

Design and Exploration of a Quantitative Comprehensive Evaluation System for Grassroots Units

Kangli Xu¹, Baohua Wang^{2*}, Chaoran Jin³

¹Unit 32125 of PLA, Jinan, China

²Army Engineering University of PLA, Nanjing, China

³Qilu Institute of Technology, Jinan, China

Email: 2397730933@qq.com, *2304828305@qq.com, 493317461@qq.com

How to cite this paper: Xu, K. L., Wang, B. H., & Jin, C. R. (2026). Design and Exploration of a Quantitative Comprehensive Evaluation System for Grassroots Units. *Open Journal of Social Sciences*, 14, 610-626. <https://doi.org/10.4236/jss.2026.148036>

Received: July 27, 2026

Accepted: August 22, 2026

Published: August 25, 2026

Copyright © 2026 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0). <http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

The quality of an internal governance system within grassroots units of a military organization not only determines the enthusiasm of its personnel in carrying out their daily work but also serves as a powerful lever for advancing the development of the military organization. This paper constructs an initial evaluation framework based on the *Checklist for the Implementation of Routine Work in Grassroots Units*, comprising five theoretical dimensions (loyalty, combat proficiency, Proactive Responsibility, Mission Performance, and Integrity) based on the *Checklist for the Implementation of Routine Work in Grassroots Units*. A questionnaire survey was conducted using personnel from grassroots units as the data sample. Exploratory factor analysis employing principal component analysis and maximum variance orthogonal rotation was applied to validate the dimensional structure, screen and optimize the evaluation indicators, and test the scale's reliability and construct validity. This ultimately resulted in a quantitative evaluation system comprising 15 secondary indicators and 42 scoring criteria. This study aims to bridge the gap between institutional requirements and the behavior of stakeholders, transforming abstract governance requirements into quantifiable and actionable governance indicators, and introducing a replicable, evidence-based assessment tool to drive the shift of grassroots governance from subjective judgment to data-driven decision-making.

Keywords

Performance Evaluation, Quantitative Governance, Factor Analysis, Grassroots Units

1. Introduction

As military organizational units operating under a highly centralized system, grassroots units' internal order and collective identity not only concern the order of daily management but also have a profound impact on the behavioral choices, value systems, and career planning of their personnel. Although the governance system is constantly being updated and top-level design mechanisms are continually being refined, subordinates' awareness of governance rules, sense of participation, and internal identification have not kept pace with these changes. Therefore, how to bridge the gap between the requirements of grassroots governance systems and the intrinsic motivation of personnel—transforming the governance system from something “written on paper and posted on walls” into something “engraved in the heart and reflected in action”—has become a pressing issue in the modernization of grassroots unit governance capabilities. Based on this contradiction, this study takes the comprehensive evaluation of grassroots military units as its entry point. Centered on the core objective of advancing the modernization of the grassroots governance system and governance capabilities, it explores the use of quantitative scoring methods to break down macro-level governance goals into more practical, quantifiable scoring items, thereby establishing a positive feedback loop—one that is perceptible, cumulative, and responsive—between individual behavior and organizational governance.

2. Establish a Framework for a Quantitative Comprehensive Evaluation System

Conducting evaluation and recognition activities is a key means of improving the development and management capabilities of grassroots units and motivating their staff; it represents both a continuation of and a transcendence of existing governance and management paradigms. Therefore, we must consistently grasp the characteristics, requirements, and essential attributes of grassroots management; follow the specific laws governing the development of grassroots units; respect and acknowledge the current state of internal institutional mechanisms; and employ a systems-integrated approach to construct a modern governance system for grassroots units, thereby abstractly delineating the ideal state of internal governance.

2.1. Overall Objective for Establishing a Quantitative Comprehensive Evaluation System

With the improvement of grassroots units' internal governance structures as the core, the reshaping of their internal governance processes as the key, the strengthening of their internal regulations and systems as the foundation, and the enhancement of governance capabilities across all elements as the driving force, this initiative aims to comprehensively elevate the governance standards of grassroots units.

2.2. General Principles for Establishing a Quantitative Comprehensive Evaluation System

Combining Overall Planning with Coordinated Implementation. The quantitative comprehensive evaluation system is a systematic project involving multiple domains, such as political ideology and daily management. At the macro level, innovative exploration of the regulations and detailed rules for quantitative comprehensive evaluation must be conducted within the existing grassroots internal governance structure; at the implementation level, the initiative and proactive engagement of the vast majority of officers and enlisted personnel must be fully stimulated to ensure the orderly conduct of quantitative comprehensive evaluation activities at the grassroots level, thereby achieving the modernization of grassroots governance in the military.

