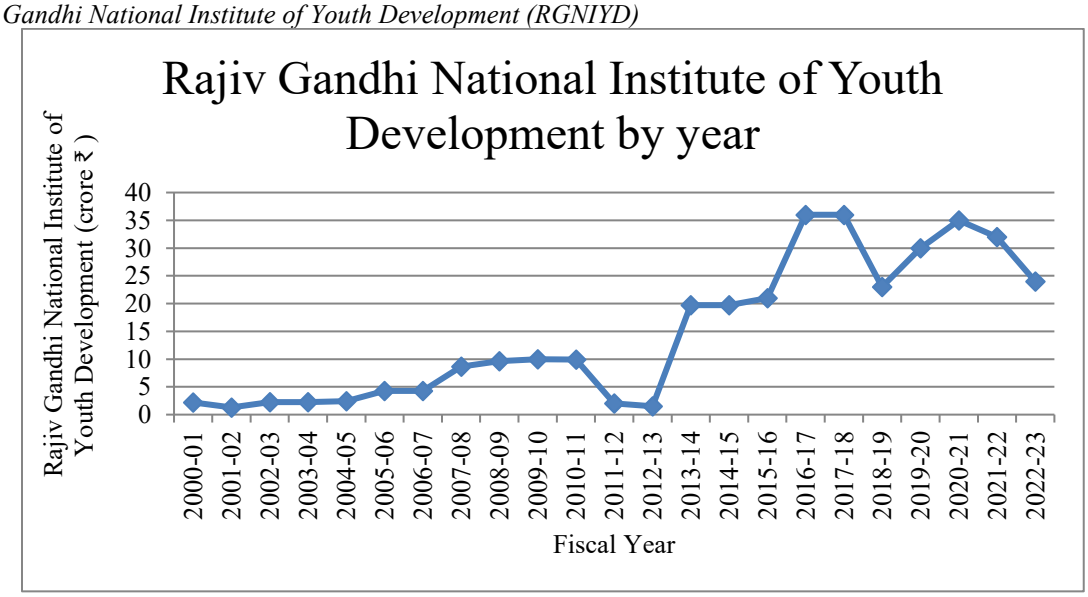

Fig. 3 Trend analysis of the Budget of Rajiv Gandhi National Institute of Youth Development (crore ₹) for FY (2000-01 to 2022-23)

The RGNIYD budget, reflected in Figure 3, has seen high fluctuation, with key turning points aligning with policy shifts. In 2012, RGNIYD was bestowed the title of "Institute of National Importance" by the Act of Parliament No. 35/2012 [36] [37], which set their initially low budget for expansion. This recognition elevated its role in youth development through academic and training programs, leading to its significant spike from 2012-13 to 2013-14.

Meanwhile, the "India Youth Development Index and Report" was released by the RGNIYD in 2017, solidifying their role in informed policymaking and commitment to R&D [38], thus leading to a large increase in its budget from 2015-16 to 2016-17: by 15 crores. However, inconsistencies from 2018 onward suggest periodic restructuring and event-based, reactive funding, while RGNIYD's overall trajectory highlights its evolving role in Indian sports.

4.1.4. Laxmi Bai National Institute of Physical Education (LNIPE)

Figure 4 depicts LNIPE's budget allocation per Year, from which it is clear that despite receiving consistently increasing funds from FY 2000-01 all the way to 2011-12, LNIPE's budget witnessed a sharp decline in 2012-13. A potential reason for the same was that MYAS diverted their attention towards centralized initiatives by SAI, like the Rajeev Gandhi Khel Abhiyan—responsible for sports promotion in rural areas—that led to a reduction in funding being allocated to other organizations like LNIPE [39].

