

## Psychometric Validation of a Scale Measuring Internal Social Capital in an Upper Secondary Educational Institution

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### Abstract

Social capital represents an intangible asset that organizations should value for its contribution to achieving goals. This study aimed to conduct the psychometric validation of a scale designed to measure internal social capital in an upper secondary education institution. The research facilitated the identification, adaptation, and validation of reliable instruments for assessing internal social capital.

Fieldwork employed a questionnaire consisting of 12 items and six sociodemographic questions, administered anonymously in a paper-and-pencil format. Participants granted informed consent at the beginning of the application process. The sample comprised 413 participants meeting the inclusion criteria, which required holding a permanent employment contract. The study followed a quantitative, non-experimental approach.

Three experts reviewed and evaluated the questionnaire. Psychometric evaluation involved an exploratory factor analysis (EFA) using the maximum likelihood extraction method with direct Oblimin rotation. Following expert recommendations, two analyses were performed. The first grouped items into three factors, consistent with the theoretical foundations identified in the literature. Subsequently, a confirmatory factor analysis (CFA) assessed construct validity, yielding model fit indices ranging from acceptable to excellent. These results corroborated the theoretical structure of the construct, with Cronbach's alpha values exceeding .76 and McDonald's omega composite reliability above .78.

In the second analysis, the EFA grouped the items into two factors, in line with expert suggestions. The subsequent CFA also produced model fit indices from acceptable to excellent, reinforcing the construct's theoretical basis. Reliability coefficients supported these findings,

with higher Cronbach's alpha values and McDonald's omega composite reliability above .80. The results indicated that the two-factor model (Cognitive-Relational; Structural) achieved greater internal consistency, leading to the conclusion that social capital qualities hold significant value and confirming the importance of the quality of internal social relationships in the workplace of an upper secondary educational institution.

**Keywords:** Social capital, Internal cognitive, Internal relational, Internal structural, Cognitive, Relational.

## Introduction

The emphasis placed on relationships built among an organization's employees strengthens its intangible capital when such interactions occur with both intensity and quality. Román et al. (2013) note that intangible capital enhances an organization's competitive advantage, as it plays a crucial role in the environment where emotions arise as part of social relationships (Fernández et al., 2005). These relationships embody values and attitudes that foster positive cooperative behaviors (Gordon, 2005), which, in turn, promote the organization's financial growth (Juárez et al., 2019) and expand its intellectual capital (Nahapiet & Ghoshal, 1998; Sánchez-Muñoz & Silva-Gorozabel, 2024).

According to Landázury and Sinisterra (2010), intangible capital comprises a set of assets integrating three types of capital: intellectual, human, and social. Social capital may take an internal or external form: internal social capital refers to internal social relationships, whereas external social capital encompasses relationships with external stakeholders such as suppliers, clients, and others. The scale validated in this study focuses exclusively on internal social capital. Barros-Contreras et al. (2014) argue that valuing the knowledge and accumulated experiences of individuals requires managing, organizing, and sharing them among members of the organization. Achieving this demands sound theoretical foundations, robust techniques, and valid scales that can be applied in similar contexts with minimal adaptations.

Oliden (2003) emphasizes that validating a test ensures that the items comprising the instrument remain not only relevant but also representative of the construct. For an upper secondary institution, this validation process proves essential in determining the extent to which permanent staff relationships contribute to achieving institutional goals and objectives. A literature review revealed that only 33 % of the identified scales included psychometric evidence of validity, while 66 % lacked reliability and validity analyses, leaving a significant gap in the literature and failing to clearly define the construct.

In this context, the general objective of this study involves the psychometric validation of a scale measuring internal social capital in an upper secondary education institution, thereby contributing a scale with confirmed internal validity. Achieving this general objective required two specific aims: first, to determine the scale's internal validity; second, to establish its convergent validity. The resulting scale will enable the identification of internal social capital levels in an upper secondary institution—an important factor for recognizing areas of opportunity that foster the sharing of resources and opportunities through social networks and connections, facilitating resource transfer, and strengthening the organization's adaptive capacity (Kerr, 2018).

## Conceptual Framework and Hypotheses

Coleman's theory (1986) marked the emergence of the social capital concept, enabling individuals to achieve goals and objectives that would remain unattainable without it. The theory also underscored the importance of horizontal and solidarity-based connections that foster trust, exchange, reciprocity, connections, and bonds, all of which strengthen the wealth and positive benefits of both individual and collective cooperation (Coleman, 1988). Later, Nahapiet and Ghoshal (1998) specified that internal social capital results from the aggregation of all internal organizational resources that emerge from interactions within a person or society, where a communication network forms. Vargas (2002) observed that interest in internal social capital arose instinctively, without a precise definition.

In this regard, social entities (organizations) assist each other, and internal social capital acquires value for those engaged in the interaction, but not for external entities (Gordon, 2005; Landázury & Sinisterra, 2010). This phenomenon illustrates the concept of internal—or private—social capital within organizations and highlights its role in addressing questions about the development of networks and the benefits of internal social relationships. It also serves as the foundation for an organization's capacity to embrace change and lead collective projects. Furthermore, internal social capital fosters norms, values, and personal relationships essential to organizational processes and provides criteria for adding assets derived from informal relationships within the organization's internal network (Baro, 2012; Terrén, 2004).

