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# Developing and Validating a Sustainability Instrument for Omani Sports Federations: Aligning with Oman Vision 2040 and Sustainable Development Goals

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**Abstract**

This paper aims to develop a questionnaire to identify the main constructs of sustainability in Omani sports federations. It also seeks to build the items of these constructs to measure six sustainable development goals (SDGs): health 3 SDG, education 4 SDG, gender equality 5 SDG, economic empowerment 8 SDG, enhance urbanism 11 SDG, and governance and peace 16 SDG, in line with Oman Vision 2040. Seven expert panels were selected to validate the items' instrument, alongside 50 individuals from Omani sports federations to assess validity and reliability using SPSS. The results showed that the validity of sustainability, as evaluated by the expert panel, reached a value of r = 0.89. For the environmental, social, and economic sustainability dimensions, the r values were 0.94, 0.92, and 0.82, respectively. The Pearson test indicated that all items of the sustainability dimensions are statistically significant, except for items 19 and 21 in the economic sustainability dimension, and item 32 in the social sustainability dimension. The overall reliability values of sustainability, measured by Cronbach's alpha and Split-half, were 0.976 and 0.990, respectively. The study confirms the accuracy of validation and reliability processes, highlighting the instrument's importance for promoting sustainability in Oman's sports federations.

**Keywords:** Sustainability, Sports Federations, Environmental Sustainability, Economic Sustainability, Social Sustainability

## Introduction

Since the early 2000s, the United Nations (UN) and other organizations have acknowledged sports' importance in international development through various resolutions. Today, sports play a key role in sustainable development under the 2030 agenda (Hozhabri et al., 2022). Sport plays a vital role in sustainable development by promoting tolerance, respect, and

empowerment. It also contributes to health, education, and social inclusion goals (Yelamos et al., 2019).

This article aims to develop a sustainability measurement tool for Omani sports federations, focusing on the environmental, social, and economic aspects of achieving SDGs. Sports federations in Oman lack commitment to promoting sustainability. Officials from relevant departments confirm that no data or actions support sustainability efforts during their programmes.

Sustainability in the Omani sports sector is evident through cooperation in training programmes between the International Olympic Solidarity Committee and the Omani Olympic Solidarity Committee (Oman Olympic Committee [OOC], 2018; 2019; 2020; 2021). However, this collaboration does not fully embody the true essence of sustainability. Numerous studies highlight sustainability in sports, exploring its impact on governance, innovation, and competitiveness (Almenhali, 2019; Kromidha et al., 2019). Other research delves into behavior, environmental concerns, and policies within sporting institutions (Cury et al., 2023; Glibo et al., 2022; Greenhalgh & Drayer, 2020; Öztopcu, 2024; Piller & Nagel, 2024; Thormann & Wicker, 2021; Trail & McCullough, 2020). Other studies suggest various models and effective ways to integrate sustainability into sporting events (Moon et al., 2022; Müller et al., 2021; Trendafilova et al., 2023).

Annesi et al. (2023) analysed 321 scientific articles on sustainability in sports. They found a lack of focus on SDGs in the literature. However, we found several studies that explored sustainability in the sports field through the lens of SDGs. Campillo-Sánchez et al. (2021) focused on SDGs 3, 4, 5, 8, 10, and 11 in their study. Gadais et al. (2022) addressed objectives 3, 4, 5, 8, and 16. Öztopcu's (2024) covered all the SDGs, categorizing them into environmental, social, and economic dimensions. It is noteworthy that Gadais et al. (2022) developed a model to promote the SDGs through sport via Sport for Development and Peace (SDP), with a primary focus on the social dimension. Furthermore, Hozhabri et al. (2022) highlighted the significance of sport in achieving key priority goals for sustainable development: Goals 3, 4, 5, 8, and 16, along with environmental sustainability. This critical aspect of sustainable development can also contribute to achieving SDGs 6, 7, 11, 12, 13, 14, and 15. In addition to Andersson (2022) study, which addressed the SDGs, as well.

