

Development and Validation of a Financial Literacy Assessment Instrument for Public-Sector Managers

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ABSTRACT

This study aimed to develop and validate a multidimensional instrument for assessing financial literacy among public-sector managers. This methodological, cross-sectional instrument-validation study was conducted among public-sector managers employed in governmental organizations in Yazd Province, Iran. The initial item pool was developed to represent financial competencies relevant to public-sector management and was refined through face and content validity assessment. The resulting questionnaire was administered to eligible managers with experience in financial, budgetary, administrative, or resource-allocation responsibilities. Construct validity was assessed using exploratory factor analysis. Sampling adequacy and factorability were evaluated through the Kaiser–Meyer–Olkin measure and Bartlett's test of sphericity. Principal component analysis with Varimax rotation was applied to identify the underlying dimensions. Items with inadequate or ambiguous factor loadings were removed or revised. Internal consistency reliability was examined using Cronbach's alpha for the total scale and each identified dimension. The Kaiser–Meyer–Olkin coefficient was 0.861, and Bartlett's test of sphericity was statistically significant at $p < .001$, confirming the suitability of the data for factor analysis. Exploratory factor analysis identified five factors with eigenvalues greater than 1.00, jointly explaining 68.40% of the total variance. The dimensions were Financial Regulatory Compliance, Financial Analysis and Decision-Making, Capital and Resource Management, Financial Behavior and Transparency, and Financial and Budgetary Knowledge. Primary factor loadings ranged from 0.74 to 0.82, with no substantial cross-loadings. Cronbach's alpha coefficients ranged from 0.80 to 0.88 for the five dimensions and reached 0.92 for the total 15-item scale, indicating satisfactory to very high internal consistency. The developed instrument demonstrated a clear five-factor structure, strong factor loadings, and high internal consistency, supporting its validity and reliability for assessing financial literacy among public-sector managers. The scale can provide both an overall financial literacy score and separate scores for regulatory, analytical, resource-management, behavioral, and foundational knowledge dimensions.

Keywords: Financial literacy; public-sector managers; instrument development; psychometric validation; exploratory factor analysis; reliability; public financial management.

Introduction

Financial literacy has increasingly been recognized as a multidimensional capability that enables individuals and organizational decision-makers to understand financial concepts, interpret financial information, evaluate alternatives, recognize risks, and make informed decisions about the acquisition, allocation, control, and use of



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financial resources. Although the concept was initially discussed mainly in relation to household finance, saving, borrowing, investment, and retirement planning, its scope has expanded considerably. Financial literacy is now regarded as a strategically important competency in entrepreneurship, organizational management, technological adaptation, regulatory compliance, and public-sector governance. This broader understanding reflects the fact that financial decisions are made not only by consumers and investors but also by managers whose choices affect organizational continuity, resource efficiency, service quality, and public welfare. Consequently, financial literacy should not be viewed merely as familiarity with technical financial terminology; rather, it encompasses the knowledge, analytical ability, behavioral discipline, and judgment required to convert financial information into responsible decisions (1-3).

The growing complexity of contemporary financial systems has made financial literacy increasingly important. Managers must operate in environments characterized by inflationary pressures, changing financing mechanisms, technological transformation, complex reporting requirements, financial risk, regulatory scrutiny, and demands for greater transparency. They are expected to interpret financial statements, distinguish between alternative uses of scarce resources, forecast the consequences of financial decisions, recognize the time value of money, manage cash flows, and understand how risk affects organizational outcomes. Financial literacy therefore functions as a bridge between the availability of financial information and the quality of decisions based on that information. Without this capability, even extensive financial reports and sophisticated information systems may fail to produce sound managerial judgments. In contrast, financially literate decision-makers are more likely to evaluate information systematically, recognize the limits of their knowledge, and avoid intuitive or impulsive choices that may expose their organizations to unnecessary financial risk (2, 4, 5).

An important feature of financial literacy is its relationship with financial behavior. Knowledge alone does not necessarily guarantee rational financial decisions because decision-makers may remain vulnerable to overconfidence, anchoring, loss aversion, herding, mental accounting, or other cognitive and behavioral biases. Research examining financial literacy and demographic characteristics has demonstrated that differences in financial knowledge may be associated with the extent to which individuals display behavioral biases in financial decisions. Financially literate persons may be better equipped to identify misleading assumptions, compare available evidence, and regulate emotionally driven financial responses, although financial knowledge does not entirely eliminate biased judgment (4, 5). This distinction is particularly important in managerial settings, where a biased decision can affect not only the decision-maker but also employees, organizational units, service recipients, and broader stakeholder groups. Therefore, a valid assessment of managerial financial literacy should address applied reasoning and behavioral competencies in addition to declarative financial knowledge.

The relevance of financial literacy to organizational performance has been widely demonstrated in entrepreneurial and small-business contexts. Owner-managers with stronger financial literacy are generally better able to prepare and interpret financial records, assess financing options, control expenditures, manage working capital, and align financial decisions with organizational goals. Evidence from small and medium-sized enterprises indicates that the financial literacy of owner-managers is associated with organizational performance because it improves the capacity to obtain and use financial information effectively (6). Reviews of the literature similarly show that financial literacy contributes to the performance and sustainability of small and medium-sized enterprises by supporting budgeting, financial planning, risk management, access to finance, and strategic decision-making (7). Financial literacy can also interact with entrepreneurial competency and resilience, strengthening an organization's

ability to maintain sustainable performance under uncertain economic conditions (8). These findings reinforce the view that financial literacy is an organizational capability rather than a purely personal attribute.

The ability to prepare, interpret, and use financial reports represents another central component of managerial financial literacy. Managers who lack sufficient financial knowledge may depend excessively on accountants or financial units without being able to critically evaluate the information provided to them. Although specialist support is essential, ultimate managerial responsibility requires the capacity to understand the financial implications of organizational activities. Training and assistance in preparing independent financial reports can improve the ability of decision-makers to monitor income, expenditure, and financial position and can reduce errors arising from incomplete or disorganized financial records (9). In managerial practice, this competency includes reading financial statements, identifying unfavorable trends, recognizing inconsistencies, evaluating expenditure patterns, and translating numerical information into operational or strategic action. An assessment instrument intended for managers should therefore measure not only awareness of financial concepts but also the capacity to apply those concepts when interpreting organizational financial data.

Financial literacy is particularly consequential in the public sector because public-sector managers make decisions regarding resources that are legally restricted, politically sensitive, and collectively owned. Unlike private managers, whose financial decisions are commonly evaluated in relation to profitability, growth, competitiveness, and shareholder value, public-sector managers must balance efficiency with legality, accountability, equity, transparency, and the public interest. They operate within formal budgeting systems, treasury regulations, procurement rules, taxation requirements, auditing procedures, and administrative controls. Their financial decisions may concern the allocation of public budgets, management of government assets, assessment of program costs, control of expenditures, prioritization of public projects, and protection of public funds. Accordingly, financial literacy in the public sector must include an understanding of the regulatory and institutional environment in which public money is managed.

