MEASURING TO INNOVATE: HOW MANAGERS EVALUATE MANAGEMENT ACCOUNTING SYSTEMS AND GAUGE INNOVATION PERFORMANCE

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Abstract

This study aims to explore two core research questions through qualitative interviews: first, how companies evaluate the effectiveness of their management accounting reporting systems (MARS), and second, how enterprises measure their innovation performance. Building on foundational frameworks such as the Global Management Accounting Principles (GMAP) (American Institute of Certified Public Accountants [AICPA], & Chartered Institute of Management Accountants [CIMA], 2014), the research employs a qualitative multi-case study design, conducting semi-structured interviews with middle and senior managers from five companies across different industries, sizes, and ownership types. Data were analyzed using content analysis and a three-stage coding process. The findings reveal that companies evaluate MARS effectiveness through multi-dimensional criteria — timeliness, accuracy, decision-support capability, and user satisfaction — supported by a multi-level reporting structure encompassing strategic, operational, and execution layers. Regarding innovation performance measurement, the study identifies a diverse set of indicators, including new product launches, patents, return on research and development (R&D) investment, and process improvements, while noting that although independent or hybrid evaluation mechanisms are emerging, significant challenges persist in data integration and metric standardization. Theoretically, this study provides empirical evidence from a managerial perspective that enriches the conceptual framework linking management accounting with innovation performance. Practically, it offers practitioners a concrete framework for assessing MARS effectiveness and a valuable reference for building robust innovation performance measurement systems.

Keywords: Management Accounting Reporting System (MARS), Innovation Performance (IP), Qualitative Research, Performance Measurement, Effectiveness Evaluation

Authors' individual contribution: Conceptualization — Q.Z. and N.T.; Methodology — Q.Z. and N.T.; Formal Analysis — Q.Z.; Data Curation — Q.Z.; Writing — Original Draft — Q.Z.; Writing — Review & Editing — Q.Z. and N.T.; Supervision — A.A. and S.T.

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1. INTRODUCTION

Since the emergence of management accounting in the 1950s, there has been a growing demand for its application in the marketplace, particularly in relation to its roles in supporting decision-making and enhancing value creation. In an effort to promote the globalisation of best practices in management accounting and elevate the professional standing of the discipline, two of the world's leading accounting bodies — the Chartered Institute of Management Accountants (CIMA) in the United Kingdom and the American Institute of Certified Public Accountants (AICPA) — jointly released the Global Management Accounting Principles (GMAP) in October 2014 through their consortium, the Chartered Global Management Accountant (CGMA).

This landmark publication provides a comprehensive outline of the core principles of management accounting, the competency framework required for management accountants, key functional areas of practice, and the pivotal role of management accountants in driving organisational value from a global perspective. It also serves as a practical guide for the application of management accounting methods and the advancement of the profession.

Simultaneously, China's Ministry of Finance (Liu, 2025) issued the Guiding Opinions on Comprehensively Promoting the Construction of the Management Accounting System, proposing the development of a management accounting reporting framework with Chinese characteristics. According to Wang (2025), management accounting — viewed as an integrated system combining information support and management control — is of significant importance to China's stable economic development. It plays a vital role in optimising industrial structure and fostering enterprise-level innovation.

Innovation is widely recognized as a cornerstone of sustained competitive advantage in today's dynamic business environment (Alshehadeh et al., 2025; Tran Thi Lan & Le Thanh, 2025). However, the innovation process is inherently fraught with uncertainty and risk. The management accounting reporting system (MARS), as a vital information and control tool, plays a potentially crucial yet underexplored role in supporting innovation-related decision-making. While the link between management accounting and performance is established, a significant gap exists in the academic understanding of how companies concretely evaluate the effectiveness of their MARS and how they navigate the complexities of measuring innovation performance in practice, particularly within the Chinese context. This study aims to fill this gap by providing a nuanced, context-rich exploration of these two interconnected processes.

To achieve this aim, this study draws on theoretical insights from information systems and management control literature, particularly the GMAP (AICPA & CIMA, 2014), to frame the analysis of MARS effectiveness. A qualitative multi-case study methodology was employed, involving semi-structured interviews with 42 managers across five Chinese enterprises from diverse industries. The main findings reveal that firms assess MARS through a multi-dimensional framework — timeliness, accuracy, decision-support, and user satisfaction — supported by a multi-level reporting structure. Regarding innovation performance, the study identifies a portfolio of indicators and organizational models, while also highlighting persistent challenges such as data fragmentation and metric standardization. The significance of this research lies in its dual contribution: theoretically, it opens the "black box" of management practice, refining the conceptual framework governing the relationship between MARS and innovation; practically, it provides managers with an actionable framework for evaluating their reporting systems and a portfolio of indicators and organizational models for measuring innovation.

This paper is guided by the following research questions:

RQ1: How do companies evaluate the effectiveness of their management accounting reporting systems?

RQ2: How can enterprises measure their innovation performance?