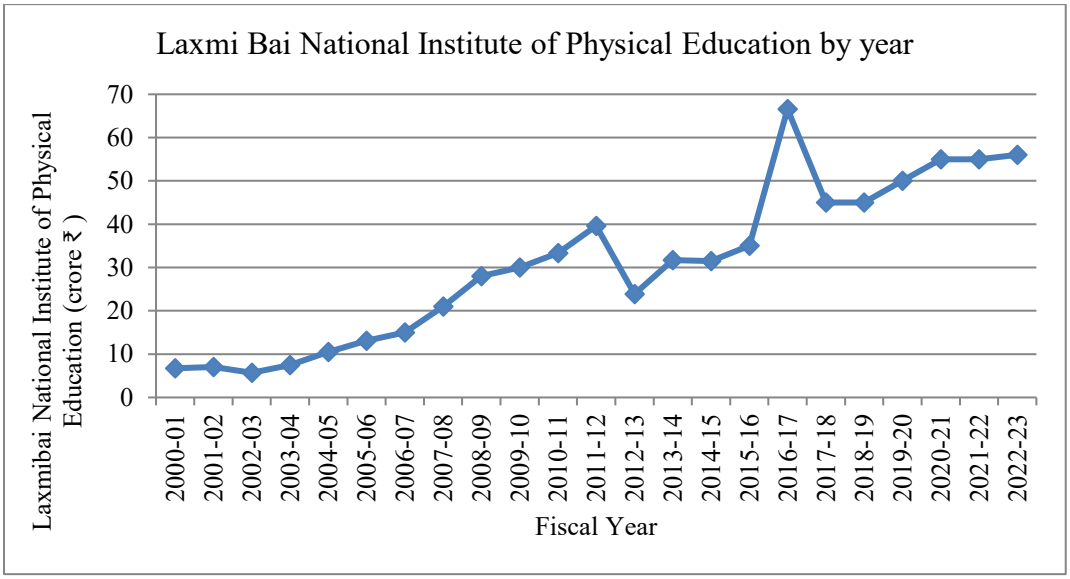

Fig. 4 Trend analysis of the Budget of Laxmibai National Institute of Physical Education (crore ₹) for FY (2000-01 to 2022-23)

Further, in anticipation of the 2016 Rio Olympics, the MYAS holistically increased their funding into sports, with the net budget significantly increased too, from ₹1,219 crores in both 2013 and 2014 to ₹1,541 crores in 2015. As a result, LNIPE, being one of India's premier institutes for physical education, also saw an increase in funding.

However, a considerable drop was imminent post the Rio Olympics in the budget for FY 2017-18 since India significantly underperformed, tallying only 2 medals compared to 6 in the previous edition of the Olympics in 2012 [4].

Thereafter, the budget was redirected from physical education and sports participation into schemes that directly support athletic achievements, like the revamped TOP scheme, which saw more attention towards intensive professional training with the objective of international sports excellence [40] [41].

4.1.5. Sports Authority of India

As graphed in Figure 5, the SAI budget saw a significant spike from 2009-10 to 2010-11, primarily to fund preparation and infrastructure for the 2010 Commonwealth Games that were set to be hosted in India.

This facilitated schemes on the redevelopment of stadiums, advancements in training facilities, and the organization of national camps across various sports amidst the games [42].

Following that, 2017-18 saw a substantial increment in the budget, exceeding the previous Year's budget by almost ₹65 crores. This was a part of India's broader vision to increase international achievements following their disappointing run in the 2016 Rio Olympics [25], for which the SAI-implemented TOP scheme received a majority of the funds.

Fig. 5 Trend analysis of Budget of Sports Authority of India (crore ₹) for FY (2000-01 to 2022-23)

Shortly after this spike at ₹481 crores in 2017-18, the SAI budget was slashed down to ₹429 crores the following year in 2018-19. Despite the overall sports budget increasing by ₹253 crores, a majority of the funds were diverted towards Khelo India and Assistance Towards Sportspersons schemes [43], as India prepared for both the Commonwealth and Asian Games in 2018. This redirection followed the beginning of Col. Rajyavardhan Singh Rathore as Indian Sports Minister, who aimed to adopt a more decentralized approach through Khelo India, stating, "it won't be like any other project managed by government servants, it will be flexible and have proper professional guidance" [44]. Lastly, from 2020-21 to 2021-22, despite the overall sports budget reducing, SAI funding took another rise, courtesy of the postponement of the 2020 Tokyo Olympics to August 2021 amidst the COVID-19 pandemic. For the same, to ensure world-class training exposure while maintaining the health of Indian athletes, the government ensured the centralized implementation of biosecure bubbles and other such precautionary measures [45], necessitating an increase in the SAI budget, which was raised by 160.41 crores.