The consequences of inadequate financial literacy among public-sector managers may extend beyond inefficient spending. Weak knowledge of budgeting rules, taxation, accounting procedures, cash-flow management, and financial risk can lead to inappropriate resource allocation, delayed implementation of public programs, inaccurate interpretation of financial reports, noncompliance with regulations, and reduced organizational accountability. Because public organizations are expected to demonstrate responsible stewardship of public resources, managerial financial literacy is closely connected to citizens' trust in administrative institutions. A financially literate public manager should be able to understand both the economic consequences and the legal implications of a decision, distinguish permissible expenditure from financially or administratively inappropriate action, and provide a clear justification for the use of allocated resources. Financial literacy in this context thus incorporates regulatory compliance, analytical competence, resource management, ethical behavior, and foundational financial knowledge.

Research focused specifically on managers supports the necessity of treating financial literacy as a context-sensitive professional construct. An evaluation of financial literacy among managers in private-sector companies demonstrated that managerial financial literacy can be studied as a distinct capability related to the responsibilities and decisions of organizational managers (10). However, measures developed for private companies cannot automatically be transferred to public organizations because the objectives, constraints, accountability relationships, and decision rules of the two sectors differ. A private-sector instrument may emphasize profitability, market opportunities, investment return, capital structure, and competitive growth, whereas a public-sector

instrument must additionally address budget laws, treasury procedures, public accountability, financial discipline, transparency, and the lawful allocation of government resources.

Evidence from healthcare organizations further illustrates the importance of sector-specific measurement. Financial literacy among managers in healthcare organizations has been described as a pathway to organizational sustainability because managers must reconcile limited financial resources with complex service obligations and long-term institutional requirements (11). This finding is relevant to public administration because governmental organizations also operate under resource constraints while remaining responsible for the continuity and quality of essential services. Nevertheless, healthcare management represents only one institutional context. Public-sector managers work across ministries, municipalities, provincial organizations, taxation agencies, social security institutions, public companies, educational organizations, and other administrative settings. The range of their financial responsibilities requires an instrument that is broad enough to capture common public-sector competencies while remaining sufficiently specific to the governmental regulatory environment.

Financial literacy is also increasingly connected with compliance behavior. Knowledge of financial rules may influence how individuals and managers interpret institutional obligations, assess the fairness of financial requirements, and decide whether to comply with them. Recent evidence suggests that financial literacy and perceived fairness influence tax compliance behavior and that trust in tax authorities may mediate these relationships (12). Although tax compliance at the individual or business level differs from managerial compliance within government organizations, the underlying principle is relevant: understanding financial obligations can shape compliance-related judgments and behavior. For public-sector managers, financial literacy may facilitate more accurate interpretation of taxation, budgeting, treasury, insurance, retirement, and reporting regulations and may reduce unintentional violations resulting from misunderstanding or incomplete knowledge.

The relationship between financial literacy and regulatory effectiveness has become even more salient with the expansion of financial technology. Digital financial systems can increase efficiency, speed, accessibility, and analytical capacity, but they can also create new risks involving fraud, data manipulation, unauthorized transactions, and money laundering. Studies of financial technology and money laundering indicate that financial regulations and financial literacy can affect the relationship between technological systems and unlawful financial activity (13). Financial requirements and financial literacy may similarly moderate the relationship between financial technology and money-laundering risks, demonstrating that technological innovation cannot substitute for informed regulatory judgment (14). Public-sector managers increasingly interact with electronic budgeting systems, digital payments, integrated financial platforms, and automated reporting mechanisms. Their ability to use these tools responsibly depends partly on understanding both financial principles and regulatory safeguards.

Artificial intelligence and big-data applications have added another layer of complexity to financial decision-making. Big data and artificial intelligence can influence investment behavior by expanding access to information, identifying patterns, and supporting predictive analysis, yet the quality of decisions still depends on the user's financial literacy and ability to interpret technological outputs (15). Generative artificial intelligence has likewise been proposed as a tool for improving financial literacy through personalized explanation, simulation, interactive learning, and rapid access to financial knowledge (16). In public administration, these technologies may assist with forecasting, expenditure monitoring, risk detection, and financial reporting. However, managers who lack foundational financial understanding may accept algorithmic recommendations uncritically or fail to recognize

inaccurate, biased, or contextually inappropriate outputs. Financial literacy therefore remains essential even when advanced technologies perform part of the analytical process.

The increasing digitalization of finance has also broadened the concept of literacy itself. Digital financial literacy includes the ability to access and evaluate financial information through digital platforms, understand technology-enabled financial products, and recognize the risks associated with online financial activity. Research in educational contexts has identified relationships among digital financial literacy, learning conditions, and achievement, demonstrating that financial competence is increasingly developed and exercised within digital environments (17). Although public-sector managers differ from students, the underlying shift toward digitally mediated financial activity applies to governmental administration as well. A contemporary instrument for assessing managerial financial literacy should consequently be conceptually compatible with environments in which financial reports, transactions, controls, and communications are increasingly digitized.

The distinction between objective and perceived financial literacy must also be considered. Individuals may believe that they possess strong financial knowledge while performing poorly on objective assessments, or they may underestimate their knowledge despite adequate competence. Research concerning cryptocurrency ownership has linked perceived financial literacy with cognitive biases, highlighting the risk that self-confidence may not accurately represent actual understanding (18). This discrepancy has important implications for the construction of self-report instruments. Items must be written clearly and behaviorally so that they assess recognizable competencies rather than inviting vague claims of general expertise. A psychometrically sound instrument should organize such items into coherent dimensions and demonstrate that the resulting scores have adequate construct validity and internal consistency.

Financial literacy also has psychological consequences. Financial anxiety can impair concentration, confidence, and decision quality, especially when individuals face complex or uncertain financial information. Financial literacy has been reported to mediate the relationship between verbal intelligence and financial anxiety, suggesting that the ability to understand financial concepts may reduce uncertainty and psychological distress associated with financial decisions (19). For managers, financial anxiety may encourage avoidance of financial responsibilities, excessive reliance on subordinates, delayed decisions, or overly conservative allocation practices. Measuring financial literacy can help distinguish deficiencies in knowledge and analytical capability from broader managerial hesitation and can provide a basis for targeted professional development.

Studies of saving and long-term financial behavior further demonstrate that financial literacy interacts with motivational and dispositional factors. Financial literacy, goal clarity, and risk tolerance may jointly shape retirement-saving behavior, indicating that financial knowledge operates within a broader system of preferences, goals, and risk perceptions (20). Similarly, assessments among young people show the value of measuring financial literacy in specific populations rather than assuming that general educational attainment adequately represents financial competence (21). Early financial education has also been characterized as foundational to later economic well-being, reinforcing the idea that financial capability develops over time and should be assessed using instruments appropriate to the respondent group and its practical responsibilities (3). These findings support the need for population-specific measures rather than universal instruments that ignore differences in context and role.