The structure of this paper is as follows. Section 2 reviews the relevant literature on the evolving role of MARS, the measurement of innovation performance, and the linkages between the two, culminating in the identification of the research gap. Section 3 describes the qualitative multi-case study methodology, including sample selection, data collection through semi-structured interviews, and the three-stage coding process used for data analysis. Section 4 presents the key findings, structured around the two research questions. Section 5 discusses the theoretical and practical implications of the findings. Section 6 synthesizes the conclusions, acknowledges the limitations of the study, and proposes directions for future research.

2. LITERATURE REVIEW

2.1. The evolving role and effectiveness of management accounting reporting systems

Management accounting has evolved significantly from its traditional focus on cost control to a strategic role in decision-making and value creation. The 2014 GMAP established an international framework, while China's Ministry of Finance concurrently promoted a management accounting system with Chinese characteristics, highlighting its strategic importance (Liu, 2025). Research on MARS construction has expanded to include multiple perspectives: strategic management (Tang, 2015), value creation (Li, 2025), industry-finance integration (Chen, 2022), and digital intelligence (Liu & Gan, 2022).

A core function of MARS is to provide timely, accurate, and decision-relevant information to compensate for the lag of traditional financial reports. Scholars generally assess MARS's effectiveness through criteria such as timeliness, accuracy, decision-support capability, and user satisfaction. The system's value is realized through a multi-level reporting structure (strategic, operational, and execution layers) that facilitates comprehensive management control (Almasria et al., 2025). However, research on how managers concretely evaluate MARS effectiveness in practice, especially within the Chinese context, remains underdeveloped.

2.2. The measurement and influences on innovation performance

Innovation performance, central to sustaining competitive advantage, refers to the efficiency and effectiveness of innovation activities. It is a multi-dimensional construct, often measured through inputs (e.g., research and development [R&D] investment), processes, and outputs (e.g., patents, new products, market share) (Hagedoorn & Cloodt, 2003; Rija, 2024). Influencing factors are complex and multi-level, spanning from individual factors (e.g., managerial cognition, employee self-efficacy) and organizational factors (e.g., culture, structure, leadership) to external ecosystem factors (e.g., collaborative networks, open innovation, government policy) (Chenhall & Moers, 2015). Despite extensive research, the mechanisms through which these diverse factors integrate to drive innovation performance are not fully understood, indicating a need for more integrated theoretical frameworks.

2.3. Linking management accounting reporting systems and innovation performance

The literature suggests that MARS can have a substantial influence on innovation performance by reducing the inherent uncertainty associated with innovation. MARS achieves this by systematically processing both internal and external information, thereby narrowing the information gap for decision-makers and enabling more informed strategic choices (Mihret et al., 2022). Additionally, it supports the rational allocation of scarce resources, providing computational insights that enhance cost control and ensure the economic viability of innovation projects (Cao et al., 2021). Beyond these traditional functions, modern MARS also plays a catalytic role in fostering innovation, actively stimulating creative thinking and the development of new business models by offering novel calculative logics and managerial insights (Gomez-Conde et al., 2023; Comite et al., 2025).

A sophisticated MARS capability can thus be a source of sustainable competitive advantage (Bedford et al., 2016). However, a significant research gap persists. While the strategic importance of MARS is acknowledged, there is a scarcity of in-depth, qualitative studies that explicitly investigate how the application of MARS — particularly as evaluated by managers using concrete criteria — interacts with and supports the processes of measuring and achieving innovation performance. This is especially true in the Chinese context, where institutional frameworks and market conditions differ from the Western contexts that have dominated existing research. This study aims to fill this gap by exploring the interplay between MARS effectiveness and innovation performance measurement from a managerial perspective.

2.4. Identified research gap

While the existing literature provides a solid foundation, a distinct and important research gap remains. There is a scarcity of in-depth, qualitative studies that explicitly and simultaneously investigate how managers evaluate the effectiveness of their MARS using concrete, practical criteria, and how these perceived effective MARS subsequently interact with and support the complex processes of measuring and achieving innovation performance. The specific mechanisms by which the informational and control properties of MARS — evaluated on dimensions like timeliness and decision-support — enable a more robust and effective innovation performance measurement system are not well understood. This gap is particularly pronounced in the Chinese context, where institutional frameworks, market conditions, and the stage of management accounting development differ substantially from the Western contexts that have dominated existing research. Therefore, this study aims to fill this void by conducting a qualitative multi-case study to explore the interplay between MARS effectiveness and innovation performance measurement from the grounded perspective of practicing managers.

3. METHODOLOGY

3.1. Research design

This study employed a qualitative research approach, utilizing in-depth, semi-structured interviews as the primary method of data collection. This design was selected for its capacity to generate rich, contextual insights into complex organizational phenomena — specifically, how managers perceive, evaluate, and utilize MARS in the context of innovation performance. A multi-case study framework was adopted, involving five companies, to allow for a comparative analysis across diverse organizational settings and to enhance the theoretical transferability of the findings.