Table 2. Total Achievements (number of medals) and Number of Trainees under SAI from 2015 to 2022

Year	SAI Achievements	SAI Trainees
2015	564	11,032
2016	1,298	11,773
2017	1,351	13,684
2018	1,454	14,907
2019	1,452	14,236
2020	1,517	11,897
2021	1,011.5	9,948
2022	506	7,998

4.1.6. Achievements and Trainees

Table 2 represents data on the number of international and national achievements and total athletes trained under SAI, as reflected in SAI's Annual Reports. For instance, in 2020, 11,897 trainees actively under SAI bagged 1,517 total achievements amongst themselves. The following section examines the trends of these key indicators of performance and participation, respectively, from 2015 to 2022.

4.1.7. SAI Total Achievements

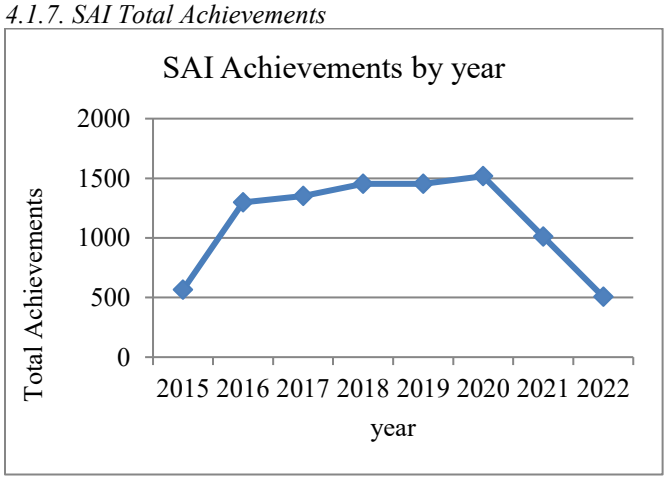

Fig. 6 Trend analysis of SAI Total Achievements (number of medals) by the Year (2015 to 2022)

From Figure 6, it can be interpreted that between 2015 and 2016, the total achievements saw a massive increase, going from 564 to 1,298 total medals at the national and international stage. This was likely associated with the formal launch of the Khelo India scheme, which instantly shifted focus onto structured talent identification and performance tracking, especially immersing themselves into the grassroots stage [46]. This also pushed the digitalization

of athlete data, allowing for efforts towards streamlining performance metrics, ensuring that achievements that may have gone unrecorded prior were now formally captured [47]. These factors carried on to 2017, wherein a moderate incline was visible, mostly in achievements at the national stage. In 2018, the total achievements spiked once again, mostly courtesy of increased national and international competition opportunities. India tallied their third-best ever result at the 2018 Commonwealth Games, bagging 66 medals; meanwhile, the Khelo India School Games were also introduced in 2018, increasing opportunity for national achievements [48]. Finally, in the 2020 Tokyo Olympics, the TOP Scheme proved effective as India recorded its highest-ever qualifications with 119 participants. Also, amidst the subsequent rise of women's sports in India, the Olympic medals increased to seven, from only two in the Rio 2016 edition [4]. Lastly, post-2020, there is a diminishing trend. As stated earlier, the fall is justified by the COVID-19 hit that led to a decline in events, participation, and therefore, achievements.

