

Advancing sustainability governance in major sport events: Development and validation of a theory-driven semi-structured interview instrument

JORGE ABRANTES¹, HUGO ÂNGELO², MÁRIO PEREIRA³, GONÇALO DIAS⁴, RAUL A. MARTINS⁵

^{1,2,3,5} Faculty of Sport Sciences and Physical Education, Univ Coimbra, PORTUGAL

^{4,5} Interdisciplinary Center for the Study of Human Performance (CIPER), Univ Coimbra, PORTUGAL

⁴ Polytechnic Institute of Coimbra, Coimbra Education School, PORTUGAL

^{3,4} SPRINT - Sport Physical Activity and Health Research & Innovation cenTer (UID/06185/2023),
PORTUGAL

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Abstract

The increasing integration of sustainability principles into sport governance requires empirically robust assessment instruments capable of capturing how sustainability is operationalised in major sporting events. Understanding how sustainability is translated into policy decisions and governance practices has become increasingly relevant for sports management researchers and practitioners. This study aimed to develop and validate a semi-structured interview script designed to examine government policies within the scope of sustainability. The instrument is based on the triple bottom line (TBL) framework and relevant policy concerning sustainability in sports, ensuring a wide-ranging approach aligned with policy priorities in contemporary sport governance. A sequential design was adopted that combined theoretical development, expert content validation, and pilot testing. Nine experts assessed content validity using Aiken's V coefficient and 95% confidence intervals, supporting objective decisions on item retention and refinement. To improve clarity and relevance, the design also incorporated qualitative feedback. The second script version, comprising 118 items, was subsequently pilot tested with organisers of international sporting events to assess its practical applicability. A structured coding framework was applied to evaluate question clarity, contextual relevance, and analytical performance. The results indicated strong content validity, multidimensional coverage, and operational applicability. No evidence of conceptual misalignment or interpretative ambiguity emerged during the pilot phase, thus supporting the instrument's internal coherence and practical utility. The final validated interview script comprised 58 primary questions structured across 10 thematic sections, each supported by follow-up prompts to enhance analytical depth and flexibility in data collection. By combining statistical validation with qualitative testing, this study provides an objective, reliable, and replicable tool for advancing research on sustainability implementation in sport governance policies. Furthermore, the protocol offers practical value for policymakers and event organisers seeking to systematically assess and enhance sustainability practices in major sporting contexts.

Keywords: sustainability, sporting event management; semi-structured interview, content validation, sustainable development goals.

Introduction

For those responsible for organising major sporting events, sustainability has shifted from a peripheral concern to a strategic priority, given the environmental, social, and economic impacts associated with large-scale sporting activities. Major sporting events generate complex legacies that extend beyond economic returns, influencing urban development, environmental management, social cohesion, and long-term governance structures (Mallen & Chard, 2012; Smith, 2009). As stakeholder expectations for sustainability increase, sports organisations are more often required to ensure that their events incorporate structured sustainability strategies (Babiak & Trendafilova, 2011; McCullough et al., 2020; Moon et al., 2022).

The global political context has further intensified this shift, with the United Nations 2030 Agenda for Sustainable Development establishing an integrated framework of Sustainable Development Goals (SDGs) and encouraging cross-sectoral contributions from the sports industry (International Olympic Committee [IOC], 2017; Lindsey & Chapman, 2017; United Nations [UN], 2015). At the European level, policies such as the European Green Deal and specific sport sustainability initiatives emphasise the advancement of environmental responsibility, resource efficiency, and climate action in sport events (European Commission [EC], 2023). These frameworks establish sporting events not only as entertainment products but also as potential catalysts for sustainable transformation (Broman & Robèrt, 2017; International Organization for Standardization [ISO], 2012; Jones, 2014).

Despite this growing institutional commitment, the implementation of sustainability in major events remains highly heterogeneous (McCullough et al., 2020; Moon et al., 2022). Event organisers operate in complex environments characterised by multiple stakeholders, competing priorities, financial constraints, and varying regulatory requirements (Geeraert, 2018). Consequently, sustainability commitments expressed in strategic documents are not always translated into operational practices or governance mechanisms. This creates important challenges for researchers seeking to understand how sustainability is effectively integrated into event planning, management, and evaluation processes.

From a practical perspective, the absence of consistent assessment approaches limits the ability of sport organisations to identify strengths, weaknesses, and opportunities for improvement in their sustainability strategies. It also constrains evidence-based decision-making and reduces the comparability of sustainability practices across different events, sports, and organisational contexts. As sustainability concerns continue to increase among governments, sponsors, local communities, and international sports bodies, the development of robust evaluation tools becomes increasingly necessary (Creswell & Poth, 2018; Hugaerts et al., 2021).

Although research on sustainability in sporting events has expanded significantly over the past decade, the field remains theoretically fragmented, methodologically inconsistent, and empirically under-instrumented, thus limiting the consolidation of cumulative knowledge. Bibliometric analyses have revealed rapid growth in publications but limited theoretical consolidation (González-Serrano et al., 2020). Empirical studies have continued to focus predominantly on environmental performance indicators, such as carbon management and resource efficiency, particularly in mega-events (McCullough et al., 2020), often overlooking broader governance and strategic dimensions. While some conceptual work emphasised the multidimensional nature of sustainability in sporting events (Mallen & Chard, 2012; Smith, 2009), this integrated approach is not consistently reflected in empirical research.

Thus, recent systematic reviews have highlighted persistent conceptual ambiguity, fragmented theoretical integration, and substantial methodological heterogeneity within sustainability research in sports events, which collectively constrain theoretical advancement (Ulloa-Hernández et al., 2023). While structured frameworks and management standards have emerged (ISO, 2012), academic enquiry has not yet fully analysed how sustainability principles are embedded within organisational governance and strategic decision-making. Existing instrument-development efforts in sporting event sustainability represent important advances (Hugaerts et al., 2021); however, comprehensive, theoretically integrated approaches to sustainability governance in major sporting events remain limited (IOC, 2017).