While a qualitative multi-case study approach was deemed most appropriate for exploring the "how" and "why" questions central to this research, several alternative methods could also be suitable for investigating the relationship between MARS and innovation performance. A quantitative survey-based approach, for instance, would enable researchers to test hypotheses derived from this study's findings on a larger scale, statistically validating the relationships between specific MARS characteristics (e.g., timeliness, accuracy) and innovation performance metrics. Alternatively, a pure grounded theory approach, without a pre-defined case study framework, could be employed to generate an entirely new theory from the data, though this might sacrifice some of the comparative insights gained from the multi-case design. Experimental or quasi-experimental designs, while challenging to implement in real-world organizational settings, could offer stronger causal inferences about the impact of specific MARS features on managerial decision-making in innovation contexts. Finally, a longitudinal case study of a single organization could provide deeper insights into how MARS and innovation measurement systems co-evolve over time, complementing the cross-sectional snapshot offered by the current multi-case design. The choice of the multi-case study method was therefore a strategic decision to balance depth, comparability, and the generation of practically relevant, contextually grounded insights.

3.2. Sample selection and data collection

A purposive sampling strategy was implemented to ensure the research captured a wide spectrum of perspectives and practices. The selection criteria were designed to maximize variation and strengthen the generalizability of the results.

Industry diversity: Companies were selected from five key sectors: 1) manufacturing, 2) information technology (IT), 3) services, 4) biomedicine, and 5) new energy. This range covers both traditional and high-innovation industries.

Firm heterogeneity: The sample included firms of varying sizes (small, medium, and large) and different ownership types (state-owned, privately held, joint ventures, and foreign-funded) to account for the influence of organizational context on MARS application.

Managerial perspectives: Participants were drawn from multiple hierarchical levels, including financial directors, chief financial officers (CFOs), general managers, and R&D managers. This ensured that the data reflected a combination of strategic oversight (from senior financial and general management) and operational reality (from R&D and financial managers), providing a holistic view of the MARS innovation interface.

In total, 42 mid-to-senior-level managers were interviewed (as shown in Table 1). All interviews were conducted one-on-one, lasting between 30 and 60 minutes each. They were audio-recorded and subsequently transcribed verbatim, yielding approximately 50,000 words of textual data for analysis.

Table 1. Basic information about interviewees

Enterprise code	*Sector*	*Type of ownership*	*Enterprise size*	*No. of interviews*	*Respondent's position*
A	Service industry	Government owned	Mega	10	General manager, finance director, finance manager (2), R&D manager (3), chief accountant, management accountant, cost accountant
B	IT	Privately run (i.e., by a company, not the state)	Medium-sized	8	General manager, CFO, finance manager, R&D manager (2), budget accountant, financial accountant (2)
C	Biomedical	Foreign capital	Mega	10	General manager, CFO, finance manager (2), R&D manager (2), budget accountant, financial accountant (2)
D	New energy	Privately run (i.e., by a company, not the state)	Medium-sized	8	General manager, finance director, finance manager, R&D manager, management accountant, budgetary accountant, financial accountant (2)
E	Services sector	Joint venture	Small	6	General manager, finance director, finance manager, R&D manager, budget accountant, financial accountant

3.3. Interview protocol design

To ensure scientific rigor, a semi-structured interview outline was developed around the core research question: "How does the application of management accounting reporting affect firms' innovation performance?" The protocol was designed based on principles of logical progression, multi-dimensional coverage, and mixed question types.

The interview guide was organized into six thematic sections:

A. *Introduction and background*: Understanding the interviewee's role and organizational context.

B. *Structure and application of MARS*: Exploring the composition, frequency, and practical usage of reports.

C. *Effectiveness of MARS*: Investigating the criteria and mechanisms used to evaluate MARS.

D. *Innovation performance measurement*: Examining how innovation is defined, measured, and linked to MARS.

E. *Challenges and improvements*: Identifying key difficulties and potential enhancement strategies.

F. *Overall assessment and suggestions*: Gathering final insights and future outlooks.

This structured yet flexible approach ensured comprehensive coverage of key topics while allowing interviewees the freedom to elaborate on pertinent issues.

3.4. Data analysis

The interview data were subjected to a systematic content analysis process, following a rigorous three-stage coding procedure grounded in the methodology of Strauss and Corbin (1998):

- Open coding: The transcribed texts were analyzed line-by-line to identify initial concepts and their properties. This inductive process involved labeling discrete phenomena found in the data (e.g., "timeliness", "strategic-level reports", "patent grants").
- Axial coding: Relationships among the open codes were identified and grouped into higher-order categories and subcategories (e.g., "effectiveness evaluation criteria", "reporting system structure", "innovation performance indicators"). This stage focused on understanding the interplay between the identified concepts.
- Selective coding: The analysis progressed to integrate and refine the categories around a central, core theme — "The role of MARS in supporting and measuring sustainable innovation performance". This process culminated in a coherent theoretical framework that explicates the relationships between the key constructs under investigation.

The coding was supported by the use of NVivo software to manage the extensive qualitative dataset efficiently.

3.5. Research ethics and implementation context

This study was conducted in China between March 2024 and September 2024. The timing was chosen to capture the evolving post-pandemic economic recovery dynamics, a period when Chinese enterprises were increasingly focused on innovation-driven growth and the optimization of internal management systems to navigate a complex and competitive market environment. Geographically, the focus on China was deliberate, given the country's unique institutional context, including the Ministry of Finance's ongoing push for management accounting system construction (Li, 2025), and the relative scarcity of qualitative research on MARS and innovation performance in non-Western settings.

