

# A MULTIDIMENSIONAL MEASURE OF DECISION-MAKING QUALITY: EVIDENCE FROM CHINESE SECURITIES FIRMS USING PLS-SEM

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**Abstract.** This study aims to develop and validate a multidimensional, firm-level measurement model of Decision-Making Quality (DMQ) tailored to the context of Chinese securities companies, addressing the absence of industry-specific and psychometrically validated instruments in the existing literature. Drawing on decision quality theory, behavioural finance, corporate governance, and financial management literature, DMQ is conceptualised as a second-order reflective construct manifested through seven first-order dimensions. Survey data were collected from 191 respondents across nine securities firms in Zhejiang Province, China. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to assess indicator reliability, construct reliability, convergent validity, discriminant validity, and the hierarchical measurement structure. The results demonstrate strong internal consistency and convergent validity for all first-order dimensions and acceptable reliability for the second-order DMQ construct. The higher-order model explains substantial variance across all dimensions, with large effect sizes, supporting the conceptualisation of DMQ as an integrated organisational capability. The study is limited to securities firms in one Chinese province and relies on cross-sectional survey data. Future research may test the scale in other institutional contexts and examine antecedents and outcomes of DMQ. The validated instrument provides managers and regulators with a diagnostic tool to assess and improve organisational decision-making quality beyond traditional performance metrics. This study offers the first industry-specific, multidimensional, and empirically validated measure of organisational decision-making quality for Chinese securities firms.

**Keywords:** *decision-making quality, measurement validation, Chinese securities firms, organisational capabilities, higher-order construct, PLS-SEM*

## Introduction

Decision-making quality has long been recognised as a fundamental driver of organisational effectiveness, particularly in financial institutions where decisions are made under conditions of uncertainty, information asymmetry, and regulatory constraint. In securities firms, decision-making extends beyond individual judgement to encompass firm-level governance mechanisms, risk controls, technological infrastructures, and strategic market positioning. Despite its centrality to organisational performance, decision-making quality remains conceptually fragmented and empirically under-measured within the securities industry.

Prior research has approached decision-making quality through a variety of adjacent constructs, including investment decision antecedents, managerial entrenchment, analyst forecasting performance, and brokerage service quality. However, evidence from recent systematic reviews indicates that no single validated measurement scale has been developed specifically to capture decision-making quality at the organisational level within securities companies (Barberis et al., 1998). Instead, existing instruments tend to focus on isolated decision contexts or organisational roles, limiting their applicability

for firm-wide assessment. For example, investment decision-making scales grounded in behavioural finance have primarily examined individual-level cognitive factors such as heuristics and risk aversion, often supplemented by selected governance or financial tool indicators (Barberis et al., 1998). While these instruments provide valuable insights into portfolio management decisions, their emphasis on individual fund managers constrains their relevance for broader organisational decision-making. Similarly, studies of securities analysts have focused on forecasting accuracy and performance determinants, highlighting the influence of personal characteristics, information channels, and work stress on decision outcomes. These approaches capture a specific decision function rather than the overall quality of organisational decision-making. The most psychometrically robust instrument identified in the literature is the managerial entrenchment scale developed, which conceptualises decision-making quality through dimensions of decision autonomy, power hierarchies, and freedom of action. Although this scale demonstrates acceptable reliability and construct validity, it was developed outside the securities industry context and focuses primarily on governance-related agency issues rather than the full spectrum of decision-making activities in securities firms. Other instruments, such as SERVQUAL-based brokerage service quality scales, address customer-facing outcomes rather than internal decision processes. Collectively, these studies underscore the multidimensional nature of decision-making quality while simultaneously revealing the absence of an integrated, context-specific measurement framework for securities companies.

This fragmentation in the literature suggests that decision-making quality in securities firms cannot be adequately captured through single-dimensional or role-specific instruments. Securities companies operate as complex organisational systems in which financial performance considerations, risk management practices, operational efficiency, corporate governance structures, technological capabilities, regulatory compliance, and strategic market timing interact to shape decision outcomes. Measuring decision-making quality therefore requires an instrument capable of integrating these dimensions into a coherent construct while maintaining empirical rigour. Addressing this gap, the present study develops and validates a multidimensional measure of decision-making quality tailored to the context of Chinese securities firms. Drawing on insights from behavioural finance, decision-making theory, corporate governance, and financial management literature, decision-making quality is conceptualised as a higher-order construct manifested through seven interrelated dimensions: financial performance orientation, risk management effectiveness, operational efficiency, corporate governance quality, market timing and strategic positioning, innovation and technology adoption, and regulatory compliance and adaptation. This conceptualisation reflects both decision processes and outcomes, aligning with calls in the literature for more holistic approaches to measuring decision quality in financial institutions.

