

Article

Better Managers for More Sustainability Sports Organizations: Validation of Sports Managers Competency Scale (COSM) in Chile

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Abstract: The aim of this study is to analyze the validity and reliability of the scale of competences of sports managers (COSM) in the Chilean context. The adaptation of the COSM to Spanish was carried out in accordance with the international methodological standards. A Spanish pilot version of the instrument was then administered to 33 municipal sports managers, whose comments on the instructions and the way the articles were written resulted in minor changes. Finally, this last version was empirically applied to 212 municipal sports managers (82.5% men and 17.5% women) from 129 city councils in 16 regions of Chile who participated. The original instrument consisted of 31 items grouped in six dimensions. The analyses carried out to check the psychometric properties of the scale determined the grouping of the indicators in three dimensions, retaining 22 items from the original proposal. The new factors were: Sports and Facilities Use Regulation (12 items), Budget Management (five items), and Communication Skills (five items). The scale presented adequate goodness-of-fit indices according to the parameters recommended by the literature, as well as optimal values of the different reliability measures. The use of this instrument will contribute to the process of diagnosis of competences in sport managers, with the purpose of planning relevant and contextualized training strategies that aim at improving skills and knowledge related to professional work. Likewise, the instrument can be used by the Chilean academic community in research processes involving sport managers' competences.

Keywords: sport management; competences; skills; sport managers; scale; COSM



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1. Introduction

1.1. Sport Management and Sustainability

Nowadays, physical activity and sport are considered an important area for society, since they have an impact on human development, both from a physical dimension and from a social and even economic one, becoming a relevant element in people's lives and their environment, including the environment [1]. This relevance is evident in the Sustainable Development Goals and their contribution to achieving the objectives: "Health and Well-being", "Gender Equality", "Sustainable Cities and Communities", and "Partnerships for Achieving the Goals" [2]. In this sense, sustainability has been positioned as a characteristic that is increasingly present in sports organizations, sports events, and in actions linked to social corporate responsibility [3]. From the internal point of view of the organization, the choice of an appropriate management model can contribute to the efficiency in the

maintenance and sustainability of the organization, impacting on innovation, motivation, and creating competition and healthy relationships, which increases job satisfaction and productivity in the organizations [4]. However, a greater effort is required from society than to promote the sustainability movement in sport more strongly [5], and in this sense, today it has established itself as one of the themes of emerging scientific research in the field of sports management, as stated by Lis and Tomanek [6]. In the same vein, it is worth mentioning McCullough, Orr, and Kellison's [7] proposal for the recognition of a new sub-discipline within sports management, which has become the ecology of sport. It is therefore necessary for sports managers to develop a set of skills that will enable them to perform optimally in their sports organizations with effective functioning and attractiveness thanks to the right decisions of the managers during the conduct of it [8]. In this line, the sports manager must be able to respond quickly, adaptably, and flexibly to meet the expectations and demands of their environment [9], enabling planning that allows the efficient allocation of resources, tasks, and people, involves all levels of the organization in the common project, and establishes the conditions for the evaluation and control of actions [10]. In this sense, strategic planning in sports organizations has become an indispensable tool for decision making, concentrating a set of actions in different areas that will be carried out in an articulated and coordinated way to achieve the expected results.

Its strategic nature gives it the leadership in the direction of the organization, motivating its managers in the planning process.

Considering that competences are key to optimal management, there is a need for tools that allow managers to assess and measure them, which could contribute to a better understanding of the structure of competences for better performance in the field of sports management. Regarding the latter, there is no general definition that clearly resolves the term management in sport; therefore, we summarize a definition from the specialized literature [9,11–13], which explains it as process of managing key resources, strategic planning, and sustainability that enables achievement of an organization's business and sport objectives.

1.2. Competences and Sports Management

There are several determinations of competence that play an important role in the management of today's organizations and that contribute greatly to improving the functions related to management and control processes of the organization's strategies and objectives, and these tasks and functions are related to senior management [14].

Competences have been transformed into a tool that contributes to the efficient management of human resources, maximizing them by matching the behaviours of its members with the objectives of the organization [15], so the managers who will prosper at work will be those who have the knowledge and skills to use this knowledge, experience, motivation and these beliefs, habits, and values, summarized in one word: competences, a term with a great variety and disparity of meanings [12]. In the same vein, the authors Boyatzis [16] and Lévy-Leboyer [17] showed that in their jobs there was a positive correlation between competence and job performance. This has promoted the need to be able to measure and evaluate competences objectively, with the purpose of verifying professional performance, improving training processes, and applying them usefully in the selection of personnel [12,18]. In this way, there will be a real opportunity to establish the efficient and quality connection between training, society, the labor market, and professional performance.