Although several studies have examined sustainability initiatives in sporting events, much of this evidence has focused on measuring specific outcomes or evaluating isolated dimensions of sustainability (Moon et al., 2022; Ulloa-Hernández et al., 2023). Comparatively less attention has been given to the governance processes through which sustainability objectives are defined, implemented, and monitored. Accordingly, there remains a limited understanding of how decision-makers interpret sustainability priorities and translate them into organisational policies and strategic actions (Geeraert, 2018; IOC, 2017). This knowledge gap is particularly relevant because governance structures influence both the effectiveness of sustainability initiatives and their long-term continuity. Understanding these processes requires methodological approaches capable of capturing organisational experiences, managerial perspectives, and contextual factors that are often difficult to assess through quantitative measures alone (Creswell & Poth, 2018; Kallio et al., 2016).

In response to this conceptual fragmentation, research approaches are needed, and qualitative research is particularly suited to exploring complex, context-dependent phenomena (Creswell & Poth, 2018). Among qualitative strategies, semi-structured interviews provide a balance between theoretical alignment and analytical flexibility, allowing researchers to examine how stakeholders interpret and operationalise sustainability principles (Kallio et al., 2016). Recent studies have developed research instruments to assess the dimensions of sustainability in sports contexts (Hugaerts et al., 2021) and to explore strategic sustainable development in sports organisations (Glibo et al., 2022). Nevertheless, there remains a limited availability of rigorously constructed, theoretically integrated interview scripts specifically designed to examine sustainability governance in major events.

Instrument development in qualitative research requires systematic procedures to ensure credibility, transparency, and content validity. Content validation methods, including structured expert reviews and statistical indices, such as Aiken's V, have been recommended to strengthen alignment between theoretical constructs and empirical indicators (Boateng et al., 2018; Lynn, 1986; Penfield & Giacobbi, 2004). Combining expert-based evaluation with pilot testing enhances construct representativeness and practical applicability, thus reducing ambiguity and improving clarity.

The development of a validated qualitative instrument may provide significant benefits for research and practice (Boateng et al., 2018). It offers researchers a structured framework for collecting comparable evidence across various sporting events and organisational settings (Hugaerts et al., 2021). Furthermore, an available, theoretically grounded interview script could enhance transparency in qualitative investigations and promote greater methodological consistency in future studies. By supporting systematic data collection, such instruments can contribute to the accumulation of empirical knowledge and strengthen the evidence base available to organisations seeking to advance sustainability objectives in sports (Glibo et al., 2022; IOC, 2017).

Therefore, there is a clear need for a theoretically grounded, methodologically validated qualitative instrument capable of systematically examining the governance of sustainability in major sporting events. To fill this gap, this study aimed to develop and rigorously validate a theoretically grounded qualitative instrument capable of systematically capturing how sustainability governance is conceptualised, operationalised, and evaluated. Furthermore, by integrating theoretical frameworks, expert-based statistical validation, and empirical pilot tests, this study sought to contribute a transparent, replicable qualitative measurement tool for research on sustainability in sports management.

Material & methods

After the interview script development, researchers with expertise in qualitative research on the analysed topic submitted the content for validation (Boateng et al., 2018; Lynn, 1986; Penfield & Giacobbi, 2004). The Scientific Council (05/02/2025) and the Ethics Committee of the Faculty of Sport Sciences and Physical Education of the University of Coimbra (CE/FCDEF-UC/00192024) approved this research. All participants were informed about the study's objectives and procedures and provided their informed consent. To ensure confidentiality and anonymity, any identifying information was removed from the collected data.

Once developed, the interview script underwent a two-phase development process. The first phase involved a panel of sustainability experts associated with sports and specialists in qualitative instrument validation. These experts assessed the script's intelligibility, correctness, and relevance, leading to an initial reformulation of the script (Elangovan, 2021; Glibo et al., 2022). The second phase consisted of conducting interviews with organisers of sporting events in a pilot-test model to assess the appropriateness of the topics addressed, as well as the clarity, coherence, and structural fluidity of the interview, to obtain the final version of the semi-structured interview script (Adams, 2015).

Protocol and Registration

The study protocol and supporting materials were deposited in the Open Science Framework (OSF) on 17 January 2026 and are publicly accessible at the following link: <https://doi.org/10.17605/OSF.IO/M7GHW>. The OSF repository includes the initial version of the semi-structured interview script, the informed consent forms (Portuguese and English versions), and a detailed description of the expert validation procedure. It also specifies the predefined criteria for item evaluation, including the cut-off thresholds for Aiken's V and the interpretation of the corresponding 95% confidence intervals (Aiken, 1980). This registration aimed to ensure transparency in the instrument's development and validation process by documenting the materials and methodological procedures adopted for the study.

Script

The script structure was grounded in established theoretical frameworks on sustainability, namely, John Elkington's triple bottom line (TBL) concept (Elkington, 1997). The TBL framework conceptualises sustainability as the balanced integration of social, economic, and environmental dimensions and has been widely applied in organisational and sporting events management research as a multidimensional approach to a sustainable performance assessment context. The TBL perspective was complemented with policy-oriented decisions specific to sport, notably the environmental sustainability goals highlighted in the Green Sport in Europe script (EC, 2023), which identifies SDGs 6, 7, 9, 11, 12, 13, 14, and 15 as particularly relevant to the environmental management of sporting events (UN, 2015).

The interview questions followed methodological recommendations for semi-structured interviews, distinguishing between Grand Tour questions (broad introductory questions), core questions (directly related to the research objectives and organised in a progressive, logical manner), follow-up questions (used to clarify or add detail to responses), and unplanned follow-up questions (emerging during the interaction based on the interviewee's answers) (DeJonckheere & Vaughn, 2019; Kallio et al., 2016). Special emphasis was placed on clarity, conceptual precision, and the avoidance of ambiguity or double meaning.

The script's theoretical and structural development was guided by existing literature addressing sustainability in sporting events, organisational governance, and qualitative interviewing techniques (Creswell & Poth, 2018; Harrell & Bradley, 2009). This process resulted in a structured sequence of items organised into the following categories of analysis: A – interviewee, B – event, C – spectators, D – event sustainability, D.1. – areas of action, D.1.A. – social, D.1.B. – environmental, D.1.C. – financial, D.1.D. – sports, E – commitment to sustainability, and F – miscellaneous. A set of items was developed for each category to comprehensively capture the interviewees' perceptions, practices, and strategic approaches to sustainability in the context of major sporting events. These initial analytical items underwent structural consolidation during the pilot refinement phase, resulting in fewer primary questions in the final version.