Methodologically, this study employs Partial Least Squares Structural Equation Modelling (PLS-SEM) to validate the proposed measurement model. PLS-SEM is particularly suitable for scale development involving complex hierarchical constructs and exploratory research objectives, especially in contexts where existing theory and measurement instruments remain underdeveloped (Sarstedt et al., 2021; Hair et al., 2019). By modelling decision-making quality as a second-order reflective-reflective construct, the study captures the shared variance among its constituent dimensions while preserving their conceptual distinctiveness. Using survey data collected from Chinese securities firms, this study contributes to the literature in three ways. First, it provides a

theoretically grounded and empirically validated measurement instrument for organisational decision-making quality in the securities industry. Second, it extends research on financial institutions in emerging markets by offering a context-sensitive operationalisation aligned with China's regulatory and institutional environment. Third, it demonstrates the methodological value of PLS-SEM for validating higher-order constructs in organisational and financial research.

The remainder of the paper proceeds as follows. The next section reviews the theoretical foundations of decision-making quality and outlines the development of the measurement instrument. This is followed by a description of the research methodology and measurement model evaluation. The results are then presented and discussed, before concluding with theoretical implications, practical relevance, and directions for future research.

### *Literature review*

#### *Decision quality theory as a higher-order capability framework*

Decision-Making Quality (DMQ) is grounded in Decision Quality Theory, which conceptualises decision quality as a latent evaluative construct that cannot be observed directly but is inferred from the coherence and effectiveness of decision outcomes across multiple criteria (Decision Quality; Howard and Abbas, 2016). Rather than focusing on the ex-post success or failure of individual decisions, Decision Quality Theory emphasises the systematic excellence of the decision process and its resulting organisational manifestations, particularly under conditions of uncertainty, risk, and constraint. Within this theoretical perspective, decision quality is defined by the extent to which decisions are logically sound, well-informed, aligned with organisational objectives, and executed consistently across domains. As such, decision quality is inherently multidimensional, encompassing financial outcomes, risk considerations, operational execution, strategic positioning, innovation responsiveness, and institutional legitimacy. These dimensions do not represent independent decision domains; rather, they are reflective expressions of an underlying decision capability embedded within the organisation. Applying Decision Quality Theory to regulated financial institutions, such as securities firms, requires an expanded interpretation of quality that extends beyond economic rationality. High-quality decisions in this context must simultaneously achieve performance orientation, effective risk management, operational efficiency, sound corporate governance, timely market positioning, adaptive innovation, and regulatory compliance. Decision Quality Theory explicitly recognises that superior decisions exhibit consistency across such evaluative criteria, implying that improvements in latent decision quality should be reflected uniformly across these dimensions (Howard and Abbas, 2016).

#### *Decision making quality*

Decision-making quality (DMQ) is a central yet contested construct in organisational and management research. Early studies conceptualised decision quality primarily in terms of rationality and outcome effectiveness, assuming that high-quality decisions result from systematic information processing and alignment with organisational objectives (Dean and Sharfman, 1996; Eisenhardt and Zbaracki, 1992). Within this tradition, decision quality was often inferred from ex post performance outcomes, such as financial returns or strategic success. However, subsequent research has questioned

the adequacy of outcome-based proxies, arguing that favourable results may arise from luck, environmental conditions, or temporary market dynamics rather than from inherently high-quality decision processes (Elbanna, 2006). Contemporary scholarship increasingly recognises decision-making quality as a multidimensional construct encompassing both decision processes and their organisational consequences. From a behavioural perspective, decision quality is shaped by cognitive limitations, heuristics, and biases that influence how information is interpreted and acted upon (Kahneman, 2011). In financial decision-making contexts, these cognitive factors are particularly salient due to uncertainty, time pressure, and information overload. Behavioural finance research has demonstrated that heuristics and risk preferences can systematically affect investment decisions, sometimes improving efficiency but often impairing judgement when not adequately managed (Barberis et al, 1998).