The specific professional competences can be defined as those attitudes that must be developed when putting into practice the knowledge, procedures, skills, and behavior into practice in an integrated manner according to the functions inherent to the professional activity being carried out, and are specific, technical, and distinctive to each training program or degree [19]. Together with general competences, in the current society, knowledge must be accompanied by new special competences in relation to human resource management at all levels of the organization. Therefore, a new aspect of management is being formed (management as the set of competences) that presents values, knowledge, and skills and

that must be proven through successful management cooperation [20]. For the purposes of our research, we have summarized the term competence as the ability to apply knowledge, skills, personal characteristics, experience, and motivation to perform in a unique and efficient way a type of work or task expected. To the above Sidera, García, Del Hierro, and Martínez del Castillo [19], they add that the essence of a competence is not the key question nowadays, but rather, what competences are essential. The competency-based approach has both advantages and disadvantages. Training focused only on key competences can lead to a reduction of the professional autonomy of a sports manager, who will only be specialized for certain tasks without possessing a variety of knowledge necessary for a quick adaptation to the sports labor market [21].

Given the importance, it is necessary that sport is given the same importance as other areas and that at present it is considered essential that well-prepared professionals who are responsible for the management, organization, and strategic planning of sport-related activities form part of sports organizations or public/private entities, among other functions [22,23]. From the above, there will be an evolution in sports organizations that will allow them to achieve new and better objectives [24,25], seeking effectiveness, efficiency, and incorporating new trends such as sustainability.

It is considered essential that sport managers have all the necessary skills for their positions and that there are interdisciplinary programs for their training [23]; at present, sport management does not escape from this and seek the modernization and constant development organizations and professionals in charge. Doing the latter will contribute greatly to the improvement of public sports policies; promoting inclusive and sustainable projects can improve the quality of life of people, reducing segregation and social vulnerability [26].

In addition, sports managers need to be able to intervene beyond their own premises [27], considering open spaces and nature as an ally for the development of sport activities, giving greater importance to the environment and its care, which allows them to create strategic alliances with the private world through corporate social responsibility in order to achieve objectives they may have in common [28]. The above, in the current scenario of a pandemic caused by the Covid-19 virus, is an opportunity to consider the recommendations for physical activity and sports practice in natural and open spaces, respecting the transitional regulations and protocols necessary for their implementation.

1.3. Sports Managers Competency Scale (COSM)

On measuring and assessing the skills of sports managers, Toh and Jamieson [23] developed an instrument that focused on the study of competences in sport management, which they called the Competences of Sport Managers (COSM). Also noteworthy are the contributions made by Ko, Henry, and Chin-Hsuung [29] who developed and applied an instrument to evaluate the competencies of sports managers in Taiwan, identifying 11 areas of competence, and these three are not present in other works (political awareness, foreign language and learning ability, and management theory and knowledge management). Soltani et al. [30] identified and validated 62 competencies grouped in nine factors in Iranian sport managers, based on the existing literature, through a mixed design and delphi method.

The COSM scale that is the object of this work, from its creation until now, has been applied in several investigations as a tool for data collection. Barcelona [21] applied it to 1580 executive directors and 227 professors responsible for sports management by performing two factor analysis procedures using Promax rotating main factor extraction on the data. The factor analysis revealed that the competences of recreational sport managers were represented by four factors consisting of 63 competency items and representing approximately 33.3% of the variance. The factors were identified as management techniques, sports programming, business procedures, and theory/base. Chen, Fu, Liu, Xu, Zhou, and Liu [31] used COSM to measure the skills needed by 344 sports managers and directors in Taiwan; they concluded that there are significant differences in project management

skills at different levels of the career model. However, the distribution remains constant across the different levels of project management positions in terms of conceptual and organizational competences, human competences, and technical competences. Ramírez [9] undertook research that provided insight into the management skills that characterize presidents of Chilean sports clubs and associations and analyze the skills that influence the action of the associations through the COSM. The main skills that emerged from the data analysis were programs tournaments, leagues, and meetings; maintaining effective communication with the board; and using good oral communication skills. Finally, Choi [32] also used the COSM to a total of 390 PGA-certified golf course managers. The result of the factor analysis on the legal competences of golf managers indicated the presence of a six-factor model, consisting of 37 observed competences. The result of the factor analysis on the legal competences of golf managers indicated the presence of a six-factor model, consisting of 37 observed competences.

Therefore, this study aims to validate the Competences of Sport Managers [23] questionnaire, in Spanish, with application in the Chilean sports context.

