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## Assessing the reliability of a self-structured questionnaire for analysing university sports governance and structure in India

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### Abstract

The purpose of this study was to assess the reliability of a self-structured questionnaire developed to analyze the governance and structure of university sports in India. The questionnaire comprised 46 items across seven domains, including governance, competition structure, resource mobilization, financial considerations, sports ecosystem, scientific support, and promotion of AIU sports. Reliability testing was conducted using Cronbach's alpha to evaluate the internal consistency of the instrument. The analysis, performed on a sample of 32 sports directors from universities across India, yielded a Cronbach's alpha coefficient of 0.885, indicating good reliability.

The results demonstrate that the questionnaire is a robust and reliable tool for measuring key constructs related to university sports governance and management. While most items contributed positively to the overall reliability, a few items with lower corrected item-total correlations highlight opportunities for future refinement. As the university sports structure in India is evolving and undergoing modifications, this tool reflects the present state of governance and management and is best suited for application in the current context.

This study underscores the importance of combining statistical rigor with expert judgment in the iterative development of research instruments. The findings provide a validated tool to support evidence-based decision-making and strategic interventions aimed at improving university sports governance in India. Future research should focus on validating the questionnaire across larger and more diverse samples to further enhance its generalizability and applicability.

**Keywords:** Reliability analysis, Indian university sports, Cronbach alpha, internal consistency, sports management, questionnaire development

### Introduction

Reliability in survey instruments refers to the degree of consistency with which an instrument measures a construct across different administrations and contexts. It ensures that the results are stable and free from random errors, providing confidence that observed variations in responses reflect actual differences among individuals rather than inconsistencies in measurement. Litwin (1995) <sup>[1]</sup> defines reliability as the extent to which survey responses are repeatable under similar conditions, emphasizing that it is not a single attribute but a combination of several types of consistencies, such as test-retest reliability, internal consistency, and inter-rater reliability.

Nunnally and Bernstein (1978) <sup>[3]</sup> describe reliability through the lens of classical test theory, defining it as the proportion of observed variance attributable to the true score variance. This conceptualization highlights that reliability is a measure of error minimization, where a reliable instrument effectively captures the intended construct with minimal influence from random fluctuations. They also argue that internal consistency, often quantified using Cronbach's alpha, is a critical aspect of reliability, particularly for multi-item scales.

According to Saris and Gallhofer (2007) <sup>[6]</sup>, reliability is the capacity of a measurement tool to consistently capture the intended information across different settings. They stress that achieving reliability involves reducing measurement errors through careful design and refinement of survey items. Saris and Gallhofer further note that internal consistency plays a pivotal role in determining how well individual items on a survey align to collectively measure the same construct.

The importance of reliability lies in its role as a cornerstone of measurement quality in survey research. Reliable instruments ensure that the data collected are consistent and stable over time, enhancing the credibility of findings. According to Taherdoost (2016) <sup>[18]</sup>, reliability is critical for ensuring the precision of research outcomes, as it minimizes random errors that can distort interpretations. A reliable tool provides confidence that observed variations in responses are genuine and reflective of the constructs being measured, rather than artifacts of measurement inconsistencies.

Taber (2017) <sup>[17]</sup> emphasizes that reliability, particularly internal consistency reliability, is vital for instruments comprising multiple items intended to measure a single construct. He argues that without sufficient reliability, the instrument's ability to capture coherent and meaningful data is compromised, rendering subsequent analyses and conclusions invalid. Furthermore, Taber highlights that internal consistency reliability, often measured using Cronbach's alpha, is a widely accepted metric in educational and social science research for verifying whether survey items are effectively aligned to the intended construct.

Mohajan (2017) <sup>[12]</sup> underscores the broader implications of reliability for the overall integrity of research. He explains that unreliable instruments can lead to inconsistent findings, reducing the study's ability to be replicated or generalized. By achieving high reliability, researchers can ensure that their instruments are dependable tools for capturing data, thereby fostering trust in the results. Mohajan also points out that reliability is not merely a statistical attribute but a fundamental requirement for robust and ethical research practices.