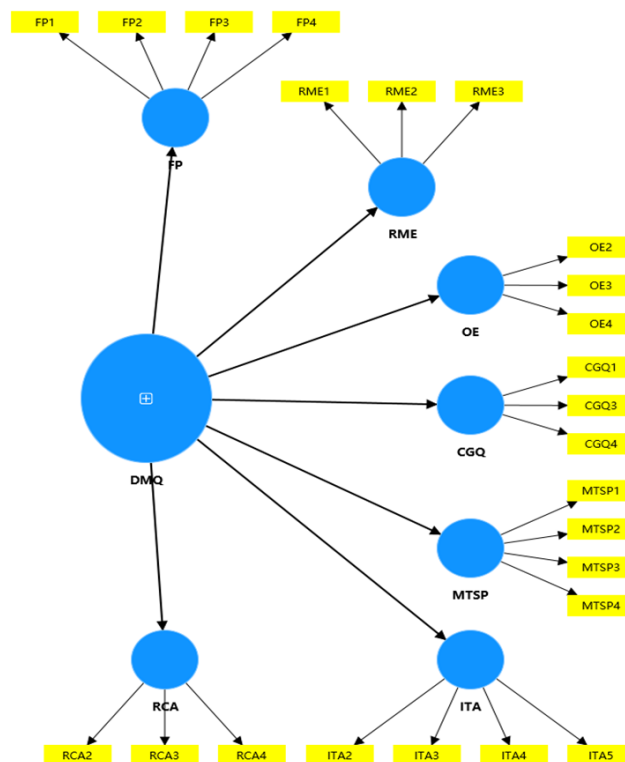
At the organisational level, decision-making quality extends beyond individual cognition to include structural and institutional factors. Corporate governance mechanisms, for example, play a critical role in shaping decision quality by aligning managerial actions with organisational objectives and constraining opportunistic behaviour. Similarly, risk management systems influence decision quality by providing formalised frameworks for identifying, assessing, and controlling uncertainty, thereby improving consistency and accountability in decision-making. These perspectives suggest that decision quality cannot be fully understood without considering the organisational context in which decisions are embedded. In the securities industry, decision-making quality is further complicated by the diversity of decision domains involved. Securities firms routinely make decisions related to investment allocation, market timing, trading execution, risk exposure, technological adoption, and regulatory compliance. Research on securities analysts has shown that decision quality in forecasting tasks depends not only on individual expertise but also on access to information, organisational resources, and environmental stressors. Likewise, studies of brokerage operations indicate that service quality outcomes are influenced by organisational systems and procedural efficiency rather than isolated managerial choices. These findings reinforce the view that decision-making quality in securities firms is inherently systemic.

Despite growing recognition of its complexity, empirical measurement of decision-making quality remains underdeveloped, particularly at the firm level. Existing instruments tend to focus on specific roles (e.g., fund managers or analysts) or narrow decision contexts, limiting their generalisability across organisational functions. Moreover, many studies rely on single-dimensional indicators or lack comprehensive psychometric validation, raising concerns about construct validity and measurement reliability. As a result, comparisons across studies and contexts remain difficult, and cumulative theory development is constrained. To address these limitations, the present study conceptualises decision-making quality as a higher-order organisational construct manifested through multiple interrelated dimensions. Rather than treating decision quality as synonymous with performance outcomes or isolated cognitive attributes, this approach integrates outcome-oriented considerations (such as financial performance and market positioning) with process-oriented and structural dimensions, including risk management effectiveness, operational efficiency, corporate governance quality, innovation and technology adoption, and regulatory compliance. This conceptualisation reflects the view that high-quality decisions in securities firms emerge from the

interaction of competent judgement, effective organisational systems, and supportive institutional frameworks.

**Partial Least Square Structural Equation Modeling (PLS-SEM) and reflective model**

This study employs Partial Least Squares Structural Equation Modelling (PLS-SEM) to develop and validate the proposed multidimensional measurement model of decision-making quality. PLS-SEM is a variance-based structural equation modelling technique that is particularly suitable for research objectives focused on prediction, theory development, and measurement validation, especially when models involve complex relationships or higher-order constructs (Sarstedt et al., 2021; Hair et al., 2019). Compared with covariance-based SEM, PLS-SEM imposes fewer distributional assumptions and performs well with non-normal data and exploratory research designs, making it appropriate for the present study. In this study, decision-making quality is specified as a second-order reflective–reflective construct. Under a reflective measurement specification, indicators are assumed to be manifestations of an underlying latent variable, such that changes in the construct are expected to be reflected in changes across all indicators (Jarvis et al., 2003). This logic is appropriate for the present context, as the first-order dimensions are theorised to reflect the overall level of decision-making quality within a securities firm rather than to form it through causal aggregation. High-quality decision-making is therefore expected to be associated simultaneously with effective governance, strong risk management, efficient operations, and sound strategic judgement (*Figure 1*).