Similarly, social attitudes such as cooperation and participation remain essential for institutions to function effectively (Boso et al., 2024; Hanifan, 1916; Soares et al., 2023). Internal social capital exercises clear influence over the mechanisms through which individuals collaborate, with this collaborative capacity grounded in the existence of networks and in norms of reciprocity that develop and generalize over time (Putnam & Subirats, 2015). At the individual level, internal social capital divides into two dimensions: trust in others and personal contribution to social relationship activities (Huang et al., 2009).

Internal social capital holds value for the organization, which should remain willing to pay or sacrifice resources to obtain it (Fernández et al., 2005). Knowledge and experience contribute to its creation and must be organized and shared among staff members (Barros-Contreras et al., 2014). This concept, generated through employee relationships, characterizes the current economy (Bueno, 2002; Sánchez-Muñiz, 2024) and accounts for a significant share of an organization's economic success (Juárez et al., 2019). Bueno (2002) also emphasizes the importance of social interaction and its contribution to value creation within the knowledge-based social network that defines the present era.

In Europe and Asia, advances in this field include studies on internal social capital that highlight its use in organizational management and in learning from errors (Lazkano et al., 2005; Nahapiet & Ghoshal, 1998; Urhan et al., 2024). Meanwhile, research in Colombia, the United States, and Mexico stresses that relationships built among employees form the foundation of internal social capital, and that the intensity and quality of these relationships determine the organization's intangible value (Boso et al., 2024; Román et al., 2013; Fernández et al., 2005; Gordon, 2005;

Juárez et al., 2019; Nahapiet & Ghoshal, 1998; Sánchez-Muñiz & Silva-Gorozabel, 2024; Soares et al., 2023; Vargas, 2002).

Based on indexed database searches, the review considered documents whose titles, abstracts, and keywords reflected similarity to the internal social capital construct (Scopus, Redalyc, Scielo, Web of Science, and Google Scholar). The reviewed works contribute insights into the wealth of individual and collective cooperation, the instinct for socialization, and the coexistence of formal and informal relationships within an environment of trust and cooperation (Baro, 2012; Boso et al., 2024; Coleman, 1988; Gordon, 2005; Hanifan, 1916; Landázury & Sinisterra, 2010; Nahapiet & Ghoshal, 1998; Putnam & Subirats, 2015; Soares et al., 2023; Terrén, 2004; Vargas, 2002). They also underscore the value of internal social capital as part of an organization's economic growth (Barros-Contreras et al., 2014; Bueno, 2002; Fernández et al., 2005; Juárez et al., 2019; Sánchez-Muñiz, 2024).

Most of the literature lacks measurement scales for internal social capital, and no studies were identified that involve an upper secondary educational institution with confirmed reliability and validity of such scales—justifying the present research. The internal social capital construct integrates network connections, norms, and trust, which enable coordination and collaboration within the organization (Delgado-Verde et al., 2011; Hoang & Truong, 2011; Yen et al., 2015).

## **Methodology**

### *Participants*

The study involved 413 employees working across 21 campuses of the Colegio de Estudios Científicos y Tecnológicos (CECyTE) in 10 municipalities of the state of Tabasco, Mexico. A non-probability quota sampling method (39.67% proportion for each group, including all individuals who voluntarily agreed to participate in the survey) guided participant selection in their regular work environment. Data collection occurred in a single session without altering the setting, with representativeness determined by inclusion and exclusion criteria (Hernández-Sampieri et al., 2018). Inclusion criteria required participants to hold a permanent employment contract (more than one year in the position), while exclusion criteria applied to employees with temporary contracts (less than six months in the position). From a total population of 1,041 employees—classified as administrative or teaching staff—those meeting the inclusion criteria provided verbal consent to participate prior to the survey's administration.

### *Procedure*

For this ongoing research, data collection relied on a comprehensive survey questionnaire. Inadequate connectivity in 16 campuses limited the use of information and communication technologies; as a result, the survey was administered in a paper-and-pencil format at the participants' workplaces. A preliminary conversation was held to obtain consent and clarify questions. Access to potential participants was coordinated through the general director's office of CECyTE Tabasco by means of an official letter, ensuring legal authorization and the formal integrity of the data collection process. All participants granted informed consent before completing the survey. The questionnaires were distributed in sealed envelopes and requested to be returned in the same manner. Participants were instructed not to include their names or any identifying information to preserve anonymity, and were informed that all data would be used solely for the current research and handled with full confidentiality.

*Instrument Development*

The internal social capital scale was developed based on a systematic review of the available literature (Boso et al., 2024; Baro, 2012; Barros-Contreras et al., 2014; Bourdieu, 1986; Bueno, 2002; Román et al., 2013; Coleman, 1988; Fernández et al., 2005; Gordon, 2005; Hanifan, 1916; Huang et al., 2009; Juárez et al., 2019; Landázury & Sinisterra, 2010; Lazkano et al., 2005; Nahapiet & Ghoshal, 1998; Putnam & Subirats, 2015; Sánchez-Muñiz & Silva-Gorozabel, 2024; Soares et al., 2023; Terrén, 2004; Urhan et al., 2024; Vargas, 2002). Measurable elements for each factor were derived from authors who had previously employed internal social capital scales (see Table 1).