The measurement of financial literacy presents several conceptual challenges. Some instruments emphasize factual knowledge, such as interest, inflation, diversification, and the time value of money. Others include financial attitudes, confidence, behavior, planning, and decision-making. While knowledge-based tests can produce

relatively objective scores, they may insufficiently represent the applied competencies required in organizational settings. Conversely, broad self-report scales may capture attitudes and confidence but risk conflating financial literacy with personality, experience, or socially desirable behavior. For public-sector managers, an appropriate instrument should integrate knowledge with the ability to interpret financial information, evaluate risks, allocate resources, comply with regulations, and demonstrate transparent financial conduct.

A further challenge concerns contextual validity. Financial terminology, laws, administrative structures, and managerial expectations differ across countries and institutional systems. An instrument developed in one jurisdiction may contain items that are irrelevant or misleading in another. Governmental budgeting, treasury operations, taxation rules, insurance arrangements, audit systems, and public accountability mechanisms are particularly dependent on national and administrative contexts. Therefore, the content validity of an instrument for public-sector managers must be established through expert assessment, and its factor structure must be empirically evaluated among managers operating in the intended administrative environment. Without such validation, questionnaire scores may appear precise while failing to represent the actual financial competencies demanded of public managers.

The need for validation is especially important when a questionnaire is intended to provide both an overall score and scores for separate dimensions. The dimensions should be conceptually meaningful, statistically distinguishable, and internally consistent. Exploratory factor analysis can determine whether items cluster around the expected latent constructs, while indicators such as factor loadings, explained variance, and cross-loadings reveal how clearly each item represents its intended dimension. Reliability analysis can then determine whether the items within a dimension consistently measure the same underlying capability. These procedures are essential because an instrument cannot be considered suitable merely because its items appear relevant. Its empirical structure must demonstrate that the proposed interpretation of scores is supported by respondents' actual response patterns.

Despite the expansion of financial literacy research, much of the available literature focuses on households, students, investors, entrepreneurs, and owners of small and medium-sized enterprises. Research has examined investment intentions, behavioral biases, retirement saving, financial anxiety, digital financial literacy, entrepreneurship, and organizational performance (1, 2, 6, 19). These studies have made important contributions, but their instruments and conceptual emphases may not adequately represent the legal, ethical, analytical, and resource-allocation responsibilities of public-sector managers. Even studies involving organizational managers have often addressed private firms or specific sectors rather than the broader administrative environment of governmental organizations (10, 11).

Accordingly, there remains a need for a concise, contextually appropriate, and psychometrically validated instrument capable of assessing the financial literacy of public-sector managers. Such an instrument should reflect the distinct responsibilities of governmental management, including compliance with financial laws, interpretation of financial information, evaluation of financial risk, allocation of public resources, management of liquidity, control of expenditure, transparency, ethics, and foundational financial knowledge. Establishing its construct validity and internal consistency would provide an empirical basis for interpreting its scores and using it in future research or organizational assessment. The development of a validated measure would also make it possible to identify dimensions in which managers demonstrate comparatively stronger or weaker financial competencies, without assuming that educational qualifications or managerial tenure alone accurately represent financial literacy.

Therefore, the aim of this study was to develop and validate a multidimensional instrument for assessing financial literacy among public-sector managers.

Methods and Materials

This study was a methodological, cross-sectional instrument-validation study conducted to develop and evaluate a questionnaire for assessing financial literacy among public-sector managers. The study focused exclusively on the psychometric validation of the proposed instrument, including the examination of its face validity, content validity, construct validity, internal consistency, and composite reliability. The target population consisted of public-sector managers employed in governmental organizations and executive agencies in Yazd Province, Iran. This population was selected because public-sector managers are directly or indirectly involved in financial planning, budget implementation, resource allocation, expenditure control, financial reporting, and compliance with governmental financial regulations. The participants were recruited from provincial governmental departments, municipalities, governorate-affiliated offices, public universities and healthcare organizations, tax and economic affairs offices, social security organizations, public companies, and other organizations operating under formal governmental budgetary and administrative structures.

Eligibility criteria included having at least five years of managerial or supervisory experience in a governmental organization, holding a position that involved financial, budgetary, administrative, or resource-allocation responsibilities, being familiar with organizational financial reports or budget implementation processes, and providing informed consent to participate in the study. Managers who had no involvement in financial or budget-related decisions, individuals who were temporarily serving in acting managerial positions without sufficient managerial experience, and respondents who submitted substantially incomplete questionnaires were excluded from the analysis. Participants were selected through a purposive and convenience sampling procedure. Initially, governmental organizations with relevant administrative and financial functions were identified, after which eligible managers were approached through official organizational correspondence, direct distribution of printed questionnaires, and secure electronic questionnaire links. This sampling strategy ensured that the questionnaire was completed by individuals who had sufficient professional exposure to the financial responsibilities associated with public management.

Because the principal statistical procedure for evaluating construct validity was exploratory factor analysis, the required sample size was determined according to the number of questionnaire items and the recommended respondent-to-item ratio. A minimum of five participants per item was considered necessary, while a larger sample was sought to improve the stability of the factor solution and the precision of reliability estimates. Accordingly, at least 150 eligible public-sector managers were required, and efforts were made to obtain approximately 200 completed questionnaires whenever organizational access and response rates permitted. Before the principal administration, the preliminary questionnaire was pilot-tested among a smaller group of public-sector managers who met the study eligibility criteria. The pilot administration was intended to assess the clarity of instructions, comprehensibility of the items, appropriateness of the response format, approximate completion time, frequency of missing responses, and potential occurrence of uniform or patterned responding. Feedback obtained during the pilot phase was used only to refine the wording and administration of the instrument before its psychometric evaluation in the main sample.

Participation was voluntary, and all respondents were informed about the purpose of the study, the confidentiality of their responses, and their right to withdraw without any organizational or professional consequences. No personally identifying information was included in the analytical dataset. Questionnaires were coded numerically, and the collected information was used solely for instrument-validation purposes. To reduce social desirability bias, participants were assured that their individual scores would not be reported to their employing organizations and would not be used for administrative appraisal, promotion, or disciplinary decisions.

Data were collected using a researcher-developed Financial Literacy Assessment Instrument for Public-Sector Managers. The questionnaire was designed specifically to measure the financial knowledge, judgment, and managerial capabilities required within governmental and public-sector settings. The initial item pool was formulated through a focused review of the theoretical and measurement literature on financial literacy, public financial management, governmental budgeting, financial decision-making, financial risk assessment, public-sector accounting, regulatory compliance, financial ethics, transparency, and accountability. Items were written to reflect the professional and institutional context of public administration rather than household finance or personal consumer behavior. Each statement was formulated as a clear and specific expression of a financial competency relevant to public-sector managerial responsibilities. Ambiguous wording, double-barreled statements, unnecessary technical terminology, excessively long sentences, and items containing explicit value judgments were avoided.

The preliminary questionnaire covered the principal domains of financial literacy relevant to public-sector management, including knowledge of financial concepts and financial statements, understanding of governmental budgeting and treasury regulations, financial analysis and interpretation, financial risk recognition, resource-allocation decision-making, liquidity and cash-flow management, compliance with taxation and governmental financial regulations, and financial transparency, ethics, and accountability. Several items were developed for each proposed dimension to ensure adequate coverage of the construct and to permit the removal of weak or redundant items during psychometric analysis. Responses were recorded on a five-point Likert scale ranging from 1, indicating “strongly disagree,” to 5, indicating “strongly agree.” Higher scores represented a higher level of financial literacy. Scores could be calculated separately for each retained dimension and as an overall financial literacy score after the factor structure of the questionnaire had been established.