2. Materials and Methods

2.1. Participants

A group of 212 municipal sports managers (82.5% men; 17.5% women) from 129 city councils in 16 regions of Chile participated. The age of the participants ranged from 21 to 64 ($M = 34.75$; $SD = 7.93$), with the average age of men being 34.49 ($SD = 7.18$) and women 35.97 ($SD = 10.77$).

2.2. Instrument

The original instrument, COSM [23], contains 31 management competences, which are grouped into six dimensions (see Appendix A): governance (seven items), sport foundations (eight items), budgeting (four items), risk management (five items), computer skills (three items) and communications (four items). The items were presented on a 5-level likert scale from 1 (very unimportant) to 5 (very important). The internal consistency for the total instrument scores obtained in the original study was: 0.96: governance (0.84), sport Foundations (0.82), budgeting (0.85), risk management (0.73), computer skills (0.70) and communications (0.73).

Translation, Adaptation, and Validation Procedure of the COSM to the Chilean Context

The adaptation of the COSM to Spanish was done considering the methodological standards defined by the International Test Commission (ITC) for a correct adaptation of the scale from one culture to another [33–35]. To avoid inaccuracies, the direct and inverse translation designs of the items were combined [36,37]. According to the parallel back-translation procedure [37], the scale was translated from the original language (English) to the study language (Spanish) by two bilingual translators independently. The two translations were then compared and analysed to obtain a final version for each item. Based on the version obtained, two other bilingual native Spanish translators with knowledge of English, and who did not know the original instrument, performed the reverse translation (Spanish to English). The goodness of the translation was judged by the degree of coincidence with the original version [38] and modifications were made in those items where the results recommended it.

The qualitative evaluation of items (content validity) was carried out through expert judgment [39]. The trial was conducted by two experts in the construction of the scale and two specialists related to the construction to be evaluated. They were given information with the specifications of the items [40,41], which included the semantic definition of the construct to be evaluated and that of its components. Then, they were shown the list of items designed to evaluate the components, and they had to judge the dimension of belonging to each one of the items. They then assessed the wording of each element and its comprehensibility, using a five-level rating scale from 1 (Strongly Disagree) to 5 (Strongly

Agree). In addition, they had a section for making observations about each of the items and could propose an alternative wording for the item if they considered it relevant. All the items obtained average scores of less than three. If the item was not classified by at least three of the four judges within the theoretical dimensions (Governance, Sport Foundations, Budgeting, Risk Management, Computer Skills, Communications), it was again reviewed, analyzing possible problems before proposing an alternative wording that would include the theoretical dimension more clearly [42].

In order to clearly define the wording of the items, the Spanish version of the instrument was applied to 33 municipal sports managers whose comments on the instructions and the way the items were written resulted in minor changes. Finally, the last version obtained was empirically applied to 212 Chilean managers, and then a psychometric results analysis and a final revision by the Spanish version for the Chilean context of the COSM.

2.3. Procedures

From a database of the Chilean Undersecretary of Regional and Administrative Development, which registers all municipal workers who work in municipal sports departments, an e-mail was sent inviting municipal officials from all regions of the country to participate in the research. Once their intention to participate was confirmed, the COSM instrument was sent by the same means [23], accompanied by an informed consent form, which was accepted and digitally signed by each subject in the sample accepting participation in the research. The information was collected between January and April 2020 by means of a non-probabilistic sampling for convenience. This sampling method was chosen because of the difficulty of carrying out a probability sampling, since a census of municipal sports managers was not available. Furthermore, the research aims did not seek representativeness or generalisation of the results. Finally, it had access to a database of potential subjects who met the inclusion criteria: being a sports manager and working in a municipal context, which also justified the use of this type of sampling.

2.4. Statistical Analysis

To check the psychometric properties of the COSM scale, a validity and reliability analysis was carried out on the sample under study. Firstly, the psychometric properties of the items of the scale were checked, by means of the statistical program SPSS version 24.0 for Windows (IBM, Armonk, NY, USA), analyzing the descriptive statistics referred to the mean, deviation, asymmetry, kurtosis, and correlation of the items with the total and alpha if the indicator is eliminated.

Secondly, exploratory factor analysis (EFAs) and confirmatory factor analysis (CFAs) were used as statistical techniques to analyze the internal validity of the scale. The statistical programs to carry out the EFA and CFA were the FACTOR program and the EQS 6.3 program for structural equation models. The EFA was carried out from the indications proposed by Lloret-Segura et al. [43] using the Unweighted Least Squares (ULS) method, applying an oblique direct rotation, because the factors were expected to be correlated, and using the optimization implemented from the parallel analysis proposed by Timmerman and Lorenzo-Seva [44] to determine the number of factors. To check the good fit of the EFA-derived model, the root mean square of the residuals (RMSR) and goodness-of-fit index (GFI) indicators proposed by Tanaka and Huba [45] were found to have values below 0.05 [46] and above 0.95 [47], respectively. The value of the generalized G-H index proposed by Ferrando and Lorenzo-Seva [48] was also checked, which allows the replicability of the factors extracted by the EFA to be ensured if it presents values higher than 0.80. Finally, items whose factor loads were lower than 0.40 or higher than this value by two or more factors were discarded.