4.1.8. SAI Trainees

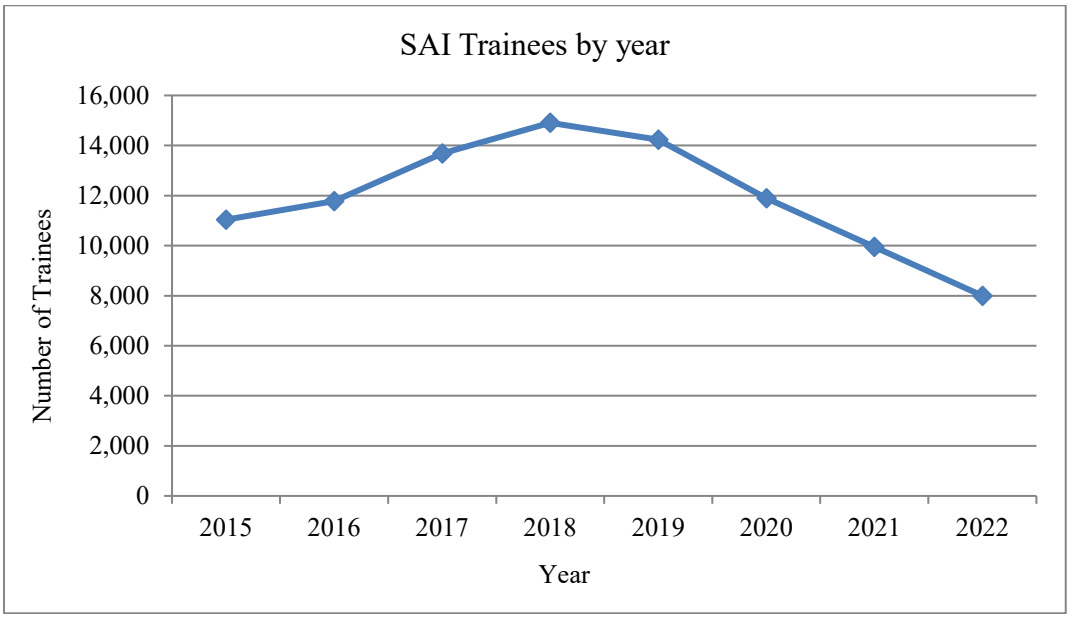

Fig. 7 Trend analysis of SAI Trainees (number of people enrolled) by the Year (2015 to 2022)

Initially, 2015 to 2016 saw a gradual increase in the number of SAI trainees, as evident in Figure 7 above, likely due to emphasis on improvements in existing sports infrastructure and coaching quality, specifically for baseline grassroots programs. The 2015-16 SAI Annual Report explicitly suggests this focus, helping attract more athletes to its training centres [49]. This upward trend skyrocketed between 2016 and 2017 as a result of SAI's newly launched Khelo India initiative, designed solely with the purpose of fostering sports culture at the grassroots level to identify talent across diverse regions.

This campaign worked to spread awareness on the benefits of athletic training, thus leading to an accelerated increase in training centres' enrolment [46]. Moreover, the rising digital revolution saw the piloting of technological tools like the National Talent Search Portal, helping identify even more prospective talents [47] and thus increasing trainee enrolment. Further, 2018 marked the peak of SAI trainees, again attributed to Khelo India's successes, but this time through their first edition of the School Games. As previously established, this bolstered sporting enthusiasm in schools nationwide, prompting trainees to enroll in SAI training programs. However, immediately following this peak, the number of trainees dipped considerably in 2019 and 2020, essentially due to the enforcement of a stricter SAI enrolment criterion as a part of their revised athletic development framework [50]. This framework prioritized high-potential, merit-based selection, limiting intake to athletes who met specific performance benchmarks [51].

Simultaneously, the popularity of private coaching academies like JSW Sports Academy bolstered, drawing a portion of elite athletes away from SAI training centres by offering international competition exposure and individualized athlete development programs [52]. Finally, a national lockdown broke in March 2020 due to the COVID-19 pandemic, leading to the number of SAI trainees witnessing a remarkable drop. Even when training programs resumed later on in the Year, COVID SOPs mandated reduced batch sizes and social distancing regulations, preventing the full-scale return of active trainees [28]. This decreasing trend persists till 2022.