Strict ethical protocols were followed throughout the research process to ensure the integrity and credibility of the findings:

• Informed consent: Prior to each interview, participants were provided with a detailed information sheet explaining the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without consequence. Written consent was obtained from all 42 participants before data collection commenced.

• Anonymity and confidentiality: To protect participant identities and encourage candid responses, all personal identifiers were removed during transcription. Participants are referred to in this paper only by their job titles and company codes (e.g., "CFO, Company A"). Company names have been anonymized, and any potentially identifying details (e.g., specific project names) were generalized or omitted. All data were stored on password-protected devices accessible only to the research team.

• Impartiality and objectivity: Several measures were implemented to minimize researcher bias. The semi-structured interview protocol was designed with open-ended questions to avoid leading participants. During the coding process, inter-coder reliability checks were conducted, with two researchers independently coding a subset of the transcripts and discussing discrepancies until consensus was reached. Additionally, findings were triangulated across multiple sources (e.g., financial managers and R&D managers within the same company) to verify consistency and reduce the risk of single-respondent bias. The research team maintained a reflexive stance throughout, documenting their own assumptions and regularly challenging interpretations to ensure that the findings genuinely reflected participant perspectives rather than preconceived notions.

4. FINDINGS

4.1. Current status of the application of management accounting reporting

Based on the results of data coding, it was found that MAR is widely applied across enterprises and demonstrates the following key characteristics.

A well-structured reporting system covered strategic, operational, and execution levels. The coding results indicate that most enterprises have established a comprehensive, multi-tiered management accounting reporting system that spans all levels of management — from strategic planning to operational oversight and execution monitoring. Table 2 illustrates this three-tier reporting structure, highlighting the distinct focus, time horizon, and primary audience of each level.

Table 2. Basic information about interview subjects

Level	*Primary focus*	*Time horizon*	*Example reports*	*Primary audience*
Strategic level	Long-term direction, resource allocation, competitive positioning	Annual/quarterly	Three-year strategic planning report, technology roadmap assessment report, capital allocation report	Senior management (CEO, board, CFO)
Operational level	Performance monitoring, efficiency improvement, cost control	Monthly	Monthly operational analysis report, cloud service cost breakdown, project progress report	Middle management (department heads, project managers)
Execution level	Real-time process control, immediate issue detection and response	Daily/real-time	Daily production line loss report, daily service efficiency report	Front-line supervisors (workshop directors, team leaders)

4.1.1. Strategic-level reports

For instance, the CFO of Group A mentioned that the group's "Three-Year Strategic Planning Report" provides high-level decision-making support for senior management, helping to guide the overall direction of business development. Meanwhile, the general manager of Company D stated that reports such as the "Technology Roadmap Assessment Report" typically include market trend analysis, competitor benchmarking, and strategic investment assessments, enabling companies to formulate well-informed and forward-looking long-term strategies.

"*We use a three-tier reporting system, with the top tier being strategic reports (annual/quarterly): 'Three-Year Strategic Planning Report' — which includes scenario simulations, such as response plans for a 10% increase in raw material prices; 'Capital Allocation Report' — last year, we used this report to cut two loss-making business lines*" (personal communication, CFO, Group A, March 2024).

"*We designed a three-tier reporting system tailored to the characteristics of the new energy industry, such as the strategic level (annual/quarterly): 'Technology Pathway Assessment Report' — comparing the 10-year cost-benefit analysis of different technology pathways, such as abandoning excessive investment in lithium iron phosphate last year based on this report*" (personal communication, General Manager, Company D, June 2024).

4.1.2. Operational-level reports

For instance, the CFO of Company B stated that the "cloud service cost breakdown" they use, as well as the "monthly operational analysis report" recommended by the general manager of Company C, are useful for monitoring daily operational performance and identifying deviations from expected targets in a timely manner. These reports focus on areas such as cost control, efficiency improvement, and risk management, providing key data support for daily decision-making and operational adjustments.

"*We designed a 'four-dimensional' reporting framework: 'Cloud Service Cost Breakdown': AWS/Azure spending broken down to each customer instance. Based on this, we optimized resource scheduling last month and saved 370,000 yuan*" (personal communication, CFO, Company B, April 2024).

"*Our management accounting report system is divided into three levels: 'Monthly Operational Analysis Report', 'Project Progress Report', etc. These reports help management monitor business progress, identify issues promptly, and adjust strategies*" (personal communication, General Manager, Company C, May 2024).

4.1.3. Execution-level reports

For instance, the CFO of Group A noted that the group's "Daily Production Line Loss Report" focuses on specific operational processes to ensure the effective execution of both strategic and operational objectives. Similarly, the general manager of Company E stated that their "Daily Service Efficiency Report" provides real-time data monitoring, anomaly detection, and rapid decision-making support, enabling the firm to optimise particular business activities and enhance overall operational efficiency.

"*The 'Daily Production Line Loss Report' in the executive layer report can be directly pushed to the workshop director's mobile phone*" (personal communication, CFO, Group A, March 2024).

"*Our reporting system is divided into three layers: the 'Daily Service Efficiency Report' in the executive layer report can monitor the service response time of front-line teams*" (personal communication, General Manager, Company E, August 2024).