After performing the EFA, a CFA was performed using the robust maximum likelihood estimation method to solve possible problems derived from a non-normal distribution of the data, using Satorra-Bentler's robust χ^2 correction [49]. Several goodness-of-fit indices were used to analyze the model's fit [50]: significant chi-square of the robust correction

proposed by Satorra-Bentler (S-B χ^2) [51]; the ratio of χ^2 , and its degrees of freedom (χ^2/df) [52], which must present values lower than 5 to be acceptable [53]; the coefficients of the robust goodness-of-fit indices referred to the Comparative Fit Index (CFI) and the Incremental Fit Index (IFI), which must present values lower than 0.90 to show a good fit on the scale [54], as well as the Root Mean Square Error of Approximation (RMSEA), whose value should not be higher than 0.08 to indicate a good fit on the model [55].

Finally, the reliability of the scale and its dimensions was checked by means of the Cronbach's Alpha, the Average Variance Extracted (AVE), and the Composite Reliability (CR) indicators [56]. It was verified that the indicators presented significant factorial loads in their respective dimensions by means of the values of the t tests, assuring the convergent validity [57]. Fornell and Larcker's [58] method was used to check the discriminant validity between pairs of factors. According to this method, we can assure the discriminant validity if the square root of AVE is superior to the correlations between pairs of factors of the scale. It is also recommended that the correlation coefficients do not exceed the value of 0.85 to ensure that the factors are measuring different aspects [50].

3. Results

3.1. Psychometric Properties of the Items

First, the psychometric properties of the scale indicators were analyzed from the analysis of the values of item–total correlation, mean, standard deviation, asymmetry, and kurtosis. This information is shown in Table 1, in which we can see that most indicators present item–total correlation coefficients above the value recommended by the literature (>0.30) [59], except in the indicators CSM25 (0.24) and CSM26 (0.28). With respect to the values of asymmetry and kurtosis, in the latter case, values above 3.0 in various indicators are observed, so it cannot ensure a normal distribution of data [60].

3.2. Exploratory Factor Analysis

An EFA was carried out for the 31 indicators of the COSM scale, using the Parallel Analysis method. This procedure recommended the grouping of the indicators into two or three factors. For this reason, not only the factorial solution with two dimensions was checked, but also the grouping of the items in three factors and the grouping of six factors proposed by the original scale.

Following the criteria for excluding indicators recommended by the literature (factor loads below 0.40 or cross loads in two or more factors), in the two-factor solution, it was necessary to eliminate six items, leaving six items in one factor and 19 in the other. In the case of the six-factor solution, nine indicators were eliminated, grouped in a final four-factor factor solution: one factor with two items, another with four, another with five, and the last with eleven items. Finally, in the three-factor solution, nine items were also eliminated, being grouped into a factor of twelve items and two of five factors. This solution was very similar to the four-factor solution, although the factor with two items was eliminated. The results of the three-factor solution are shown in Table 2.

Table 1. Mean, standard deviation, corrected item–total correlation, alpha if the item is removed, asymmetry, and kurtosis values of the indicators of the COSM.