Combining adherence to inherent principles with a focus on combat readiness. The quantitative comprehensive evaluation system must follow the inherent principles of personnel development, update concepts of grassroots governance, and establish a structural framework aligned with the growth patterns of the personnel themselves. However, grassroots units within a military organization are fundamentally designed to serve the needs of warfare; this dictates that whether through traditional management or current grassroots internal governance, the objective must remain firmly rooted in enhancing combat effectiveness, with a focus on the battlefield and warfare.

Combining a problem-oriented approach with a goal-oriented approach. The actual, prevalent issues at the grassroots level serve as the “golden key” guiding the direction of the quantitative comprehensive evaluation. The fundamental goal of the grassroots governance system is to streamline internal unit relationships in a high-quality and efficient manner and to balance the demands of various stakeholders. In the actual process of constructing the internal governance system, it is essential to adhere to the principle of combining a problem-oriented approach with a goal-oriented approach.

2.3. General Framework for Establishing a Quantitative Comprehensive Evaluation System

In accordance with the “Checklist for the Implementation of Routine Work at the Grassroots Level,” a general framework for a quantitative comprehensive evaluation system was established (**Figure 1**). Building on the implementation of relevant policies and regulations, this framework standardizes grassroots governance and establishes rigorous and concrete standards.

3. Methodology for Establishing a Quantitative Comprehensive Evaluation System

To ensure that personnel from grassroots units are genuinely involved in the process, a questionnaire survey was conducted to determine the indicators for the quantitative comprehensive evaluation. This section is organized as follows: first, questionnaire development and content validation (3.1); second, participant se-

lection and sampling procedures (3.2); third, survey administration and data cleaning (3.3); fourth, reliability testing (3.4) and validity testing with exploratory factor analysis (3.5); fifth, the linkage from factor analysis results to the final evaluation system (3.6); sixth, the data analysis procedure and factor score model (3.7); seventh, the finalized indicator framework (3.8); and finally, the scoring protocol for the evaluation system (3.9).

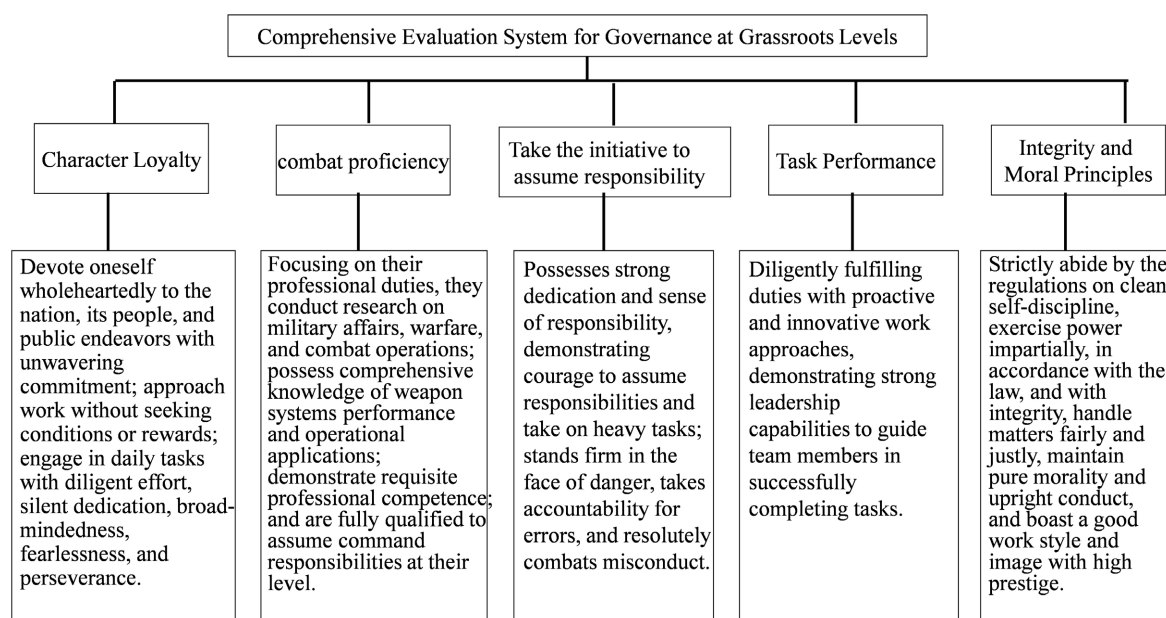


Figure 1. Overall framework of the quantitative comprehensive evaluation system.