Face validity was assessed before the main administration of the questionnaire. A small group of eligible public-sector managers and specialists reviewed the items in terms of clarity, readability, relevance, simplicity, appropriateness of administrative language, and compatibility with the professional responsibilities of governmental managers. Reviewers were asked to identify items that were difficult to understand, vague, repetitive, overly technical, culturally inappropriate, or unrelated to public-sector financial responsibilities. Items identified as unclear or unsuitable were revised, simplified, merged, or removed. The apparent importance of each item was also examined to ensure that the retained statements were perceived as meaningful indicators of financial literacy within governmental management settings.

Content validity was evaluated by a panel of specialists with expertise in public administration, public-sector financial management, governmental accounting, budgeting, financial policy, instrument development, and psychometrics. Panel members independently assessed whether each item was essential, relevant, clear, and representative of its proposed dimension. The content validity ratio was calculated using Lawshe's method to determine the essentiality of each item. Items with content validity ratio values below the acceptable threshold for the number of participating experts were removed or substantially revised. The content validity index was also

calculated at the item and scale levels. Experts rated the relevance, clarity, and simplicity of each statement, and items with inadequate item-level content validity indices were reconsidered. Qualitative comments from the panel were used to correct terminology, reduce conceptual overlap, improve alignment between items and their intended dimensions, and ensure sufficient coverage of the financial literacy construct. The revised version produced after face and content validity assessment was used in the pilot study and subsequently administered to the main sample.

The pilot data were examined to identify problematic items before the principal factor analysis. Item means, standard deviations, response distributions, missing-response rates, floor and ceiling effects, and corrected item–total correlations were evaluated. Items showing extremely limited variability, excessive concentration in a single response category, weak associations with the total score, or substantial conceptual redundancy were considered for revision or deletion. Preliminary internal consistency was examined using Cronbach’s alpha. However, decisions regarding item retention were not based solely on alpha coefficients; conceptual relevance, content coverage, corrected item–total correlations, and the potential effect of deleting each item were considered together.

The final questionnaire package also included a brief demographic and professional information form. This form collected only variables necessary to describe the validation sample, such as age, gender, educational level, field of study, managerial level, years of managerial experience, type of governmental organization, and degree of involvement in financial or budgetary decision-making. These variables were not treated as independent outcomes and were collected only to characterize the participants and evaluate the diversity of the validation sample.

Data were analyzed using SPSS software. Before conducting the psychometric analyses, the dataset was screened for completeness, coding errors, out-of-range values, duplicate submissions, and response patterns indicating insufficient engagement. Questionnaires with substantial missing data were excluded. For questionnaires containing a very small proportion of missing responses, the missing-data pattern was examined before an appropriate treatment procedure was applied. Descriptive statistics, including frequency, percentage, mean, standard deviation, minimum, maximum, skewness, and kurtosis, were calculated to summarize participant characteristics and item distributions. The response distribution of each item was examined to identify severe floor or ceiling effects and marked deviations from normality that could affect factor extraction.

Construct validity was evaluated using exploratory factor analysis. Before factor extraction, the suitability of the correlation matrix was assessed through the Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett’s test of sphericity. A Kaiser–Meyer–Olkin value of at least 0.70 was regarded as evidence of acceptable sampling adequacy, while a statistically significant Bartlett’s test indicated that the correlations among the items were sufficient for factor analysis. The anti-image correlation matrix and individual measures of sampling adequacy were also reviewed to identify items that were poorly integrated with the remaining questionnaire.

Factors were extracted using principal axis factoring because the objective was to identify the underlying latent dimensions of the financial literacy instrument rather than merely reduce the observed variables. The number of retained factors was determined by considering eigenvalues, the scree plot, the proportion of explained variance, interpretability of the factor solution, and theoretical coherence of the dimensions. Because the dimensions of financial literacy were expected to be conceptually related, an oblique rotation method was preferred. A factor loading of 0.40 or greater was considered acceptable. Items with loadings below this criterion, low communalities, substantial cross-loadings on more than one factor, or weak conceptual compatibility with the factor on which they loaded were examined for removal. An item was considered to have a problematic cross-loading when it loaded meaningfully on multiple factors and the difference between its two highest loadings was insufficient to support an

unambiguous interpretation. Item removal was conducted iteratively, and the exploratory factor analysis was repeated after each major modification until a statistically stable and conceptually interpretable factor structure was obtained.

The adequacy of each retained factor was evaluated by considering the number of items loading on the factor, the magnitude and pattern of the loadings, the conceptual similarity of the items, and the factor's contribution to explaining the construct. Factors represented by too few items or by items without a coherent conceptual relationship were not retained solely on statistical grounds. The final names of the dimensions were assigned according to the shared substantive content of their items. The total percentage of variance explained by the retained factor structure was calculated and reported as an indicator of the instrument's capacity to represent financial literacy among public-sector managers.

Item analysis was conducted after establishing the preliminary factor structure. Corrected item–total correlations and corrected item–subscale correlations were calculated. Items with corrected correlations below 0.30 were considered potentially weak, although deletion decisions also took account of content validity and the need to preserve adequate construct coverage. Inter-item correlations were examined to detect items that were either insufficiently related or excessively similar. Very high correlations between two items were interpreted as possible redundancy, while consistently low correlations suggested that an item might not measure the same underlying dimension as the other items in its subscale.

Internal consistency reliability was assessed using Cronbach's alpha for the complete questionnaire and each extracted dimension. Alpha coefficients of 0.70 or higher were considered acceptable for research purposes, while coefficients of 0.80 or higher indicated good internal consistency. The corrected item–total correlation and the value of Cronbach's alpha if an item was deleted were examined to determine whether individual items weakened the reliability of their respective dimensions. Because Cronbach's alpha may be influenced by the number of items, the mean inter-item correlation was also considered when interpreting reliability.

Composite reliability was calculated for each retained dimension using the standardized factor loadings and corresponding error variances. A composite reliability coefficient of at least 0.70 was considered acceptable. Convergent validity was examined through the average variance extracted, with values of 0.50 or higher indicating that the items explained an adequate proportion of variance in their intended latent dimension. When the average variance extracted was slightly below 0.50 but composite reliability remained acceptable and the factor loadings were theoretically and statistically adequate, the dimension was evaluated by considering the overall pattern of evidence rather than applying a single mechanical deletion criterion.

The scoring procedure was finalized only after the factor structure and item composition had been established. Subscale scores were computed by summing or averaging responses to the items retained within each dimension, and the total score was derived from all retained items. Reverse-scored items, where applicable, were recoded before score calculation. Higher subscale and total scores indicated greater financial literacy. The distribution of total and dimensional scores was examined to provide preliminary descriptive guidance for interpretation. All statistical tests were conducted at a significance level of 0.05, and psychometric decisions were based on the combined consideration of statistical evidence, conceptual coherence, content validity, and practical suitability for public-sector managerial settings.

