

Developing and Validating a Culturally Grounded Scale of Indigenous Leadership Competencies: Evidence from Maya-Mam and Xinka Communities in Guatemala

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Abstract

Indigenous communities in Guatemala face persistent social, economic, and political inequities that limit their participation in development decision-making, including agricultural and rural development initiatives. Leadership development programs often rely on Western leadership models that many times do not reflect Indigenous epistemologies and communal leadership practices. The purpose of this study was to develop and validate an empirical instrument to measure the perceptions of Maya-Mam and Xinka communities regarding the leadership competencies that characterize effective indigenous leaders. Guided by Indigenous Maya-Mam and Xinka leadership practices, an initial 20-item instrument was developed, pilot-tested, and validated. Data were collected from 138 Indigenous community members using both paper-based and online surveys. Exploratory factor analysis retained 13 items across a four-factor structure: service, mediation, Indigenous values, and experience, accounting for 43.71% of the total variance following rotation. The overall scale demonstrated evidence of convergent and discriminant validity, indicating that the resulting instrument is a psychometrically sound, culturally grounded tool for measuring community perceptions of Indigenous leadership competencies. This instrument provides agricultural development practitioners, extension professionals, and development organizations with a culturally connected tool to support their assessments and strengthen Indigenous leadership capacity.

Article History

Received: May 6, 2026

Accepted: August 5, 2026

Published: August 11, 2026

Keywords

Indigenous leadership competencies; Guatemala; Scale development and validation; Agricultural development; SDG 16: Peace, Justice, and Strong Institutions

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Introduction and Problem Statement

Guatemala is a Central American country with a population of approximately 17 million people, nearly half of whom identify as Indigenous, including the Maya, Garifuna, and Xinka (International Work Group for Indigenous Affairs [IWGIA], 2024). Although Guatemala has the largest economy in Central America, these economic gains are unevenly distributed. Indigenous populations continue to experience disproportionate levels of poverty, social exclusion, racism, and loss of livelihoods (Aguilar-Støen & Sveinsdóttir, 2022; IWGIA, 2024).

The Mayas, Guatemala's largest Indigenous group, face persistent barriers to education, employment, and healthcare, with many communities living in extreme poverty (Ippolito et al., 2017; USAID, 2023). Limited access to bilingual education and interpretation services further restricts civic participation (Aragón, 2014). The Xinka people, an Indigenous group with a long history in Guatemala, have faced colonization, displacement, and marginalization. Nevertheless, efforts to revive their culture have led to increased population numbers and a stronger sense of community identity (de los Ángeles et al., 2015; Vásquez Monterroso, 2019).

A key driver of these inequities is the limited representation of Indigenous peoples in decision-making processes, resulting in unequal access to essential services, economic opportunities, and food security (USAID, 2023; Zhang et al., 2012). These challenges also affect agricultural and rural development initiatives, which often depend on trusted community leaders to facilitate participation, collective action, and engagement with external organizations (Lamino, Ceme, et al., 2025; Speer & Vásquez, 2013). Despite investments in Indigenous leadership, many initiatives rely on Western frameworks that don't adequately reflect Guatemala's Indigenous practices, which are collective, communitarian, and service-oriented (Aguilar-Støen & Sveinsdóttir, 2022; Ekern, 2011; Hall & Patrinos, 2014). Therefore, this study addresses that gap by developing and validating a culturally grounded instrument to measure community perceptions of the leadership competencies that characterize effective Indigenous leaders.

Theoretical and Conceptual Framework

This study is grounded in the leadership competency-based (LC) model, which conceptualizes leadership as a set of measurable motives, traits, values, knowledge, and skills that can be adapted across diverse cultural contexts (Chouhan & Srivastava, 2014; Dubois, 1998; Page et al., 1994). However, the LC model has been critiqued for its limited contextual sensitivity, particularly in non-Western settings, where leadership is often shaped by culturally embedded values, relational dynamics, and lived experiences (Ibrahim & Hasnan, 2014; Megahed, 2018).