3.1. Questionnaire Development and Content Validity

The initial item pool was derived directly from the Checklist for the Implementation of Routine Work in Grassroots Units. Two researchers independently mapped each checklist item to one of the five theoretical dimensions (loyalty, combat proficiency, proactive responsibility, mission performance, and integrity), resolving discrepancies through discussion. This process generated an initial set of 52 items. Each item was framed as a declarative statement about the frequency or quality of a specific behavior, using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

To establish content validity, the 52-item draft questionnaire was reviewed by a panel of three senior military officers (with over 15 years of grassroots command experience) and two subject matter experts in military management. The panel assessed each item for relevance, clarity, and representativeness of its assigned dimension. Based on their feedback, items with a content validity index (CVI) below .78 were revised or removed. This process reduced the item set to 45 items. A pilot test was then conducted with 30 officers from a comparable unit (not included in the final sample) to check for comprehension and feasibility. Minor wording adjustments were made based on pilot responses, yielding the final 45-item questionnaire used in the main survey.

3.2. Selection of Survey Participants and Sampling Procedure

This survey calculates the sample size based on a 95% confidence level, using the formula for determining sample size in a survey of means. Here, N represents the sample size—that is, the total number of personnel in the grassroots units, $N = 5200$ —and e represents the precision of the survey results, set at $e = .1$, σ represents the standard error of the estimate; based on previous research, the standard error of the estimate is preliminarily estimated to be $\sigma = .92$. α represents the significance level; that is, the smaller α is, the larger the sample size required, and vice versa. To achieve a 95% confidence level, α is set to .05, and the corresponding value from the normal distribution, $Z = 1.96$, is looked up (Lu, 1992). Based on the formula, the minimum sample size was calculated to be 308.

$$n = \frac{\sigma^2}{\left(\frac{e}{z}\right)^2 + \frac{\sigma^2}{N}} \quad (1)$$

The sampling method was stratified random sampling. The unit's personnel roster was first stratified by rank (officer, non-commissioned officer, and enlisted) and then by primary function (combat, support, and administrative). Within each stratum, individuals were randomly selected using a random number generator to ensure representativeness. Eligibility criteria required participants to have served in the unit for at least one year to ensure familiarity with routine work procedures. The final sample comprised 310 valid respondents, including 45 officers (14.5%), 120 non-commissioned officers (38.7%), and 145 enlisted personnel (46.8%), representing all major functional branches of the unit.

3.3. Survey Administration and Data Cleaning

The survey was administered in group settings during scheduled training breaks in March 2026. Participants were assured of the anonymity and confidentiality of their responses; they were informed that the data would be used solely for research purposes and that individual scores would not be disclosed to their chain of command. Each participant completed the 45-item questionnaire in approximately 20 minutes. Completed questionnaires were collected immediately by the research team.

Data cleaning followed a two-step procedure. First, questionnaires with more than 10% missing items (i.e., ≥ 5 blank items) were excluded. Second, responses were screened for logical consistency using three embedded reverse-coded items. Cases that showed contradictory patterns (e.g., agreeing with both a statement and its reverse-coded counterpart) were flagged and removed. Of the 315 returned questionnaires, 310 were retained as valid after this cleaning process. The retained valid response rate was $310/320 = 96.9\%$.

3.4. Reliability Testing

Reliability measures the consistency of the results from the items in a scale. In this study, Cronbach's α , a measure of internal consistency, was used to assess the reliability of the questionnaire. Generally, an α value greater than .80 indicates very

good reliability; an α between .70 and .80 indicates good reliability; an α between .60 and .70 indicates acceptable reliability; an α between .50 and .60 indicates poor reliability; and an α below .50 indicates that irrelevant variables should be excluded (Zhang & Tian, 2007).

The formula for calculating Cronbach's α is

$$\text{Cronbach } \alpha = \frac{k}{k-1} \left(1 - \frac{\sum_{i=1}^k S_i^2}{S_x^2} \right) \quad (2)$$

In the formula: k represents the number of questionnaire items; S_i represents the variance of the score for item i ; S_x represents the variance of the total questionnaire score.

The reliability test results show that the Cronbach's α coefficient for the total scale is .874, and the Cronbach's α coefficients for the five dimensions are as follows: Character Loyalty .851, Combat Proficiency .839, Proactive Responsibility .802, Mission Performance .818, and Integrity .795. The α coefficients for each dimension range from .795 to .851, all exceeding the acceptable threshold of .7, indicating that this scale possesses high internal consistency and good reliability.

3.5. Validity Testing and Exploratory Factor Analysis

An exploratory factor analysis (EFA) was conducted using principal component analysis (PCA) as the extraction method, followed by maximum variance (varimax) orthogonal rotation. The Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests can be used to determine whether the sample data are suitable for factor analysis; The KMO measure of sampling adequacy represents the ratio of all correlation coefficients associated with a variable to its perfect correlation coefficient. The coefficient ranges from 0 to 1; the closer the value is to 1, the higher the degree of correlation and the more suitable the data is for factor analysis. A KMO value greater than .6 indicates that factor analysis can be performed, while a value below .6 indicates that it is not suitable; The Bartlett's sphericity test is used to determine whether the inter-item correlation coefficients are different from zero and greater than zero. If the test results are significant, it indicates that the correlation coefficients are sufficient for extracting factors in factor analysis (Jin, 2001). A validity analysis of a sample dataset yielded the KMO and Bartlett's test statistics (see Table 1).