Number	Items	Means (SD) ¹	R IT-c ²	α Without Item	A ³	K ⁴
CSM1	Implements sound procedures for postponements, rescheduling, and forfeiture of games	4.57 (0.72)	0.52	0.93	−1.81	3.48
CSM2	Handles disciplinary action, accidents, game protests, and eligibility status reports	4.17 (0.79)	0.62	0.93	−0.44	−0.90
CSM3	Implements appropriate sport rules and regulations	4.47 (0.79)	0.63	0.93	−1.85	4.28
CSM4	Implements appropriate system of procurement and evaluation for officials	4.33 (0.86)	0.46	0.93	−1.15	0.95
CSM5	Utilizes procedures to regulate the conduct of participants and spectators	4.33 (0.75)	0.60	0.93	−0.77	−0.31
CSM6	Uses sound procedures for settling protests	4.51 (0.63)	0.54	0.93	−0.95	−0.15
CSM7	Establishes eligibility guidelines for participants	4.16 (0.93)	0.65	0.93	−1.06	0.95
CSM8	Applies updated knowledge in recreational sport research to practice	4.39 (0.80)	0.59	0.93	−1.43	2.35
CSM9	Articulates the benefits and values of recreational sport to individuals	4.83 (0.43)	0.47	0.93	−2.43	5.44
CSM10	Demonstrates an understanding of the sociological and psychological aspects of sport	4.48 (0.71)	0.58	0.93	−1.14	0.57
CSM11	Demonstrates an understanding of human limitations in sport	4.52 (0.70)	0.63	0.93	−1.88	5.40
CSM12	Applies leadership theories applicable to recreational sport.	4.39 (0.82)	0.61	0.93	−1.30	1.31
CSM13	Demonstrates an understanding of the organizational and operational. aspects of different types of sport programming	4.60 (0.60)	0.65	0.93	−1.26	0.54
CSM14	Applies theories of cooperative and competitive play	4.31 (0.84)	0.61	0.93	−1.11	1.07
CSM15	Demonstrates an understanding of the organizational and operational aspects of different types of sport programming (e.g., informal, instructional, club, etc.).	4.61 (0.66)	0.57	0.93	−1.94	4.74
CSM16	Identifies sources of revenue and expenditures for the budget	4.61 (0.72)	0.52	0.93	−2.01	4.13
CSM17	Defends a budget proposal.	4.64 (0.74)	0.52	0.93	−2.40	6.29
CSM18	Prepares a budget proposal.	4.61 (0.76)	0.56	0.93	−2.47	7.05
CSM19	Monitors the budget	4.45 (0.89)	0.55	0.93	−1.73	2.70
CSM20	Coordinates training for staff on legal and safety issues (e.g., first aid and CPR training)	4.24 (0.91)	0.59	0.93	−1.01	0.26
CSM21	Establishes a safety program to prevent injuries and accidents	4.24 (0.91)	0.62	0.93	−0.98	0.37
CSM22	Conducts routine inspections of facilities and equipment	4.50 (0.82)	0.59	0.93	−2.10	5.14
CSM23	Designs strategies/policies to prevent misuse of facilities and equipment	4.38 (0.80)	0.62	0.93	−1.31	1.63
CSM24	Exercises effective decision making in dealing with accidents	4.52 (0.71)	0.49	0.93	−1.48	1.79
CSM25	Utilizes computer software for word processing, spreadsheet, presentation, etc.	4.73 (0.63)	0.24	0.93	−3.01	11.54
CSM26	Utilizes computer operating system (e.g., Windows 95, Mac OS, etc.)	4.68 (0.67)	0.28	0.93	−2.44	6.66
CSM27	Utilizes customized computer software programs for such purposes as scheduling, reservations, registration, etc.	4.44 (0.88)	0.48	0.93	−1.85	3.57
CSM28	Promotes harmony among personnel	4.79 (0.48)	0.45	0.93	−2.56	7.45
CSM29	Uses good verbal communication skills	4.75 (0.50)	0.45	0.93	−1.85	2.62
CSM30	Maintains effective communications with staff	4.73 (0.52)	0.59	0.93	−1.82	2.47
CSM31	Motivates staff or volunteers	4.74 (0.52)	0.47	0.93	−2.06	4.57

¹ SD = Standard Deviation; ² Corrected item–total correlation; ³ Assymetry; ⁴ Kurtosis; 1 = Very unimportant, 2 = Unimportant, 3 = Undecided, 4 = Important 5 = Very important.

Table 2. Rotated factorial structure of the COSM scale, communalities, eigenvalues, and variance explained.

Number	Items	F1	F2	Com. ¹
Factor 1: Sports and Facilities Use Regulation				
CSM21	Establishes a safety program to prevent injuries and accidents	0.60		0.55
CSM23	Designs strategies/policies to prevent misuse of facilities and equipment	0.57		0.57
CSM14	Applies theories of cooperative and competitive play.	0.59		0.59
CSM5	Utilizes procedures to regulate the conduct of participants and spectators.	0.61		0.56
CSM2	Handles disciplinary action, accidents, game protests, and eligibility status reports	0.59		0.60
CSM12	Applies leadership theories applicable to recreational sport.	0.63		0.60
CSM22	Conducts routine inspections of facilities and equipment	0.56		0.52
CSM3	Implements appropriate sport rules and regulations	0.85		0.72
CSM27	Utilizes customized computer software programs for such purposes as scheduling, reservations, registration, etc.	0.41		0.34
CSM7	Establishes eligibility guidelines for participants	0.81		0.66
CSM8	Applies updated knowledge in recreational sport research to practice	0.90		0.70
CSM20	Coordinates training for staff on legal and safety issues (e.g., first aid and CPR training)	0.53		0.51
Factor 2: Budget Management				
CSM17	Defends a budget proposal.		0.80	0.72
CSM16	Identifies sources of revenue and expenditures for the budget		0.77	0.68
CSM18	Prepares a budget proposal.		0.84	0.80
CSM15	Demonstrates an understanding of the organizational and operational aspects of different types of sport programming (e.g., informal, instructional, club, etc.).		0.55	0.59
CSM19	Monitors the budget		0.85	0.75
Factor 3: Communication Skills				
CSM31	Motivates staff or volunteers.		0.69	0.61
CSM29	Uses good verbal communication skills		0.78	0.63
CSM6	Uses sound procedures for settling protests		0.45	0.48
CSM30	Maintains effective communications with staff		0.77	0.83
CSM28	Promotes harmony among personnel		0.76	0.64
G H Index		0.94	0.93	0.91
Items		12	5	5