In response to these limitations, this study expands the LC and aligns it with two culturally grounded frameworks: the Indigenous Maya-Mam Leadership Competencies (IM-MLC) framework (Lamino, Boren-Alpízar, et al., 2025) and the Xinka Leadership Practices Model (XLPM) framework (Lamino et al., 2026). The LC model provided the theoretical foundation,

while the IM-MLC and XLPM frameworks contextualized leadership competencies within Maya-Mam and Xinka communities and informed the development of the instrument.

In the IM-MLC framework, the knowledge component is expanded to include experience, subdivided into leading by example, literacy, and life stages. Skills and traits include mediator competencies such as project management, agricultural brokerage, and bilingualism. Service is a central competency embedded within both motives and values. As a motive, service emphasizes developing future leaders; as a value, it encompasses religious commitment, relationship-building, inclusion, and transparency (Lamino, Boren-Alpízar, et al., 2025).

Similarly, the XLPM framework integrates experience within the knowledge component, encompassing guiding experiences, formal education, and internal and external knowledge. Skills and traits reflect common Indigenous competencies, with mediation identified as a core leadership function that involves shared leadership, effective communication, and cultural brokerage. Service is also central to Xinka leadership, guiding motives through leader development and the conservation of Xinka values (Lamino et al., 2026).

Across both frameworks, motives reflect drivers of action; traits represent consistent responses to situations; self-concept and values capture attitudes and identity; knowledge encompasses learning and experience; and skills refer to task performance (Chouhan & Srivastava, 2014; Spencer & Spencer, 1993). While skills and knowledge are more readily developed through training, deeper components such as motives and values are shaped over time and remain essential to a holistic understanding of Indigenous leadership.

Purpose

This study aimed to develop and validate a culturally grounded instrument to measure community perceptions of the leadership competencies that characterize effective Indigenous leaders in Maya-Mam and Xinka communities. To accomplish this purpose, the following research question was established:

1. What factor structure and psychometric properties emerge from an Indigenous leadership competency instrument developed for and validated with Maya-Mam and Xinka communities in Guatemala?

Methods

Instrument Development and Validation

This study used an exploratory approach to instrument development and psychometric validation (DeVellis, 2017). The earlier qualitative phases included two separate grounded theory studies that created the IM-MLC framework and the IXL Model (Lamino, Boren-Alpízar, et al., 2025; 2026). In this phase, the community's perceptions of leadership competencies from the IM-MLC and XLPM were transferred to a survey instrument to assess its psychometric properties.

Thus, for the present study, a non-probabilistic, purposive sampling was used to recruit Indigenous Maya and Xinka participants. Although these groups are culturally distinct, their contextual conditions are highly similar, supporting the use of a shared measurement instrument (USAID, 2023). An initial 20-item instrument, developed from the community perceptions of the leadership competencies identified in the IM-MLC and XLPM frameworks, was evaluated using exploratory factor analysis with hypothesized loadings on five leadership constructs: service, mediation, experience, collectivity, and gender.

Content validity was established through a literature review conducted before and during the development of the constructs, which specifically identified the competencies of Indigenous leaders. After developing the items, a panel comprising two experts in instrument design, two experts in leadership development, and three experts familiar with the Guatemalan cultural context reviewed the instrument to assess its content validity. Response process validity was established during in-person data collection in the pilot phase, in which participants confirmed that the items and information accurately reflected their leader competencies (Newton, 2018). Items were rated using a three-point Likert-type scale (1 = strongly disagree, 2 = neither agree nor disagree, 3 = strongly agree).

For internal structure validity, descriptive statistics were calculated for each item scale, including frequencies, skewness, and kurtosis. Individual-item analysis assessed normality and outliers, indicating that responses were well distributed across options. The means and variances of Maya-Mam and Xinka responses were compared and showed no significant differences, allowing the data to be treated as a homogeneous group (Salkind, 2010). An exploratory factor analysis [EFA] was then performed to examine the data structure, the scale's factor structure, and individual factors (Crocker & Algina, 1986; Ferguson & Cox, 1993).

According to Messick (1995), consequential validity concerns the implications of score interpretations and test use, particularly regarding bias, fairness, and distributive justice. In line with this definition, respondents were asked to comment on the instrument's overall quality, suggest improvements, and judge how accurately the items reflected their real experiences.