Sustainability is a complex concept involving social, environmental, and economic dimensions. It requires careful management for long-term viability. Collaboration among stakeholders is crucial for its implementation and ongoing success (Fernandes & Philippi, 2017; Van Holt & Whelan, 2019).

There are three dimensions of sustainability: environmental, economic, and social. To achieve true sustainability, these factors must be balanced equally and harmoniously (Amman Stock Exchange, 2018). “Sustainability implies a link towards ecological impacts; namely, the consumption of natural resources and the deliberation of pollution and energy use, the concern for social inclusion and distribution of wealth, coupled with the economic themes of growth and longevity” (Raj & Musgrave, 2009, p. 2)

*Environmental Sustainability*

There is a strong scientific and international consensus on the relationship between sport and environmental sustainability, particularly regarding the impact of hosting sporting events. This includes the carbon footprint, plastic or metal waste, the impact on biodiversity, and the quality of energy used to operate sports facilities. Ross et al. (2024) noted that sustainability efforts are influenced by strategic decisions, where progress is made but sports organizations lack a clear endpoint for these efforts. Cury et al. (2023) mentioned in his research that 40 sports organizations did not reference external environmental policies and frameworks. Additionally, 32 sports organizations did not develop protocols, regulations or plans for environmental stability. Studies by Glibo et al. (2022), Kromidha et al. (2019) and Piller and Nagel (2024) addressed the challenges facing the development or implementation of environmental policies in sports organizations and events they host. As Glibo et al. (2022) noted, many international organizations struggled to implement their policies effectively and only appeared to follow them superficially. Moreover, their standards for policy compliance were unsatisfactory. Research by Perkumienė et al. (2023) and Piccerillo et al. (2023) focused on the carbon footprint from sporting events. Therefore, it is logical for government and private entities, in cooperation with the sports sector, to promote environmental sustainability by developing strategies and policies that regulate sporting practices impacting the environment. The elements of the environmental sustainability dimension were aligned with the eighth and eleventh SDGs and with Oman Vision 2040.

*Economic Sustainability*

Erdoğdu et al. (2016) defined economic sustainability as strategies promoting the efficient and responsible use of resources, aiming for long-term benefits for society and the environment. The economic dimension requires a system that ensures economic stability, fosters equitable growth and development, and uses resources responsibly. This involves effective fiscal and monetary policies, promoting fair competition and innovation, protecting consumer rights, fostering international collaboration, and implementing sustainable development strategies (Caradonna, 2014). Sports significantly contribute to national and regional economies, demonstrating their economic impact through major events. Sport is integral to the UN SDGs as it drives sustainable development strategies (de Werra, 2022).

Many SDP programs use sport to promote inclusive, sustainable economic growth and provide productive, decent jobs for all. The expanding sport industry, both locally and globally, offers economic growth and employment opportunities while fostering hybrid organizational models in the SDP sector (Svensson & Seifried, 2017). Sport programs can enhance employability for women, people with disabilities, and other vulnerable groups, contributing to inclusive economic growth (Warner et al., in press). Moreover, sport-based educational programs provide youth with employability skills and job market opportunities. Additionally, producing sporting goods in compliance with labor standards supports SDG8 by avoiding forced labor and discrimination. This sector could benefit SDP, especially in social enterprises (Giulianotti et al., 2019). The study by Campillo-Sánchez et al. (2021) showed the progress made by one study group in promoting SDG 8 on the role of sport, demonstrating the positive association between recreation, sport, and tourism. Meanwhile, the study by Moon et al. (2022) indicated that the main obstacle to implementing sustainability efforts is the lack of financial and human resources.

Therefore, it is important to direct efforts in SDP towards promoting economic sustainability through cooperation and partnerships between the sports sector and governmental and private institutions. The items of the economic sustainability dimension were aligned with the six SDGs addressed in the article and in line with Oman Vision 2040.