¹ Com. = Communality.

The fit of the model derived from EFA was analyzed using the RMSR and gamma index or GFI coefficients, with scores within the intervals recommended by the literature: RMSR = 0.05 (<0.05) GFI = 0.99 (>0.95). Additionally, the possible replicability of the factors in other studies was checked by using the Generalized G–H Index, which had values above 0.80, indicating a possible good replicability of these in other samples [48]. Finally, the 22 items retained by the EFA explained 66.79% of the variance.

3.3. Confirmatory Factor Analysis

After the EFA, several CFAs were performed to check the fit of the factorial solutions derived from the EFA and the proposed six-factor solution of the original Toh and Jamieson scale [23]. Table 3 shows the adjustment rates of each of the factorial solutions. Firstly, it can be seen that all of them present good adjustment indexes with values within the intervals recommended by the literature, except the one proposed in the model derived from the original scale in which the CFI and IFI indexes presented values lower than 0.90. However, the solution re-specified from the original factor structure (six factors and 29 items) presented problems of reliability in the “computer skills” factor ($\alpha = 0.56$) and

also did not meet the Fornell and Larcker criteria [58] on discriminant validity. The same problems were detected in the case of the four-factor solution derived from the EFA due to the retention of the computer skills factor. In the case of the two-factor solution derived from the EFA, although it presented a good fit, it did not allow a good theoretical interpretation of the factor with fewer indicators, because it included items related to budget management with others that were scarcely related. For this reason, it was decided to select the three-factor solution derived from the EFA, because it presented a good theoretical interpretation of the factors and met the requirements of validity and reliability.

Table 3. Goodness-of-fit indices of the various COSM factorial solutions.

Factorial Solution	χ^2	df ¹	χ^2/df ¹	RMSEA (CI ²)	CFI ³	IFI ⁴
Original: 6 factors and 31 ítems	1115.90	419	2.66	0.046 (0.038–0.054)	0.88	0.89
Original: 6 factors and 29 ítems	948.91	362	2.62	0.046 (0.037–0.054)	0.90	0.90
EFA: 2 factors and 25 ítems	698.00	274	2.55	0.044 (0.033–0.054)	0.90	0.90
EFA: 3 factors and 22 ítems	581.85	206	2.82	0.052 (0.041–0.063)	0.90	0.90
EFA: 4 factors and 22 ítems	548.23	203	2.70	0.050 (0.039–0.061)	0.90	0.90

¹ Degrees of freedom; ² CI = Confidence Interval; ³ CFI = Comparative Fit Index; ⁴ IFI = Incremental Fit Index.

To analyze the reliability of the three-factor solution, the values of the Cronbach's Alpha measurements, the composite reliability (CR) and the Average Variance Extracted (AVE) were checked (see Table 4). Cronbach's Alpha showed values above 0.70, fulfilling the parameters recommended by the literature [56]. This criterion was also met in the case of CR values, with values of 0.90 for the factor of Sports and Facility Use Regulation, 0.86 for the factor of Budget Management, and 0.80 for the factor of Communication Skills factor. Regarding the AVE indicator, it was found that two of the three factors did not have values above the cut-off point of 0.50 recommended by the literature [61]. However, Hatcher [62] points out that if the reliability of the construct is acceptable, a marginally low value of the AVE can be accepted.

Convergent validity was checked by means of t-test values associated with factor loadings, which must be higher than 1.96 ($p < 0.05$) for each indicator in the factor to which they belong. The different values of the t-tests ranged from 5.31 to 11.77, fulfilling this criterion. Regarding the discriminant validity, it was found that the correlation between the three factors was lower than 0.85 as recommended by Kline [50]. Additionally, it was found that the square root of the AVE was higher than the correlation between pairs of factors, also fulfilling this criterion (see Table 5).

Table 4. Factorial loads, composite reliability, average variance extracted, and Cronbach's Alpha of the COSM scale indicators.