Table 1. KMO and bartlett's test values table.

Calculate a sufficiently high Kaiser-Meyer-Olkin statistic		.805
Approximate Chi-Square		3763.855
Bartlett's Sphericity Test	df	435
	Sig.	<.001

The KMO value was .805, which is greater than .6; the p -value for Bartlett's

sphericity test was significant ($p < .001$), indicating correlations among variables suitable for factor analysis.

The factor extraction procedure followed pre-defined criteria: 1) retain factors with eigenvalues greater than 1.0; 2) retain factors that jointly explain at least 60% of the total variance; 3) items with factor loadings below .40 on all factors were considered for removal; 4) items with cross-loadings above .32 on two or more factors (i.e., loading within .10 of each other) were also removed. The analysis yielded five common factors with eigenvalues > 1 , cumulatively explaining 72.4% of the variance. During the rotation process, three items were removed due to low primary loadings ($< .40$), and two items were removed due to high cross-loadings ($> .32$). The final factor loadings for the retained 40 items ranged from .512 to .873, with no significant cross-loadings, indicating good construct validity.

3.6. Linkage from Factor Analysis Results to the Final Evaluation System

The five retained factors corresponded precisely to the five theoretical dimensions, confirming the hypothesized structure. The items loading on each factor were then grouped thematically to form the secondary indicators. For example, within the “Character Loyalty” factor, items related to political expression, participation in education, and adherence to party principles clustered together to form the “Ideals and Beliefs” secondary indicator; items concerning knowledge mastery, study habits, and publication outputs formed “Theoretical Study”; and items reflecting work passion, dedication, and diligence formed “Ideological Quality.” This process was repeated for all five factors, yielding 15 secondary indicators. Finally, within each secondary indicator, the constituent items’ specific behavioral descriptions were converted into observable scoring criteria. For instance, the “Ideals and Beliefs” indicator’s three items were translated into three scoring criteria: “No improper comments or discussions,” “Participation in education,” and “No political issues.” This systematic, data-driven procedure directly linked the 40 retained items to the final structure of 15 secondary indicators and 42 scoring criteria.

3.7. Data Analysis Procedure

Assuming that the attitudes of the total population toward the quantitative evaluation indicators constitute a sample, the data matrix for the N samples is

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1,N} \\ x_{21} & x_{22} & \cdots & x_{2,N} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{n,3N} \end{bmatrix} = (x_1 \quad x_2 \quad \cdots \quad x_N) \quad (3)$$

Among them

$$x_j = \begin{bmatrix} x_{1j} \\ x_{2j} \\ \vdots \\ x_{nj} \end{bmatrix}, \quad j = 1, 2, \cdots, N \quad (4)$$

Evaluation metrics involve combining N observed metrics into several new metrics, that is,

$$\begin{aligned} X_1 &= a_{11}F_1 + a_{12}F_2 + \cdots + a_{1m}F_m + \varepsilon_1 \\ X_2 &= a_{21}F_1 + a_{22}F_2 + \cdots + a_{2m}F_m + \varepsilon_2 \\ &\vdots \\ X_N &= a_{N1}F_1 + a_{N2}F_2 + \cdots + a_{Nm}F_m + \varepsilon_N \end{aligned} \quad (5)$$

The following conditions must be satisfied: 1) F_i and F_j are uncorrelated ($i \neq j$), and their variances are both 1, with $m \leq p$; 2) F and ε are uncorrelated; 3) $\varepsilon_1, \varepsilon_2, \dots, \varepsilon_p$ are uncorrelated and have different variances.

In this equation, F is referred to as the key indicator of the quantitative comprehensive evaluation (X), ε is referred to as the specific indicator of the quantitative comprehensive evaluation (X), a_{ij} is referred to as the factor loading, and the matrix composed of a_{ij} is referred to as the factor loading matrix of the quantitative comprehensive evaluation. Here, the factor loadings of the quantitative comprehensive evaluation represent the correlation coefficients between the i -th quantitative comprehensive evaluation indicator and the j -th “key indicator of the quantitative comprehensive evaluation”; that is, they represent the proportion (load) by which the quantitative comprehensive evaluation indicator X_i depends on F_j (Xu & Zhu, 2005).

- 1) Select the raw indicator data, standardize it, and convert it to the required data type.
- 2) Organize and preprocess the obtained data, discarding any data that violates logical consistency.
- 3) Construct the correlation matrix for all variables.
- 4) Calculate the eigenvalues and corresponding unit eigenvectors of the correlation coefficient matrix, and select the top K eigenvalues and their corresponding eigenvectors based on their cumulative contribution rates to construct the factor loading matrix.
- 5) Perform varimax rotation on the factor loadings matrix.
- 6) Calculate factor scores, output the factor score coefficient matrix, and establish a common factor model.
- 7) Finally, analyze the problem based on the calculated factor scores and the selected common factors (Yang et al., 2025).