### The Need for Restructuring University Sports Governance in India

The governance and management of university sports in India face significant challenges due to the complexity and diversity of the nation's higher education system. Despite the recognition of sports as an integral component of university activities, the development of a cohesive framework for promoting athletic excellence remains an ongoing challenge. Limited coordination between central, state, and institutional bodies has contributed to inefficiencies in resource utilization and program implementation, impacting the growth of university sports.

Fragmented efforts in governance have often resulted in disparities in the quality of sports infrastructure and the effectiveness of athletic programs. Additionally, while universities are expected to nurture athletic talent, there is a lack of systematic mechanisms to channel athletes into national and international platforms. This highlights the need for a comprehensive review of existing systems to ensure that governance structures are responsive to the evolving demands of sports management.

To address these challenges, there is an urgent need for a detailed analysis of the current university sports structure and its governance practices. This will provide critical insights into areas that require strengthening and help in formulating strategies for an optimized and sustainable sports framework.

To contribute to this endeavor, a self-structured questionnaire has been developed to evaluate the governance and structural aspects of university sports in India. This instrument focuses on gathering comprehensive feedback from sports directors across universities nationwide, covering areas such as governance frameworks, resource management, and program effectiveness. By analyzing these responses, the study aims to

provide actionable recommendations for restructuring and enhancing university sports governance and operations.

The present paper focuses on assessing the reliability of the self-structured questionnaire. Establishing reliability through Cronbach's alpha is a critical step in ensuring that the instrument is both consistent and dependable for broader application in analyzing university sports governance and structure in India (Bhattacharyya, 2018) <sup>[4]</sup>.

### Methodology

#### Instrument Development: Initial Design

The initial questionnaire was developed through an extensive literature review and focus group discussions with experts in the field of sports management and governance. This approach ensured that the instrument addressed the key aspects necessary to analyze the university sports structure in India comprehensively. A total of 57 items were initially created, categorized into seven distinct domains that were identified as critical to the effective functioning of sports organizations.

#### These domains included

- 1. Sports Governance:** Examining decision-making processes, organizational frameworks, and administrative mechanisms.
- 2. Competition Structure:** Assessing the organization, format, and regulations of university-level competitions.
- 3. Resource Mobilization and Infrastructure Sustainability:** Evaluating the availability, allocation, and sustainability of resources and sports infrastructure.
- 4. Financial Considerations:** Analyzing financial management practices, including funding mechanisms and budget allocations.
- 5. Sports Ecosystem:** Understanding the collaboration between stakeholders and their collective role in promoting university sports.
- 6. Scientific Support and Research:** Assessing the integration of sports science and research in enhancing athlete performance and program effectiveness.
- 7. Promotion of AIU Sports:** Evaluating efforts to enhance the visibility and engagement of Association of Indian Universities (AIU) sports events.

These domains were selected based on their significance in the governance and management of any sports organization, making them highly relevant for the analysis of university sports in India. The questionnaire was designed to capture both qualitative and quantitative insights across these critical areas.

#### Content Validity

The content validity of the questionnaire was evaluated using the Lawshe Content Validity Ratio (CVR) method, a widely accepted approach to determine the essentiality of items in an instrument based on expert judgment (Lawshe, 1975) <sup>[9]</sup>. For this study, 57 items categorized under seven domains were assessed by a panel of 8 experts in the field of sports management and governance. These domains were selected to comprehensively cover critical aspects of university sports, ensuring the questionnaire's alignment with the research objectives.

Each item was rated by the experts to determine its relevance to the construct being measured. The CVR values were calculated for all items, ranging from -0.50 to 1.00. According to Lawshe's criteria, with 8 experts, a minimum CVR value of

0.75 is required for an item to be considered essential (Ayre & Scally, 2014)<sup>[3]</sup>. Based on this threshold, 17 items with CVR values below 0.75 were identified for removal from the instrument. However, after careful consideration, 6 of these items were retained as the researcher deemed them essential for addressing specific dimensions critical to the study's objectives. This decision was made to preserve the comprehensiveness and theoretical relevance of the instrument, ensuring it adequately covered all necessary domains.