4.2. Correlation Analysis

Table 3. Correlation Analysis of Budget, Total Achievements, Trainees for SAI

Variable		Total Achievements	Trainees	Budget
Total Achievements	Correlation (r)	1	0.8	-0.3
	p-value		0.018**	0.465
Trainees	Correlation (r)	0.8	1	-0.54
	p-value	0.018**		0.169
Budget	Correlation (r)	-0.3	-0.54	1
	p-value	0.465	0.169	

*Note: ** indicates p-value < 0.05*

Table 2 represents the correlation analysis between total achievements, number of trainees, and budget allocations. From the same, a statistically significant, positive correlation ($r = 0.80$, $p = 0.018$) is evident between total achievements and trainees, indicating a strong linear relationship. This suggests that higher participation in training is directly associated with improved performance outcomes, thus affirming the critical role of athlete development in increasing sports achievements. Programs like Khelo India have been instrumental in this regard, establishing numerous State Centres of Excellence (KISCEs) across the country to identify and nurture talents from diverse regions and provide them with necessary access to quality coaching and training facilities [53], thereafter leading to improved results on national and international stages.

In contrast, rather counterintuitively, the data suggest a weak negative correlation between total achievements and budget ($r = -0.30$); however, it is not statistically significant ($p = 0.465$). This possibly stems from inconsistencies in year-to-year funding patterns and the absence of traceability of financial input and outcome metrics. The budgets often varied sharply depending on major events or policy shifts, for instance, the SAI budget spiking in 2017-18 [54] after unsatisfactory performances in the 2016 Rio Olympics, only to be cut by ₹52 crores immediately after due to the appointment of a new Sports Minister, Col. Rathore [44], giving more weightage to other programs like Khelo India. As a result, annual comparisons in the budget and its subsequent impact on achievements become unreliable, as finding allocations are often cyclic and delayed, thus investments made in a year may only show results in subsequent years. Moreover, non-monetary factors like administrative restructuring and institutional objectives significantly influence achievements, making it difficult to isolate the impact of the budget alone [1].

Similarly, a moderate negative correlation is observable between the number of trainees and budget; however, that too is statistically insignificant ($r = -0.54$, $p = 0.169$). This may indicate that the funding was not directly channelized towards increasing sports participation, but rather disproportionately focused on infrastructural development or tailored attention specifically towards elite-level programs at the expense of expanding trainee numbers within the country [55]. Furthermore, programmatic shifts like the shift from the centralized SAI-led training to decentralized schemes under Khelo India possible fragmented data collection and reporting regarding the actual number of trainees at grassroots level, with these large inconsistencies and gaps in data [56] thereafter leading to inconclusiveness in the correlation between the number of trainees and budget.

The correlation between funding and achievements for the Australian Institute of Sports (AIS) [10] significantly contrasts with that established above for SAI. A study by Hogan and Norton [10] suggested a significant linear relationship between sports expenditure and total medals won at the Olympics for Australia—a relationship that was mirrored when all medal types were analysed independently as well. This opposes the statistically insignificant correlation between the same variables in India ($r = -0.30$, $p = 0.465$), as reflected in Table 2.

5. Conclusion

India's approach to sports policy and funding allocations has witnessed a visible transformation over the past two decades, with particular attention in recent years to elite athletic development through structured schemes overseen by various autonomous bodies. This paper observes the budgetary changes to these autonomous bodies and whether they have resulted in tangible outcomes on sports achievements and mass participation in India. In doing so, this study aimed to assess the impact of public sports expenditure on grassroots trainee enrolment and performance at national and international stages. Data on year-on-year budget allocations for specific bodies was collected from MYAS Budget Grants, together with the number of trainees and total achievements under SAI, sourced from SAI Annual Reports. Against these metrics, trend analysis was conducted to examine the spending patterns between 2000 and 2023, followed by a Pearson coefficient analysis to determine the strength, direction, and significance of the correlation between budget, achievements, and trainees.