Table1. Main Scales of Internal Social Capital

Author	Country	Sample	Instruments	Reliability	Validity	Variables	Results and Conclusions
Hoang & Truong (2021)	Vietnam	677	Survey, questionnaire	Cronbach's $\alpha = 0.60$	Convergent and Discriminant	Social capital, knowledge sharing, and business performance	Social capital exerts a positive and significant impact on knowledge sharing.
Delgado-Verde et al. (2011)	Madrid, Spain	251	Survey, questionnaire	Cronbach's $\alpha = 0.87$	None	Social capital, relational capital, and technological innovation	Inter-organizational relationships are essential for the innovation process.
Román et al. (2013)	Colombia	160	Survey, questionnaire	Cronbach's $\alpha = 0.83$	None	Organizational social capital	The companies analyzed perceive positively the quality of their internal social relationships as well as those maintained with external stakeholders.
Idrovol et al. (2012)	Mexico	152	Survey, questionnaire	Cronbach's $\alpha = 0.88$	None	Workplace social capital, social support	Workplace social capital correlates appropriately with two dimensions of the Job Content Questionnaire.
Chacón-Hena et al. (2022)	Colombia	113	Survey, questionnaire	Cronbach's $\alpha > 0.70$	Convergent and Discriminant	Shared leadership, social capital, and organizational performance	The shared leadership of the management team positively influences organizational performance, with social capital fully mediating this relationship.
Chen et al. (2008)	China	128	Survey, questionnaire	Cronbach's $\alpha > 0.78$	None	Bonding, social capital, management	Scale scores significantly predicted several theoretically related factors, including interpersonal skills, sociability, investment in social capital, informational support, instrumental support, emotional support, and collective efficacy.

*Note.* Compiled based on the reviewed literature.

The content validation process involved compiling a list of 10 potential candidates based on their professional experience and scientific and academic background. From this list, three experts confirmed their participation according to availability—two theoretical experts in organizational studies and one practical expert serving as a director of one of the campuses. The first virtual meeting with the experts focused on reaching agreements and reviewing sentence

structure, as well as analyzing the pertinence, clarity, and coherence of the items, ensuring alignment with the research objectives. A second meeting addressed the proposed modifications and incorporated adjustments, resulting in the first draft of the items. In a third meeting, the experts ratified the final set of survey items.

To implement the expert judgment strategy, a consecutive quantitative analysis was conducted using Fleiss' kappa coefficient (IBM, 2019) and a data template for collecting expert agreement statistics (Valdés et al., 2019). The analysis yielded high reliability in the ratings provided by the three experts, indicating that the items met the criteria of sufficiency, clarity, coherence, and relevance for defining internal social capital (Fleiss, 1971).

The finalized items—after minor formatting adjustments—were incorporated into the survey and classified into three factors, as outlined by Cabero and Lorente (2013): Cognitive (CO, three items), Structural (ES, six items), and Relational (RE, three items) (see Table 2). However, the three-factor structure underwent qualitative scrutiny by the experts during the detailed review process, prompting the development of a second version. This alternative model retained the same items but restructured them into only two factors: Cognitive and Relational (CORE, five items) and Structural (ES, seven items). This second model was tested using the same dataset. Specifications and adjustments appear in Table 3, aiming to determine which of the two structures more effectively measures internal social capital in an upper secondary educational institution.

The 12 items were rated on a seven-point Likert scale (1 = Never to 7 = Always) (Cummins & Gullone, 2000).

Table 2. Specifications of the Factors in the Internal Social Capital Scale (Three-Factor Model)

Factor	Item	Author
<b>Cognitive (CO)</b> Common goals, shared language, and mutual understanding within social networks are necessary because they positively influence knowledge sharing (Hoang & Truong, 2021).	My colleagues and I share the same vision and goals.	Hoang & Truong (2021)
	My colleagues and I understand the strategic objectives of the school.	Román et al. (2013)
	My colleagues and I recognize the direction and working style of the school.	Román et al. (2013)
<b>Relational (RE)</b> Willingness that originates from the form and content of a relationship (Hoang & Truong, 2021).	I can trust my colleagues when I need them.	Hoang & Truong (2021)
	Colleagues help one another to generate new ideas and increase capacity in daily work.	Román et al. (2013)
	Colleagues willingly share their experiences and knowledge.	Román et al. (2013)

Factor	Item	Author
<b>Structural (ES)</b> The process of sharing knowledge in an organization, associated with the characteristics of the social network structure (Hoang & Truong, 2021).	I maintain a positive relationship with my colleagues.	Hoang & Truong (2021)
	My colleagues know what skills, knowledge, or expertise I possess.	Hoang & Truong (2021)
	I am aware of which of my skills, knowledge, or expertise could be useful to my colleagues.	Hoang & Truong (2021)
	My department functions as a work team in which everyone trusts one another.	Román et al. (2013)
	In my institution, colleagues interact informally to exchange ideas and information about daily activities.	Delgado-Verde et al. (2011)
	In my institution, colleagues engage in constructive discussions when things go wrong.	Delgado-Verde et al. (2011)

*Note.* Compiled from Delgado-Verde et al. (2011), Román et al. (2013), and Hoang & Truong (2021).