Data Collection, Cleansing, and Analysis

Prior to full implementation, the instrument was pilot-tested with 15 participants who shared demographic characteristics like those of the target population. After their feedback, data were collected via both paper-based surveys and the Qualtrics online platform, coded in Excel, and analyzed using the Statistical Package for Social Sciences (SPSS) version 27. In total, 153 responses were collected in August 2022, and surveys with over 10% missing data ($n = 10$) were excluded (Raaijmakers, 1999). The remaining missing values were visually assessed for randomness (Jakobsen et al., 2017). Once randomness was confirmed, six multiple imputations for Likert-type missing data were performed, and the imputation means were used to construct the final database, yielding 138 responses (Enders, 2017).

Individual scatterplots were also checked for outliers, and any points that occurred more than 3 times were excluded from the analysis. Multicollinearity was evaluated using correlation

matrices, which showed no correlations above .60, indicating the absence of multicollinearity (Berry et al., 1985; Watkins, 2018). The gender construct, with its four items, was omitted from further analysis because it is not an Indigenous leadership competency, and including it would reduce model parsimony.

Descriptive statistics and EFA were conducted using principal axis factoring [PAF] with varimax rotation to identify the underlying factor structure (Watkins, 2018). The analysis began with 16 items measuring community perceptions of Indigenous leadership competencies following the conceptual removal of the gender construct. Preliminary screening indicated that Items 14 and 16 failed to meet the minimum inter-item correlation criterion (.30) and were excluded before EFA, leaving 14 items. During EFA, one additional item (Q13) failed to meet the minimum factor loading criterion (.40) and was removed, resulting in a final 13-item scale.

Although the items had acceptable skewness values (< 2) and kurtosis values (< 7) (Fabrigar et al., 1999; West et al., 1995), we decided to use PAF because our data violated the assumption of multivariate normality based on the Shapiro-Wilk test ($p < .05$), and since PAF is recommended when researchers have a clear theoretical understanding of the constructs being measured (Costello & Osborne, 2005; Finch & French, 2018; Shultz et al., 2013). A 0.05 alpha was established a priori.

Findings

Overall Instrument Exploratory Factor Analysis

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .80, indicating that the correlation matrix was suitable for factor analysis and that the common variance among items was sufficient to produce reliable factors (Kaiser, 1974). Bartlett's test statistics were significant ($\chi^2 = 525.501$, $p < .01$), which indicated that factor analysis was justified (Chan & Idris, 2017). Thus, it was concluded that EFA would be useful for detecting the underlying factor structure of the 14 items for the Indigenous leadership scale.

The EFA yielded four factors with eigenvalues greater than 1.00, accounting for 30.52%, 10.74%, 9.71%, and 7.71% of the variance, respectively. Visual inspection of the scree plot also supported the retention of four factors by indicating a clear point of inflection after the fourth factor (Cattell, 1966). In addition to meeting statistical criteria, the four-factor solution demonstrated conceptual interpretability, with each factor representing a distinct dimension on the scale identified during the qualitative framework development phase (Pett et al., 2003).

The unrotated solution indicated that the four retained factors accounted for 58.68% of the total variance. Following Varimax rotation, variance was redistributed across factors, resulting in a cumulative explained variance of 43.71%, with Factor 1 accounting for 12.53%, Factor 2 for 11.73%, Factor 3 for 11.55%, and Factor 4 for 7.90%. Because factor rotation redistributes variance to improve interpretability, subsequent interpretations are based on the rotated

solution (Pett et al., 2003). Table 1 presents the extracted factors from the initial and rotated solutions.

Table 1

Total Variance Explained by the Four Extracted Factors of the IM-MLC and XLPM scale

Factor	Initial Eigenvalues			Extracted Rotated Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	4.27	30.52	30.52	1.75	12.53	12.53
2	1.50	10.74	41.26	1.64	11.73	24.25
3	1.36	9.71	50.97	1.62	11.55	35.80
4	1.08	7.71	58.68	1.11	7.90	43.71

The resulting factor structure was generally consistent with the hypothesized model, although the final solution comprised four factors rather than the five initially proposed. Of the 14 items included in the exploratory factor analysis, factor loadings ranged from .43 to .85, exceeding the recommended minimum loading criterion of .40 (Watkins, 2018), except for item 13, which did not load sufficiently on any factor and was therefore excluded from the final scale.