Additionally, modifications were made to the terminology and language of some items during the face validation process based on expert feedback (Allen *et al.*, 2023)<sup>[2]</sup>. This refinement ensured that the retained items were not only statistically valid but also contextually appropriate and easily comprehensible by the intended respondents. Consequently, the revised questionnaire consisted of 46 items, which were finalized for subsequent reliability analysis.

### Sample Description

The sample for this study consisted of 32 participants, all of whom were sports directors from various universities across India. These individuals were selected purposively due to their significant roles in the management and governance of university sports, ensuring that the data collected were relevant and directly aligned with the study's objectives.

A sample size of 32 was deemed appropriate for conducting the reliability analysis using Cronbach's alpha. Research has established that a sample size of 30 or more is generally acceptable for reliability testing, providing sufficient precision in estimating internal consistency. Smaller sample sizes, such as 30-50 participants, are considered suitable when the characteristics of the data align with the assumptions of reliability analysis (Yurdugül, 2008)<sup>[19]</sup>. Furthermore, Bonett (2014)<sup>[5]</sup> emphasizes that the adequacy of a sample size depends on the desired precision and the data structure, which were carefully considered in this study.

The sample size not only meets the recommended threshold for reliability analysis but also ensures practical feasibility within the constraints of the research. The sports directors' expertise and direct involvement in university sports governance add to the validity and depth of the insights gathered from the questionnaire.

### Sampling Method

In this study, a purposive sampling method was employed to select participants. Purposive sampling, also known as judgmental or selective sampling, is a non-probability sampling technique where the researcher deliberately selects participants based on specific characteristics or expertise relevant to the research objectives. This method is particularly effective when the researcher seeks to gain insights from individuals who have specialized knowledge or experience in the subject area.

The selection of sports directors from various universities across India was intentional, aiming to gather data from individuals directly involved in the governance and management of university sports. Their expertise and firsthand experience were deemed essential for obtaining relevant and insightful data pertinent to the study's aims.

Purposive sampling is widely used in qualitative research where specific information or characteristics are sought from the sample to address the research objectives. This method allows researchers to focus on particular aspects of a phenomenon, ensuring that the sample is well-suited to

provide the necessary information (Rai, n.d.).

By utilizing purposive sampling, the study ensured that the selected participants possessed the requisite knowledge and experience to provide meaningful contributions, thereby enhancing the validity and relevance of the research findings.

### Data Collection Process

The data collection for this study was conducted using a mixed-mode approach, combining both online and in-person methods to enhance response rates and data quality.

### Online Administration

An online version of the questionnaire was created using Google Forms, a widely accessible and user-friendly platform. The online survey was distributed via email to the selected sports directors, providing them with the convenience to complete the questionnaire at their preferred time and location. This method is recognized for its cost-effectiveness and ability to reach a broad audience efficiently. Regmi *et al.* (2016) highlight that online surveys can collect large amounts of data in a short time frame and are feasible for reaching participants who may be geographically dispersed.

### In-Person Administration

To complement the online distribution and address potential limitations such as varying levels of internet accessibility or preferences for face-to-face interaction, in-person data collection was also conducted. This involved visiting universities and administering the questionnaire directly to sports directors who were available and willing to participate on-site. In-person surveys can enhance data quality, as interviewers can assist with clarifications and ensure that the questionnaire is completed accurately.

### Rationale for Mixed-Mode Approach

Employing a mixed-mode data collection strategy leverages the strengths of both online and in-person methods. This approach aims to improve response rates by accommodating the preferences and accessibility of different participants, thereby enhancing the representativeness and comprehensiveness of the collected data. Mixed-mode surveys are effective in reducing nonresponse bias and can lead to more accurate and generalizable findings (Leeuw, 2010)<sup>[10]</sup>.

By utilizing both online and in-person data collection methods, the study ensured flexibility and inclusivity, facilitating the participation of a diverse group of sports directors across various universities in India.