Findings and Results

The final version of the Financial Literacy Assessment Instrument for Public-Sector Managers was administered to managers employed in governmental organizations in Yazd Province. The quantitative validation stage examined the demographic characteristics of the respondents, item-level descriptive statistics, sampling adequacy, the latent factor structure of the questionnaire, factor loadings, and internal consistency reliability. The collected data provided the empirical basis for determining whether the proposed questionnaire possessed an interpretable multidimensional structure and sufficient psychometric quality for assessing financial literacy among public-sector managers.

The validation sample included public-sector managers with different educational backgrounds, levels of managerial experience, and organizational positions. As presented in Table 1, 81% of the participants were men and 19% were women. Most respondents held postgraduate qualifications, with 54% holding a master's degree and 18% holding a doctoral degree. Regarding managerial experience, 51% had between 5 and 15 years of experience, while 12% had more than 15 years of managerial experience. The participants were drawn from headquarters, executive, and financial organizations, indicating that the questionnaire was evaluated by managers working in different governmental functions.

Table 1. Demographic Characteristics of the Participants

Demographic variable	Category	Percentage
Gender	Men	81%
Gender	Women	19%
Educational level	Bachelor's degree	28%
Educational level	Master's degree	54%
Educational level	Doctoral degree	18%
Managerial experience	Less than 5 years	37%
Managerial experience	5–15 years	51%
Managerial experience	More than 15 years	12%
Type of organization	Headquarters organization	27%
Type of organization	Executive organization	41%
Type of organization	Financial organization	32%

The demographic findings indicated that most respondents had advanced academic qualifications and that nearly two-thirds had more than five years of managerial experience. Consequently, the instrument was assessed primarily by individuals with sufficient familiarity with governmental administration and organizational financial decision-making. The organizational diversity of the participants also supported the applicability of the validation findings across different types of public-sector institutions. Item-level descriptive statistics were calculated to examine response distributions before conducting exploratory factor analysis. The available descriptive results for the 12 reported items are presented in Table 2. Item means ranged from 3.23 to 4.56, indicating that respondents generally selected responses above the theoretical midpoint of the five-point scale. Standard deviations ranged from 0.48 to 0.86, demonstrating sufficient response variability without excessive dispersion.

Table 2. Descriptive Statistics of the Reported Questionnaire Items

Item	Mean	Standard deviation	Skewness	Kurtosis
Item 1	3.72	0.86	−0.05	−0.31
Item 2	4.53	0.52	0.34	−0.64
Item 3	4.22	0.50	−0.36	0.29
Item 4	4.04	0.50	0.02	−0.10
Item 5	3.42	0.57	0.11	−0.60
Item 6	3.42	0.69	−0.54	−0.01

Item 7	3.28	0.64	0.13	-0.74
Item 8	4.41	0.56	-0.40	0.65
Item 9	4.04	0.74	-0.52	-0.39
Item 10	4.19	0.48	0.54	0.26
Item 11	3.23	0.56	0.56	-0.30
Item 12	4.56	0.60	0.37	0.03

All reported skewness and kurtosis coefficients were within the range of -1 to $+1$. The item distributions therefore showed no substantial deviation from normality. The absence of extreme skewness, kurtosis, or restricted variability suggested that the items could appropriately be entered into the subsequent factor analysis. Moreover, all item means exceeded 3.20, indicating generally favorable responses to the statements included in the instrument. These findings demonstrated that the data had adequate dispersion and distributional characteristics for evaluating the structural validity and reliability of the questionnaire.

Exploratory factor analysis was conducted to identify the underlying dimensions of financial literacy among public-sector managers. Before extracting the factors, the Kaiser–Meyer–Olkin measure and Bartlett's test of sphericity were used to determine whether the sample and correlation matrix were appropriate for factor analysis.

As reported in Table 3, the Kaiser–Meyer–Olkin coefficient was 0.861, substantially exceeding the minimum acceptable value of 0.70. This result indicated a high level of common variance among the questionnaire items and very good sampling adequacy. Bartlett's test of sphericity was statistically significant at $p < .001$, confirming that the item correlation matrix differed significantly from an identity matrix. Thus, sufficient correlations existed among the items to justify factor extraction.

Table 3. Kaiser–Meyer–Olkin Measure and Bartlett's Test of Sphericity

Test	Obtained value	Acceptable criterion	Interpretation
Kaiser–Meyer–Olkin measure	0.861	Greater than 0.70	Very good sampling adequacy
Bartlett's test of sphericity	$p < .001$	Less than .05	The item correlations were suitable for factor analysis

The combination of a KMO coefficient close to 0.90 and a highly significant Bartlett's test demonstrated that the dataset possessed an adequately coherent correlational structure. The observed relationships among the items were not random and could be represented through a smaller number of common latent factors. These results therefore supported the continuation of exploratory factor analysis and the extraction of the principal dimensions underlying the instrument.

Exploratory factor analysis was performed using principal component extraction and Varimax rotation. Factors with eigenvalues greater than 1.00 were retained. The analysis identified five factors that jointly explained 68.40% of the total variance. The five-factor solution was statistically interpretable and consistent with the intended multidimensional structure of financial literacy in public-sector management.

As shown in Table 4, the first factor, Financial Regulatory Compliance, had an eigenvalue of 4.21 and explained 21.05% of the total variance. The second factor, Financial Analysis and Decision-Making, explained an additional 16.90%. The third factor, Capital and Resource Management, accounted for 14.05%, while Financial Behavior and Transparency explained 10.95%. The fifth factor, Financial and Budgetary Knowledge, explained the remaining 5.45%. Together, the five factors accounted for more than two-thirds of the variance in questionnaire responses.

Table 4. Eigenvalues and Variance Explained by the Extracted Factors

Extracted factor	Eigenvalue	Percentage of variance explained	Cumulative variance
Financial Regulatory Compliance	4.21	21.05%	21.05%

Financial Analysis and Decision-Making	3.38	16.90%	37.95%
Capital and Resource Management	2.81	14.05%	52.00%
Financial Behavior and Transparency	2.19	10.95%	62.95%
Financial and Budgetary Knowledge	1.09	5.45%	68.40%

Financial Regulatory Compliance made the greatest contribution to the explained variance, indicating that knowledge and observance of governmental financial regulations represented the most prominent dimension of financial literacy among the participating managers. Financial Analysis and Decision-Making emerged as the second factor, reflecting the importance of interpreting financial information, evaluating financial risks, and comparing alternative financial courses of action.

Capital and Resource Management comprised competencies related to allocating public resources, forecasting economic returns, and managing liquidity and working capital. Financial Behavior and Transparency represented disciplined expenditure, ethical financial conduct, transparency, and accountability in financial decisions. Financial and Budgetary Knowledge represented the foundational understanding of inflation, the value of money, financial statements, interest rates, and cash flows. Although this fifth factor explained a smaller proportion of variance than the other factors, it remained statistically meaningful because its eigenvalue exceeded 1.00 and its items formed a conceptually coherent dimension.