Assuming that K common factors are obtained after factor analysis, the expressions for these K common factors are as follows:

$$F_i = u_{i1}x_1 + u_{i2}x_2 + \cdots + u_{iN}x_N \quad (i = 1, 2, \dots, k) \quad (6)$$

In this equation, F_i is referred to as the key indicator of (X), and U_{ij} represents the component (proportion) of the common factor F_j that depends on X_i , also known as the loading.

3.8. Finalized Indicator Framework

Using factor analysis, the multiple indicators used in the comprehensive evalua-

tion are distilled into several key, meaningful composite indicators, thereby optimizing and restructuring the quantitative comprehensive evaluation system (Zhao, 2021) (see Figure 2).

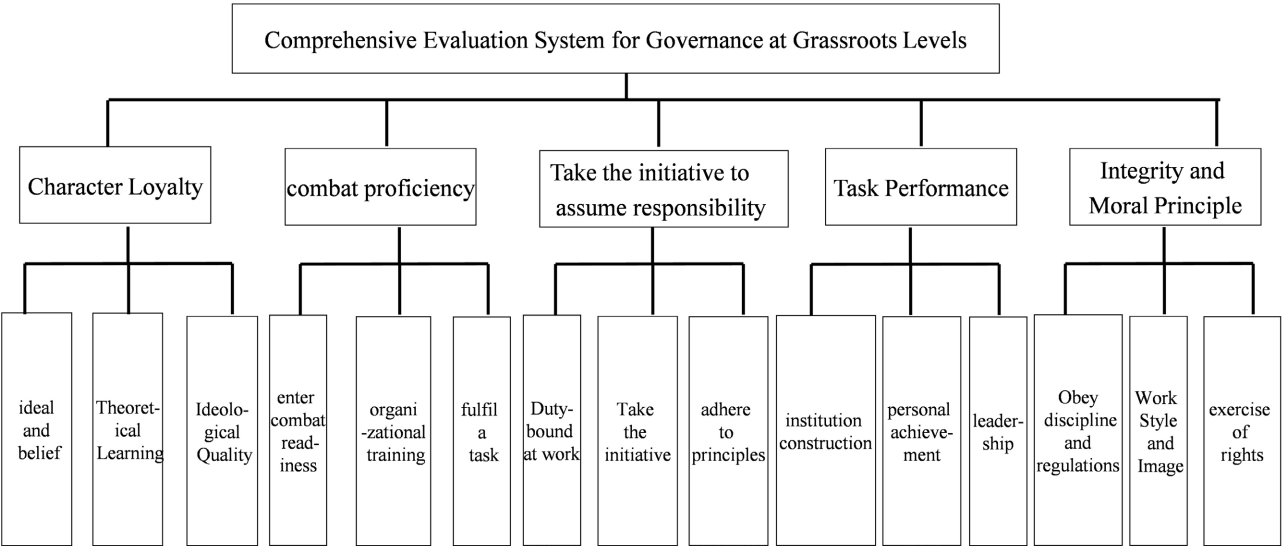


Figure 2. Comprehensive evaluation system indicator framework.

Using the preliminary indicator system described above and refining it further through factor analysis, we can derive the evaluation content and dimensions for a comprehensive evaluation system. At this point, we have established the Character Loyalty comprehensive evaluation framework, and all dimensions and secondary indicators are as follows.

Table 2. Character loyalty.

Character Loyalty	
Item	Content
Ideals and Beliefs	No improper comments or discussions
	Participation in education
	No political issues
Theoretical Study	Mastery of theoretical knowledge
	Reading and study notes
	News publication status
Ideological Quality	Passion for own work
	Strong sense of dedication
	Diligent and steadfast work

The “Character Loyalty” dimension comprises three secondary indicators: Ideals and Beliefs, Theoretical Study, and ideological Quality, with a total of nine scoring criteria (see Table 2).

Table 3. Combat proficiency.

Combat Proficiency	
Item	Content
Combat Readiness Implementation	Clear understanding of assigned tasks
	Combat readiness duties
	Combat readiness materials
	Combat readiness drills
Organization and Implementation of Training	Participation in and supervision of training
	Training order
	Assignment of teaching roles
Task Completion	Completion of major tasks
	Completion of daily tasks

The “Combat Proficiency” dimension comprises three secondary indicators: Combat Readiness Implementation, Organization and Implementation of Training, and Task Completion, with a total of nine scoring criteria (see **Table 3**).

Table 4. Taking initiative to assume responsibility.