### Reliability Testing

The reliability of the self-structured questionnaire was assessed using Cronbach's alpha, a widely accepted measure for evaluating the internal consistency of items within a scale. Cronbach's alpha determines the extent to which items in a questionnaire are interrelated, reflecting their ability to collectively measure a single construct. The coefficient ranges from 0 to 1, with higher values indicating stronger reliability (Nunnally, 1978)<sup>[13]</sup>.

The analysis was conducted using SPSS software, a standard tool in social sciences for statistical computations. SPSS facilitates the efficient calculation of Cronbach's alpha and supports the identification of items that may not align well with the overall scale. This allows researchers to refine the instrument to enhance its reliability and validity.

The interpretation of Cronbach's alpha values adheres to

commonly established thresholds:

- **Above 0.9:** Excellent reliability
- **0.8 - 0.9:** Good reliability
- **0.7 - 0.8:** Acceptable reliability
- **0.6 - 0.7:** Questionable reliability
- **Below 0.6:** Poor reliability.

Reliability testing is an essential step in ensuring that the questionnaire consistently captures the intended constructs, providing confidence in its dependability for future application (Gliem & Gliem, 2003)<sup>[6]</sup>.

## Results

The reliability analysis of the self-structured questionnaire

was conducted to evaluate its internal consistency, ensuring that the instrument effectively captures the intended constructs. Cronbach's alpha was employed as the reliability measure, as it is widely used for assessing the interrelatedness of items within a scale. The analysis was performed using SPSS software on the final set of 46 items across the seven domains of the questionnaire.

The following table presents the Cronbach's alpha values for the overall questionnaire and each individual domain, reflecting the internal consistency reliability of the instrument.

**Table 1:** Reliability Statistics

Cronbach's Alpha	N of Items
.885	46

**Table 2:** Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1	179.50	342.839	-.049	.890
Item 2	178.31	334.028	.159	.886
Item 3	179.00	333.871	.123	.888
Item 4	178.25	327.355	.287	.884
Item 5	178.06	331.738	.407	.882
Item 6	178.31	326.609	.426	.881
Item 7	177.81	333.125	.286	.883
Item 8	179.41	333.346	.192	.885
Item 9	178.56	328.577	.282	.884
Item 10	179.00	329.935	.206	.886
Item 11	179.13	325.532	.332	.883
Item 12	178.41	319.733	.582	.879
Item 13	177.91	324.797	.465	.881
Item 14	178.06	327.931	.404	.882
Item 15	179.97	342.031	-.027	.889
Item 16	178.16	337.039	.114	.886
Item 17	178.66	320.555	.433	.881
Item 18	178.16	327.814	.468	.881
Item 19	178.00	319.613	.710	.878
Item 20	178.13	326.823	.522	.880
Item 21	178.06	325.673	.578	.880
Item 22	179.13	333.403	.136	.887
Item 23	178.22	331.209	.255	.884
Item 24	179.91	329.959	.293	.883
Item 25	178.03	330.547	.418	.882
Item 26	178.28	334.015	.168	.885
Item 27	178.44	328.706	.266	.884
Item 28	178.00	328.194	.447	.881
Item 29	177.97	332.225	.370	.882
Item 30	177.75	330.968	.480	.881
Item 31	178.44	325.673	.397	.882
Item 32	178.63	318.887	.484	.880
Item 33	178.19	326.286	.532	.880
Item 34	178.03	324.676	.521	.880
Item 35	178.44	320.190	.561	.879
Item 36	178.16	324.330	.561	.880
Item 37	178.03	319.967	.542	.879
Item 38	177.69	330.480	.565	.881
Item 39	177.84	323.362	.597	.879
Item 40	177.66	328.878	.592	.881
Item 41	177.59	329.668	.525	.881
Item 42	178.00	325.419	.608	.880
Item 43	178.72	326.080	.288	.884
Item 44	178.06	321.996	.588	.879
Item 45	178.38	324.887	.522	.880
Item 46	177.66	332.039	.494	.882

The reliability analysis of the 46-item questionnaire was performed using Cronbach's alpha to evaluate the internal consistency of the instrument. The analysis yielded an overall

Cronbach's alpha coefficient of 0.885, indicating good reliability. This suggests that the questionnaire items are sufficiently interrelated and capable of consistently measuring

the intended constructs.