Methods (first phase)

The first phase of expert evaluation comprised submitting the preliminary interview script for critical analysis by experts external to the research team. This evaluation allowed for the verification of the adequacy and comprehensiveness of the script's content in relation to the study's objectives and themes. It also allowed for inquiries into the questions' relevance and provided significant guidance on how to formulate and organise them (Kallio et al., 2016; Lynn, 1986).

This procedure, which involved experts in sustainability associated with sports and experts in validating qualitative instruments, was implemented as follows:

a) Specialists were contacted to present the study and send the script with respective instructions, along with the informed consent form.

b) Follow-up contact was made, first by email and then by phone, when there was no response.

c) Qualitative analysis of the replies and the calculation of Aiken's V were performed, and corresponding confidence intervals were estimated using the method proposed by Penfield and Giacobbi (Aiken, 1980; Penfield & Giacobbi, 2004).

d) The script was revised based on the analyses, indicating eliminated, reformulated, or added items.

A 5-point Likert scale (1 = not at all adequate - 5 = totally adequate) applied question by question was used to analyse the script. An open-response section was included at the end of each part, allowing experts to recommend changes, make observations, or express opinions on the topics covered. These responses allowed for qualitative feedback and ensured the adequacy and clarity of each question, minimising ambiguities and offering suggestions on how to improve wording and harmonisation (Boateng et al., 2018; Descamps et al., 2025; Elangovan, 2021). Using this validation scale, the experts assessed 10 different categories that emerged from the bibliographic review of the scientific literature. The script comprised 149 items and sub-items, including 28 related to identification data (interviewee, event, and spectators).

To enhance the statistical interpretation of the collected data, Aiken's V coefficient was calculated for each item, given that it is particularly suitable for assessing content validity in ordinal rating scales and provides a robust estimate of expert agreement compared to alternative indices, such as the content validity index:

Equation (1)

$$V = \frac{\bar{X} - l_0}{c}$$

where $\bar{X}$ is the mean of the experts' ratings, l_0 is the lowest possible score (1 in this case), and c represents the range of the rating scale (highest minus lowest score), corresponding to 4 in the present study (5 - 1). Confidence intervals for Aiken's V were estimated using the score method proposed by Penfield and Giacobbi, which provides improved accuracy in interval estimation (Merino-Soto & Livia Segovia, 2009; Penfield & Giacobbi, 2004). This combined framework allowed for applying an objective criterion based on predefined Aiken's V thresholds while incorporating an estimation of coefficient precision through confidence interval analysis (Saldaña, 2016). The equations for the lower (L) and upper (U) confidence limits were as follows:

Equation (2)

$$L = \frac{2nV^2 - z\sqrt{z^2 - 4nV(1-V)}}{2(n-1)}$$

Equation (3)

$$U = \frac{2nV^2 - z\sqrt{z^2 - 4nV(1-V)}}{2(n-1)}$$

where L is the lower bound and U the upper bound, n is the number of experts, V is Aiken's coefficient of content validity, and z is the standard normal deviate associated with the selected confidence level. In the present study, a 95% confidence level was adopted ($z = 1.96$). For interpretation purposes, the lower confidence limit was considered satisfactory when ≥ 0.70 , in accordance with recommendations in the literature, thus acknowledging that interval width is influenced by sample size (Penfield & Giacobbi, 2004).

Experts

Given that statistical generalisation was not the goal of this research stage, experts were selected through purposive sampling to ensure epistemic alignment between domain-specific expertise and construct representation in accordance with best practices in qualitative instrument validation (Patton, 2015). This selection process ensured that their professional experience was linked to sustainability, diversity of functions and responsibilities, and representation from various entities. Experts were sought who, in their name or on behalf of the entities to which they were linked, represented the following: central or local government, non-governmental organisations, companies, higher education institutions, and international sports associations.

Validation was conducted using a panel of sustainability experts associated with sports and specialists in qualitative research instruments. The intended validation combined content, for which experts analysed clarity, relevance, comprehensiveness, and redundancy, with form, for which they assessed comprehensibility and language adequacy (Boateng et al., 2018; Lynn, 1986). Our research indicated that the literature did not specify a recommended number of experts to be consulted, with studies showing panels composed of 3–20 participants. Therefore, efforts were made to obtain responses from the identified groups, aiming for a panel size of between 6 and 12 experts (Lynn, 1986; Polit & Beck, 2006).

The experts involved were contacted by email, and the validation process included the participation of nine experts linked to sustainability and the validation of qualitative research instruments. These experts represented, with some overlap in affiliations (two experts fit in two areas), governmental and municipal entities, non-governmental organisations, companies, higher education institutions, and international sports associations.

Table 1: Areas of the experts involved in the preliminary interview script validation process.

	Central / Local government	Non- governmental organizations	Companies	Higher education institutions	International sports associations
Experts’ Areas	1	3	2	3	2

After this phase, some items were removed, and modifications were made to the formulation and organisation of the questions. Recommendations that the experts provided were incorporated to reduce conceptual ambiguities and strengthen the content validity of the instrument, resulting in a second version of the semi-structured interview script. This revised version was used in the subsequent pilot phase.

Pilot test

The second stage of instrument improvement was conducted as a pilot test with two organisers of international sporting events. This phase was intended to assess the intelligibility, cognitive processing, and practical applicability of the interview questions, functioning as an instrument calibration stage aligned with cognitive interviewing principles that determined whether they effectively raised the intended perceptions aligned with the study objectives (Creswell & Poth, 2018; Kallio et al., 2016).

Based on the pilot application, the clarity and structure of the questions were examined, their operational adequacy was assessed, and the follow-up questions were improved. The pilot test also enabled the assessment of the average duration of each interview session and the appropriateness of the interaction flow between interviewer and interviewee (Kallio et al., 2016; Turner, 2010).

The script was applied to organisers whose professional profiles were comparable to those of the target sample, ensuring contextual relevance. This phase also served to test the technical procedures, including audio and video recording and subsequent transcription and processing in qualitative analysis software, thereby confirming the feasibility of the data management workflow adopted in the study (Creswell & Poth, 2018; Silver & Lewins, 2014).