A high level of system integration significantly enhances data processing and analytical capabilities, thereby improving the effectiveness of managerial decision-making. Coding results reveal that the CFO of Group A noted that the company is actively leveraging advanced information systems to support the generation, integration, and analysis of management accounting reports. Similarly, the finance director of Company D stated that they are piloting blockchain technology, as such a high degree of system application greatly improves the timeliness, accuracy, and efficiency of data processing.

Group A has built a financial data middle platform to integrate multi-source data and enhance data processing capabilities.

Company D is piloting blockchain technology to improve the level of data automation processing. The application of these systems has significantly improved the efficiency and accuracy of management accounting report generation, providing strong support for corporate decision-making.

4.2. Evaluating the effectiveness of management accounting reporting systems (*RQ1*)

The analysis of interview data revealed a sophisticated and multi-faceted approach to evaluating MARS effectiveness within the sampled enterprises. The findings indicate that managers do not rely on a single metric but instead assess their reporting systems through an integrated framework encompassing structural, qualitative, and technological dimensions.

4.2.1. Multi-level reporting structure

A consistent finding across all five companies was the implementation of a comprehensive, multi-tiered reporting architecture designed to serve distinct managerial functions. This structure ensures that information is tailored to the specific decision-making needs at different organizational levels.

At the strategic level, reports are characterized by their long-term orientation and focus on macro-level analysis. For instance, the CFO of Group A emphasized the value of their "Three-Year Strategic Planning Report", which includes scenario simulations, such as "*response plans for a 10% increase in raw material prices*" (personal communication, March 2024). Similarly, the general manager of Company D highlighted their "Technology Roadmap Assessment Report", which involves "*comparing the 10-year cost-benefit analysis of different technology pathways*" (personal communication, June 2024), illustrating how strategic MARS informs fundamental directional choices.

The operational level reports bridge strategic goals with daily management, focusing on performance monitoring and efficiency. The CFO of Company B described their "cloud service cost breakdown", which provides granular data such as "*AWS/Azure spending broken down to each customer instance*" (personal communication, April 2024), enabling precise cost optimization. The general manager of Company C noted that their "Monthly Operational Analysis Report" helps management "*monitor business progress, identify issues promptly, and adjust strategies*" (personal communication, May 2024), demonstrating the role of MARS in maintaining operational alignment with strategic objectives.

At the execution level, reports provide real-time, granular data for immediate operational control. The CFO of Group A pointed out that their "Daily Production Line Loss Report" is "*directly pushed to the workshop director's mobile phone*" (personal communication, March 2024), enabling instant response to production issues. This tiered structure ensures that critical information flows efficiently from the shop floor to the boardroom, supporting coherent decision-making throughout the organization.

4.2.2. Multi-dimensional evaluation criteria

Beyond structural considerations, managers evaluated MARS quality using four interconnected criteria that reflect both the technical attributes of the reports and their practical utility.

Timeliness emerged as a critical factor, particularly in fast-moving industries. The general manager of Company E provided a compelling example: "*E Company's 'Customer Churn Analysis Report' was generated in a timely manner, helping the company improve its after-sales service process and increase customer retention by 15%*" (personal communication, August 2024). This demonstrates how the speed of information delivery can directly impact business outcomes and competitive responsiveness.

Accuracy was universally emphasized as the non-negotiable foundation of credible reporting. The CFO of Company D stated unequivocally that: "*The data in Company D's 'Battery Recycling Business Feasibility Report' is accurate, providing a reliable basis for company decision-making and avoiding decision-making errors caused by data errors*" (personal communication, July 2024). This highlights managers' recognition that even the most sophisticated reporting structure is worthless without data integrity.

The decision-support degree criterion reflects how MARS translates data into actionable insights. Finance manager 2 of Company C explained how their "*R&D Expenditure Capitalization Manual standardizes the handling of research and development expenditures, providing management with clear information on research and development costs and supporting research and development decisions*" (personal communication, May 2024). This illustrates how MARS can institutionalize knowledge and provide structured guidance for complex managerial judgments.

User satisfaction served as the ultimate barometer of system effectiveness. The general manager of Company B noted that "*Company B was satisfied with the 'Customer Acquisition Cost Analysis' report, which helped the company optimize its marketing strategy and improve marketing efficiency*" (personal communication, April 2024). This criterion captures the practical usability and perceived value of the reports among their primary consumers, bridging the gap between technical quality and real-world utility.

4.2.3. System integration and data capability

The technological foundation of MARS emerged as a critical enabler of its effectiveness. Companies are increasingly leveraging advanced digital platforms to enhance their reporting capabilities. The CFO of Group A described how they "*built a financial data middle platform to integrate multi-source data and enhance data processing capabilities*" (personal communication, March 2024). Similarly, the finance director of Company D revealed that they are "*piloting blockchain technology to improve the level of data automation processing*" (personal communication, July 2024).

These technological investments significantly enhanced what we term the informational-processing capacity of MARS — the system's ability to collect, process, and disseminate high-quality information efficiently. This capacity directly supports what the data reveals as the three core mechanisms through which MARS enables innovation: resource allocation, risk assessment, and performance incentives. For example, the R&D manager of Group A reported using "*project input-output analysis report to shift resources from inefficient projects to efficient ones*" (personal communication, March 2024), demonstrating how robust data processing enables optimal resource allocation for innovation.