The reliability of individual items was further assessed using item-total statistics, which included the corrected item-total correlation and the Cronbach's alpha value if an item were deleted. The corrected item-total correlation values ranged from -0.049 to 0.710, with the majority of items demonstrating positive correlations, signifying their contribution to the scale's overall consistency.

Additionally, the Cronbach's alpha values, if an item were deleted, ranged from 0.878 to 0.890, indicating that no single item substantially reduced the internal consistency of the scale. These results support the robustness of the instrument and affirm its reliability for further application in the study of university sports governance and structure in India.

## Discussion

The reliability analysis of the self-structured questionnaire yielded a Cronbach's alpha coefficient of 0.885, indicating good internal consistency. This finding aligns with established guidelines suggesting that alpha values between 0.8 and 0.9 denote good reliability (Ahmad *et al.*, 2024) <sup>[1]</sup>. Such a high level of internal consistency suggests that the questionnaire items are cohesively measuring the intended constructs related to university sports governance and management.

The corrected item-total correlation values ranged from -0.049 to 0.710. While most items exhibited positive correlations, a few items showed lower or negative correlations, indicating potential areas for refinement. Items with low or negative item-total correlations may not align well with the overall scale and could be candidates for revision or removal to enhance the instrument's reliability (Kimberlin & Winterstein, 2008) <sup>[8]</sup>.

The analysis also revealed that the Cronbach's alpha values, if an item were deleted, ranged from 0.878 to 0.890. This minimal fluctuation suggests that no single item significantly detracted from the overall reliability of the scale. Such findings support the robustness of the questionnaire, indicating that the instrument is well-constructed and that each item contributes meaningfully to the measurement of the intended constructs (Raykov, 2008) <sup>[15]</sup>.

These results underscore the effectiveness of the questionnaire in capturing nuanced aspects of university sports governance and structure in India. The high internal consistency achieved suggests that the instrument can reliably gather data pertinent to the study's objectives. However, the presence of items with lower item-total correlations highlights the need for ongoing evaluation and refinement of the questionnaire to ensure its continued effectiveness.

In conclusion, the findings contribute to the broader discourse on the development of reliable instruments in sports management research. They emphasize the importance of rigorous reliability testing and the iterative process of questionnaire refinement to achieve a robust measurement tool. Future research may focus on further validation of the questionnaire across diverse populations and settings to enhance its generalizability and applicability.

## Conclusion

This study aimed to establish the reliability of a self-structured questionnaire designed to analyze the governance and structure of university sports in India. The reliability testing, conducted using Cronbach's alpha, demonstrated good internal consistency, with a coefficient of 0.885 for the 46-item instrument. This finding underscores the robustness of the questionnaire and its ability to consistently measure

constructs across multiple domains, including governance, competition structure, resource mobilization, and sports promotion.

The results validate the instrument's suitability for application in research focused on university sports management. While most items contributed positively to the overall reliability, a few items exhibited lower corrected item-total correlations, indicating potential areas for refinement. Such iterative evaluations are essential in developing comprehensive and reliable research tools.

As the university sports structure in India is currently evolving and undergoing modifications, this tool reflects the present state of governance and management and is most applicable in its current context. Its design is aligned with the existing challenges and opportunities within university sports, making it a valuable instrument for understanding and addressing contemporary issues.

The study highlights the importance of combining statistical rigor with theoretical and practical considerations in the instrument development process. By ensuring the reliability of the questionnaire, this research provides a dependable tool for gathering insights into the challenges and opportunities within university sports governance and management in India. Future research could focus on further validation of the instrument across larger and more diverse samples to enhance its generalizability and applicability.

This reliable tool serves as a foundation for evidence-based recommendations, paving the way for informed decision-making and strategic interventions aimed at improving university sports in India.

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