*Social Sustainability*

Sport's role in society, its global popularity, and its mass communication capability makes it a vehicle for delivering messages with impacts beyond sport, such as social development (Bas et al., 2020). This includes concepts promoting change, like the transition to positive social and environmental actions. Sport plays a vital role in addressing modern complexities and uncertainties, leading the way for our global society (Triantafyllidis & Mallen, 2022).

Sport's communication power has been harnessed for sustainable development through various interventions, promoting personal development, health, active living, plant-based nutrition, wellness, social equity, inclusion, justice, peace, economic growth, prosperity, environmental stewardship, and sustainability (Beutler, 2008). The promotion of these ideas has occurred locally, regionally, nationally, and globally. This can lead to positive socio-economic and environmental outcomes, enhancing well-being, improving community quality of life, and strengthening local economies. Consequently, sport contributes to global sustainable development (Triantafyllidis & Mallen, 2022).

Leadership promoting good governance in sport for sustainable development is essential for understanding societies and the sports world. It can identify gaps in sport, such as gender equality and social justice, and encourage strategies to address them. Such leadership is crucial for implementing, evaluating, and reporting recommendations, as well as renewing effective strategies (Broman & Robèrt, 2017). The leadership role involves facilitating debates on addressing gaps in the sporting society, reaching consensus on the way forward, and using sport to contribute effectively to a well-functioning community (Triantafyllidis & Mallen, 2022).

Therefore, it is indisputable that the sports sector can play an important role in promoting social sustainability through SDP. This can be achieved within the framework of cooperation and partnership between the sports sector and governmental and private institutions. The items of the economic sustainability dimension were aligned with the six SDGs addressed in the article and in line with Oman Vision 2040.

Figure 1 which we designed, explains the relationship between these dimensions within the framework of SDP. Activating any of the three dimensions using sport as a tool will positively impact the others.

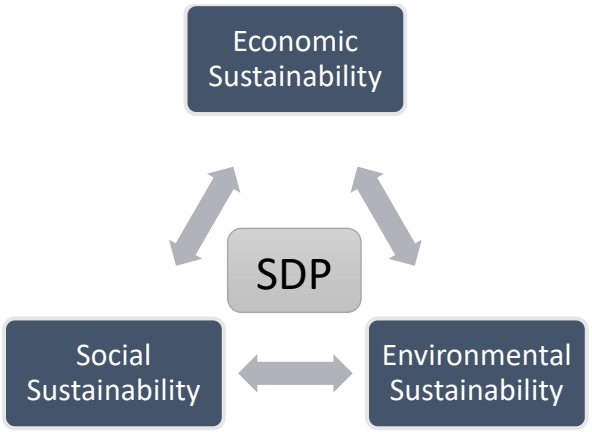


Figure 1 Sustainability in SDP

*SDP (Sport for Development and Peace).*

In pursuit of this article's objectives, we designed and developed a tool to measure sustainability across three dimensions: environmental, economic, and social. This tool was created using the theoretical framework and previous studies. We linked it to the SDGs by placing it within the framework of SDP, including health (SDG 3), education (SDG 4), gender equality (SDG 5), economic empowerment (SDG 8), enhanced urbanism (SDG 11), and governance and peace (SDG 16), in line with Oman Vision 2040. The instrument was designed using a four-point Likert scale: the lowest score is "totally disagree" and the highest score is "totally agree."

*The Objectives of this Article Are*

1. Develop an instrument to assess the level of sustainability through its three dimensions: environmental, economic, and social in Omani sports federations, in line with Oman Vision 2040.
2. Determine the instrument's validity for assessing the level of sustainability in Omani sports federations, in line with Oman Vision 2040.
3. Determine the instrument's reliability for assessing the level of sustainability in Omani sports federations, in line with Oman Vision 2040.

*The Researchers Designed this Instrument to Answer the Following Questions*

1: What is the level of sustainability in Omani sports federations?
2: What are the differences in sustainability among Omani sports federations?
3: Do the levels of sustainability in their environmental, economic, and social dimensions affect each other?