4.3. Measuring innovation performance (*RQ2*)

The analysis of interview data reveals that enterprises are increasingly recognising the importance of establishing systematic approaches to evaluate innovation performance, though the depth, structure, and implementation vary significantly across organisations. Drawing on the results of open and axial coding, this section explores how firms define, operationalise, and manage innovation performance assessment within their organisational contexts.

4.3.1. Establishment of innovation performance evaluation systems

Across the five interviewed enterprises, most firms have developed some form of innovation performance evaluation mechanism, though their scope and formalisation levels differ. Group A and Company C have implemented independent innovation evaluation systems that function parallel to or partially integrated with financial performance systems. These systems are typically governed by cross-functional teams — primarily involving the R&D and finance departments — who jointly define evaluation criteria, collect data, and generate performance reports.

Integrating innovation performance indicators into management accounting practices enables organisations to more effectively monitor and evaluate their R&D outcomes. For example, the chief accountant of Group A reported that they have established a dual-track system in which both financial and innovation key performance indicators (KPIs) are monitored concurrently, with the Innovation Office and Finance Team jointly conducting quarterly reviews. Similarly, the finance manager 1 of Company C noted that in their biopharmaceutical projects, R&D effectiveness is assessed through a dedicated innovation scorecard, which includes indicators such as trial success rates, patent outcomes, and speed to market.

"*We established a dual-track system. Financial and innovation KPIs are monitored concurrently. The Innovation Office and Finance Team co-manage the review process every quarter*" (personal communication, Chief Accountant, Group A, March 2024).

"*In our biopharmaceutical projects, R&D effectiveness is reviewed using a separate innovation scorecard, covering trial success rates, patent outcomes, and speed to market*" (personal communication, Finance Manager 1, Company C, May 2024).

On the other hand, smaller and medium-sized businesses, like Companies D and E, are more likely to use less formal, project-specific methods for

reporting on innovation. Companies don't usually have separate systems for keeping track of innovation efforts. Instead, they rely on regular performance meetings or cost-benefit assessments that are part of their overall management accounting reporting methods.

4.3.2. Signs used to measure how well innovation is working

The interview results show that businesses use a wide range of indicators to measure the success of their innovations. These indicators have both quantitative and qualitative parts, and the choice of which ones to use is typically based on things like the company's industry, the type of innovation initiative, and larger strategic goals. Some of the most common measures are:

- New product development indicators, such as how many new items are released and how much of the company's revenue comes from these new products.
- Intellectual property measures: the number of patent applications, trademark registrations, and license agreements.
- Financial metrics: returns on R&D investments or savings from process innovation.
- Market-related results: changes in market share or getting new customers because of new items.
- Improvements in processes: shorter manufacturing cycles, fewer defects, or less resource use.

People usually compare these indicators to either internal strategy goals or industry standards. For instance, Company B, which works in the IT industry, uses time-to-market and user feedback as important performance indicators, in line with the fast pace of innovation in that field. Company D, which works with renewable energy, puts greater weight on figuring out if something is technically possible and how much money it will save in the long run.

Keep track of how well their innovation activities are working and make changes as needed by setting clear and measurable innovation indicators. The R&D manager of Company D said that success can be measured by a number of things, such as getting patents approved, validating prototypes, and figuring out the internal rate of return. The way the market responds to these things is another way to validate success. The general manager of Company B stated that they regularly monitor product launch dates and adoption rates. If new software modules don't meet user engagement goals within the first month, they are swiftly redesigned.

"*We assess innovation success based on patent grants, prototype approval, and internal rate of return. Market reaction is considered later-stage validation*" (personal communication, R&D Manager, Company D, June 2024).

"*We track launch cycles and app adoption rates. If a new module doesn't meet user engagement targets in 30 days, it's flagged for redesign*" (personal communication, General Manager, Company B, April 2024).

4.3.3. Responsibility and data sources for innovation performance measurement

The responsibility for innovation performance data collection and reporting varies depending on organisational size and maturity. In larger enterprises such as Group A and Company C, this function is typically shared between R&D and finance departments. R&D is responsible for collecting technical and output-related data (e.g., test results, product specs, design improvements), while finance verifies and integrates this information into formal reports.

In smaller firms, innovation performance data is often collected on a project basis, usually by the department initiating the innovation, with finance providing support for budgeting and cost verification. This decentralised approach, while flexible, may lead to inconsistencies in measurement standards.

Effective innovation performance monitoring requires systematic data sharing and coordination between departments. In Company C, for example, the budget accountant noted that the R&D team uploads project KPIs to a shared dashboard, which is reviewed by the finance department prior to each quarterly innovation board meeting. In contrast, the finance director of Company E pointed out that their innovation data remains fragmented, and updates often depend on project managers providing information during review meetings.

"*Our R&D team uploads project KPIs to a shared dashboard, which finance reviews before the quarterly innovation board meeting*" (personal communication, Budget Accountant, Company C, May 2024).