The semi-structured interviews were conducted individually, and combined open-ended and structured questions. Follow-up questions (e.g., “why” and “how”) were used to clarify responses and encourage elaboration, a practice consistent with established semi-structured interviewing (Adams, 2015).

Methods (second phase)

The semi-structured interviews procedure was implemented by contacting the organisers to present the study and send the informed consent form in advance.

Before the start of each interview, the interviewer clarified the study’s scope and objectives as well as the intended use and dissemination of the information collected. The interviewer also obtained written informed consent from the interviewees. The interviews were conducted face-to-face in a meeting room in Portuguese (the native language of both the interviewer and interviewees).

The start and end times of each session were noted to determine the total duration, which was approximately one hour per interview. Participants were informed that the interviews would be recorded in audio and video formats and fully transcribed for research purposes.

The interviews were initially transcribed verbatim (Creswell & Poth, 2018; Poland, 1995) using the automatic transcription function available in Microsoft Word. Each transcript was subsequently reviewed manually through simultaneous listening to the original recordings to correct transcription inaccuracies and to ensure fidelity to the spoken content (Poland, 1995). A revised version of the transcript was then prepared for qualitative analysis, in which minor disfluencies (e.g., hesitations or repeated words) were removed solely for readability purposes without altering the semantic meaning of the participants’ replies (Kvale & Brinkmann, 2009; Poland, 1995).

Participants

To assess the practical effectiveness of the interview script, a pilot test was conducted with two organisers of international sporting events (Kallio et al., 2016; Van Teijlingen & Hundley, 2001). One interviewee was responsible for a world-level event, and the other for a European-level event, both of whom organised the events under the auspices of their respective international sport federations. In both cases, the participants held senior positions within the organising committees, with direct involvement in management and strategic decision-making processes.

Their functions provided perspectives on the planning of their events and the implementation of sustainability-related policies and practices into them.

Results

The analytical procedures described in Section 3 were applied to generate the several validation outcomes.

The interview script content was examined and validated using Aiken's V coefficient as an index of expert agreement regarding the adequacy of each item. This quantitative indicator provided statistical evidence supporting the validation process of the instrument (Aiken, 1980).

Nine experts were invited to evaluate the initial version of the interview script. Due to occasional missing responses for specific items, the effective number of evaluators (n) varied across items. For each of the 149 items, Aiken's V coefficient was calculated based on the mean rating assigned by the experts and the number of valid responses per item.

Item maintenance was primarily guided by the magnitude of Aiken's V, following thresholds commonly reported (Lynn, 1986; Polit & Beck, 2006) in content validation studies. Items with Aiken's V ≥ 0.80 were retained without modification, items with values between 0.70 and 0.79 were retained and subject to revision, and items with V < 0.70 were removed or substantially reformulated.

To enhance the statistical interpretation of the coefficient and consider the expert panel sampling variability, 95% confidence intervals were calculated using the scoring method proposed by Penfield and Giacobbi (2004). The lower confidence bound was analysed as a complementary indicator of stability and robustness among experts, supporting a more cautious interpretation of borderline values.

When applying these criteria, a high proportion of retained items (n = 75) indicated a strong alignment between the theoretical framework and the operationalised indicators, corroborating the adequacy of the conceptual basis underpinning the instrument.

Removed items (n = 31) predominantly involved requests for detailed operational information (e.g., specific meal composition, exact spectator numbers, or technical aspects of broadcast transmission), as well as instances of conceptual overlap that the experts identified. Items requiring reformulation (n = 43) mainly reflected the need for greater clarity in wording and the broader framing of the requested information.

Table 2: Content validation results (Aiken's V coefficients and 95% confidence intervals).

		Item	n (experts)	Mean rating	Aiken's V coefficient	Lower bound (95% CI)	Upper bound (95% CI)	Decision criterion
A		1.	8	4.50	0.875	0.760	0.990	Retain
		2.	8	4.75	0.938	0.854	1.000	Retain
B		3.	8	5.00	1.000	1.000	1.000	Retain
		4.	9	4.89	0.972	0.919	1.000	Retain
		5.	9	4.22	0.806	0.676	0.935	Retain
		6.	9	3.89	0.722	0.576	0.869	Retain
		7.	9	4.00	0.750	0.609	0.891	Retain
		8.	8	4.75	0.938	0.854	1.000	Retain
		9.	9	4.67	0.917	0.826	1.000	Retain
		10.	8	4.13	0.781	0.638	0.924	Retain
		11.	9	4.22	0.806	0.676	0.935	Retain
		12.	9	4.22	0.806	0.676	0.935	Retain
		13.	9	4.22	0.806	0.676	0.935	Retain
		14.	9	4.22	0.806	0.676	0.935	Retain
		15.	9	4.33	0.833	0.712	0.955	Retain
C		16.	9	4.11	0.778	0.642	0.914	Retain
	17.	17.1.	9	4.44	0.861	0.748	0.974	Retain
		17.1.1.	8	4.13	0.781	0.638	0.924	Retain
			8	3.75	0.688	0.527	0.848	Retain
		17.1.2.	9	4.00	0.750	0.609	0.891	Retain
		17.1.3.	9	3.78	0.694	0.544	0.845	Retain
		17.1.3.1.	8	3.25	0.563	0.391	0.734	Retain
		17.2.	9	4.22	0.806	0.676	0.935	Retain
		17.2.1.	9	3.11	0.528	0.365	0.691	Retain
			9	3.78	0.694	0.544	0.845	Retain
		17.2.2.	9	3.56	0.639	0.482	0.796	Retain
		17.2.3.	9	3.33	0.583	0.422	0.744	Retain
		17.2.3.1.	7	2.86	0.464	0.280	0.649	Retain