**Research Methodology**

A quantitative approach was used to collect data on sustainability in its three dimensions through a questionnaire. According to Williams et al. (2022), understanding why something happened and predicting its future occurrence or extent is central to quantitative research. It involves collecting and coding data expressible as numbers. Iyadurai (2023) state that a questionnaire is also known as a "survey instrument" or "research instrument". Its design is crucial for project success and must address all research questions. Validity and reliability should be established through a pilot study for new instruments.

*Research Sample*

In this study, the researchers used 50 individuals from members and employees of Omani sports federations as a sample to achieve the article's objectives.

*Validity*

This research will use a questionnaire for content validity, ensuring it covers the entire domain related to the variable it measures (Hayashi et al., 2019). Construct validity infers test results from the researched concept; for example, does a high depression score truly indicate high depression? (Heale & Twycross, 2015). Content validity assesses if a new questionnaire includes necessary items and excludes undesirable ones (Boudreau et al., 2001).

The researcher assessed the instrument's validity through expert evaluation. By presenting the initial version to specialists, they determined the percentage of expert agreement, evaluating section relevance to the study, phrase alignment with axes and subject, and overall comprehensiveness.

To establish content validity, a judgmental approach uses literature reviews and expert panel evaluations (Taherdoost, 2016). Seven sports management and governance experts evaluated the instrument, assessing their suitability for research variables. The Semantic Differential scale, ranging from 0 (Not Related) to 10 (Very Related), was used. Experts scored each researcher-developed item. According to Said et al. (2020) and Stoklasa, Talášek and Stoklasová (2019), this scale assesses attitudes without checklists, organizing options positively on the right and negatively on the left, producing suitable interval data for this research (See Table 1).

Table 1
*Score Values of The Experts' Score*

| Grading scores of instrumentation items | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Not Related | | | | | | | | | | Very Related |

After experts examine the instruments for content validity, the researcher uses a formula recommended by Mohd and Ahmad (2005) to determine expert validity. This formula, used in studies like Madihie and Noah (2013) and Said et al. (2020), is credible and reliable in research. It helps evaluate how well an instrument reflects the intended construct, reinforcing its validity. Using this method strengthens the study and aligns it with established research practices, ensuring dependable findings. The detailed steps of this formula are outlined below for systematic validity assessment.

$$\frac{\text{Score total}}{\text{Maximum score}} \times 100\% = \text{The overall content validity achievement}$$

Table 2
*Values of Content Validity by Experts in the Sustainability Dimensions*

| | Sustainability | | | |
|---|---|---|---|---|
| | Environmental | Economic | Social | Score |
| Expert 1 | 0.98 | 0.85 | 0.96 | 0.93 |
| Expert 2 | 0.98 | 0.62 | 0.97 | 0.85 |
| Expert 3 | 1 | 0.84 | 0.95 | 0.93 |

| | | | | |
|---|---|---|---|---|
| Expert 4 | 0.77 | 0.91 | 0.84 | 0.84 |
| Expert 5 | 1 | 0.83 | 0.88 | 0.90 |
| Expert 6 | 0.87 | 0.88 | 0.88 | 0.87 |
| Expert 7 | 1 | 0.87 | 0.96 | 0.94 |
| **Total value of r =** | 0.94 | 0.82 | 0.92 | **0.89** |

Table 2 illustrates that the sustainability measurement instrument achieved a total score of 0.89. The highest value, 0.94, was given by expert 7, while the lowest, 0.84, was given by expert 4. Other experts provided scores ranging from 0.85 to 0.93. The environmental sustainability dimension had the highest value at 0.94, followed by social sustainability at 0.92, and economic sustainability at 0.82.