Table 3. Specifications of the Factors in the Internal Social Capital Scale (Two-Factor Model)

Factor	Item	Author
<b>Cognitive and Relational (CORE)</b> Assesses the participant's perception of common goals, shared language, and understanding within social networks—elements considered necessary because they positively influence knowledge sharing—as well as the willingness, form, and content of relationships (Hoang & Truong, 2021).	My colleagues and I share the same vision and goals.	Hoang & Truong (2021)
	My colleagues and I understand the strategic objectives of the school.	Román et al. (2013)
	My colleagues and I recognize the direction and working style of the school.	Román et al. (2013)
	I can trust my colleagues when I need them.	Hoang & Truong (2021)
	Colleagues willingly share their experiences and knowledge.	Román et al. (2013)

Factor	Item	Author
<b>Structural (ES)</b> Assesses the participant's perception of knowledge-sharing processes within an organization, associated with the characteristics of the social network structure (Hoang & Truong, 2021).	Colleagues help one another to generate new ideas and increase capacity in daily work.	Román et al. (2013)
	I maintain a positive relationship with my colleagues.	Hoang & Truong (2021)
	My colleagues know what skills, knowledge, or expertise I possess.	Hoang & Truong (2021)
	I am aware of which of my skills, knowledge, or expertise could be useful to my colleagues.	Hoang & Truong (2021)
	My department functions as a work team in which everyone trusts one another.	Román et al. (2013)
	In my institution, colleagues interact informally to exchange ideas and information about daily activities.	Delgado-Verde et al. (2011)
	In my institution, colleagues engage in constructive discussions when things go wrong.	Delgado-Verde et al. (2011)

*Note.* Compiled from Delgado-Verde et al. (2011), Román et al. (2013), and Hoang & Truong (2021).

## Data Analysis

Missing data were addressed through the substitution (imputation) method, replacing them with the arithmetic mean of the remaining values to avoid altering the distribution or removing records, which could have led to significant information loss. The dataset met normality assumptions, as indicated by skewness values within the range  $[-0.98$  to  $0.04]$  (Hair et al., 2010). Multivariate normality was examined using Mardia's coefficient, which assesses multivariate kurtosis, yielding a value of 34.938—considered indicative of normality. Homoscedasticity was verified using Levene's test for equality of variances, with results ranging from  $[0.0$  to  $4.88]$  and p-values greater than  $\alpha = 0.05$ , confirming similar variances across the data.

Kaiser–Meyer–Olkin (KMO) and Bartlett's test of sphericity were applied to assess the adequacy of the data for exploratory factor analysis (EFA). Given the normality assumption was met, EFA was performed using the maximum likelihood extraction method to group variables in the correlation matrix, followed by direct Oblimin rotation (IBM, 2019), based on the theoretical assumption that the factors were correlated. This procedure was applied to both proposed models.

Construct validity for the measurement models was evaluated through confirmatory factor analysis (CFA) to estimate the effects and relationships among multiple variables via structural equation modeling. Analyses were conducted using AMOS software, version 24 (IBM, 2015). Analytical properties were configured with 2,000 bootstrap resamples at a 95% confidence

interval, enabling the maximum likelihood option due to the assumption of multivariate normality.

Model fit for both models was assessed using the following indices:

Absolute fit indices compare the variance–covariance matrices of the proposed model and the data-derived model, including Chi-square with associated probability ( $\chi^2$ , p), where non-significance indicates no difference between the theoretical measurement model and the data-derived model; the Goodness-of-Fit Index (GFI), which examines the relative amount of variance and covariance explained by the proposed model; and the Root Mean Square Residual (RMSR), which assesses residuals, with fewer residuals indicating better fit.

Incremental fit indices compare the proposed model with the null model to identify relationships between variables, including the Tucker–Lewis Index (TLI), which reflects the degree to which a model improves over the null model, and the Comparative Fit Index (CFI), which compares the specified model with the null model.

Parsimony fit indices contrast models with different numbers of estimated parameters, including the Adjusted Goodness-of-Fit Index (AGFI), which incorporates degrees of freedom, and the Root Mean Square Error of Approximation (RMSEA), which compares the fit of the proposed model with the null model.

Theoretical fit indices compare different theoretical measurement models for the construct, including the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC), where smaller values indicate more parsimonious models given the sample size (Valdés et al., 2019).

Reliability was estimated for both proposed models using Cronbach’s alpha and McDonald’s omega ( $\omega$ ). Cronbach’s alpha was calculated for item responses with more than two response categories, while McDonald’s omega was based on factor loadings, with both indices reporting adequate values (Ventura-León & Caycho-Rodríguez, 2017). All calculations were conducted using IBM SPSS (IBM, 2019) (see Table 4).