The cumulative variance of 68.40% indicated that the five-factor model captured a substantial proportion of the observed variation in financial literacy responses. The absence of an excessive number of weak factors and the presence of five interpretable dimensions supported the structural validity of the questionnaire.

The rotated factor matrix was examined to determine the extent to which each item was associated with its intended dimension. A loading of 0.40 was adopted as the minimum acceptable criterion. Loadings of 0.50 or greater were considered strong. Items with insufficient loadings or problematic cross-loadings were excluded or revised during instrument refinement.

The final rotated matrix, presented in Table 5, showed a clear simple structure. Each item had its highest loading on one factor, and the primary factor loadings ranged from 0.74 to 0.82. The secondary loadings were substantially lower, indicating adequate differentiation among the five dimensions.

Table 5. Rotated Factor-Loading Matrix for the Final Financial Literacy Instrument

Questionnaire item	Financial Regulatory Compliance	Financial Analysis and Decision-Making	Capital and Resource Management	Financial Behavior and Transparency	Financial and Budgetary Knowledge
Familiarity with budgeting and treasury laws	0.82	0.14	0.18	0.25	0.09
Knowledge of taxation laws	0.80	0.10	0.11	0.29	0.12
Familiarity with insurance and retirement regulations	0.76	0.23	0.20	0.19	0.15
Analysis of financial statements	0.22	0.81	0.17	0.16	0.18
Ability to assess financial risk	0.18	0.79	0.21	0.22	0.20
Comparison of financial alternatives	0.29	0.76	0.30	0.14	0.18
Allocation of resources and budgets	0.32	0.28	0.80	0.21	0.17
Forecasting returns and economic benefits	0.23	0.29	0.78	0.18	0.22

Management of liquidity and working capital	0.25	0.32	0.75	0.24	0.20
Transparency in financial decision-making	0.26	0.14	0.19	0.81	0.25
Observance of financial discipline and ethics	0.24	0.22	0.15	0.79	0.21
Expenditure control and cost efficiency	0.18	0.19	0.22	0.77	0.24
Understanding inflation and the value of money	0.21	0.17	0.16	0.26	0.78
Knowledge of the components of financial statements	0.23	0.19	0.18	0.22	0.76
Understanding interest rates and cash flows	0.21	0.20	0.22	0.18	0.74

The first factor was designated Financial Regulatory Compliance because its three items measured familiarity with budgeting and treasury laws, taxation laws, and insurance and retirement regulations. The primary loadings of these items ranged from 0.76 to 0.82, demonstrating a strong association with the factor.

The second factor was named Financial Analysis and Decision-Making. It consisted of items related to financial-statement analysis, financial-risk assessment, and comparison of financial alternatives. Its factor loadings ranged from 0.76 to 0.81, indicating that the items represented a coherent capacity for interpreting financial information and selecting appropriate financial courses of action.

The third factor, Capital and Resource Management, included resource and budget allocation, forecasting returns and economic benefits, and liquidity and working-capital management. The associated factor loadings ranged from 0.75 to 0.80. These items collectively represented the managerial ability to plan, allocate, and control financial resources.

The fourth factor was designated Financial Behavior and Transparency. Its items measured transparency in financial decision-making, observance of financial discipline and ethics, and expenditure control and cost efficiency. The loadings ranged from 0.77 to 0.81, confirming that ethical conduct, accountability, transparency, and disciplined spending formed a distinct financial literacy dimension.

The fifth factor, Financial and Budgetary Knowledge, comprised understanding inflation and the value of money, recognizing the components of financial statements, and understanding interest rates and cash flows. Factor loadings ranged from 0.74 to 0.78. This factor represented the foundational conceptual knowledge required for informed financial management.

The magnitude and pattern of the loadings demonstrated that every retained item was strongly associated with its intended factor. No retained item had a primary loading below 0.74, and none displayed a cross-loading approaching the magnitude of its principal loading. Accordingly, the rotated solution provided evidence that the five dimensions were internally coherent and empirically distinguishable.

Following confirmation of the factor structure, Cronbach's alpha was calculated for the complete questionnaire and each of its five dimensions. The overall Cronbach's alpha coefficient was 0.92, indicating very high internal consistency. As presented in Table 6, the alpha coefficients for the five dimensions ranged from 0.80 to 0.88, and all exceeded the minimum acceptable criterion of 0.70.

Table 6. Internal Consistency Reliability of the Questionnaire and Its Dimensions

Dimension	Number of items	Cronbach's alpha	Reliability interpretation
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Financial Regulatory Compliance	3	0.88	Excellent
Financial Analysis and Decision-Making	3	0.86	Very good
Capital and Resource Management	3	0.84	Good
Financial Behavior and Transparency	3	0.82	Good
Financial and Budgetary Knowledge	3	0.80	Acceptable
Total scale	15	0.92	Very high

Financial Regulatory Compliance produced the highest dimension-level reliability coefficient, with an alpha of 0.88. Financial Analysis and Decision-Making had an alpha of 0.86, while Capital and Resource Management had an alpha of 0.84. The coefficients for Financial Behavior and Transparency and Financial and Budgetary Knowledge were 0.82 and 0.80, respectively. These results indicated that the items assigned to each factor consistently measured the same underlying dimension.

The overall alpha coefficient of 0.92 demonstrated strong homogeneity among the 15 retained items without suggesting that the dimensions lacked conceptual distinction. The reliability findings therefore supported both the use of separate dimension scores and the calculation of an overall financial literacy score.

The final Financial Literacy Assessment Instrument for Public-Sector Managers consisted of 15 items organized into five dimensions, with three items assigned to each dimension. Financial Regulatory Compliance measured managers' ability to understand, interpret, and observe governmental financial, budgetary, taxation, treasury, insurance, and retirement regulations. Financial Analysis and Decision-Making assessed the ability to interpret financial statements, evaluate risks, and compare alternative financial decisions. Capital and Resource Management measured competencies in financial planning, budget allocation, return forecasting, liquidity management, and the management of public resources.

Financial Behavior and Transparency assessed financial ethics, expenditure discipline, transparency, accountability, and cost control. Financial and Budgetary Knowledge evaluated managers' understanding of basic financial and economic concepts, including inflation, the value of money, financial-statement components, interest rates, and cash flows. Each dimension contained three items, thereby producing a balanced structure across the five components.

Representative statements included familiarity with taxation and budgetary laws applicable to the respondent's governmental organization; the ability to analyze financial statements and identify organizational financial weaknesses; the use of systematic methods when allocating resources and budgets among organizational activities; observance of discipline and transparency in financial decisions; and comprehension of concepts such as rates of return, the present value of money, inflation, and cash flow.

All items were closed-ended and scored on a five-point Likert scale ranging from 1, "strongly disagree," to 5, "strongly agree." The possible total score therefore ranged from 15 to 75, with higher scores indicating greater financial literacy. Each dimension produced a score ranging from 3 to 15. The structure permitted the calculation of both a total financial literacy score and five separate dimension scores.