Table 3
*Content Validity Values by Experts in Environmental Sustainability Items*

| | Items | | Expert 1 | Expert 2 | Expert 3 | Expert 4 | Expert 5 | Expert 6 | Expert 7 | Score |
|---|---|---|---|---|---|---|---|---|---|---|
| Environmental Sustainability | 1 | Our sports federation implements sustainable waste management practices, reducing the environmental impact of its events and activities. | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 1 |
| | 2 | When holding events and competitions, our sports federation considers using sports facilities constructed to green building standards. | 10 | 10 | 10 | 3 | 10 | 10 | 10 | 0.90 |
| | 3 | Our sports federation implements environmental initiatives to protect resources and ecosystems impacted by sporting activities. | 10 | 10 | 10 | 7 | 10 | 10 | 10 | 0.95 |
| | 4 | Our sports federation seeks to promote and conserve biodiversity, safeguarding native flora and fauna near sports venues. | 10 | 10 | 10 | 9 | 10 | 9 | 10 | 0.97 |
| | 5 | Our sports federation creates partnerships with environmental organizations and stakeholders to promote environmental management and sustainability. | 10 | 10 | 10 | 9 | 10 | 9 | 10 | 0.97 |
| | 6 | Our sports federation aims to priorities preparing transparent environmental impact reports to support accountability and build stakeholder trust. | 10 | 10 | 10 | 9 | 10 | 10 | 10 | 0.98 |
| | 7 | Our sports federation has a long-term environmental plan for sustainable development in sports. | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 0.98 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8 | Environmental assessments are conducted to evaluate the Sports Federation's environmental impact and identify areas for improvement. | 10 | 9 | 10 | 10 | 10 | 9 | 10 | 0.97 |
| | 9 | Our federation promotes sustainable procurement practices, reducing environmental impact through environmentally friendly supply policies. | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 0.98 |
| | 10 | Our sports federation invests in green technologies to enhance sustainability and reduce carbon emissions. | 10 | 9 | 10 | 10 | 10 | 10 | 10 | 0.98 |

Looking at table 3, which presents the experts' evaluation of the validity of the environmental sustainability dimension items, it is clear that the values of the items range between 0.90 and 1. Thus, according to the experts, they effectively measure what they were designed for.

Table 4
*Content Validity Values by Experts in Economic Sustainability Items*

| | Items | | Expert 1 | Expert 2 | Expert 3 | Expert 4 | Expert 5 | Expert 6 | Expert 7 | Score |
|---|---|---|---|---|---|---|---|---|---|---|
| Economic Sustainability | 1 | Our sports federation actively supports initiatives to reduce the financial burden caused by non-communicable diseases such as heart attacks and diabetes. | 10 | 6 | 10 | 10 | 10 | 10 | 10 | 0.94 |
| | 2 | Our federation promotes physical activity through targeted programmes to prevent non-communicable diseases. | 10 | 6 | 10 | 10 | 10 | 10 | 10 | 0.94 |
| | 3 | Our sports federation and the Ministry of Health cooperate to establish programmes raising awareness about physical activity's role in preventing chronic diseases like heart attacks and diabetes. | 10 | 6 | 10 | 8 | 10 | 10 | 10 | 0.91 |
| | 4 | Our sports federation invests in programmes developing cognitive capabilities and skills of domestic sports specialists. | 1 | 4 | 1 | 10 | 4 | 9 | 2 | 0.44 |
| | 5 | Many members and employees of our sports federation have scientific degrees related to sports. | 10 | 9 | 6 | 8 | 8 | 9 | 10 | 0.85 |
| | 6 | Our sports federation collaborates with universities to monitor and evaluate educational frameworks for sport specializations. | 3 | 4 | 5 | 8 | 5 | 5 | 4 | 0.48 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7 | Our sports federation works to increase the economic resources for the women's element. | 10 | 7 | 10 | 10 | 10 | 10 | 10 | 0.95 |
| 8 | Our sports federation collects and evaluates gender data to promote equality in investment projects. | 10 | 8 | 10 | 10 | 9 | 9 | 10 | 0.94 |
| 9 | Our sports federation contributes to job creation through its investment projects. | 10 | 7 | 10 | 10 | 9 | 10 | 10 | 0.94 |
| 10 | There is a reluctance from the private sector to invest in sports managed by our sports federation. | 10 | 8 | 10 | 10 | 9 | 9 | 10 | 0.94 |
| 11 | Our sports federation develops necessary skills through volunteering opportunities provided by its programmes and sporting competitions, meeting market needs. | 10 | 8 | 10 | 8 | 7 | 8 | 10 | 0.87 |
| 12 | The media and television broadcasting's limited role hinders investment in sports managed by our sports federation. | 10 | 8 | 10 | 10 | 8 | 9 | 10 | 0.92 |
| 13 | Our sports federation participates with the Ministry of Housing and Urban Planning, and the Ministry of Culture, Sports and Youth to develop urban planning policies. | 3 | 4 | 3 | 8 | 7 | 4 | 4 | 0.47 |
| 14 | Our sports federation participates with the Ministry of Housing and Urban Planning through the Ministry of Culture, Sports and Youth to establish sports facilities within green spaces in residential plans. | 10 | 8 | 10 | 8 | 10 | 10 | 10 | 0,94 |
| 15 | Our sports federation invests in organizing sporting events in green spaces near residential areas. | 10 | 9 | 10 | 8 | 9 | 10 | 10 | 0.94 |
| 16 | Sport is utilized by our federation to address societal issues draining state resources. | 10 | 4 | 10 | 10 | 9 | 10 | 10 | 0.90 |