Table 4. Reliability Coefficients for the Two Models of Internal Social Capital in an Upper Secondary Educational Institution

Reliability Coefficient	Model Values 3 Factors			Model Values 2 Factors	
	F1	F2	F3	F1	F2
McDonald’s Omega ( $\omega$ )	0.844	0.815	0.780	0.865	0.811
Cronbach’s Alpha ( $\alpha$ )	0.841	0.769	0.775	0.853	0.808

Note. Values calculated using IBM SPSS software (IBM, 2019).

## Analysis and Results

### *Descriptive Analysis*

Standard deviation, skewness, and kurtosis of the items serve as key indicators of data normality in relation to the mean (Hair et al., 2010). For the study data, skewness values ranged from –

0.888 to 0.089, kurtosis values from  $-1.114$  to  $0.395$ , and standard deviations from  $0.992$  to  $1.836$ , all of which indicate normality in the dataset (Hair et al., 2010) (see Table 5).

Table 5. Mean, Standard Deviation, Skewness, and Kurtosis of the Internal Social Capital Scale

Item Code	Item	Mean	Standard Deviation	Skewness	Kurtosis
CSICO01	My colleagues and I share the same vision and goals within the institution.	4.31	1.84	-0.24	-0.97
CSICO02	My colleagues know the institution's strategic objectives.	4.82	1.63	-0.25	-1.11
CSICO03	My colleagues identify with the institution's direction and working style.	4.88	1.53	-0.36	-0.73
CSIES01	I maintain a positive relationship with my colleagues.	5.76	1.22	-0.82	-0.33
CSIES02	My colleagues know what skills, knowledge, or expertise I possess.	5.68	0.99	-0.06	-1.10
CSIES03	I am aware of which of my skills, knowledge, or expertise could be useful to my colleagues.	5.74	1.18	-0.73	-0.38
CSIES04	My department functions as a work team in which everyone trusts one another.	5.16	1.65	-0.89	0.40
CSIES05	In my institution, colleagues interact informally to exchange ideas and information about daily activities.	4.88	1.53	-0.34	-0.86
CSIES06	In my institution, colleagues engage in constructive discussions when things go wrong.	4.75	1.75	-0.47	-0.65
CSIRE01	I can trust my colleagues when I need them.	4.73	1.53	-0.20	-0.94
CSIRE02	Colleagues help one another to generate new ideas and increase capacity in daily work.	5.32	1.44	-0.54	-0.49
CSIRE03	Colleagues willingly share their experiences and knowledge.	5.41	1.02	0.09	-1.11

*Note.* Data obtained from the survey (IBM, 2019) and compiled based on Magaña & Aguilar (2022), N = 200.

#### *Exploratory Factor Analysis (EFA)*

The exploratory factor analysis employed the Maximum Likelihood extraction method in combination with direct Oblimin rotation. Factor loadings greater than 0.31 were considered, indicating the intensity, content, precision, and representativeness of the item in defining the factor—classified as optimal ( $> 0.70$ ), moderate ( $0.40-0.70$ ), and minimal ( $0.30$ )—reflecting the theoretical robustness of each item for factor definition (Hair et al., 2010; Lloret-Segura et al., 2014).

For the three-factor model, the 12 items of the scale accounted for a total of 52.33% of the variance. The first factor, composed of three items, explained 40.39% of the variance; the second factor, with two items, explained 4.43%. Notably, item CSIRE02 (“Colleagues help one another to generate new ideas and increase capacity in daily work”) loaded on the third factor. This third factor, composed of six items, explained 7.52% of the variance (see Table 6).

For the adjusted two-factor model, the first factor comprised five items, incorporating the first two factors of the initial model, except for item CSIRE02, which again loaded on the second factor. In this model, the second factor included seven items. The first factor explained 39.97% of the variance, while the second accounted for 6.75%.

The loading of item CSIRE02 onto a different factor may result from ambiguity in the item wording, insufficient relevance to the construct being measured, or specific contextual characteristics of the permanent staff at CECyTE Tabasco.

Table 6. Exploratory Factor Analysis of the Two Models of the Internal Social Capital Scale

Item Code	Three-Factor Theoretical Model			Adjusted Model	Two-Factor Model	<i>h</i> <sup>2</sup>
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	
CSICO01 My colleagues and I share the same vision and goals within the institution.	0.27	0.00	<b>-0.47</b>	0.22	<b>-0.49</b>	0.46
CSICO02 My colleagues know the institution's strategic objectives.	-0.04	0.08	<b>-0.88</b>	-0.07	<b>-0.95</b>	0.82
CSICO03 My colleagues identify with the institution's direction and working style.	0.00	0.07	<b>-0.84</b>	-0.04	<b>-0.91</b>	0.77
CSIRE01 I can trust my colleagues when I need them.	0.08	<b>0.77</b>	-0.16	0.32	<b>-0.48</b>	0.84
CSIRE02 Colleagues help one another to generate new ideas and increase capacity in daily work.	<b>0.50</b>	0.27	-0.04	<b>0.60</b>	-0.14	0.50
CSIRE03 Colleagues willingly share their experiences and knowledge.	0.02	<b>0.72</b>	-0.04	0.27	<b>-0.33</b>	0.56
CSIES01 I maintain a positive relationship with my colleagues.	<b>0.64</b>	0.15	0.01	<b>0.72</b>	-0.02	0.52
CSIES02 My colleagues know what skills, knowledge, or expertise I possess.	<b>0.54</b>	0.04	0.00	<b>0.57</b>	0.01	0.31
CSIES03 I am aware of which of my skills, knowledge, or expertise could be useful to my colleagues.	<b>0.63</b>	0.01	0.06	<b>0.65</b>	0.08	0.36
CSIES04 My department functions as a work team in which everyone trusts one another.	<b>0.61</b>	0.01	0.03	<b>0.61</b>	0.04	0.36
CSIES05 In my institution, colleagues interact informally to exchange ideas and information about daily activities.	<b>0.58</b>	-0.13	-0.16	<b>0.50</b>	-0.12	0.41
CSIES06 In my institution, colleagues engage in constructive discussions when things go wrong.	<b>0.58</b>	-0.04	-0.08	<b>0.53</b>	-0.07	0.37