"*Innovation data is scattered. Sometimes we rely on project managers to provide updates in review meetings*" (personal communication, Finance Director, Company E, August 2024).

4.3.4. Frequency and review mechanisms

Innovation performance is typically reviewed on a quarterly or semi-annual basis, depending on the enterprise's innovation cycle. High-tech firms with fast iteration cycles (e.g., Company B) tend to evaluate innovations more frequently and adjust metrics dynamically. In contrast, capital-intensive sectors like energy or biomedicine (e.g., Companies C and D) rely on longer-term performance indicators and milestone-based assessments.

Furthermore, several firms mentioned integrating innovation results into strategic planning or incentive mechanisms. Performance reviews inform project continuation decisions, R&D budget allocations, and talent recognition schemes.

Linking innovation performance to organisational planning and staff evaluation enhances the strategic alignment and accountability of R&D activities. For example, the finance director of Company D stated that successful innovations are documented in the quarterly innovation portfolio review, which directly informs the following year's budget planning. Likewise, the R&D director of Company A noted that they assign points based on R&D impact scorecards, which form part of the annual performance appraisals for technical teams.

"*Successful innovations are documented in the quarterly innovation portfolio review, which feeds into next year's budget planning*" (personal communication, Finance Director, Company D, July 2024).

"*We award points based on R&D impact scorecards, which are part of annual appraisals for our technical teams*" (personal communication, R&D Director, Company A, March 2024).

4.3.5. Key challenges

Despite varied approaches to innovation measurement, several common challenges emerged across the sample:

- Systemic fragmentation posed a fundamental obstacle to comprehensive innovation assessment. The finance director of Company E's observation that "*innovation data is scattered*" (personal communication, August 2024) was echoed across multiple interviews, indicating that information silos remain a persistent barrier to holistic innovation management.
- Metric standardization challenges were particularly acute for organizations operating across multiple business units or geographic locations. As companies expand, the lack of consistent innovation metrics complicates performance comparison and strategic portfolio management.
- Temporal misalignment between innovation cycles and reporting periods created significant measurement difficulties. The general manager of Company C articulated this challenge eloquently: "*It's hard to evaluate innovation in a one-size-fits-all way. Breakthroughs in research may take years to materialize*" (personal communication, May 2024). This highlights the inherent tension between the long-term nature of meaningful innovation and the short-term orientation of conventional performance management systems.
- Integration gaps between innovation metrics and mainstream financial reporting limited the strategic impact of innovation measurement. Many organizations continued to treat innovation assessment as a separate stream rather than integrating it into core management processes, reducing its influence on resource allocation and strategic direction.

These findings collectively paint a picture of organizations navigating the complex terrain of innovation measurement with diverse tools and approaches, while grappling with common structural and cultural barriers that limit the effectiveness of their assessment systems.

5. DISCUSSION

5.1. Interpretation of key findings

This study set out to explore how managers evaluate the effectiveness of their MARS and how enterprises measure innovation performance. The findings reveal a sophisticated, multi-dimensional approach to both processes, underscoring the intricate relationship between information quality and innovation management.

Regarding the first research question (*RQ1*), the findings demonstrate that managers assess MARS effectiveness through an integrated framework comprising structural, qualitative, and technological dimensions. The multi-level reporting structure (strategic, operational, execution) ensures that information is tailored to distinct decision-making needs, while the four evaluation criteria — timeliness, accuracy, decision-support capability, and user satisfaction — provide a holistic assessment of system quality. This finding extends prior research by Chen (2022) and Liu and Gan (2022), who emphasized the technical aspects of MARS construction, by revealing the specific criteria managers use in practice to judge system value. The emergence of user satisfaction as a key criterion is particularly noteworthy, as it shifts the focus from system outputs to user perceptions, aligning with insights from information systems success literature (Delone & McLean, 2003).

Regarding the second research question (*RQ2*), the findings reveal that innovation performance measurement is a "diverse hybrid" practice, varying significantly across organizations in terms of indicator selection, organizational responsibility, and review mechanisms. The identified indicators span output metrics (e.g., new products, patents), financial metrics (e.g., return on R&D investment), process metrics (e.g., cycle time reduction), and market metrics (e.g., market share gains). This multi-dimensionality echoes the work of Hagedoorn and Cloodt (2003), who argued for the use of multiple indicators to capture the complexity of innovation. However, this study extends their work by providing contextualized evidence of how these indicators are operationalized in practice, and by highlighting the organizational arrangements (e.g., dual-track systems, cross-functional teams) that support their implementation.

5.2. Comparison with existing literature

The findings of this study both align with and extend existing literature on management accounting and innovation performance.

Consistent with prior research, this study confirms the strategic importance of MARS in supporting decision-making and value creation (AICPA & CIMA, 2014; Wang, 2025). The multi-level reporting structure observed across the five companies reflects the principles outlined in the GMAP, demonstrating their practical relevance in the Chinese context. Similarly, the emphasis on timeliness and accuracy as core evaluation criteria resonates with the foundational role of MARS in compensating for the lag of traditional financial reports (Cao et al., 2021).