Regarding the items of the economic sustainability dimension, table 4 shows that the item “Our sports federation invests in programmes developing cognitive capabilities and skills of domestic sports specialists” scored 0.44. The item “Our sports federation collaborates with universities to monitor and evaluate educational frameworks for sport specializations” scored 0.48, and the item “Our sports federation participates with the Ministry of Housing and Urban Planning, and the Ministry of Culture, Sports and Youth to develop urban planning policies” scored 0.47. Therefore, the researchers suggested deleting these items. The experts also suggested adding some items and improving the wording of others. The value of the remaining items ranged between 0.85 and 0.95, which, according to the experts, measures what they were created for.

Table 5

*Content Validity Values by Experts in Social Sustainability Items*

| | Items | | Expert 1 | Expert 2 | Expert 3 | Expert 4 | Expert 5 | Expert 6 | Expert 7 | Score |
|---|---|---|---|---|---|---|---|---|---|---|
| Social Sustainability | 1 | Our sports federation collaborates with the Ministry of Health to develop sports programmes addressing health concerns. | 10 | 9 | 10 | 9 | 10 | 10 | 10 | 0.97 |
| | 2 | Our sports federation implements initiatives to address health issues like heart disease, diabetes, high blood pressure, cancers, and physical inactivity within the community. | 10 | 9 | 10 | 9 | 10 | 10 | 10 | 0.97 |
| | 3 | Our sports federation employs educational campaigns to promote the significance of physical activity and well-being. | 10 | 9 | 10 | 10 | 10 | 10 | 10 | 0.98 |
| | 4 | Community sports programmes by our sports federation encourage regular exercise and healthy lifestyles. | 10 | 10 | 10 | 9 | 8 | 9 | 10 | 0.94 |
| | 5 | Our sports federation promotes well-being in the community by helping to prevent and manage health issues associated with a lack of physical activity. | 3 | 9 | 2 | 8 | 7 | 1 | 3 | 0.47 |
| | 6 | Our sports federation offers quality sports education programmes and workshops in collaboration with scientific bodies and institutions. | 10 | 10 | 10 | 7 | 6 | 5 | 10 | 0.82 |
| | 7 | Our sports federation works to promote scientific and cognitive progress in sports among its members and workers in the field of the federation's remit. | 10 | 10 | 10 | 9 | 6 | 7 | 10 | 0.88 |
| | 8 | Our sports federation provides equal leadership opportunities for both sexes. | 10 | 10 | 10 | 8 | 10 | 10 | 10 | 0.97 |
| | 9 | Our sports federation exhibits a greater media interest in men's sports compared to women's sports. | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 0.98 |
| | 10 | Our sports federation promotes gender equality through partnerships with national and international organizations. | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 0.98 |
| | 11 | Our sports federation collects and evaluates data by gender to assess the impact of sport on promoting gender equality. | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 0.98 |
| | 12 | Our sports federation works to improve the lives of community members by creating job opportunities and driving economic development. | 10 | 10 | 10 | 4 | 9 | 9 | 10 | 0.88 |
| | 13 | Our sports federation collaborates with companies to promote a social lifestyle through corporate social responsibility initiatives. | 10 | 10 | 10 | 9 | 9 | 10 | 10 | 0.97 |
| | 14 | Our sports federation aims to use government and private initiatives to establish sports facilities near health and education centers. | 10 | 10 | 10 | 7 | 10 | 9 | 10 | 0.94 |
| | 15 | When establishing and building sports facilities, our sports federation, in cooperation with relevant authorities, considers ease of access and inclusivity for diverse societal groups. | 10 | 10 | 10 | 8 | 9 | 10 | 10 | 0.95 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 16 | Our sports federation utilizes sport as a tool in resolving conflicts to promote respect between groups. | 10 | 9 | 10 | 7 | 9 | 9 | 10 | 0.91 |
| 17 | Our sports federation utilizes the power of sport to promote peace in society. | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 1 |
| 18 | Our sports federation has a high level of integrity in combating abuse, violence, and sports corruption. | 10 | 10 | 10 | 8 | 10 | 10 | 10 | 0.97 |