Note. *N* = 413; *KMO* = .89; *df* = 66;  $\chi^2 = 2186.02$ ; *p* < .001; *h*<sup>2</sup> = *Communality*. Extraction method: Maximum likelihood analysis with direct Oblimin rotation. Three-factor model: Factor 1 = Cognitive (CO); Factor 2 = Relational (RE); Factor 3 = Structural (ES). Explained variance: 52.33%. Two-factor model: Factor 1 = Cognitive and Relational (CORE); Factor 2 = Structural (ES). Explained variance: 46.73%.

Confirmatory Factor Analysis (CFA)

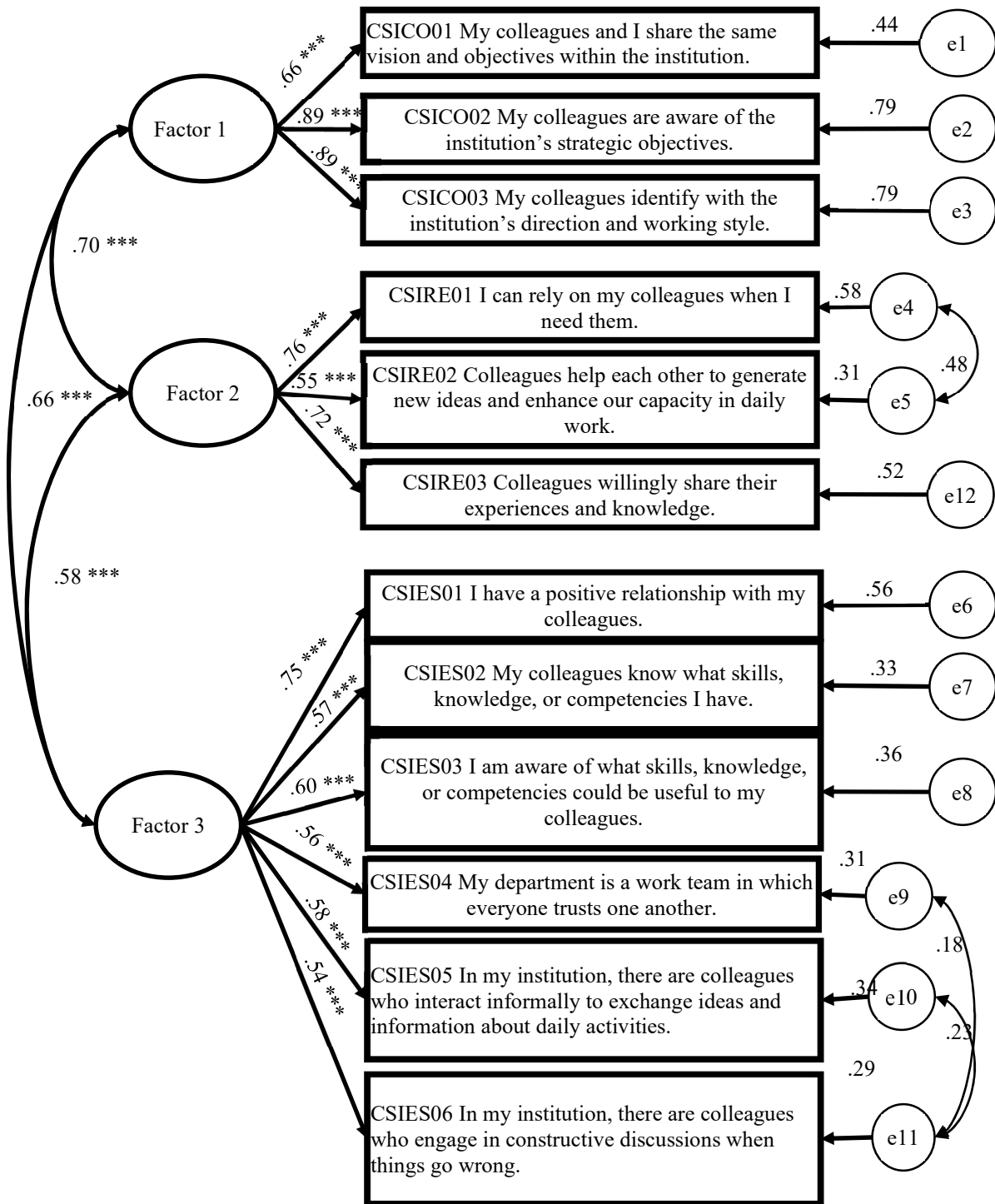
Based on the theoretical framework of the model, a Confirmatory Factor Analysis (CFA) was conducted to validate the structure derived from the theoretical deductions for two models: the three-factor model (see Figure 1) and the two-factor model (see Figure 2). Both models achieved significant factor loadings greater than .50, indicating the proportion of variance explained by the construct—where values closer to one denote stronger explanatory power (Samperio, 2019)—and positive covariances among the internal constructs. According to Valdés et al. (2019), an analysis of the global fit indices was considered, including the absolute fit indices (Chi-square with associated probability ( $\chi^2$ , p), Goodness of Fit Index (GFI), and Root Mean Square Residual (RMSR)); the incremental fit indices (Tucker–Lewis Index (TLI), Comparative Fit Index (CFI)); the parsimony fit indices (Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA)); and the theoretical fit indices (Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC)) (see Table 7).