		Item	n (experts)	Mean rating	Aiken's V coefficient	Lower bound (95% CI)	Upper bound (95% CI)	Decision criterion
I D	A	18.	9	4.33	0.833	0.712	0.955	Retain
		18.1.	9	3.89	0.722	0.576	0.869	Retain
		19.	9	4.22	0.806	0.676	0.935	Retain
		19.1.	9	4.56	0.889	0.786	0.992	Retain
		19.1.1.	8	4.50	0.875	0.760	0.990	Retain
		19.2.	9	4.56	0.889	0.786	0.992	Retain
		19.2.1.	9	4.56	0.889	0.786	0.992	Retain
		20.	9	4.67	0.917	0.826	1.000	Retain
		21.	9	4.67	0.917	0.826	1.000	Retain
		21.1. 21.1.1.	9	4.00	0.750	0.609	0.891	Retain
		21.1.2.	9	3.33	0.583	0.422	0.744	Retain
		21.1.3.	9	4.11	0.778	0.642	0.914	Retain
		21.1.4.	9	4.00	0.750	0.609	0.891	Retain
		21.1.5.	9	4.11	0.778	0.642	0.914	Retain
		21.1.5.1.	9	4.11	0.778	0.642	0.914	Retain
		21.1.5.2.	9	4.00	0.750	0.609	0.891	Retain
		21.1.5.3.	9	4.11	0.778	0.642	0.914	Retain
I D	A	22.	9	4.67	0.917	0.826	1.000	Retain
		22.1.	9	4.22	0.806	0.676	0.935	Retain
		23.	9	4.56	0.889	0.786	0.992	Retain
		23.1.	9	4.22	0.806	0.676	0.935	Retain
		24.	9	4.56	0.889	0.786	0.992	Retain
		24.1.	9	4.22	0.806	0.676	0.935	Retain
		25.	9	4.56	0.889	0.786	0.992	Retain
		25.1.	9	4.22	0.806	0.676	0.935	Retain
		26.	9	4.44	0.861	0.748	0.974	Retain
		26.1.	9	4.22	0.806	0.676	0.935	Retain
		27.	9	4.44	0.861	0.748	0.974	Retain
		27.1.	9	4.33	0.833	0.712	0.955	Retain
		28.	9	4.67	0.917	0.826	1.000	Retain
		28.1.	8	4.25	0.813	0.677	0.948	Retain
		29.	9	4.56	0.889	0.786	0.992	Retain
		29.1.	9	4.22	0.806	0.676	0.935	Retain
		30.	9	4.67	0.917	0.826	1.000	Retain
		30.1.	8	4.25	0.813	0.677	0.948	Retain
		31.	9	4.44	0.861	0.748	0.974	Retain
		31.1.	8	4.13	0.781	0.638	0.924	Retain
		32.	9	4.22	0.806	0.676	0.935	Retain
		33.	9	4.22	0.806	0.676	0.935	Retain
		34.	9	4.44	0.861	0.748	0.974	Retain
		35.	9	4.33	0.833	0.712	0.955	Retain
		36.	9	4.11	0.778	0.642	0.914	Retain
		36.1.	9	3.78	0.694	0.544	0.845	Retain
	B	37.	8	4.50	0.875	0.760	0.990	Retain
		37.1.	9	4.22	0.806	0.676	0.935	Retain
		38.	9	4.00	0.750	0.609	0.891	Retain
		39.	9	4.33	0.833	0.712	0.955	Retain

			Item	n (experts)	Mean rating	Aiken's V coefficient	Lower bound (95% CI)	Upper bound (95% CI)	Decision criterion
I D A T A S O F T W A R E	I B D R E V I S T O R I A L D E C I S I O E S	40.	40.	8	4.38	0.844	0.718	0.970	Retain
			41.	9	4.67	0.917	0.826	1.000	Retain
			41.1.	8	4.13	0.781	0.638	0.924	Retain
			41.2.	9	4.44	0.861	0.748	0.974	Retain
			42.	9	4.44	0.861	0.748	0.974	Retain
			42.1.	8	4.00	0.750	0.600	0.900	Retain
			42.2.	9	4.44	0.861	0.748	0.974	Retain
		43.	43.1.	9	3.89	0.722	0.576	0.869	Retain
			43.2.	8	4.25	0.813	0.677	0.948	Retain
			44.	9	4.22	0.806	0.676	0.935	Retain
			44.1.	7	3.14	0.536	0.351	0.720	Retain
			44.2.	8	3.75	0.688	0.527	0.848	Retain
		45.	45.	9	4.00	0.750	0.609	0.891	Retain
			45.1.	8	3.63	0.656	0.492	0.821	Retain
			45.2.	8	3.63	0.656	0.492	0.821	Retain
			46.	9	4.11	0.778	0.642	0.914	Retain
		46.1.	46.1.	8	4.00	0.750	0.600	0.900	Retain
			47.	9	3.67	0.667	0.513	0.821	Retain
			47.1.	8	3.50	0.625	0.457	0.793	Retain
			48.	9	3.78	0.694	0.544	0.845	Retain
		48.2.	48.2.	9	3.33	0.583	0.422	0.744	Retain
			48.3.	9	3.78	0.694	0.544	0.845	Retain
			48.4.	9	4.33	0.833	0.712	0.955	Retain
			48.5.	9	3.89	0.722	0.576	0.869	Retain
		48.6.	48.6.	9	4.22	0.806	0.676	0.935	Retain
			49.	9	4.56	0.889	0.786	0.992	Retain
			49.1.	7	4.14	0.786	0.634	0.938	Retain
			50.	9	4.56	0.889	0.786	0.992	Retain
		51.	51.	9	4.11	0.778	0.642	0.914	Retain
			51.1.	9	4.22	0.806	0.676	0.935	Retain
			52.	9	4.44	0.861	0.748	0.974	Retain
			52.1.	7	3.57	0.643	0.465	0.820	Retain
		53.	53.	9	4.56	0.889	0.786	0.992	Retain
			53.1.	8	4.38	0.844	0.718	0.970	Retain
			53.1.1.	9	4.56	0.889	0.786	0.992	Retain
			53.2.	8	3.75	0.688	0.527	0.848	Retain
		54.	54.	9	4.44	0.861	0.748	0.974	Retain
			54.1.	7	4.43	0.857	0.728	0.987	Retain
			55.	9	4.33	0.833	0.712	0.955	Retain
			55.1.	8	4.00	0.750	0.600	0.900	Retain
		56.	56.	9	3.89	0.722	0.576	0.869	Retain
			56.1.	7	3.29	0.571	0.388	0.755	Retain
			57.	9	4.22	0.806	0.676	0.935	Retain
			57.1.	8	3.88	0.719	0.563	0.875	Retain
		58.	58.	8	4.00	0.750	0.600	0.900	Retain
			58.1.	8	3.75	0.688	0.527	0.848	Retain
			59.	9	4.33	0.833	0.712	0.955	Retain
			59.1.	8	4.00	0.750	0.600	0.900	Retain