However, this study also reveals several nuances that extend existing knowledge. First, while prior research has often treated MARS effectiveness as a technical or design issue (Tang, 2015; Li, 2025), this study highlights the importance of user satisfaction as a complementary evaluation criterion, suggesting that system effectiveness is ultimately determined by its perceived usefulness among managers. Second, the study provides empirical evidence of the specific mechanisms through which MARS supports innovation — resource allocation, risk assessment, and performance incentives — thereby opening the "black box" of the MARS-innovation relationship that previous studies have called for (Mihret et al., 2022; Gomez-Conde et al., 2023).

Regarding innovation performance measurement, this study confirms the multi-dimensional nature of the construct (Hagedoorn & Cloodt, 2003) and the influence of contextual factors such as industry and firm size on indicator selection (Chenhall & Moers, 2015). However, it also identifies persistent challenges — systemic fragmentation, metric standardization, temporal misalignment, and integration gaps — that have received limited attention in prior literature. These challenges highlight the gap between theoretical frameworks and practical implementation, suggesting a need for more actionable guidance for organizations navigating the complexities of innovation measurement.

5.3. Explanation of findings

Several factors explain these patterns. The emphasis on multi-level reporting structures reflects increasing organizational complexity, necessitating tiered approaches that balance strategic oversight with operational responsiveness. The prominence of user satisfaction as an evaluation criterion aligns with the shifting role of management accounting from a compliance-oriented function to a strategic partner, consistent with Chenhall and Moers' (2015) "information provision perspective". The diversity in innovation measurement practices stems from the inherent heterogeneity of innovation activities, which resist standardization and require context-adapted approaches.

6. CONCLUSION

This study explored two research questions through a qualitative multi-case study of five Chinese enterprises. Regarding *RQ1*, companies evaluate MARS effectiveness through a multi-dimensional framework: structurally (strategic, operational, execution levels), qualitatively (timeliness, accuracy, decision-support, user satisfaction), and technologically (system integration and data processing capabilities).

Regarding *RQ2*, innovation performance measurement is a context-dependent practice characterized by diverse indicators (output, financial, process, market metrics) and organizational arrangements (from dual-track systems to project-based assessments). Common challenges persist, including systemic fragmentation, metric standardization difficulties, temporal misalignment, and integration gaps between innovation metrics and financial reporting.

This study makes several theoretical contributions to the literature on management accounting and innovation performance.

First, it refines the conceptualization of MARS effectiveness by identifying the specific criteria managers use in practice — timeliness, accuracy, decision-support capability, and user satisfaction — thereby operationalizing abstract constructs of information and system quality in the context of management accounting.

Second, it expands the theoretical understanding of MARS in innovation management by demonstrating that MARS functions not merely as a passive information provider but assumes three additional critical roles: as a value assessor (enabling self-evaluation of the reporting system), as a process enabler (facilitating resource allocation, risk assessment, and performance incentives), and as a strategic integrator (bridging financial and innovation metrics).

Third, it provides empirical evidence of the mechanisms linking MARS to innovation performance, addressing a gap identified in prior literature (Mihret et al., 2022; Gomez-Conde et al., 2023). By revealing how informational-processing capacity enables resource reallocation, risk mitigation, and performance-based incentives, the study opens the "black box" of the MARS-innovation relationship.

Fourth, it contributes to the innovation measurement literature by providing contextualized evidence of how organizations operationalize multi-dimensional innovation constructs in practice, and by identifying the persistent challenges that limit the effectiveness of current approaches.

For practitioners, this study offers several actionable frameworks and recommendations:

MARS self-assessment framework: Managers can utilize the four key criteria (timeliness, accuracy, decision-support, user satisfaction) as a practical checklist for evaluating and improving their reporting systems, with the multi-level structure providing guidance for comprehensive coverage across organizational levels.

Innovation measurement portfolio: The identified indicators — spanning output, financial, process, and market metrics — provide a reference portfolio that organizations can adapt based on their industry context and strategic priorities. The study also highlights the importance of combining quantitative metrics with qualitative insights to capture the full complexity of innovation performance.

Organizational models for innovation assessment: The continuum of approaches observed — from independent dual-track systems to integrated project-based assessments — offers models that organizations at different stages of maturity can emulate. The study emphasizes the importance of cross-functional collaboration between R&D and finance functions in designing and implementing effective innovation measurement systems.

Specific improvement pathways: The findings suggest several concrete improvement avenues, including: building integrated digital platforms to overcome data fragmentation; developing standardized innovation metrics while allowing for contextual adaptation; implementing milestone-based evaluations to address the time-lag challenge; and enhancing cross-departmental training to improve collaboration between R&D and finance functions.

This study has several limitations. The sample of five companies, while diverse, limits generalizability. The focus on Chinese enterprises may limit transferability to other institutional contexts. The cross-sectional design does not capture system evolution over time. Reliance on self-reported data may be subject to bias.

Future research should pursue quantitative validation of measurement scales, cross-national comparative studies, longitudinal investigations of system evolution, exploration of technology integration (artificial intelligence, blockchain), and sustainability integration into innovation measurement frameworks.

In conclusion, this research underscores that innovation excellence is closely tied to information excellence. By strengthening MARS foundations, organizations can enhance their capacity to measure, manage, and maximize innovation performance.

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