Table 7. Fit Indices for the Two Models of Internal Social Capital in an Upper Secondary Educational Institution

Indicator	Expected Values	3-Factor Model Values	2-Factor Model Values
<b>Indicators of the Model's Goodness of Fit</b>			
$\chi^2$		<b>136.82</b>	<b>132.91</b>
Gf		48	48
<i>p</i>	> .05	<b>.017</b>	<b>.027</b>
<b>Absolute Fit Indices</b>			
$\chi^2/gf$	1 a 3	<b>2.85</b>	<b>2.77</b>
Goodness of Fit Index	> .90	.95	.95
Standardized Root Mean Square Residual (SRMR)	≤ .08	.05	.05
<b>Incremental Fit Indices</b>			
Tucker-Lewis Index (TLI).	≥ .90	.94	.94
Comparative Fit Index (CFI).	≥.95	.96	.96
<b>Parsimony Fit Indices</b>			
Adjusted Goodness of Fit Index (AGFI).	≥ .90	.92	.92
Root Mean Square Error of Approximation (RMSEA).	De .06 a .08	.07 IC 90 [.05-.08]	.07 IC 90 90 [.05-.08]
<b>Theoretical Fit Indices</b>			
Akaike Information Criterion (AIC)	Smaller values suggest better fit	<b>196.81</b>	<b>192.91</b>
Bayesian Information Criterion (BIC)		<b>317.52</b>	<b>313.61</b>

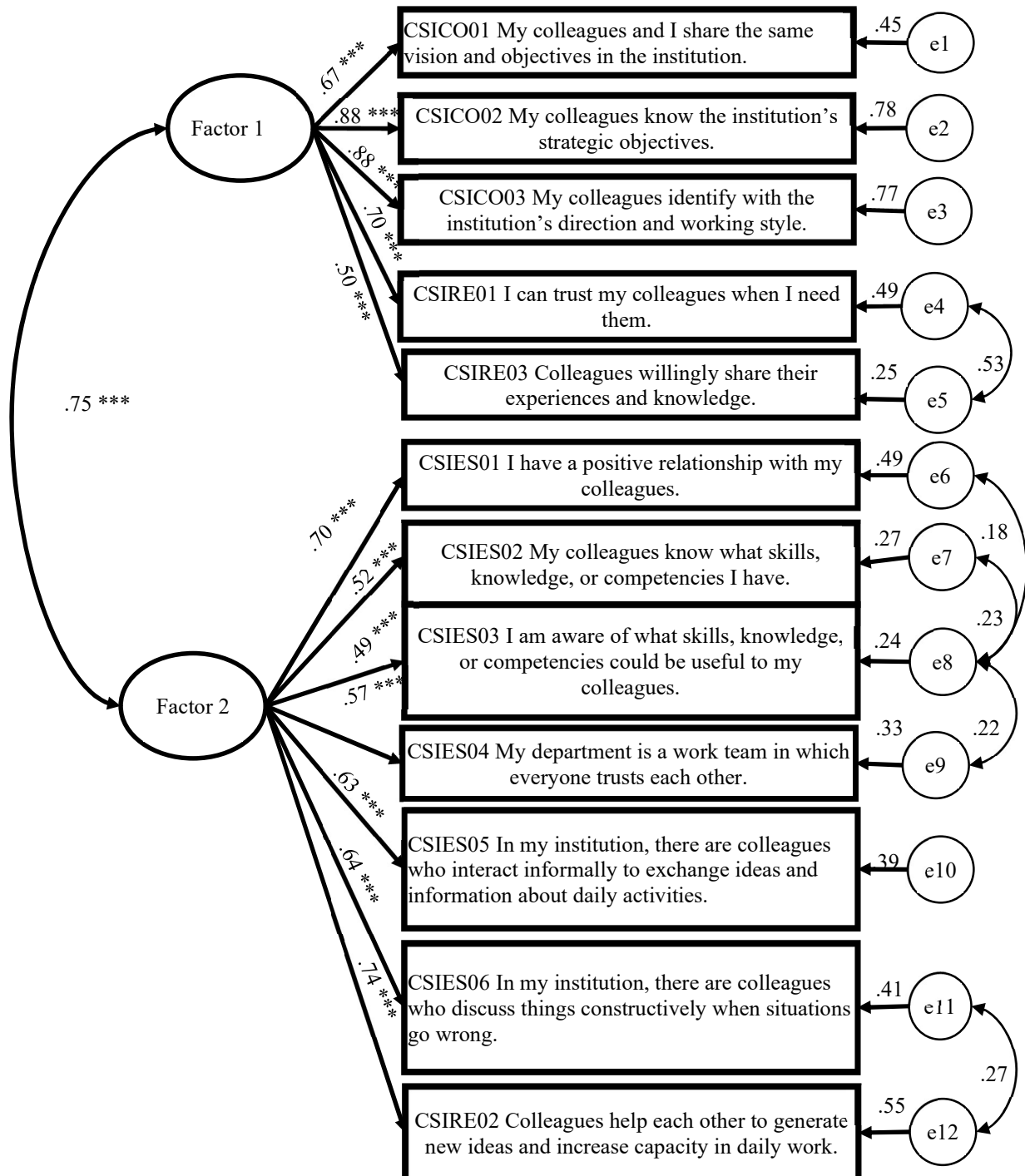
Note. Prepared based on Valdés et al. (2019). N = 413.