I D	A B C D	60.	60.1.	9	3.89	0.722	0.576	0.869	Retain
		60.1.1.	60.1.1.1.	9	3.78	0.694	0.544	0.845	Retain
		60.1.2.	60.1.2.1.	9	3.22	0.556	0.393	0.718	Retain
			60.1.2.2.	9	3.56	0.639	0.482	0.796	Retain
	A B C D	61.	61.1.	9	4.33	0.833	0.712	0.955	Retain
		61.1.1.	61.1.1.1.	9	4.00	0.750	0.609	0.891	Retain
			61.1.1.2.	9	4.00	0.750	0.609	0.891	Retain
			61.1.1.2.1.	9	3.89	0.722	0.576	0.869	Retain
			61.1.1.3.	9	4.00	0.750	0.609	0.891	Retain
		61.1.1.3.1.	8	3.63	0.656	0.492	0.821	Retain	
		62.	62.1.	9	4.22	0.806	0.676	0.935	Retain
		62.1.1.	62.1.1.1.	9	4.22	0.806	0.676	0.935	Retain
	62.1.2.		62.1.2.1.	9	3.44	0.611	0.452	0.770	Retain
			62.1.2.2.	9	3.78	0.694	0.544	0.845	Retain
E	A B C D E F G H I J K	63.	63.1.	9	4.33	0.833	0.712	0.955	Retain
			63.2.	8	3.88	0.719	0.563	0.875	Retain
			63.3.	9	4.11	0.778	0.642	0.914	Retain
			64.	7	4.14	0.786	0.634	0.938	Retain
			64.1.	7	3.86	0.714	0.547	0.882	Retain
			65.	8	4.25	0.813	0.677	0.948	Retain
			65.1	7	3.86	0.714	0.547	0.882	Retain
			66.	8	3.75	0.688	0.527	0.848	Retain
			66.1.	7	3.43	0.607	0.426	0.788	Retain
F	A B C D E F G H I J K		67.	9	4.33	0.833	0.712	0.955	Retain
		68.	68.1.	9	4.11	0.778	0.642	0.914	Retain
			68.2.	9	4.00	0.750	0.609	0.891	Retain
V B C	Notes: Ratings were obtained using a 5-point Likert scale (1 = lowest relevance; 5 = highest relevance). Aiken's V was calculated for each item based on the mean rating and the number of valid expert responses. Items were classified according to predefined thresholds: V = 0.80 (retained), 0.70 = V < 0.80 (retained with minor revisions), and V < 0.70 (removed or substantially revised). 95% confidence intervals were computed using the score method proposed by Penfield and Giacobbi (2004) using the score method, providing additional evidence of coefficient stability. 9 experts were invited to evaluate the instrument. Due to occasional missing data for specific items, the effective number of experts (n) varied across items. All coefficients and confidence intervals were calculated using the actual number of valid expert responses per item.								

Following the statistical and qualitative improvement from the expert validation phase, the revised semi-structured interview script, comprising 118 items distributed across 10 thematic sections, was subjected to pilot testing with two event organisers representative of the target population. Although the pilot version contained 118 items, all of which were used, the interview was not applied rigidly. Some items acted as thematic stimuli, and the created structure allowed for contextual adaptation, according to the development of the semi-structured interview. The interviews were analysed using MAXQDA 26.0.0 (VERBI Software), which supported the implementation of a coding framework.

The coding framework comprised two complementary systems: System 1 (theoretical codes), structured into seven groups aligned with the study's research objectives, and System 2 (methodological codes), comprising nine subcodes designed to evaluate the performance and clarity of each question (Table 3). System 1 codes were developed deductively, based on theoretical frameworks and previous literature, while System 2 codes were generated inductively, based on observations from pilot interviews and methodological considerations.

A double-coding procedure was conducted with two researchers (JA and HA) autonomously coding the interview transcripts, using the predefined coding structure to reduce interpretive bias and increase analytical rigour. Both researchers possessed expertise in sustainability and qualitative research, which underpinned the codebook's development and improvement. Given the interpretive nature of qualitative analysis and the exploratory purpose of the pilot phase, no statistical measures of intercoder reliability (e.g., Cohen's Kappa coefficient) were applied. Instead, discrepancies were systematically discussed and resolved through consensus, allowing for refining code definitions and improving conceptual clarity. Coding was conducted at the level of analytical units corresponding to individual questions and associated prompts. This procedure strengthened analytical consistency and credibility in line with qualitative quality criteria (Tracy, 2010).

The researchers acknowledge that their professional background and theoretical assumptions related to sustainability and sporting event management may have influenced code development and data interpretation. Reflexive discussions were conducted throughout the analysis to critically examine these potential biases and to ensure that the findings remained grounded in the participants' perspectives and the empirical data.

Table 3: Coding Framework Applied in the Pilot Test (System 1 and System 2)

Code System	Code Family	Code	Analytical Function
System 1	Event Sustainability Governance & Strategy	Sustainability Strategy	Substantive content
		Defined Sustainability Objectives	Substantive content
		Sustainability Project or Report	Substantive content
		Sustainability Practices	Substantive content
		Performance Indicators	Substantive content
		Sustainability Officer	Substantive content
		Sustainability Not a Strategic Priority	Substantive content
		Sustainability Driven by Other Motivations	Substantive content
		Willingness to Implement Sustainability in the Future	Substantive content
	Social Sustainability	Inclusion of people belonging to minority groups	Substantive content
		Gender Equality Measures	Substantive content
		Inclusion of Athletes with Disabilities	Substantive content
		Accessibility for Spectators with Disabilities	Substantive content
		Support for Financially Disadvantaged Participants	Substantive content
		Community Engagement Activities	Substantive content
		Volunteer Recognition and Incentives	Substantive content
		Philanthropic Actions	Substantive content
	Environmental Sustainability	Carbon Neutrality Measures	Substantive content
		Carbon Footprint Calculation	Substantive content
		Shared Transport Solutions	Substantive content
		Electric Mobility Partnerships	Substantive content
		Energy Efficiency Measures	Substantive content
		Waste Management	Substantive content
		Sustainable Catering Planning	Substantive content
		Reduction of Paper Use through Digitalisation	Substantive content
	Economic & Financial Sustainability	Financial Balance as Main Priority	Substantive content
		Goal to benefit local businesses	Substantive content
		Equipment Rental and Reuse	Substantive content
		Financial Constraints Limiting Sustainability Actions	Substantive content
	Sport Infrastructure & Legacy	Sport Facilities Use	Substantive content
		Post-Event Use of Facilities	Substantive content
		Reuse of Sport Equipment	Substantive content
	Stakeholder Engagement & Partnerships	Collaboration with Sport Federations	Substantive content
		Partnerships with Local Authorities	Substantive content
		External Entities for Sustainability Actions	Substantive content
	Sustainability Certification & Commitments	Event Sustainability Certification	Substantive content
		Alignment with Standard Certification	Substantive content
		Alignment with UNSDG	Substantive content
		Public Communication on Sustainability	Substantive content