Regarding the items in the social sustainability dimension, the item "Our sports federation promotes well-being in the community by helping to prevent and manage health issues associated with a lack of physical activity" received a value of 0.47. Consequently, the researchers decided to delete this item. The values of the remaining items ranged between 0.82 and 1, thus achieving the intended goal. The experts also suggested improving some items (see Table 5).

Based on the experts' evaluation, the sustainability measurement instrument comprised 41 items distributed across its three dimensions: environmental sustainability had 10 items, economic sustainability had 14 items, and social sustainability had 17 items. Appendix A

As shown in table 6, we assessed internal consistency validity using the SPSS statistics program by determining the correlation coefficients between the items and the total of their respective dimensions. This was conducted with a pilot sample of 50 members and employees of sports federations in the Sultanate of Oman. Table 6 shows that the internal consistency coefficient values for the items of the environmental sustainability dimension ranged from 0.637 to 0.878. These values are significant at the 0.01 level, confirming that all the items effectively measure the intended dimension and are therefore valid.

Table 6
*Internal consistency validity of the sustainability variable (correlation coefficient of each item with the dimensions to which it belongs). n = 50*

| Environmental Sustainability | | Economic Sustainability | | Social Sustainability | |
|---|---|---|---|---|---|
| No. Item | Correlation | No. Item | Correlation | No. Item | Correlation |
| 1 | 0.637** | 11 | 0.723** | 25 | 0.799** |
| 2 | 0.851** | 12 | 0.606** | 26 | 0.680** |
| 3 | 0.868** | 13 | 0.580** | 27 | 0.687** |
| 4 | 0.814** | 14 | 0.621** | 28 | 0.788** |
| 5 | 0.837** | 15 | 0.758** | 29 | 0.861** |
| 6 | 0.873** | 16 | 0.769** | 30 | 0.846** |
| 7 | 0.878** | 17 | 0.806** | 31 | 0.802** |
| 8 | 0.878** | 18 | 0.789** | 32 | 0.183 |
| 9 | 0.856** | 19 | 0.240 | 33 | 0.734** |
| 10 | 0.758** | 20 | 0.671** | 34 | 0.753** |
| | | 21 | 0.176 | 35 | 0.822** |
| | | 22 | 0.746** | 36 | 0.776** |
| | | 23 | 0.609** | 37 | 0.819** |
| | | 24 | 0.754** | 38 | 0.810** |
| | | | | 39 | 0.839** |
| | | | | 40 | 0.796** |
| | | | | 41 | 0.731** |