The trends of net budget allocation suggest the government's spending on sports has been highly event-driven and thus reactive rather than following a consistent pattern or strategy. The most notable surges in funding were

linked to major international events. For instance, the budget reached its peak at ₹3,565 crores in 2010-11, aligning with the 2010 Commonwealth Games hosted in Delhi. This was plausibly due to the need to accommodate infrastructure development, athlete training, and logistical preparations in light of the major competition. However, such spikes were immediately followed by periods of declined funding, as FY 2011-12 saw the budget return to ₹1,121 crores, highlighting the one-time circumstantial nature of investment and the lack of a sustained strategy towards funding to aid sports development over time. That said, the overall growth from 2000-01 to 2022-23 still reflects a significant upward trajectory, wherein the net budget allocated rose from ₹260 crores to ₹3,062.60 crores, a staggering 1077.92% increment. Meanwhile, the number of SAI achievements at national and international stages rose as well, going from 564 in 2015 to a thrilling 1,517 medals in 2020. The number of trainees also increased from 11,032 in 2015 to 14,907 in 2018; however, it then dipped back down to 11,897 in 2020 due to COVID-19 regulations. To test whether these trends were statistically directly associated with one another, Pearson correlation analysis was conducted between the three variables: funding, SAI total achievements, and number of trainees. The results revealed that achievements and trainee enrolment formed a strong direct correlation ($p = 0.018$, $r = 0.80$). However, the budget had no statistically significant correlation with either the total achievements ($p = 0.465$) or the number of trainees (p-value 0.169). Therefore, the findings indicate that while expenditure has increased over time, it has not consistently resulted in tangible outcomes through achievements or trainees. This accentuates the crucial takeaway that Indian sports performance and participation are more closely tied with non-budgetary factors like policy reforms, schemes like Khelo India, and talent identification efforts, rather than funding alone.

Policy Implications and Limitations

These findings carry implications for stakeholders across the sports ecosystem. For policymakers, particularly those within the MYAS, the study offers a data-backed evaluation of the current sports funding strategy to assess its effectiveness. It highlights the need for a shift away from event-driven, reactive allocations toward a more consistent and progressive funding framework. Moreover, the analysis points to a lack of ground-level invigilation in how funds are distributed and utilised, suggesting that without robust monitoring systems, even increased allocations may fail to translate into tangible outcomes. Simultaneously, this study is deemed valuable to Indian researchers and sports economists as well, who can build upon the established model to further evaluate the outcomes of public expenditure on either specific sports or regions in India. By breaking down budgetary allocations and correlating them with performance and participation indicators at a sport-specific or state-specific level, researchers can uncover more detailed insights into how funding has helped or failed to shape sports development within India.

However, the study faces certain limitations. Firstly, due to the lack of consolidated data across all national, international, and grassroots competitions, SAI data was used as a proxy for total achievements and the number of trainees, only representing a subset of India's broader sporting ecosystem. Even within SAI, however, consistent data were available only from 2015 to 2020, resulting in a small sample size, a factor that furthered the limitation by restricting the use of regression analysis. A regression may have yielded more precise results by incorporating the predictive power of funding as compared to correlation analysis. This is since it would not only indicate strength, direction, and significance of a relationship, but would also provide an equation that could be used to predict trends in one variable based on another; however, it required a broader dataset of achievements and trainees. Secondly, the use of Pearson correlation limits the analysis to linear relationships, potentially overlooking non-linear or rank-based relationships between funding, performance, and participation that could have been captured through alternative methods like the Spearman rank coefficient. Despite these limitations, however, the study offers a meaningful step toward understanding the dynamic between sports budget allocation and athletic outcomes in India, having effectively employed a data-backed approach to model the correlation between sports funding, performance, and participation.

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