Code System	Code Family	Code	Analytical Function
System 2	Methodological Evaluation	Rich / In-depth Response	Question performance
		Adequate (even if Limited) Response	Question performance
		Dichotomous Response Only (Yes/No)	Question performance
		Evidence of Question Comprehension	Question performance
		Question Unclear	Question performance
		Evidence of Difficulty in Responding	Question performance
		Question Not Applicable to Event Context	Question performance
		Redundant Question	Question performance
		Unprompted Spontaneous Comment	Question performance

The researchers acknowledge that their professional background and theoretical assumptions related to sustainability and sporting event management may have influenced code development and data interpretation. Reflexive discussions were conducted throughout the analysis to critically examine these potential biases and to ensure that the findings remained grounded in the participants' perspectives and the empirical data. A total of 176 methodological codings (System 2) were generated across the two pilot interviews (Table 4). Of these, 22 corresponded to Rich and In-Depth Responses (12.5%), 49 to Adequate Responses (27.8%), and 60 to Dichotomous Responses (34.1%). Additionally, 43 codings reflected Evidence of Question Comprehension (24.4%), and 2 corresponded to Unprompted Spontaneous Comments (1.1%). Significantly, no occurrences were identified for the following categories: Question Unclear, Evidence of Difficulty in Responding, Redundant Question, and Question Not Applicable to the Event Context.

Table 4: Distribution of Methodological Codes (System 2) Across Pilot Interviews.

Methodological Code	Interview 1	Interview 2	Total	%
Rich / In-depth Response	3	19	22	12,5
Adequate (even if Limited) Response	21	28	49	27,8
Dichotomous Response Only (Yes/No)	31	29	60	34,1
Evidence of Question Comprehension	20	23	43	24,4
Question Unclear	0	0	0	0,0
Evidence of Difficulty in Responding	0	0	0	0,0
Question Not Applicable to Event Context	0	0	0	0,0
Redundant Question	0	0	0	0,0
Unprompted Spontaneous Comment	1	1	2	1,1

Note: Percentages may not total 100% due to rounding.

The absence of these latter categories indicated that all items were understood, contextually appropriate, and operationalised within the event settings studied. Furthermore, no recurring analytical problems were identified, and no questions were considered conceptually misaligned with the predefined research objectives.

To improve instrument refinement, explicit rules were established (Miles et al., 2014) based on the proportional distribution of methodological codes per item, supported by an analytical review. Items generating predominantly adequate responses without evidence of misunderstanding were retained and adjusted to the natural discourse of a semi-structured interview. Items that frequently elicited dichotomous responses were examined for possible reformulations and integration with other items. When appropriate, these items were included as follow-up prompts within broader open-ended questions to improve analysis, flow, and narrative elaboration. This merger of items did not alter the conceptual domains assessed, but aimed solely at improving narrative flow and reducing structural fragmentation.

After applying these criteria to the 118 analytical items, 44 were retained without modification, 14 were retained with small adjustments to the typical discourse of an interview, 54 were reformulated and merged into other items to improve clarity and encourage more detailed responses, and 6 were removed due to limited contribution identified during the pilot phase.

Table 5: Instrument refinement decisions following pilot testing.

Decision	Number of Items	% of Total (118)
Retained without modification	44	37.3
Retained with small adjustments	14	11.9
Reformulated and merged	54	45.8
Removed	6	5.1

Note:

Structural merging of certain items resulted in a reduced number of primary questions in the final validated guide.

As shown in Table 5, most items were retained, indicating the instrument's structural stability. A significant number of responses were classified as dichotomous, not due to ambiguity or comprehension difficulties but to the structural nature of certain closed or confirmation-oriented items. Therefore, minor linguistic refinements were introduced when necessary to promote greater discursive depth while maintaining the instrument's theoretical coherence. Although refinement decisions were initially applied to 118 analytical items, structural consolidation during the final revision phase resulted in 58 primary questions organised with integrated follow-up prompts.

The pilot findings demonstrated that the final interview script presented structural consistency, contextual applicability, and methodological robustness. The refinement process enhanced the instrument's capacity to generate analytically meaningful data while preserving alignment with the research objectives.

Discussion

The present study developed and validated a semi-structured interview script designed to examine sustainability governance and practices in major sporting events. By combining theoretical grounding, expert validation, and pilot testing, this study advances the field by indicating how theoretically grounded qualitative instruments can bridge the gap between abstract sustainability frameworks and their empirical operationalisation in sport governance in real-world event management contexts (Collins et al., 2009; Mallen & Chard, 2012). The validation process refers to content and applicability validation in a qualitative framework and does not imply psychometric validation in the quantitative sense.

The expert validation phase provided evidence of content adequacy. The use of Aiken's V coefficient, complemented by 95% confidence intervals, enabled objective decision-making regarding item retention, reformulation, and exclusion. This approach reduced ambiguity in instrument refinement and strengthened the validation process's transparency (Boateng et al., 2018; Lynn, 1986). The exclusion of items related to operational details and conceptual redundancy indicated that the instrument evolved towards a greater strategic focus, clearly aligned with sustainability governance dimensions rather than the technical or incidental aspects of event operations.