Taking Initiative to Assume Responsibility	
Item	Content
Job Responsibility	Competent in own position
	Work standards and quality effectiveness
	Work implementation status
Proactive Action	Proactive work attitude
	Unit self-development status
	Problem-solving status
Adherence to Principles	Handling of sensitive issues
	Daring to grasp and manage work
	Safety hazard prevention

The “Taking Initiative to Assume Responsibility” dimension comprises three secondary indicators: Job Responsibility, Proactive Action, and Adherence to Principles, with a total of nine scoring criteria (see **Table 4**).

The “Task Performance” dimension comprises three secondary indicators: Unit Development, Individual Achievements, and Leadership Ability, with a total of nine scoring criteria (see **Table 5**).

The “Integrity and Moral Principle” dimension comprises three secondary indicators: Discipline and Regulation Compliance, Conduct and Image, and Use of Power, with a total of nine scoring criteria (see **Table 6**).

Table 5. Task performance.

Task Performance	
Item	Content
Unit Development	Combat readiness work
	Military training
	Ideological and political work
	Daily management
Individual Achievements	Recognition by higher authorities
	Competitions, assessments, and training
	Leading task completion status
Leadership Ability	subordinate appraisal
	Familiar with colleagues

Table 6. Integrity and moral principle.

Integrity and Moral Principle	
Item	Content
Discipline and Regulation Compliance	Implementation of regulations
	Strict self-discipline
	Violations of rules and discipline
Conduct and Image	Exemplary leading role
	Military appearance and discipline
	Civilized behavior
Use of Power	Extortion or solicitation of bribes
	Encroachment on interests
	Transparency of affairs

3.9. Scoring Protocol for the Evaluation System

Since each grassroots unit has different responsibilities, during the quantitative evaluation process, staff members must be assessed and scored in accordance with the project guidelines. For each item, performance is categorized as “good,” “average,” or “poor,” with scores of +1, 0, and −1, respectively.

The +1/0/−1 scoring is assigned by the immediate supervisor (e.g., squad leader for enlisted personnel, platoon leader for NCOs, or company commander for officers) based on observable evidence accumulated during the evaluation period. The criteria for each category are defined as follows: “Good” (+1) requires consistent, exemplary performance on the specific criterion with no documented violations or deficiencies; “Average” (0) indicates satisfactory, routine performance that meets basic standards; “Poor” (−1) is assigned when there are documented instances of non-compliance, failure to meet standards, or negative feedback from higher authority. To resolve scoring disagreements (e.g., between a supervisor and

a review board), a three-person appeal panel comprising a representative from the unit's political office, a senior non-commissioned officer, and a peer elected from the unit reviews all documented evidence and makes a final determination by majority vote. All scoring changes and appeal decisions are recorded and made available for periodic audit.

4. Standardizing the Implementation of the Quantitative Comprehensive Evaluation System

4.1. Optimizing the Steps of the Comprehensive Evaluation Process

Only by continuously optimizing the operational workflow of the quantitative comprehensive evaluation can we enhance the vitality of internal governance within grassroots units. We should follow an approach centered on the "demand side" within the grassroots units, guided by the goal of stimulating staff enthusiasm for practical work, and using the streamlining of redundant processes as a means to comprehensively optimize the steps of the comprehensive evaluation process, dividing it into quarterly stage evaluations and annual overall evaluations.

The quantitative comprehensive evaluation is organized according to the following schedule: "weekly inspections, monthly reviews, quarterly rankings, and annual summaries." Taking a specific unit as an example, it will undergo at least one specialized or task-based inspection per week, and the results of these inspections will be announced; each month, the evaluation results for that month are compiled, and during the end-of-month regular meeting, bonus points are awarded to high-performing units; Each quarter, the evaluation results are compiled, rankings are published, findings are reported, issues are identified, and recommendations are made; units with strong performance receive double points, and detailed information on quarterly progress, as well as point adjustments, is made public; annually, in conjunction with the year-end summary, annual evaluation results are compiled and combined with assessment scores to award top-performing units triple points, and the annual total score along with detailed information on point adjustments is made public. This process will continue to be refined and improved during implementation to ensure its effective and flexible application, fostering a virtuous cycle where "individual successes drive broader improvements, and broader improvements propel the entire bureau forward," thereby elevating the development of grassroots units to new heights.