Communality estimates ranged from .24 to .80, with nine of the thirteen retained items exceeding the commonly recommended .40 threshold, indicating that most items were well represented by the extracted factors. Three items (Q6, Q11, and Q19) exhibited relatively low communalities (.24–.32), suggesting that a smaller proportion of their variance was explained by the common factors. However, these items exceeded the minimum factor-loading criterion (<.40) and represented conceptually important dimensions of the community perceptions identified in the preceding qualitative phase for the IM-MLC and XLPM frameworks.

Consistent with recommendations that item retention in exploratory instrument development should be informed by both statistical evidence and theoretical relevance (Costello & Osborne, 2005; Watkins, 2018), these items were retained. The final solution consisted of four interpretable factors: Factor 1 - Service, Factor 2 - Mediation, Factor 3 - Indigenous Values, and Factor 4 - Experience. Table 2 shows the exploratory factor analysis of the scale.

Table 2*Exploratory Factor Analysis of Aggregate IM-MLC and XLPM Scale*

Scale Items	Factors				Communalities
	1	2	3	4	
The leader of my community should share his knowledge. (Q10)	.74				.64
The leader of my community should frequently communicate with its members. (Q5)	.70				.48
The leader of my community should seek group welfare. (Q8)	.65				.46
The leader of my community must be a connection between the community and public and private institutions. (Q9)		.55			.49
Community leaders should seek connections with other neighboring communities. (Q15)		.55			.42
Community leaders should not be elected by all members of the community. (Q6)		.47			.24
The leader of my community is recognized in other neighboring communities. (Q19)		.46			.32
The leader of my community is like an older brother who seeks to help the younger. (Q11)		.43			.28
**The leader of my community avoids having vices. (Q13)					
The community leader should seek to protect nature. (Q3)			.85		.80
The community leader must have a facility for public speaking. (Q2)			.74		.68
The leader of my community must have experience working outside the community. (Q4)				.57	.39
The leader of my community must have experience in other leadership positions within the community. (Q7)				.53	.39
The community leader must have experience speaking both Spanish and the community's Indigenous language. (Q1)				.48	.38

Note. Principal Axis Factoring. Varimax rotation. Item identifiers are in parentheses. ** -item failed to reach the minimum threshold for factor loading.

Factor Interpretation

The rotated factor matrix exhibited a relatively simple structure, with salient loadings concentrated on a single factor and no substantial cross-loadings, supporting the interpretability of the four-factor solution. The first factor, Service, consisted of three items

reflecting leadership behaviors centered on communication, knowledge sharing, and promoting collective welfare. A separate exploratory factor analysis of these items yielded a single-factor solution with an eigenvalue of 2.02, explaining 68.0% of the total variance. The KMO measure of sampling adequacy was .68, and Bartlett's test of sphericity was significant ($\chi^2 = 102.34$, $p < .01$), supporting that the items represented an independent latent construct.

The second factor, Mediation, comprised five items describing the leader's role in connecting the community with internal and external stakeholders while fostering relationships beyond the local community. The independent EFA supported a one-factor solution with an eigenvalue of 2.22, accounting for 44.77% of the total variance. Sampling adequacy was acceptable (KMO = .74), and Bartlett's test was significant ($\chi^2 = 101.93$, $p < .01$), indicating that the items represented a coherent latent construct.

The third factor, Indigenous Values, included two items emphasizing stewardship of nature and culturally valued communication skills. The separate EFA yielded a single factor with an eigenvalue of 1.74, accounting for 87.16% of the total variance. Although the KMO value (.50) represented the minimum acceptable level for factor analysis, Bartlett's test was significant ($\chi^2 = 108.86$, $p < .01$), supporting the retention of this factor.

The fourth factor, Experience, consisted of three items describing prior leadership involvement, work experience outside the community, and bilingual proficiency in Spanish and the community's Indigenous language. The independent EFA yielded a single-factor solution with an eigenvalue of 1.65, explaining 54.82% of the total variance. The KMO was .61, and Bartlett's test was significant ($\chi^2 = 41.39$, $p < .01$), indicating support for the factor structure.