***. Correlation is significant at the 0.01 level (2-tailed).*

The previous table also shows the values of the internal consistency coefficient for the items of the economic sustainability dimension. The values for items 19 and 21 were 0.240 and 0.176, respectively, which are insignificant. In contrast, the rest of the items ranged from 0.580 to 0.806, which are significant at the 0.01 level. This confirms that they measure what the dimensions is intended to measure, making them valid for their purpose. The table also shows the values of the correlation coefficients for the social sustainability dimension. The value for item No. 32 was 0.183, which is insignificant. In contrast, the internal consistency coefficient for the remaining items ranged from 0.680 to 0.861, and these values are significant at the 0.01 level. This confirms that they measure what the dimensions measures, thus demonstrating validity and fulfilling their intended purpose.

Based on the values of the internal consistency coefficient shown in table 6 for the sustainability items in its three dimensions—environmental, economic, and social—items 19, 21, and 32 were excluded as they were not statistically significant. Accordingly, the final image of the sustainability measurement instrument emerged from 38 items distributed across its three dimensions: environmental (10 items), economic (12 items), and social (16 items). Appendix B

*Reliability*

An instrument with validity is not necessarily reliable (Mohd Said et al., 2020). Reliability refers to the consistency across parts of a measuring instrument (Taherdoost, 2016). If scale items hang together and measure the same construct, the scale has high internal consistency (Robinson, 2010). Reliability is assessed using statistical measures due to the instrument's quantitative nature (Saunders, 2014). The Cronbach Alpha coefficient is the most commonly used statistic for internal consistency and is ideal for Likert scales (Robinson, 2010). In educational research, the acceptable Cronbach's alpha value should not fall below 0.6, according to Churchill and Gilbert (1979). Griethuijsen et al. (2014) also indicated that acceptable values for Cronbach's alpha are 0.7 or 0.6. According to Mohd Said et al. (2020), acceptable Cronbach Alpha values range from 0.71 to 0.99.

Table 7 shows that the reliability coefficient of the questionnaire instrument was calculated using the split-half method. The length was then corrected using the Spearman equation, and finally, the Cronbach's alpha coefficient was calculated. This was done for a sample of 50 individuals, randomly selected from members and employees of sports federations in the Sultanate of Oman, outside the main study sample. This coefficient estimates the value and percentage of error resulting from the lack of correlation between the phrases of the research tool with each other and their respective axis. The higher this coefficient's value, the greater the reliability of the phrases.

Table 7

*Reliability of the dimensions of the sustainability variable using the split-half method and Cronbach's alpha coefficient* *n = 50*

| Variable | Dimensions | Split-half | Cronbach's alpha |
|---|---|---|---|
| Sustainability | Environmental Sustainability | 0.968 | 0.947 |
| | Economic Sustainability | 0.954 | 0.913 |

| | | |
|---|---|---|
| Social Sustainability | 0.969 | 0.958 |
| Total | 0.990 | 0.976 |

As shown in table 7, the overall stability coefficient of the sustainability instrument reached 0.976 based on Cronbach's alpha coefficient and 0.990 using the split-half method. The stability coefficients for all sustainability dimensions were very similar across the two methods. The social sustainability dimension had the highest value, at 0.958 based on Cronbach's alpha and 0.969 using the split-half method.

**Conclusion**

This article has successfully developed and validated a comprehensive sustainability instrument tailored specifically for Omani sports federations, aligning closely with both Oman Vision 2040 and relevant SDGs. Through meticulous methodology, including expert panels and empirical testing among federation members, the instrument has proven to be both reliable and valid, as indicated by exceptionally high reliability values. The implementation of this instrument is poised to significantly advance sustainability practices within the sports sector in Oman, addressing critical areas such as health, education, gender equality, economic empowerment, urban enhancement, and governance. By filling the existing gap in sustainability measurement within this sector, the instrument not only facilitates targeted and effective sustainability strategies but also contributes to the broader national goals encapsulated in Oman Vision 2040. This research thus provides a vital foundation for future initiatives aiming to integrate sustainability deeply and comprehensively into the fabric of Omani sports federations, ultimately fostering a more sustainable and equitable sporting environment.

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