Overall, the exploratory factor analysis supported a clear five-factor structure explaining 68.40% of the total variance. Primary factor loadings ranged from 0.74 to 0.82, and Cronbach's alpha coefficients ranged from 0.80 to 0.88 for the individual dimensions and reached 0.92 for the complete scale. These results demonstrated that the final 15-item instrument possessed satisfactory construct validity, clear factorial differentiation, and high internal consistency for assessing financial literacy among public-sector managers.

Discussion and Conclusion

The present study developed and validated a multidimensional instrument for assessing financial literacy among public-sector managers. The final questionnaire consisted of 15 items distributed equally across five dimensions: Financial Regulatory Compliance, Financial Analysis and Decision-Making, Capital and Resource Management, Financial Behavior and Transparency, and Financial and Budgetary Knowledge. Exploratory factor analysis supported this five-factor structure, which explained 68.40% of the total variance. The Kaiser–Meyer–Olkin coefficient was 0.861, and Bartlett's test of sphericity was statistically significant at $p < .001$, confirming that the correlation matrix was appropriate for factor analysis. The primary factor loadings ranged from 0.74 to 0.82, with no substantial cross-loadings. Internal consistency was also satisfactory, as Cronbach's alpha coefficients ranged from 0.80 to 0.88 for the five dimensions and reached 0.92 for the total scale. Taken together, these findings indicate that the instrument has a coherent factorial structure and high internal consistency for measuring financial literacy among public-sector managers.

The descriptive findings provided initial support for the suitability of the questionnaire items. The reported item means ranged from 3.23 to 4.56, while the standard deviations ranged from 0.48 to 0.86. These results indicated that the participants generally endorsed the financial literacy statements while still displaying sufficient response variability. Moreover, all skewness and kurtosis coefficients were within the range of -1 to $+1$, suggesting that the item distributions did not show substantial departures from normality. This pattern was important because extremely skewed responses or limited variance could have weakened the differentiation among participants and reduced the stability of the factor solution. The favorable distribution of responses suggests that the statements were understandable, relevant to public-sector managerial responsibilities, and capable of distinguishing between different levels of perceived financial competence.

The adequacy of the data for factor analysis was supported by the KMO coefficient of 0.861 and the significant Bartlett's test. A KMO value of this magnitude indicates that the items shared sufficient common variance to represent a smaller number of underlying dimensions. The significant Bartlett's test further demonstrated that the observed correlations were not random and that the items were sufficiently interconnected for structural analysis. These findings support the assumption that financial literacy among public-sector managers is not a collection of unrelated financial skills but a coherent multidimensional construct. This interpretation is consistent with systematic evidence showing that financial literacy encompasses interconnected domains of knowledge, decision-making, behavior, planning, and risk management rather than a single body of factual information (1, 7).

The five-factor solution accounted for 68.40% of the total variance, which indicates that the retained dimensions captured a substantial proportion of the financial literacy construct. The factor structure supports the argument that managerial financial literacy must be assessed more broadly than through questions about inflation, interest rates, or basic accounting terminology. Financially competent managers need to understand financial rules, interpret financial data, evaluate alternatives, allocate resources, control expenditure, and act transparently. Previous studies have similarly linked financial literacy with financial reporting, planning, risk evaluation, resource management, and organizational performance. Financial literacy among owner-managers has been associated with stronger business performance because it facilitates informed financing, budgeting, and operational decisions (6). Reviews of small and medium-sized enterprises have likewise concluded that financial literacy contributes to financial planning, working-capital management, sustainability, and performance (7). Although public organizations differ from private

enterprises, the present five-factor structure reflects comparable core capacities while incorporating the regulatory and accountability requirements of governmental management.

Financial Regulatory Compliance emerged as the strongest factor, explaining 21.05% of the total variance. Its items assessed familiarity with budgeting and treasury laws, taxation regulations, and insurance and retirement rules. The prominence of this factor is theoretically meaningful because public-sector financial decisions are made within a highly regulated institutional environment. Government managers do not exercise unrestricted discretion over public resources; their financial decisions must comply with formal budget classifications, treasury procedures, taxation requirements, administrative rules, and auditing standards. Accordingly, understanding the regulatory framework is a central element of financial literacy in the public sector rather than an external legal competency.

The importance of regulatory knowledge is supported by research connecting financial literacy with compliance behavior. Financial literacy may strengthen tax compliance by improving individuals' understanding of financial obligations and their ability to interpret institutional requirements (12). It may also influence how financial technologies are used within regulated environments. Research on financial technology and money laundering has shown that financial literacy and financial regulations can moderate the risks associated with technology-enabled financial activities (13). Similarly, the interaction between financial requirements, financial literacy, and financial technology has implications for preventing inappropriate or unlawful financial practices (14). These studies align with the present finding that regulatory compliance forms a distinct and central dimension of financial literacy among public-sector managers.

Financial Analysis and Decision-Making was the second factor and explained 16.90% of the variance. Its items measured the ability to analyze financial statements, assess financial risks, and compare alternative financial options. This factor reflects the practical transformation of financial information into managerial judgment. Financial literacy is valuable only when managers can use financial concepts to interpret organizational conditions and select defensible courses of action. The strong factor loadings for this dimension demonstrate that the respondents distinguished analytical and decision-making capability from general financial knowledge.

This result is consistent with research showing that financial literacy regulates intended investment behavior and influences the construction of financial portfolios by improving the interpretation of risk and expected outcomes (2). It is also compatible with evidence that financial literacy is related to behavioral biases in financial decision-making (4, 5). Managers with insufficient financial understanding may rely on intuition, recent experience, overconfidence, or organizational routines rather than systematic analysis. Perceived financial literacy may also diverge from actual competence and become associated with cognitive biases, as demonstrated in research on cryptocurrency ownership (18). The inclusion of financial analysis and risk assessment in the instrument therefore strengthens its capacity to measure applied competence rather than general financial confidence.

Capital and Resource Management represented the third factor and accounted for 14.05% of the total variance. This dimension included the allocation of resources and budgets, forecasting of economic returns, and management of liquidity and working capital. The emergence of this factor indicates that public-sector financial literacy involves the ability to organize scarce resources in accordance with organizational objectives. Although public organizations are not primarily established to maximize profit, their managers must still evaluate costs, forecast resource requirements, maintain liquidity, and ensure that allocated budgets generate appropriate public or organizational value.

Previous findings in entrepreneurial and organizational contexts support this interpretation. Financial literacy among managers has been associated with improved financial planning and stronger organizational outcomes (10). Financial reporting assistance can also improve the ability to organize expenditure information and independently monitor financial activities (9). Entrepreneurial financial literacy, competency, and resilience have further been identified as drivers of sustainable organizational performance (8). These findings align with the present result by demonstrating that financial literacy supports the conversion of limited financial resources into sustainable organizational outcomes. For public-sector managers, this competence is expressed through responsible budget allocation, liquidity control, and the prioritization of expenditures rather than through profit maximization alone.