Number	Items	λ	α	CR ¹	AVE ²
	Factor 1: Sports and Facilities Use Regulation		0.90	0.90	0.44
CSM21	Establishes a safety program to prevent injuries and accidents	0.67			
CSM23	Designs strategies/policies to prevent misuse of facilities and equipment	0.67			
CSM14	Applies theories of cooperative and competitive play.	0.67			
CSM5	Utilizes procedures to regulate the conduct of participants and spectators.	0.65			
CSM2	Handles disciplinary action, accidents, game protests, and eligibility status reports	0.65			
CSM12	Applies leadership theories applicable to recreational sport.	0.68			
CSM22	Conducts routine inspections of facilities and equipment	0.67			
CSM3	Implements appropriate sport rules and regulations	0.76			
CSM27	Utilizes customized computer software programs for such purposes as scheduling, reservations, registration, etc.	0.49			
CSM7	Establishes eligibility guidelines for participants	0.74			
CSM8	Applies updated knowledge in recreational sport research to practice	0.71			
CSM20	Coordinates training for staff on legal and safety issues (e.g., first aid and CPR training)	0.58			
	Factor 2: Budget Management		0.86	0.86	0.56
CSM17	Defends a budget proposal.	0.79			
CSM16	Identifies sources of revenue and expenditures for the budget	0.73			
CSM18	Prepares a budget proposal.	0.83			
CSM15	Demonstrates an understanding of the organizational and operational aspects of different types of sport programming (e.g., informal, instructional, club, etc.).	0.64			
CSM19	Monitors the budget	0.75			
	Factor 3: Communication Skills		0.78	0.80	0.45
CSM31	Motivates staff or volunteers.	0.60			
CSM29	Uses good verbal communication skills	0.60			
CSM6	Uses sound procedures for settling protests	0.53			
CSM30	Maintains effective communications with staff	0.86			
CSM28	Promotes harmony among personnel	0.70			

¹ CR = Composite Reliability; ² AVE = Average Variance Extracted.

Table 5. Correlations between COSM scale factor pairs and AVE square root in the diagonal.

Factor	F1	F2	F3
Factor 1: Sports and Facilities Use Regulation	0.67		
Factor 2: Budget Management	0.51	0.75	
Factor 3: Communication Skills	0.57	0.47	0.67

4. Discussion

Given the need for validation of the COSM instrument in the Chilean context, the main objective of this study was to have a first version of this scale translated and adapted into Spanish for Chilean sports managers. To achieve this purpose, first the psychometric properties of the items and central tendency statistics were analyzed, and then the validity and reliability of the scale was assessed on the basis of various exploratory and confirmatory factor analyses.

All the models analyzed showed a tendency to reduce the number of items. The EFA suggested the grouping of the indicators into three factors. However, this solution did not coincide with the components obtained by the original Toh and Jamieson [23] six-factor scale. This could be explained by the fact that it is a sample from a different context than the one used for the original version of the COSM scale, so the three-factor model suggested eliminating nine indicators, proposing a shortened version of the Toh and Jamieson model [23]. The final model consisted of 22 elements grouped into three factors. Factor 1

Sports and Facilities Use Regulation (12 items): establishes a safety program to prevent injuries and accidents; designs strategies/policies to prevent misuse of facilities and equipment; applies theories of cooperative and competitive play; utilizes procedures to regulate the conduct of participants and spectators; handles disciplinary action, accidents, game protests, and eligibility status reports; applies leadership theories applicable to recreational sport; conducts routine inspections of facilities and equipment; implements appropriate sport rules and regulations; utilizes customized computer software programs for such purposes as scheduling, reservations and registration; establishes eligibility guidelines for participants; applies updated knowledge in recreational sport research to practice; and coordinates training for staff on legal and safety. These items are directly related to the professional contexts, specialties, areas, and levels of intervention of sport managers that must be considered when identifying the competency profile assigned to them. In addition, the different policies, aims, and objectives of organizations, departments, sections, and hierarchical levels require specific competencies, as well as different importance and value. It was found that regulation of the use of sports and facilities is common and inherent to sport management professionals. Coinciding with what was expressed by Kim et al. [15], who point out that the competencies became a tool that helps and complements the efficient management and administration of human resources, maximizing them by making the behavior of its members coincide with the objectives of the organization. Factor 2 Budget Management (five items): defends a budget proposal, identifies sources of revenue and expenditures for the budget, prepares a budget proposal, demonstrates an understanding of the organizational and operational aspects of different types of sport programming, and monitors the budget. Emphasizing the competence of the directors and managers in relation to the budgetary and financial resources of the respective organizations, Judge et al. [63] argued that the management of budgets, facilities, and personnel for the different modalities and equipment stand out as the most developed and important functions. Factor 3: Communication Skills (five items): motivates staff or volunteers, uses good verbal communication skills, uses sound procedures for settling protests, maintains effective communications with staff, and promotes harmony among personnel. Competencies in terms of extraversion; knowing how to communicate, judge, and consider; superior integration; and orientation are also highlighted as essential for those who assume planning, leadership, and team coordination behaviours [64]. Seifried [65] adds that leadership behaviours should not only be oriented towards results and task performance, but also towards interpersonal relationships in order to achieve greater organizational effectiveness.