Figure 1. Measurement model of the Internal Social Capital scale of an upper secondary educational institution



with three factors  
 Nota: \*\*\* p < 0.001.

Figure 2. Measurement model of the Internal Social Capital scale of an upper secondary educational institution with two factors.



Nota: \*\*\*  $p < 0.001$ .

## Discussion

The present study psychometrically validated a scale designed to measure internal social capital in upper secondary educational institutions. Based on the two analyses conducted, the two-factor model (Cognitive–Relational and Structural) achieved superior fit indices, reliability, and convergent validity compared with the three-factor model.

Although differences in fit between the two models remained minimal, indicators such as the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) supported the stronger fit of the two-factor internal social capital model (Cognitive–Relational; Structural) for determining the extent to which resources and opportunities are shared through social networks and connections, thereby fostering adaptive capacity (Kerr, 2018) in an upper secondary educational institution.

Psychometric properties of the scale—according to the exploratory factor analysis and the models adjusted in the CFA following Valdés et al. (2019)—confirmed its validation as a tool to measure internal social capital in such institutions. This validation gained further support from the two-factor model proposed by Delgado-Verde et al. (2011) and Chen et al. (2008).

Integration of the scale into the study of internal social capital at an upper secondary educational institution highlighted the value employees place on trusting colleagues in times of need, assisting each other in formulating new ideas, and maintaining positive relationships. It also emphasized the importance of knowing which skills, knowledge, or competencies colleagues possess, identifying which of these could prove useful, cultivating informal relationships, and engaging in constructive discussions when challenges arise.

Reliability assessment followed two approaches. First, factor loadings of the items were examined to determine their consistency in measuring the construct according to the model, using McDonald's Omega Composite Reliability ( $\Omega$ ) (Hair et al., 2010), with the recommended threshold set at  $\geq 0.60$ . Second, given that the items offered more than two response options, Cronbach's alpha ( $\alpha$ ) was calculated to assess the degree to which items relate to each other and measure the same construct (Hair et al., 2010). Both calculations yielded values exceeding .80—both for Cronbach's alpha and for McDonald's Omega composite reliability—indicating strong internal consistency, with items functioning harmoniously to measure internal social capital in an upper secondary educational institution. A comparison of both models revealed that the two-factor structure delivered higher measurement precision for this educational level.

The Average Variance Extracted (AVE), defined as the proportion of variance explained by the factor's indicators, should exceed 0.50. Convergent validity requires both composite reliability (CR) to surpass AVE and AVE to exceed 0.50 (Hair et al., 2010). The results demonstrated convergent validity for the first factor, indicating precision and reliability in measuring it, but did not confirm this for the second factor.

According to Hoang and Truong (2021), the three dimensions of social capital—structural, relational, and cognitive—hold significance in workplace contexts; these findings also confirm the importance of the quality of internal social relationships (Román et al., 2013).

This study provides instruments with evidence of validity and reliability for strengthening internal social capital. Based on these findings, future research should deepen the design and validation of specific internal social capital models applicable to both primary and higher education institutions, with the purpose of analyzing their effects, structural and functional relationships, as well as their impact on organizational and educational processes.

### **Limitations**

The scale advances research on internal social capital within a specific context, supported by the robustness and reliability of its components. However, certain limitations must be acknowledged (Manterola & Otzen, 2015). While the instrument demonstrates value for measuring the construct, the study population included only upper secondary education institutions. Expanding the dataset could improve model fit, and the minimal number of items per factor may have affected the fit indices.

Future studies should broaden the context so that the sample includes institutions beyond the upper secondary level. Such expansion will require re-evaluating the scale's dimensions. Increasing the number of observable variables could yield stronger results, and the wording and purpose of item CSIRE02 should also be reassessed.

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