Collectively, these findings demonstrate that the four retained dimensions, service, mediation, indigenous values, and experience, represent distinct yet complementary aspects of Indigenous leadership competencies. The consistency between the statistical evidence and the conceptual meanings derived from the preceding qualitative IM-MLC and XLPM frameworks provides additional support for the instrument's construct validity.

Descriptive and Internal Consistency Analysis

Mean scores ranged from 2.46 (Experience) to 2.76 (Indigenous Values), indicating that participants generally agreed that the retained competencies characterized effective Indigenous leaders. Standard deviations ranged from .34 to .57, suggesting relatively limited variability in responses across the four dimensions. Skewness and kurtosis values suggested no substantial departures from univariate normality for the Service, Mediation, and Experience subscales. In contrast, the Indigenous Values subscale exhibited greater negative skewness (-2.20) and positive kurtosis (4.30), indicating that responses were concentrated near the upper end of the three-point response scale and clustered around higher scores. This pattern, together with the highest observed mean score ($M = 2.76$), suggests strong endorsement of competencies related to environmental stewardship and culturally appropriate communication. These findings are consistent with the IM-MLC and XLPM frameworks, which identified these competencies as central dimensions of Indigenous leadership.

The overall instrument demonstrated strong internal consistency (Cronbach's $\alpha = .82$). Among the subscales, Indigenous Values exhibited the highest reliability ($\alpha = .85$), followed by Service ($\alpha = .76$), both exceeding the commonly recommended threshold of .70 (DeVellis, 2017; Taber, 2018). The Mediation subscale demonstrated acceptable internal consistency ($\alpha = .69$), which is considered adequate for exploratory instrument development (DeVellis, 2017). Although the Experience subscale yielded a lower reliability coefficient ($\alpha = .60$), this value remains acceptable for a newly developed scale comprising a small number of items and is consistent with recommendations for early-stage instrument development (Nunnally, 1994).

Collectively, these findings provide evidence that the overall instrument and its four subscales demonstrate satisfactory internal consistency for measuring perceptions of Indigenous leadership competencies. Descriptive statistics and internal consistency measures for the four factors and overall *IM-MLC* and *XLPM* index scale scores are presented in Table 3.

Table 3

ILC Scales: Descriptive Statistics and Scale Reliability

Factor	N	M	SD	Skewness	Kurtosis	Cronbach's α
Service	138	2.55	.57	-1.0	-.28	.76
Mediation	138	2.57	.34	-.52	-.36	.69
Values	138	2.76	.48	-2.2	4.3	.85
Experience	138	2.46	.52	-.77	-.26	.60
Overall	138	2.57	.36	-.97	.59	.82

Note. The instrument employed a three-point Likert-type scale (1 = strongly disagree, 2 = neither agree nor disagree, 3 = strongly agree).

All inter-factor correlations were positive and statistically significant ($p < .01$), ranging from .29 to .42. These moderate associations indicate that the four dimensions are conceptually related while remaining empirically distinct, supporting the instrument's multidimensional structure (Davis, 1971; Hair et al., 2019). Specifically, the absence of high inter-factor correlations (e.g., $r > .80$) suggests that the subscales measure complementary rather than redundant aspects of Indigenous leadership competencies (DeVellis, 2017).

Each subscale also demonstrated a strong positive correlation with the overall ILC score, ranging from .65 (Indigenous Values) to .76 (Mediation), providing additional evidence that each dimension contributes meaningfully to the broader construct of Indigenous leadership (Davis, 1971; Hair et al., 2019). Collectively, these findings support the instrument's internal structure by demonstrating both convergent validity, through strong associations with the overall scale, and discriminant validity, through moderate correlations among the individual dimensions (Crocker & Algina, 1986; Ferguson & Cox, 1993). Although related, no correlation approached levels indicative of multicollinearity (e.g., $r \geq .80$), further supporting the conceptual distinctiveness of the four subscales (DeVellis, 2017). The correlations among the four ILC subscales and the overall scale are presented in Table 4.