The factors contained in the budget management and communication skills largely coincide with the original COSM scale. In contrast, the proposed factor of sports regulation and use of facilities was generated under the grouping of three items of governance, four items of sports fundamentals, four items of risk management, and one of computer skills.

In other studies that have used the COSM scale to analyze the competences of sports managers in different contexts, it has been observed that its application has been under the original instrument. However, Choi [32] made modifications using the Delphi technique, using information provided by a panel of experts, resulting in a six-factor instrument: business procedures, facilities/equipment management, staff/customer relations, emergency planning, risk management, and legal compliance.

On the other hand, it is important to keep in mind that this study has some limitations that must be considered for a correct interpretation of the results. First, it is a scale adapted to the Chilean context, so its validity and reliability must be checked in other Spanish-speaking countries in order to see whether the instrument replicates the dimensions of the original scale or proposes other groupings as in this work. On the other hand, it should be noted in mind that the sampling used is of convenience, so one must be cautious when generalizing the results to the population under study, because it may not be representative of it.

5. Conclusions

Through the validation process of the competences of sport managers (COSM) scale, it was possible to verify the psychometric criteria of validity and reliability, resulting in a new measurement instrument relevant to the Chilean context. The new instrument contains three factors and 22 items.

The content validity phase through expert judgment allowed adjustments to be made in terms of terminology and language level appropriate to the specific context of application by validating the criteria of sufficiency, clarity, consistency, and relevance, supported by the calculations of the various content validation indices.

Subsequently, we proceeded with the validation of the construct by means of the EFA and CFA, obtaining a reduction of factors and items and a new grouping, as well as the verification of the adjustment of the model to the empirical data.

Finally, the use of the Chilean version of the COSM will contribute to the process of diagnosing the competences of sports managers, establishing a baseline that will make it possible to establish the needs and gaps of sports organisations with regard to the competences of their managers, with the purpose of planning relevant and contextualized training strategies that aim at improving skills and knowledge related to professional work. Likewise, the instrument can be used by the Chilean academic community in research processes involving sport managers' competences, since it would reduce research time and allow researchers to concentrate on the analysis and interpretation of results.

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Appendix A

Below, for the reader's reference, is a Table A1 listing both factors and items from the original version of the Sports Managers Competency Scale of Toh and Jamieson [23].

Table A1. Factors and items of de original version of the Sports Managers Competency Scale.

Factor	Items
Governance	Implements sound procedures for postponements, rescheduling, and forfeiture of games
	Handles disciplinary action, accidents, game protests, and eligibility status reports
	Implements appropriate sport rules and regulations
	Implements appropriate system of procurement and evaluation for officials
	Utilizes procedures to regulate the conduct of participants and spectators
	Uses sound procedures for settling protests
Sport Foundations	Establishes eligibility guidelines for participants
	Applies updated knowledge in recreational sport research to practice
	Articulates the benefits and values of recreational sport to individuals
	Demonstrates an understanding of the sociological and psychological aspects of sport
	Demonstrates an understanding of human limitations in sport
	Applies leadership theories applicable to recreational sport.
	Demonstrates an understanding of the organizational and operational. aspects of different types of sport programming
Applies theories of cooperative and competitive play	
Budgeting	Demonstrates an understanding of the organizational and operational aspects of different types of sport programming (e.g., informal, instructional, club, etc.)
	Identifies sources of revenue and expenditures for the budget
	Defends a budget proposal.
	Prepares a budget proposal.
Risk Management	Monitors the budget
	Coordinates training for staff on legal and safety issues (e.g., first aid and CPR training)
	Establishes a safety program to prevent injuries and accidents
	Conducts routine inspections of facilities and equipment
	Designs strategies/policies to prevent misuse of facilities and equipment
Computer Skills	Exercises effective decision making in dealing with accidents
	Utilizes computer software for word processing, spreadsheet, presentation, etc.
	Utilizes computer operating system (e.g., Windows 95, Mac OS, etc.) Utilizes customized computer software programs for such purposes as scheduling, reservations, registration, etc.
Communications	Promotes harmony among personnel
	Uses good verbal communication skills
	Maintains effective communications with staff
	Motivates staff or volunteers

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