**Figure 1.** 2nd order reflective-reflective model of decision-making quality.

## Materials and Methods

### *Research design*

This study adopts a quantitative, cross-sectional research design to develop and validate a multidimensional measurement model of decision-making quality in Chinese securities firms. A survey-based approach was selected as it is widely used in scale development and validation research, particularly where latent organisational constructs are examined through perceptual indicators (Hair et al., 2019). The primary objective of the study is measurement validation rather than causal hypothesis testing, which aligns with the exploratory and construct-focused nature of the research. A key methodological motivation for adopting PLS-SEM lies in the hierarchical nature of the decision-making quality construct. Decision-making quality is conceptualised as a higher-order construct manifested through multiple interrelated first-order dimensions, including financial performance orientation, risk management effectiveness, operational efficiency, corporate governance quality, market timing and strategic positioning, innovation and technology adoption, and regulatory compliance and adaptation. Modelling such hierarchical latent variable structures is well supported within the PLS-SEM framework, which provides established procedures for estimating and validating higher-order constructs (Hair et al., 2019; Becker et al., 2012). By adopting PLS-SEM and a reflective–reflective modelling approach, this study ensures methodological consistency between the theoretical conceptualisation of decision-making quality and its empirical operationalisation. This approach provides a rigorous foundation for validating the proposed measurement model and supports subsequent empirical investigation of decision-making quality in securities firms.

Measurement model evaluation follows established PLS-SEM guidelines for reflective constructs. Indicator reliability is assessed through standardised outer loadings, while internal consistency reliability is evaluated using Cronbach's alpha, composite reliability, and Dijkstra–Henseler's rho. Convergent validity is examined using the average variance extracted (AVE), and discriminant validity is assessed through both the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT) (Hair et al., 2019; Henseler et al., 2015; Fornell and Larcker, 1981). For higher-order constructs, particular attention is given to the interpretation of discriminant validity results, as high correlations between the second-order construct and its dimensions are theoretically expected in reflective hierarchical models.

### *Population and sampling*

The target population comprised employees working in licensed securities firms operating in Zhejiang Province, China. The unit of analysis was the individual respondent, reflecting their perceptions of organisational-level decision-making quality. Data were collected from nine securities firms, yielding a final sample size of 191 valid responses shown in *Table 1*. Participants were recruited through firm-level access and completed the survey voluntarily via an online questionnaire. This approach facilitated efficient data collection across geographically dispersed organisations while ensuring respondent anonymity. The final sample size exceeds the minimum requirements for Partial Least Squares Structural Equation Modelling (PLS-SEM), which recommends a sample size of at least ten times the maximum number of structural paths directed at any construct in the model (Hair et al., 2019). Given the hierarchical structure of the model, the achieved sample size was deemed sufficient for robust estimation.

**Table 1. Sample characteristics (n=191).**

Variable	Category	Frequency	Percentage (%)
Gender	Male / Female	106 / 85	55.5 / 44.5
Age	21–30 / 31–40 / 41–50 / 51 +	58 / 73 / 45 / 15	30.4 / 38.2 / 23.6 / 7.8
Education Level	Bachelor / Master / Doctorate	102 / 76 / 13	53.4 / 39.8 / 6.8
Job Position	Technical / Managerial / Operational	71 / 59 / 61	37.2 / 30.9 / 31.9
Years in Firm	< 3 yrs / 3–5 yrs / > 5 yrs	49 / 78 / 64	25.7 / 40.8 / 33.5

### ***Instrument development and measurement***

The measurement instrument was developed based on an extensive review of the decision-making, behavioural finance, corporate governance, and financial management literature. As stated in the literature review part, Decision-making quality was conceptualised as a second-order construct reflected by seven first-order dimensions: financial performance orientation, risk management effectiveness, operational efficiency, corporate governance quality, market timing and strategic positioning, innovation and technology adoption, and regulatory compliance and adaptation. All items were measured using a five-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”), which is commonly employed in organisational research and facilitates respondent comprehension and statistical analysis. Prior to formal data collection, the instrument was reviewed to ensure clarity, contextual relevance, and content validity within the securities industry context.

### ***Item reliability and validity***

According to Mowday et al. (1979), expert review is a widely recognized the essential method in the questionnaire development. The researcher could adopt the items from the literature and customize the items to suit the current setting. During the expert review process, field experts, methodology expert and academic expert are employed to examine the items of the questionnaire and offer a critique in the items as a technique of recognizing questionnaire problems, potential measurement errors or breakdown in the question answering process (Olson, 2010). Expert reviewers could examine the items of the questionnaire in a new perspective since the researcher is too familiar with the research topic to observe the questionnaire from different angles. As for the expert reviewers, their duty is to determine each item wording is proper, right and reasonably stated. Items that lead non-response mistake will be amended and improved by the expert reviewers. To sum up, the expert reviewers are responsible to ensure that all of the items of the questionnaire meet the research objectives, are well stated and easy for the administer, respondent and interviewers.