4.2. Promoting a Deep Understanding of Comprehensive Evaluation

Through ideological guidance. We must prioritize building awareness among personnel, treating the quantitative comprehensive evaluation standards as a powerful tool for advancing the modernization of grassroots units, an important means of enhancing modern governance, and an effective method for inspiring staff to take initiative. Through leadership from the "fortresses." We must enhance the organizational capacity of grassroots units, their cohesion in critical moments,

and their decisiveness in times of urgency; standardize the operations of grassroots units; promote the implementation of the quantitative comprehensive evaluation; strengthen organizational functions; and drive the comprehensive development of grassroots units. Rely on Standards and Regulations (Liu, 2022). First, we must grasp the basic standards for implementing the quantitative comprehensive evaluation system, recognizing that this system serves as the core supporting mechanism within the existing institutional framework at the grassroots level, while other specialized systems serve to supplement and refine its content; second, we must keep pace with the dynamic standards of grassroots units' development—the guidelines for quantitative comprehensive evaluation are not set in stone and must be adjusted in a timely manner based on specific circumstances; third, we must adhere to an open standard of upholding principles while embracing innovation—we must continuously improve the quantitative comprehensive evaluation system, reach out to learn from advanced practices, and ensure we keep pace with the times and stay up to date; Fourth, we must strengthen the substantive standards centered on the personnel of grassroots units. The effectiveness of implementing the quantitative comprehensive evaluation is closely linked to the basic qualities and habits of the personnel; we must use this evaluation to inspire their enthusiasm for work.

4.3. Recommendations for Implementing the Comprehensive Evaluation System

Enhance Awareness. We must continue to devote effort to cultivating a core team, fostering a wholesome work environment, and nurturing a positive atmosphere within grassroots units. The comprehensive evaluation system is not an overnight solution for the development of grassroots units; rather, it is a long-term initiative that yields results slowly but lays a solid foundation for sustainable growth—one that operates with high efficiency despite its low visibility. Only through consistent and sustained implementation can we continuously strengthen the foundation of grassroots unit development. **Emphasize Scientific Coordination.** Promoting the implementation of the evaluation system is by no means about creating a separate system, imposing additional burdens, or adding unnecessary tasks; rather, it involves integration and synergy. The quantitative comprehensive evaluation must be incorporated into daily work and integrated into major initiatives. We must firmly establish the mindset that “competition and striving occur in the day-to-day,” carefully coordinate relevant responsibilities, personnel, and tasks, and scientifically plan work and management. **Establish a Clear Direction.** We must establish a clear guiding principle within the unit: “If you want to advance within the unit, the only path is through hard work and striving for excellence” (Li, 2019). Guided by the principle that “those with ability are given positions, and those who work hard are rewarded,” we conduct both horizontal and vertical comparisons. Through solid implementation and by mobilizing the participation of all staff, we ensure that everyone truly engages in healthy competition and gets

to work.

5. Summary

This study takes the quantitative comprehensive evaluation of grassroots units as its starting point. In accordance with the “Checklist for the Implementation of Routine Grassroots Work,” the quantitative comprehensive evaluation was broken down into five dimensions: “Loyalty and Integrity”, “Combat Readiness”, “Proactive Responsibility”, “Task Performance”, and “Integrity and Upright Conduct”. Using exploratory factor analysis, 310 valid questionnaires were subjected to dimensionality reduction. The results indicate that the factor model exhibits good structural validity (KMO value of .805, Bartlett’s sphericity test $p < .001$) and internal consistency (Cronbach’s α for the total scale = .874), with a cumulative variance explained of 72.4%. This validates the validity of the five-dimensional structure and provides a relatively comprehensive reflection of the cognitive profiles of personnel in grassroots units.

5.1. Theoretical Significance

At the theoretical level, this study introduces the conceptual framework of “governance modernization” in local public administration into the field of grassroots unit management, explores pathways for the concrete application of the “governance” concept in military contexts, and enriches research perspectives on internal governance at the grassroots level within the field of military management. The study demonstrates that using quantitative methods to translate principled requirements into measurable indicators is an effective approach to bridging the gap between “macro-level institutions” and “micro-level behavior”.

Through quantitative assessment, this study transforms abstract subjective evaluations into actionable quantitative comparisons, thereby validating the applicability of quantitative assessment tools within highly disciplined military organizations. Unlike traditional perspectives in Western military organization research, which focus on “civil-military relations” or “military effectiveness”, this paper examines how internal governance mechanisms influence the incorporation of individual behavior, thereby providing an empirical supplement to the study of military organizational behavior in non-Western contexts.

5.2. Practical Implications

The evaluation system developed in this study provides grassroots units with a set of replicable, scalable, and operational tools. Building on factor analysis, the study further refined the specific evaluation items under each dimension, forming a comprehensive evaluation system covering 15 secondary indicators and 42 scoring criteria, including ideals and convictions, theoretical study, ideological quality, implementation of combat readiness, organization and conduct of training, task completion, fulfillment of job duties, proactive initiative, adherence to principles, unit development, individual achievements, leadership ability, discipline and com-

pliance, conduct and image, and exercise of authority—comprising 15 secondary indicators and 42 scoring criteria. The study also established quantitative scoring guidelines distinguishing three levels (“Excellent,” “Average,” and “Poor”) using a +1/0/−1 scale. This transformed the qualitative evaluation—which had previously relied on subjective impressions—into a quantitative yardstick anchored in specific behaviors and featuring a three-tier scoring system (+1/0/−1), shifting the comprehensive quantitative assessment from qualitative descriptions to quantitative measurements and establishing an operational foundation for implementation within actual units.