Financial Behavior and Transparency constituted the fourth factor and explained 10.95% of the variance. The dimension comprised transparency in financial decision-making, observance of financial discipline and ethics, and control of expenditure. Its emergence as a separate factor demonstrates that managerial financial literacy has a behavioral and ethical component. A manager may possess technical knowledge yet fail to apply it transparently, consistently, or responsibly. Therefore, the assessment of financial literacy should not be restricted to what managers know; it should also address how they report, justify, and control financial decisions.

This interpretation is consistent with evidence that financial literacy is related to behavioral biases and financial conduct (4, 5). It also corresponds with research showing that trust, perceived fairness, and financial understanding affect compliance behavior (12). In public administration, financial transparency and ethical discipline are especially important because managerial decisions concern public funds and are subject to institutional accountability. The strong loadings of the items in this dimension indicate that the questionnaire successfully captured a behavioral component that is theoretically related to, but empirically distinct from, regulatory knowledge and analytical competence.

Financial and Budgetary Knowledge was the fifth factor and explained 5.45% of the variance. Its items assessed understanding of inflation and the value of money, the components of financial statements, interest rates, and cash flows. Although this factor accounted for the smallest proportion of variance, it retained an eigenvalue greater than 1.00 and exhibited strong item loadings between 0.74 and 0.78. Its lower relative contribution does not imply that foundational knowledge is unimportant. Rather, it suggests that basic financial knowledge functions as a necessary foundation that must be combined with regulatory, analytical, behavioral, and resource-management capabilities to represent managerial financial literacy comprehensively.

The identification of a distinct knowledge factor is consistent with assessments of financial literacy across different populations. Research among young people has shown that financial knowledge must be measured directly rather than inferred from general education or demographic characteristics (21). Financial education in childhood has also been described as foundational to later economic well-being and responsible financial behavior (3). Financial literacy has further been found to mediate the relationship between verbal intelligence and financial anxiety, indicating that financial understanding can reduce uncertainty associated with complex financial tasks (19). In managerial settings, this foundational knowledge enables managers to understand the terminology and numerical relationships necessary for more advanced analysis and decision-making.

The findings also have implications for financial literacy in increasingly digital administrative environments. Public-sector managers now encounter electronic budgeting, automated reporting, digital payments, integrated financial systems, big-data analytics, and artificial intelligence. Research suggests that big data and artificial intelligence interact with financial literacy in shaping investment decisions (15). Generative artificial intelligence may

also support financial education by providing personalized explanations, simulations, and rapid access to financial information (16). However, technology cannot compensate for inadequate financial understanding. Managers must be able to evaluate the reliability of automated outputs, recognize inappropriate recommendations, and interpret digital financial information within legal and organizational constraints.

The relevance of digital financial competence is further supported by studies linking digital financial literacy with learning and performance in technology-mediated environments (17). As governmental financial processes become increasingly digital, the five dimensions identified in this study may provide a foundation for evaluating whether managers possess the knowledge and judgment required to use these systems responsibly. Regulatory compliance is required to understand digital financial controls, analytical ability is necessary to interpret system outputs, resource-management competence guides budgetary action, transparent behavior supports accountability, and foundational knowledge enables managers to evaluate financial information rather than merely accept automated results.

The reliability findings further supported the quality of the instrument. Cronbach's alpha for the overall scale was 0.92, while the coefficients for the five dimensions ranged from 0.80 to 0.88. These values indicate that the items within each dimension were sufficiently homogeneous without being identical. The highest coefficient belonged to Financial Regulatory Compliance, which is consistent with the clear conceptual similarity among its items. The other dimensions also demonstrated satisfactory internal consistency, supporting the calculation of both dimension-specific scores and an overall financial literacy score.

The high overall reliability is compatible with prior efforts to assess managerial financial literacy as an organized and measurable construct (10, 11). The study of managers in healthcare organizations emphasized the role of financial literacy in organizational sustainability, suggesting that managerial financial competencies can be represented through stable and relevant indicators (11). The present study extends this perspective by identifying a broader five-dimensional structure suitable for public-sector management rather than a single organizational sector.

The final instrument also responds to evidence that financial literacy operates in conjunction with goals, risk preferences, and long-term planning. Financial literacy, goal clarity, and risk tolerance have been associated with retirement-saving behavior (20). Although retirement saving is distinct from public financial management, this finding illustrates that financial knowledge gains practical meaning when it informs goal-oriented decisions under uncertainty. The present dimensions of financial analysis, risk assessment, and resource allocation similarly represent the application of financial knowledge to organizational goals.

Overall, the findings demonstrate that financial literacy among public-sector managers is best conceptualized as a multidimensional professional competency. The instrument does not reduce the construct to basic knowledge or personal financial behavior. Instead, it captures the regulatory, analytical, managerial, behavioral, and conceptual requirements associated with the stewardship of public resources. The clear five-factor structure, substantial explained variance, strong factor loadings, and high reliability indicate that the questionnaire provides a psychometrically coherent measure of these competencies.

This study had several limitations. First, the validation sample was restricted to public-sector managers employed in Yazd Province, and the administrative characteristics of this setting may limit the generalizability of the findings to other provinces or national governmental institutions. Second, the purposive and convenience sampling procedure may have introduced selection bias because managers who were more accessible or more interested in

financial issues may have been more likely to participate. Third, the instrument relied on self-reported responses and may therefore have been affected by social desirability, overestimation of competence, or cautious responding due to the sensitivity of governmental financial responsibilities. Fourth, the construct validity assessment was based on exploratory factor analysis, and the identified five-factor structure was not independently tested through confirmatory factor analysis in a separate sample. Finally, the cross-sectional design did not permit evaluation of test–retest reliability, sensitivity to change, or the predictive validity of questionnaire scores in relation to actual managerial financial performance.

Future studies should evaluate the questionnaire among larger and more geographically diverse samples of public-sector managers from different provinces, ministries, municipalities, and governmental agencies. The five-factor structure should be examined through confirmatory factor analysis in an independent sample, and measurement invariance should be assessed across gender, managerial level, organizational type, educational background, and years of experience. Future research should also examine test–retest reliability, convergent validity, discriminant validity, criterion validity, and predictive validity by comparing questionnaire scores with objective tests of financial knowledge, audit outcomes, budgetary performance, or evaluations of financial decision quality. Longitudinal studies could determine whether the instrument is sensitive to changes following financial training and whether improvements in scores correspond with better managerial performance. Researchers may also investigate whether a digital-financial-literacy dimension should be incorporated as electronic financial systems, artificial intelligence, and automated reporting become more prominent in public administration.

Governmental organizations may use the instrument as a structured diagnostic measure for identifying strengths and weaknesses in managers' financial competencies. Separate dimension scores can help training units distinguish whether a manager requires support in regulatory knowledge, financial analysis, resource allocation, transparency, or foundational financial concepts. The questionnaire may be administered before and after professional-development programs to evaluate changes in financial literacy, provided that it is not used as the sole basis for promotion, disciplinary action, or employment decisions. Organizations should combine questionnaire results with objective assessments, work-performance evidence, and professional interviews. Training programs based on the five dimensions should use practical governmental scenarios, including budget interpretation, risk evaluation, expenditure control, legal compliance, financial reporting, and transparent justification of resource-allocation decisions.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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