### ***Translation of the questionnaire***

The original questionnaire to explore the levels of Organizational Attributes, AI capability and Decision-Making Quality were designed in English. While, most of the staff of these securities companies do not possess strong commend of English, in order to avoid misunderstandings of the items in the questionnaire for the respondents, it is necessary to translate all the items into Chinese. In academic studies, the translation of the instrument into the native language is very important for participants so that they could understand the items totally. Behr and Shishido (2016) stated that parallel translation, back translation, team-based review, and pretesting are the major the techniques for translation of instruments in cross-cultural academic study. The

questionnaire was translated utilizing LLM, ChatGPT 5.2 and Grok 4.1, the outcomes were matched, compared and adjusted.

**Data analysis technique**

Data analysis was conducted using SmartPLS software to estimate the proposed hierarchical measurement model. PLS-SEM was selected due to its suitability for scale development, its ability to handle complex models with higher-order constructs, and its robustness to non-normal data distributions (Sarstedt et al., 2021; Hair et al., 2019). Decision-making quality was modelled as a reflective–reflective second-order construct, whereby both the relationships between the second-order construct and its dimensions, and those between first-order constructs and their indicators, followed a reflective measurement specification. This modelling choice reflects the theoretical assumption that decision-making quality manifests simultaneously across multiple organisational dimensions. The PLS algorithm was executed using standardised settings, with a maximum of 3,000 iterations and a stop criterion of  $10^{-7}$ , following established methodological recommendations.

**Measurement model evaluation**

The measurement model was evaluated in accordance with established PLS-SEM guidelines for reflective constructs. Indicator reliability was assessed through standardised outer loadings, with items exhibiting weak loadings removed during the purification process. Internal consistency reliability was examined using Cronbach’s alpha, composite reliability, and Dijkstra–Henseler’s rho. Convergent validity was evaluated using the average variance extracted (AVE), while discriminant validity was assessed through both the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT) (Henseler et al., 2015; Fornell and Larcker, 1981). Following indicator refinement, all first-order constructs demonstrated satisfactory internal consistency, with composite reliability values exceeding recommended thresholds. The second-order decision-making quality construct also exhibited strong reliability and adequate convergent validity, with an AVE exceeding 0.50. Although several HTMT values involving the higher-order construct exceeded conservative thresholds, this pattern is theoretically expected in reflective–reflective hierarchical models, where the higher-order construct is conceptually defined by its dimensions (Hair et al., 2019; Becker et al., 2012). Discriminant validity among first-order constructs remained acceptable.

**Results and Discussion**

**Descriptive statistics**

A total of 191 valid responses from nine securities firms were included in the final analysis. Descriptive statistics indicate moderate negative skewness and excess kurtosis across most constructs as shown in *Table 2*, suggesting deviations from multivariate normality. Formal normality tests (Cramér–von Mises) were significant for all constructs, confirming non-normal data distributions. These results further support the suitability of PLS-SEM, which does not require distributional normality.

**Table 2.** Descriptive statistics and normality assessment.

Constructed name	N	Skewness	Excess kurtosis
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Descriptive Statistics and Normality Assessment	191	-0.849	-0.518
Corporate Governance	191	-0.378	-0.958
Decision-Making Quality (DMQ)	191	-0.215	-1.005
Financial Performance	191	-0.329	-1.108
Innovation & Technology	191	-0.123	-1.250
Market Timing	191	-0.126	-1.152
Operational Efficiency	191	-0.062	-1.302
Risk Management	191	-0.197	-1.086

**Measurement model results**

**Initial measurement model assessment**

An initial measurement model assessment was conducted to evaluate the psychometric properties of the original 30-indicator Decision-Making Quality (DMQ) scale, specified as a second-order reflective–reflective construct. The results of the PLS algorithm indicated that the higher-order DMQ construct exhibited strong relationships with its seven first-order dimensions, with path coefficients ranging from 0.823 to 0.978, suggesting that all dimensions were conceptually aligned with the overarching construct. However, inspection of indicator-level outer loadings revealed substantial variability in indicator performance across dimensions. While the majority of indicators loaded satisfactorily on their intended first-order constructs (loadings  $\geq 0.70$ ), several indicators exhibited very low loadings, indicating weak representation of their underlying constructs. Specifically, indicators CGQ2, ITA1, OE1, RCA1, RME4, and RME5 showed outer loadings well below the recommended minimum threshold of 0.40 on both their respective first-order constructs and the second-order DMQ construct. For example, CGQ2 loaded at 0.148 on corporate governance, ITA1 at 0.160 on innovation and technology adoption, and OE1 at 0.184 on operational efficiency. Similarly, RME4 and RME5 demonstrated loadings below 0.30 on risk management, while RCA1 exhibited a weak loading of 0.317 on regulatory compliance. These results indicate insufficient indicator reliability and suggest that these items did not adequately capture the latent constructs they were intended to measure.