This study also optimized the design of a two-tiered operational process consisting of “quarterly stage evaluations” and “annual comprehensive assessments,” establishing a year-round process-oriented governance mechanism. By organically integrating the accumulation of daily performance with year-end comprehensive evaluations, it has formed a closed-loop management mechanism that “promotes development and drives improvement through evaluation,” thereby avoiding the randomness and one-sidedness of previous year-end evaluations that served as the “final word.” The evaluation system developed by the institute has undergone preliminary pilot implementation in some units. Feedback from practice indicates that quantitative evaluations have effectively enhanced personnel’s clarity regarding evaluation criteria, strengthened the goal-oriented nature of daily work, and provided managers with a relatively objective basis for selecting outstanding performers and award recipients.

5.3. Limitations of the Study

This study has certain limitations. First, the sample data is derived solely from a single grassroots unit; the external validity of the conclusions requires cross-validation across a wider range of military units of different types. Second, due to resource constraints, this study is a cross-sectional survey and did not conduct longitudinal tracking, making it difficult to fully reveal the long-term impact of the quantitative comprehensive evaluation system on grassroots governance capabilities. Third, indicator weights are currently assigned equally, and more refined weighting methods—such as the Analytic Hierarchy Process (AHP) or entropy weighting—have not yet been introduced, which may, to some extent, affect the precision of score differentiation. Fourth, due to sample size limitations (310 valid samples), while the study meets the basic requirements for factor analysis, expanding the sample size to over 1,000 in future research would facilitate the use of structural equation modeling to further test the causal pathways among the various dimensions.

6. Outlook

Future research will be expanded in the following four areas. First, this evaluation system will be promoted and validated across different types of grassroots units, and revised to develop a more universally applicable version. Second, a longitudi-

nal tracking design will be introduced to examine changes in the level of grassroots development before and after the implementation of the comprehensive quantitative evaluation, thereby empirically verifying improvements in governance effectiveness. Third, we will explore the integration of digital tools—such as big data analysis and intelligent algorithms—into the automatic collection and intelligent analysis of evaluation data to enhance the timeliness and objectivity of the evaluation; Fourth, we will extend research on grassroots governance from the level of “individual evaluations” to that of “organizational governance capacity”, further exploring evaluation frameworks and pathways for enhancing the overall governance capacity of grassroots units.

The quantitative comprehensive evaluation system constructed in this study based on empirical data is methodologically sound and practically feasible, providing an evidence-based reference tool for advancing the modernization of the governance systems and capabilities of grassroots units within military organizations. However, the value of any governance tool must ultimately be validated through practical testing. This system still requires continuous iteration across a broader scope, over a longer timeframe, and among a more diverse range of grassroots units.

Author Contributions

Kangli Xu: Conceptualization, methodology, software, formal analysis, investigation, data curation, writing—original draft, visualization, writing—review & editing. Baohua Wang: Supervision, project administration, resources, writing—review & editing. Chaoran Jin: Investigation, data curation, validation. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Jin, Y. (2001). *Xinli Celiang* [Psychological Measurement]. East China Normal University Press.
- Li, M. (2019). Pathways for Optimizing the Implementation of Performance Management for Military Representatives. *Fundamentals of National Defense Technology*, No. 2, 57-62.
- Liu, G. M. (2022). The Connotation and Pathways for Advancing the Modernization of Grassroots Governance in the Military. *Chinese Military Science*, No. 4, 132-140.
- Lu, M. (1992). Methods and Applications of Simple Random Sampling (I). *Educational Science Research*, No. 5, 20-24.
- Xu, H., & Zhu, X. N. (2005). An Analysis of the Current Status and Countermeasures for Government Performance Evaluation. *Journal of Southwest Jiaotong University (Social Sciences Edition)*, No. 2, 68-72.
- Yang, T. C., Cao, K., Shao, H. et al. (2025). Development of An Evaluation System for the Combat-Ready Capabilities of Frontline Military Personnel in the Treatment of Combat

Injuries Based on the Analytic Hierarchy Process. *Journal of Explorations in Chinese Medical Education*, 24, 721-726. (In Chinese)

Zhang, H., & Tian, M. F. (2007). The Application of Reliability Analysis in Questionnaire Design. *Statistics and Decision Making*, No. 21, 25-27. (In Chinese)

Zhao, G. (2021). Development of A Performance Evaluation Scale for Military Personnel Based on Exploratory Factor Analysis. *Mathematical Statistics and Management*, 40, 523-532.