The pilot phase also demonstrated the instrument's contextual applicability. The revised 118-item script was successfully implemented with organisers of international sporting events, holding senior strategic roles. The restructuring into 58 primary questions improved narrative coherence without reducing conceptual coverage. The absence of methodological codes indicating a lack of clarity, difficulty, redundancy, or contextual misalignment indicated that the instrument achieved a high level of comprehension and relevance. This finding is particularly relevant in sustainability research, in which conceptual ambiguity often challenges empirical operationalisation (Purvis et al., 2019).

The distribution of methodological codes showed that a substantial proportion of responses were classified as adequate, indicating the instrument's capacity to generate meaningful narratives. Although a proportion of responses was dichotomous, this result reflected the inclusion of confirmation-oriented questions aimed to ensure the coverage of specific sustainability dimensions, such as environmental management practices, governance commitments, and policy implementation. These items contributed to analysing the extent of alignment with sustainability principles and SDGs rather than limiting analytical depth (Kallio et al., 2016).

Grounding the instrument in the TBL framework (Elkington, 1997), complemented by sustainability policies relevant to sports, and ensured a balanced analysis of social, environmental, economic, and sport-specific dimensions. This multidimensional structure enhanced the instrument's suitability for studying how sustainability commitments are interpreted and operationalised. The categorisation of themes facilitates a comparative analysis between events and organisational contexts.

This study demonstrates that using semi-structured interviews for sustainability research can benefit from validation procedures typically associated with quantitative tool development (Boateng et al., 2018; Creswell & Poth, 2018). The statistical content validation and qualitative pilot testing contribute to methodological rigour while maintaining the necessary flexibility to capture specific sustainability strategies in each context. The structured nature of the instrument enhances analytical consistency but can also shape the discursive boundaries of sustainability by privileging predefined dimensions over emergent interpretations, which reflects an inherent tension in theory-driven qualitative research.

The validated interview script provides a reliable, theoretically grounded instrument for investigating sustainability in sporting events. Its development process offers a replicable methodological model for future studies seeking to operationalise sustainability constructs within organisational and policy-oriented research settings. By enhancing analytical consistency, the instrument contributes to strengthening empirical research on sustainability implementation in the sports sector (Babiak & Trendafilova, 2011; Geeraert, 2018).

Conclusion

The validated interview script is a reliable, theoretically grounded instrument for investigating sustainability in sporting events. The findings support its ability to operationalise sustainability constructs in a structured and analytically consistent manner, thus contributing to addressing existing methodological challenges in the field. Its development process offers a replicable methodological model for future studies seeking to operationalise sustainability constructs in organisational and policy-oriented research settings. By enhancing analytical consistency, the instrument contributes to strengthening empirical research on sustainability implementation in the sports sector (Boateng et al., 2018; Creswell & Poth, 2018).

The validation process combined statistical evaluation using Aiken's V coefficient and confidence intervals (Aiken, 1980; Penfield & Giacobbi, 2004) with qualitative feedback from experts and pilot participants to ensure that the final instrument presented conceptual alignment with sustainability frameworks, structural coherence (Boateng et al., 2018), and operational applicability. The results indicate that the script can generate analytically meaningful and contextually grounded data across different event settings.

By grounding the script in the TBL framework (Elkington, 1997) and the policy priorities for sustainable development, the instrument supports the analysis of the social, environmental, economic, and sport-

specific dimensions of event management. The absence of ambiguous or out-of-context questions during pilot testing reinforces its applicability to sports governance environments.

This study contributes methodologically to sustainability research in sports by demonstrating that qualitative interview instruments can undergo validation procedures comparable to those applied in quantitative tools (Boateng et al., 2018; Lynn, 1986). The integration of statistical validation with qualitative pilot testing enhances transparency, reduces subjectivity in item selection, and strengthens the credibility of qualitative data collection processes. To further research transparency and replicability (Tracy, 2010), the final semi-structured validated interview script is available as supplementary material. Making this instrument accessible enables its application in future studies investigating sustainability implementation in sporting events.

The validated script constitutes a reliable, theoretically grounded tool for advancing research on sustainability policies in the sports sector. Despite methodological limitations, which are detailed in the next section the instrument offers a robust foundation for future empirical applications and cross-contextual studies, supporting the development of cumulative knowledge and evidence-based practice in sports sustainability.

Limitations and further study

Despite the methodological rigour adopted throughout the validation process, several limitations should be acknowledged.

Although consistent with methodological recommendations, the relatively small expert panel may have limited the epistemic diversity of perspectives incorporated into the validation process (Lynn, 1986; Polit & Beck, 2006). The inclusion of additional experts from different geographical or intervention contexts could enhance cross-contextual robustness and reduce potential domain-specific bias.

The pilot phase involved two organisers of international sporting events holding senior strategic roles. Although their involvement allowed for testing the instrument's clarity and applicability in real-world settings (van Teijlingen & Hundley, 2001), the limited number of pilot interviews did not permit the assessment of variability across different organisational scales, event typologies, or cultural contexts. Future research could apply the instrument to a broader, more heterogeneous sample to evaluate its reliability and adaptability across contexts.

The instrument was theoretically grounded in the TBL framework and policy-oriented sustainability priorities. While this grounding ensures multidimensional coverage, it could also influence the framing of responses as predefined sustainability dimensions (Elkington, 1997; Purvis et al., 2019). Other theories, such as institutional or stakeholder theories, could complement future applications and provide additional interpretations.

Finally, as with all semi-structured interview scripts, the instrument retains an inherent degree of flexibility, allowing follow-up probing adapted to interview dynamics. Although this methodology is a strength (Creswell & Poth, 2018; Kvale & Brinkmann, 2009) in qualitative research, it may introduce variability in data collection across studies if not carefully standardised either in interviewer training or protocol adherence.

Therefore, future research could focus on applying the validated script to compare studies, make assessments of sustainability integration in sports events, or use mixed-method designs combining qualitative insights with quantitative performance indicators (Creswell & Poth, 2018). This focus would contribute to consolidating empirical knowledge on sustainability implementation in the sports sector (Babiak & Trendafilova, 2011; Geeraert, 2018).

Supplementary Materials - The following supporting information will be available upon request or via contact with the corresponding author:

S1: Final validated semi-structured interview script

S2: Content validation results (Aiken's V and confidence intervals)

S3: Pilot coding framework

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Informed Consent Statement – All participants signed an informed consent form agreeing to participate in the research and, in the case of the pilot test participants, acknowledging that their interviews were recorded in audio and video.

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