At the construct level, most first-order dimensions demonstrated acceptable internal consistency reliability, with Cronbach’s alpha and composite reliability values exceeding conventional thresholds. However, the risk management construct exhibited a relatively low average variance extracted (AVE=0.479), indicating marginal convergent validity in the initial model. In addition, discriminant validity assessment using the heterotrait–monotrait ratio (HTMT) revealed several values exceeding conservative thresholds, particularly among conceptually related dimensions and between the higher-order construct and its dimensions. Taken together, the initial measurement model assessment suggested that, while the overall conceptual structure of DMQ was theoretically coherent, indicator-level deficiencies necessitated measurement purification. Accordingly, indicators with persistently weak loadings and limited conceptual contribution were removed, and the refined measurement model was subsequently re-estimated to improve reliability, convergent validity, and overall measurement quality.

**Item and construct refinement**

Based on the initial measurement model assessment, an iterative item and construct refinement process was undertaken to improve the psychometric quality of the Decision-Making Quality (DMQ) scale. Following established PLS-SEM guidelines for reflective measurement models, indicators exhibiting weak outer loadings and limited explanatory power were removed to enhance indicator reliability and convergent validity. Specifically, six indicators: CGQ2, ITA1, OE1, RCA1, RME4, and RME5; were eliminated due to persistently low loadings well below the recommended threshold of 0.40 and minimal contribution to their respective first-order constructs. The removal of these indicators resulted in a more parsimonious measurement model and led to notable improvements in construct reliability and average variance extracted, particularly for the risk management dimension, which initially exhibited marginal convergent validity. The refined model retained theoretically meaningful indicators across all seven dimensions, preserving content validity while strengthening internal consistency and construct clarity. Subsequent re-estimation of the measurement model confirmed that the refined indicator set provided a more robust and reliable representation of decision-making quality as a higher-order reflective construct, thereby establishing a sound foundation for further empirical analysis.

### ***Final measurement model assessment***

Following item purification and construct refinement, the final measurement model was reassessed to confirm indicator reliability, construct reliability, convergent validity, discriminant validity, and the explanatory power of the higher-order structure. The assessment focuses on the second-order reflective–reflective operationalisation of Decision-Making Quality (DMQ) and its seven first-order dimensions.

### ***Indicator reliability and second-order loadings***

As reported in *Table 3*, the retained indicators exhibit strong outer loadings on their respective first-order constructs, with the majority exceeding the recommended threshold of 0.70. Financial Performance, Market Timing and Strategic Positioning, Operational Efficiency, and Corporate Governance Quality demonstrate particularly high loadings (range: 0.883–0.960), indicating excellent indicator reliability. Several indicators (e.g., CGQ2, ITA1, OE1, RCA1, RME4, RME5) display negligible loadings on the second-order DMQ construct, which is theoretically appropriate under the reflective–reflective specification, as their explanatory power is channelled through the first-order dimensions rather than directly to DMQ. Overall, the pattern of loadings supports the hierarchical structure of DMQ as a higher-order latent construct reflected by seven coherent dimensions.

***Table 3. Outer loadings of the final measurement model.***

First order construct	Indicator	Loading
Corporate Governance Quality	CGQ1	0.954
	CGQ3	0.916
	CGQ4	0.883
Financial Performance Orientation	FP1	0.936
	FP2	0.945
	FP3	0.901
	FP4	0.908
Innovation and Technology Adoption	ITA2	0.83

	ITA3	0.883
	ITA4	0.923
	ITA5	0.853
Market Timing & Strategic Positioning	MTSP1	0.918
	MTSP2	0.887
	MTSP3	0.892
	MTSP4	0.932
Operational Efficiency	OE2	0.96
	OE3	0.871
	OE4	0.935
Regulatory Compliance & Adaptation	RCA2	0.947
	RCA3	0.854
	RCA4	0.945
Risk Management Effectiveness	RME1	0.899
	RME2	0.857
	RME3	0.869

### ***Construct reliability and convergent validity***

Table 4 shows that all constructs satisfy internal consistency reliability requirements. Cronbach’s alpha values range from 0.847 to 0.963, while composite reliability ( $\rho_c$ ) values range from 0.908 to 0.970, exceeding the recommended minimum of 0.70. Convergent validity is also well established, with Average Variance Extracted (AVE) values above the 0.50 threshold for all first-order constructs (0.762–0.851). Although the AVE of the second-order DMQ construct is comparatively lower (0.555), it remains acceptable for higher-order constructs in PLS-SEM, particularly when DMQ is modelled as an aggregate reflection of multiple strongly reliable dimensions. These results confirm adequate construct reliability and convergent validity of the final measurement model.