Table 4*Correlation Matrix of ILC Scales*

Scale	1	2	3	4	5
1. Service	-				
2. Mediation	.36**	-			
3. Values	.33**	.42**	-		
4. Experience	.29**	.42**	.41**	-	
5. Overall	.72**	.76**	.65**	.69**	-

Note. ** $p < .05$

Conclusions, Discussion, and Recommendations

This study developed and validated an empirical instrument to assess how Maya-Mam and Xinka community members perceive the leadership competencies associated with effective Indigenous leaders, addressing a gap in Indigenous leadership measurement research in Latin America (Abeyta et al., 2020; Bravo & Vázquez, 2019). Results supported a four-factor model consisting of service, mediation, indigenous values, and experience. Although the initial framework included five dimensions, removing the gender construct and underperforming items yielded a more parsimonious model that better reflected participants' views of Indigenous leadership.

Beyond validating a measurement model, these findings contribute to broader leadership scholarship by demonstrating that Indigenous leadership is grounded in relational, cultural, and community-oriented practices that extend beyond conventional individualistic leadership frameworks (Ibrahim & Hasnan, 2014; Megahed, 2018). The roles of service, mediation, indigenous values, and experience highlight the importance of maintaining community relationships, preserving cultural knowledge, and connecting communities with broader social systems. These findings align with Indigenous leadership perspectives emphasizing reciprocity, accountability, and collective action (de los Ángeles et al., 2015; Ekern, 2011; Oliveras-Ortiz & Hickey, 2020).

Future studies validating instruments with Indigenous populations should consider the culturally responsive response format to reduce cognitive load and improve understanding. Research shows that three-point scales can produce data comparable to those from longer ones when reliability and validity are maintained (Haladyna & Rodriguez, 2013; Jacoby & Matell, 1971; Lehmann & Hulbert, 1972). These scaled-down formats are especially suitable for populations with limited education or unfamiliar survey modes, as they lower response burden and reduce satisficing, selecting a “good enough” answer without careful thought (Sullivan & Artino, 2013). Shorter formats are quicker to administer, require less training, and are more acceptable to rural and marginalized Indigenous communities (Lorente et al., 2020; Mwape et al., 2022).

Agricultural development practitioners working with Indigenous communities in Guatemala should use culturally responsive assessment approaches to identify and support local leaders. A good example is the proposed instrument, which integrates them into community needs assessments, leadership program design, and program evaluation cycles. By using the scale of communities' perceptions regarding the leadership competencies that characterize effective Indigenous leaders, practitioners can move beyond generic leadership frameworks and design culturally responsive interventions (Aragón, 2014; MacNeill, 2014). The instrument also offers a tool for identifying and cultivating Indigenous community leaders as partners in agricultural extension efforts, aligning programmatic investments with the effective leadership competencies communities recognize (Hall & Patrinos, 2014).

Future studies should replicate the validation process using a larger, more geographically diverse sample of Indigenous communities across Guatemala and Latin America to assess the instrument's generalizability and cultural transferability. Researchers should revisit and reassess the rephrased excluded items and strengthen the mediation and experience by refining and expanding the items.

Acknowledgments

Funding Information: The research was self-funded.

Conflict of interest: There are no conflicts of interest.

Previous Dissemination: A portion of this article was previously included in a dissertation (Lamiño Jaramillo, P. S., 2023). *Indigenous leadership competencies: A mixed-methods grounded-theory study exploring the Maya-Mam and Xinka communities in Guatemala* [Doctoral dissertation, Texas Tech University] <https://ttu-ir.tdl.org/items/b485f6c5-8438-4c96-ae62-e1f63244ab0f>.

Artificial Intelligence: Grammarly, Microsoft 365 Copilot, and ChatGPT were used as AI tools to assist with language refinement and grammar correction during manuscript preparation.

Author Contribution Statement: **P. Lamino** – conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing – original draft, writing – review & editing, visualization, supervision, project administration, funding acquisition; **A.E. Boren-Alpizar** – validation, resources, project administration, funding acquisition; **J. Headrick** – validation, resources; **S. Burris** – validation, resources, funding acquisition; **C. Carpio** – validation, resources.

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