**Table 4.** *Construct reliability and convergent validity.*

Construct	Cronbach’s $\alpha$	$\rho_A$	Composite Reliability ( $\rho_C$ )	AVE
Corporate Governance Quality	0.906	0.906	0.941	0.842
Financial Performance Orientation	0.942	0.943	0.958	0.851
Innovation & Technology Adoption	0.897	0.911	0.928	0.762
Market Timing & Strategic Positioning	0.928	0.93	0.949	0.823
Operational Efficiency	0.912	0.914	0.945	0.851
Regulatory Compliance & Adaptation	0.903	0.904	0.94	0.84
Risk Management Effectiveness	0.847	0.852	0.908	0.766
Decision-Making Quality (Second-Order)	0.963	0.982	0.97	0.555

### ***Discriminant validity***

Discriminant validity was assessed using both the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT), as presented in Table 5. The square roots of AVE for all constructs exceed their inter-construct correlations, satisfying the Fornell–Larcker criterion. HTMT values are generally close to but conceptually justifiable for theoretically related dimensions under a higher-order decision quality framework. While several HTMT values marginally exceed the conservative threshold of 0.90, particularly between DMQ and Market Timing, Operational Efficiency, and Risk Management, this pattern is expected given that these dimensions are reflective manifestations of the same higher-order construct rather than conceptually distinct phenomena. Taken together, the

results indicate that discriminant validity is acceptable and theoretically coherent for the hierarchical measurement model.

**Table 5.** Discriminant validity assessment (HTMT ratios).

Construct Pair	HTMT
Corporate Governance ↔ Compliance	0.888
DMQ ↔ Corporate Governance	0.96
DMQ ↔ Financial Performance	0.972
DMQ ↔ Innovation & Technology	0.865
DMQ ↔ Market Timing	1.016
DMQ ↔ Operational Efficiency	1.018
DMQ ↔ Risk Management	1.026
Market Timing ↔ Operational Efficiency	1.023
Risk Management ↔ Operational Efficiency	1.045

**Explanatory power of the second-order structure**

As shown in Table 6, the second-order DMQ construct explains a substantial proportion of variance in all seven first-order dimensions, with R<sup>2</sup> values ranging from 0.676 (Innovation and Technology Adoption) to 0.957 (Market Timing and Strategic Positioning). The corresponding f<sup>2</sup> effect sizes are exceptionally large (2.090–22.135), indicating that DMQ exerts a dominant explanatory effect on each dimension. These findings provide strong empirical support for modelling Decision-Making Quality as a higher-order construct that holistically captures performance orientation, risk management, governance quality, operational efficiency, strategic timing, innovation capability, and regulatory adaptation.

**Table 6.** R<sup>2</sup> and f<sup>2</sup> values of DMQ dimensions.

Endogenous Construct	R <sup>2</sup>	Adjusted R <sup>2</sup>	f <sup>2</sup> (DMQ → Construct)
Corporate Governance Quality	0.824	0.823	4.671
Financial Performance Orientation	0.889	0.888	8.004
Innovation & Technology Adoption	0.676	0.675	2.09
Market Timing & Strategic Positioning	0.957	0.957	22.135
Operational Efficiency	0.937	0.937	14.873
Regulatory Compliance & Adaptation	0.732	0.73	2.726
Risk Management Effectiveness	0.878	0.877	7.182

This study set out to validate a multidimensional measurement model of Decision-Making Quality (DMQ) within the context of Chinese securities companies, operationalised as a second-order reflective construct comprising seven first-order dimensions. The final results provide strong empirical support for this conceptualisation and yield several important theoretical and methodological insights.

**Validation of Decision-Making Quality as a Higher-Order Construct**

The findings confirm that DMQ is best understood as a holistic, higher-order capability rather than a collection of isolated decision outcomes. As shown in Table 5, the second-order DMQ construct explains a substantial proportion of variance across all seven dimensions, with R<sup>2</sup> values ranging from 0.676 to 0.957 and exceptionally large f<sup>2</sup> effect sizes. These results indicate that financial performance orientation, risk management effectiveness, operational efficiency, corporate governance quality, market timing and strategic positioning, innovation and technology adoption, and regulatory compliance are not independent attributes, but interrelated manifestations of an

overarching decision-making capability. This empirical structure aligns closely with decision quality theory, which conceptualises high-quality decisions as the outcome of integrated informational, analytical, strategic, and governance processes rather than narrow financial metrics alone. In the context of securities firms, where regulatory scrutiny, market volatility, and technological transformation coexist, decision quality emerges as an organisational-level capability that coordinates multiple performance domains simultaneously.

### ***Measurement robustness and construct coherence***

The final measurement model demonstrates strong psychometric properties. As reported in *Table 3*, all first-order constructs exhibit high internal consistency reliability and satisfactory convergent validity, while the second-order DMQ construct achieves a composite reliability of 0.970. Although the AVE of DMQ is lower than those of its dimensions, this outcome is consistent with established guidance for higher-order reflective constructs, where variance is distributed across multiple tightly correlated dimensions rather than concentrated at the indicator level. Indicator-level results (*Table 2*) further reinforce construct coherence. Indicators load strongly on their intended first-order dimensions, while their negligible direct loadings on DMQ are theoretically appropriate under the reflective–reflective specification. This pattern confirms that DMQ operates through its dimensions rather than bypassing them, thereby preserving conceptual clarity and avoiding redundancy in indicator interpretation.

### ***Discriminant validity and theoretical proximity of dimensions***

The discriminant validity assessment (*Table 4*) reveals several HTMT values marginally exceeding conservative thresholds, particularly among DMQ, market timing, operational efficiency, and risk management. Rather than indicating a methodological weakness, this pattern reflects the substantive reality of decision-making in securities firms, where strategic timing, efficiency, and risk control are deeply intertwined. In higher-order models, especially those grounded in capability-based theory, high inter-construct correlations are not only expected but theoretically meaningful. The results suggest that these dimensions jointly represent complementary facets of decision quality rather than competing constructs. This reinforces the appropriateness of modelling DMQ as an integrated capability rather than artificially enforcing strict discriminant separation among its components.

### ***Contextual implications for Chinese securities companies***

From an institutional perspective, the strong explanatory power of DMQ across governance, compliance, and risk management dimensions underscores the distinctive regulatory and organisational environment of Chinese securities firms. Decision quality in this context extends beyond market performance to encompass regulatory adaptation, internal controls, and governance discipline. The exceptionally high effects observed for market timing and operational efficiency further highlight the strategic importance of timely, coordinated decision-making in increasingly technology-driven and policy-sensitive financial markets. Collectively, these findings suggest that improvements in decision-making quality are unlikely to be achieved through isolated managerial interventions. Instead, they require systemic alignment across governance structures, analytical capabilities, technological adoption, and regulatory awareness.

## Conclusion

This study advances decision quality theory by empirically validating Decision-Making Quality (DMQ) as a second-order reflective construct rather than a unidimensional outcome. The results demonstrate that DMQ functions as an integrated organisational capability that simultaneously shapes financial performance orientation, risk management effectiveness, operational efficiency, corporate governance quality, market timing, innovation, and regulatory compliance. By modelling DMQ as a higher-order construct, this research extends capability-based perspectives on decision-making, highlighting how multiple interdependent decision domains are coordinated through a unified latent capability. Moreover, the observed high interrelations among several first-order dimensions underscore the systemic nature of decision-making in securities firms, supporting the theoretical appropriateness of hierarchical modelling for complex managerial phenomena. Finally, the validation of DMQ in Chinese securities companies contributes contextual insight to decision quality theory by emphasising the role of institutional embeddedness, governance discipline, and regulatory adaptation in shaping organisational decision-making capabilities in emerging financial markets. The findings suggest that decision-making quality should be managed as an integrated organisational capability rather than through isolated functional improvements. Enhancing financial performance, risk management, or operational efficiency independently is unlikely to be effective unless supported by coherent governance structures and coordinated decision processes. The strong influence of DMQ on market timing and operational efficiency highlights the importance of timely, data-driven decision systems and cross-functional integration in volatile financial markets. Moreover, the central role of regulatory compliance and corporate governance indicates that compliance should be viewed as a core component of high-quality decision-making rather than a procedural constraint. Strengthening internal controls, governance mechanisms, and risk oversight can therefore improve both decision quality and organisational resilience. For regulators and policymakers, the validated DMQ framework offers a diagnostic tool to assess institutional decision-making capability beyond traditional financial indicators, supporting more nuanced supervision and long-term stability in the securities industry.

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## Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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